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Date: April 1, 2021
Our Ref: 30064362
Subject: Groundwater Investigation Work Plan Revision 1 Submission
Former Texaco Research Center Site, Site No. 3-14-004
Town of Fishkill, Dutchess County

Dear Mr. Bennett,

On behalf of Chevron Environmental Management Company (CEMC), Arcadis of New York, Inc. (Arcadis) has prepared this Ground Water Investigation Work Plan Revision 1 (Work Plan) in response to the February 11, 2021 New York State Department of Environmental Conservation (NYSDEC) comment letter. As requested, all modifications have been implemented as suggested by the NYSDEC or as presented in the response to comments submitted by Arcadis on March 5, 2021. A description of the modifications and how they were responded to within the report are provided below:

- ***Modification 1, OU-1D/OU-1E:*** *In the second paragraph of Section 1, OU-1E is incorrectly referred to as OU-1D in two locations. OU-1E contains monitoring wells subject to the semi-annual sampling, not OU-1D.*

Arcadis revised the incorrect references to OU-1D and has replaced these references with a correct reference to OU-1E.

- ***Modification 2, OU-4****: It should be noted in this work plan that the delineation of the Building 44/55 area plume extends into OU-4. It may also be noted that OU-4 is subject to and environmental easement allowing for only industrial use which includes a restriction on the use of groundwater beneath the OU.*

Arcadis documented the above OU-4 information within the text of the Work Plan.

- ***Modification 3, Groundwater Elevation Monitoring****: The work plan states that, "the remainder of the site overburden is inferred to be unsaturated where monitoring wells were either dry or not present." The absence of wells should not be used to infer an absence of overburden groundwater. The Department recommends the installation of piezometers in areas of the site where overburden groundwater levels cannot be determined based on the current monitoring well network.*

As presented in the response to comments submitted to the NYSDEC on March 5, 2021, Arcadis does not believe the installation of piezometer wells in the interpreted unsaturated vadose zone areas of the site is needed at this time. Instead, the text in question was revised to reflect a similar justification as presented within the RIR. This discussion relies on observations of bedrock and groundwater that indicate bedrock features limiting the extent of overburden groundwater in various regions of the site. Additional justification is provided within the Work Plan.

- ***Modification 4, Section 2.2.1, Building 51 Area****: SWMW-62 is identified as both exceeding standards and having no historical impacts. Please clarify.*

Arcadis revised Section 2.2.1 to clarify SWMW-62 standard exceedances.

- ***Modification 5, Section 2.2.2****: Please revise to indicate monitoring wells in this portion of the site are "overburden" and not "bedrock."*

Arcadis revised Section 2.2.2 to indicate the discussed monitoring wells screened in the overburden and not in the bedrock.

- ***Modification 6, 1,4-Dioxane Sampling****: The following wells which are part of the proposed sampling program for the Building 51 Area for other analytes must also be sampled for 1,4-Dioxane: SWMW-113 (O), SWMW-14 (B), SWMW-107 (B), SWMW-126 (B), SWMW-112 (B), SWMW-109 (B), and ITMW-6 (B).*

Arcadis revised Tables and Figures within the report to include a supplemental 1,4-dioxane sampling as requested by the NYSDEC. However, as presented in the response to comments letter submitted to the NYSDEC on March 5, 2021, the request to sample SWMW-107 will not be possible due to its prior abandonment. Instead SWMW-111 has been supplemented as accepted by the NYSDEC.

- ***Modification 7, Figures 5 & 6****: The symbols presenting rationale for different analytes presented on this figure are difficult to distinguish from each other. Please revise Figures 5 and 6 so that VOCs, SVOCs and metals sampling rationales are presented on separate figures (i.e. Figure 5A - VOCs, Figure 5B – SVOCs, and Figure 5C – Metals).*

Arcadis replaced former Figures 5 and 6 so the VOCs, SVOCs, and Metals are depicted on separate figures for both overburden and bedrock monitoring wells. In addition, the color coding for the depictions was revised to provide more clarity between suspect plume and delineation monitoring locations.

- ***Modification 8, Additional Wells for VOC Sampling****: The following wells which are identified in Table 1 as part of the proposed sampling program for other analytes must also be sampled for VOCs: ITMW-5 (O), SB35-1R (O), SB35-3R (O), SB35-4R (O), SWMW-24 (O), BR-2 (B), ITMW-22 (B), SWMW-29 (O), SWMW-32 (O), SWMW-37 (O), SWMW-74 (O). Monitoring wells SWMW-54(O) and SWMW-59 (O) must be added to the proposed sampling program and sampled for VOCs.*

Arcadis added the requested monitoring wells to the sampling plan. Revised sampling tables and figures have been provided.

- ***Modification 9, Discrepancies Between Table 1 & Table 3, Figures 5 through 7****: The following discrepancies were observed in the sampling plan outlined in Tables 1 & 3 and Figures 5 through 7:*
    - *The total number of field samples identified for each analytical group in Table 1 and Table 3 differ.*
    - *Bedrock B36 - Table 1 identifies ITMW-31 (B) for sampling while Figures 6 and 7 identify ITMW-22 (B) for sampling (and not ITMW-31 (B)). Sampling of either or both wells is acceptable.*
    - *Bedrock B58/83 - Table 1 identifies ITMW-13 (B) for sampling while Figure 7 identifies BR-2 (B) for sampling (and not ITMW-13 (B)). Both ITMW-13 (B) and BR-2 (B) should be sampled for VOCs.*
    - *Bedrock B51 – Table 1 identifies SWMW-122 (B) for sampling while Figure 7 indicates no sampling at this well. SWMW-122 (B) should be sampled as denoted in Table 1 and shown on Figure 7 as being sampled.*

William Bennett
NYSDEC
April 1, 2021

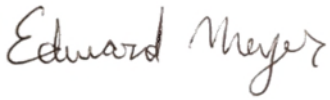
Arcadis identified the discrepancies in the text, tables, and figures, and updated the report with the available information and modifications as presented in this cover letter. The files have been thoroughly reviewed to ensure the Tables, Figures, and Text are clear and consistent.

- ***Modification 11, Health & Safety Plan****: The work plan must include or reference an applicable health & safety plan which includes precautions necessary due to COVID-19.*

Arcadis included our site-specific Health and Safety Plan and supporting COVID-19 protocols and precautions currently being implemented onsite.

We are confident this revised Work Plan addresses the comments provided and hope this meets the NYSDEC's expectations. If a discussion is appropriate to review the updates in greater detail, please do not hesitate to reach out to myself or Mark Hendrickson of CEMC at 832.854.6706 or via email at MHendrickson@chevron.com.

Sincerely,
Arcadis of New York, Inc.



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CC. Ellen Haggerty, Arcadis Deputy Portfolio Manager
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Chevron Environmental Management Company

Groundwater Investigation Work Plan Revision 1

Former Texaco Research Center Beacon
Glenham, New York
Site ID#314004
NYSDEC ID# 3-1330-48/16-0
EPA ID#091894899

February 2021

Groundwater Investigation Work Plan Revision 1

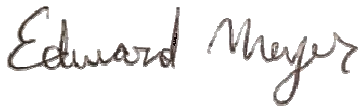
Former Texaco Research Center Beacon
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February 2021

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2. Arcadis Groundwater and Soil sampling Equipment Decontamination Guidance

Appendix D. Health and Safety Plan and COVID-19 Guidance

Appendix E. Pace Analytical Method Standard Operating Procedures

Acronyms and Abbreviations

Arcadis	Arcadis of New York, Inc.
AST	Aboveground Storage Tank
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
°C	Celsius
CEMC	Chevron Environmental Management Company
COC	Constituent of Concern
DUSR	Data Usability Summary Report
EDD	Electronic Data Deliverable
ELAP	Environmental Laboratory Accreditation Program
HDPE	High-Density Polyethylene
IDW	Investigation-Derived Waste
LNAPL	light non-aqueous phase liquid
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NTU	Nephelometric turbidity unit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
QA/QC	Quality Assurance/ Quality Control
RIR	Remedial Investigation Report
SVOC	Semivolatile Organic Compounds
TOGS	Technical and Operational Guidance Series
TRCB	Texaco Research Center, Beacon
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WATF	Washington Avenue Tank Farm
WWTP	Wastewater Treatment Plant

Qualified Environmental Professional Certification

I, Krista Mastracola, certify that I am currently a NYS registered professional engineer and that this Feasibility Study 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) and that all activities were performed in full accordance with the DER-approved work plan and any DER-approved modifications (DER-10, Section 1.5(b)2).



_____

Krista Mastrocola, PE
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Arcadis Senior Civil Engineer

1 Introduction

On behalf of Chevron Environmental Management Company (CEMC), Arcadis of New York, Inc. (Arcadis) has prepared this Groundwater Investigation Work Plan (Work Plan) in response to requested information presented in the New York State Department of Environmental Conservation's (NYSDEC's) October 2, 2020 comment letter (Appendix A) on the former Texaco Research Center Beacon (TRCB; NYSDEC Site #314004) (site; Figure 1) Revised Remedial Investigation Report (RIR) (Arcadis 2020). The site facility is located in the Hamlet of Glenham, New York. This Work Plan has been developed to address two of the NYSDEC RIR comments regarding the inclusion of groundwater isopleths for key constituents of concern (COCs) and to analyze the connection between elevated semi-volatile organic compound (SVOC) and metal concentrations in soil and groundwater. This Work Plan proposes a groundwater sampling event be conducted to observe current concentrations of key COCs in various monitoring wells on site in an effort to generate groundwater isopleth figures and to understand current groundwater conditions related to soil impacts on groundwater. A proposed monitoring well sampling list and supporting rationale justification for samples to be collected are presented herein and will allow for the generation of an accurate sitewide set of data that can depict current key COC plume conditions on site.

There are nine Operable Units (OUs) on site. Five of the OUs have no groundwater monitoring wells (OU-1B, OU-1D, OU-1F, OU-2, and OU-3) and have been excluded from consideration in this Work Plan. Of the remaining OUs (OU-1A, OU-1C, OU-1E, and OU-4), this investigation focuses primarily on OU-1A and OU-1C. OU-1E is part of a routine semiannual groundwater monitoring program and collecting additional data for OU-1E is not considered necessary at this time. A small number of groundwater exceedances of the NYSDEC Class GA Groundwater Standards and Guidance Values published in the Technical and Operational Guidance Series (TOGS) standards have been observed on OU-4; however, the OU is not believed to be the primary source of those observations. As described later in this report, a plume identified as being centered near Buildings 45 and 55 extends onto a portion of OU-4 north of Fishkill Creek. OU-4 is currently subject to an environmental easement and the use of groundwater beneath OU-4 is restricted.

1.1 Site Description and Background

The site is located on approximately 153 acres and is bisected by Fishkill Creek. A dam previously used for generating hydroelectric power spans the creek within the boundaries of the site. The site is divided into distinct OUs for investigation purposes. The Main Facility (OU-1A) parcel and the Church Property (OU-1B) parcel are both located north of Fishkill Creek. The former Washington Avenue Tank Farm (WATF) (OU-1C) is located south of Fishkill Creek on the eastern edge of the site. Two Residential Property (OU-1D and OU-3) parcels exist along the northern side of Washington Avenue and south of Fishkill Creek. OU-4 is a 4.96-acre parcel located along Fishkill Creek and includes the former hydroelectric facility buildings and dam. OU-2 is a road parcel, located along Washington Avenue south of Fishkill Creek. Lastly, the Back 93 Acre (OU-1E) parcel comprises the remaining site area south of the Creek, Tank Farm, and Washington Avenue. OUs are displayed on Figure 1. Further details regarding the parcels where groundwater sampling is to be performed are described below.

1.1.1 OU-1A

The Main Facility (OU-1A) consists of 33 acres of land and includes most of the developed areas located north of Fishkill Creek (except for a portion of OU-4). From 1811 until 1930, the site was occupied by textile mills. The

mills were powered by water wheels and steam engines. Blacksmith and carpentry shops operated in support of the mills. OU-1A has also been used as a non-production, non-transportation laboratory complex engaged in research, development, and technical services related to petroleum products and energy. It contained parking areas, offices, and laboratory buildings (Buildings 41, 42, 51, 65, 68, and 70), aboveground storage tanks (ASTs), underground storage tanks (USTs), roads, a wastewater treatment plant (WWTP), and storage areas. Figure 2 presents the locations of these key features on OU-1A.

Petroleum, coal products, and chemicals that were tested as potential additives, and solvents have been used at OU-1A in connection with research operations. Vinyl chloride and solvents, gasoline, diesel fuels, waste oil, and industrial waste were present in USTs located near the former Building 51, Building 45/55, and Building 36 areas. Flammable solvents, combustible oils, chlorinated solvents, gasoline, base oil stocks, various fuel lubricant additives, research gasolines, lubricating oil for engine testing, chlorinated/non-chlorinated waste solvents, used oil, and used ethylene glycol were stored in the drums near the Building 51, Building 45/55, and Building 58/83 areas. Chemicals such as unleaded gasoline, diesel fuel; Stoddard solvent; type "A" waste oil; No. 6 fuel oil, heating oil, and unleaded gasoline were present in the ASTs located near the Building 51, Building 45/55, and Building 36 areas, as shown on Figure 2. In 2011 and 2012, CEMC conducted a Sitewide Asbestos Containing Material Abatement and Building Demolition project (Parsons 2019). This project resulted in the demolition of the majority of buildings on site down to the basement or slab level. Currently, only a few administrative and/or support buildings exist on OU-1A.

Sanitary wastewater and industrial wastewater generated at TRCB were treated at the on-site WWTP, located to the west of the former Mill Buildings on site. The industrial wastewater conveyance and treatment system was discontinued following the closure of the Industrial Sewer System in 2006 (Parsons 2006); however, the sanitary wastewater system and the on-site WWTP remain active and continue to discharge into Fishkill Creek under a State Pollution Discharge Elimination System permit.

1.1.2 OU-1C

The WATF (OU-1C) consists of 5 acres of land located south of Fishkill Creek. It is bound by Fishkill Creek to the north, Washington Avenue to the east, and the Metro-North Railroad line to the south and west. The WATF (OU-1C) is surrounded by a chain-link fence, as depicted on Figure 2. This OU formerly included approximately 30 ASTs and associated facilities. These ASTs contained chemicals such as diesel fuel, Stoddard solvent, various raw gasoline fractions, and gasoline. All of the tanks were decommissioned from late 2002 to 2003; no environmental samples were collected at the time of decommissioning because all of the ASTs were located on concrete containment structures. Currently, no structures exist at OU-1C and the area is an open maintained grass-covered parcel with the remains of piping structures and a previously operated groundwater recovery system.

OU-4 is located adjacent to OU-1C and the likely source of impacts on the eastern portion of OU-4 are suspected to be related to historical operations from OU-1C. As mentioned previously, this Work Plan focuses on OU-1A and OU-1C groundwater but also includes sampling of one OU-4 parcel overburden monitoring well given its proximity to impacts on OU-1C.

2 Sampling Rationale

Investigations of various media were performed in the past on the OU-1A parcel to characterize potential releases from on-site laboratories (Buildings 41, 42, 51, 65, 68, and 70) and on-site USTs and ASTs. Investigations were also performed on the OU-1C parcel to characterize potential releases from the former tank farm and associated piping. The tank farm consisted of ASTs and a pump house that supplied chemicals from the tanks to the Main Facility (OU-1A). This section presents the justification rationale for proposing that the monitoring wells be sampled as part of this investigation related to the NYSDEC comments and identified potential groundwater areas of impacts for volatile organic compounds (VOCs), SVOCs, and metals on site. Selection was considered related to the historical operations presented above, the current groundwater flow conditions, and historical groundwater results observed on the OU-1A and OU-1C parcels. The following presents a summary of the supporting information. Tables, figures, and appendices to this Work Plan are referenced and present a more comprehensive level of detail.

2.1 Groundwater Elevation Monitoring

Inferred overburden and bedrock groundwater potentiometric analyses have been completed in an effort to understand current groundwater flow conditions on site. The results are based on groundwater elevation measurements collected during a sitewide survey conducted by Arcadis between September 2 and 4, 2020 and completed on September 21, 2020. The overburden and bedrock observations on site north of Washington Avenue have been presented on Figures 3 and 4, respectively. The generalized flow direction of both overburden and bedrock groundwater is toward Fishkill Creek. Based on both the observed overburden groundwater elevations and evaluations of the bedrock surface at the site, there are three regions of the saturated overburden:

1. The eastern region consisting of a 150- to 250-foot-wide strip that parallels Fishkill Creek,
2. The west-central portion of OU-1A,
3. The southwestern portion of OU-1A in a bowl-shaped depression in the rock surface.

The remainder of the OU-1A overburden is inferred to be unsaturated based on analysis of soil borings, drilled bedrock monitoring wells, and a three-dimensional model of bedrock surface generated onsite and detailed in the Remedial Investigation Report. As part of the Remedial Investigation Report, the bedrock surface is well defined at OU-1A. As depicted on Figure 3, the groundwater has been shown where present in the overburden using an overlay of noted observed groundwater elevations and bedrock elevations detected at the site.

To determine the extent of groundwater saturation, the results of gauging events analyzed during the remedial investigation phase were developed into a potentiometric surface. This surface was applied over the bedrock surface to identify intersections between the groundwater and bedrock surface – leading to an extent of saturated groundwater. Due to the site conditions identified in the Remedial Investigation Report, evidence that the bedrock and overburden groundwater at certain locations on site are connected indicated the overburden groundwater may infiltrate into bedrock at these locations or be restricted within. Three main bedrock features split the overburden into three distinct regions:

- The easternmost ridge – the area of overburden on the easternmost site is a 150- to 250-foot-wide strip that parallels Fishkill Creek. Near the Texaco Dam, a narrow ridge of bedrock further limits the extent of saturated overburden.

- In the west-central portion of OU-1A, another region of the saturated overburden is generally aligned along the fault.
- In the southwest portion of OU-1A, the third region of saturated overburden occurs where there is a bowl-shaped depression in the rock surface. Groundwater in this area is derived from recharge of precipitation and possibly some lateral seepage of groundwater from the bedrock hill immediately to the northwest.

To additionally support the outer limits of the groundwater extent, Arcadis reviewed groundwater levels at select monitoring wells. The yearly variability of wells being identified as either having water present or being dry indicates that select monitoring wells, SWMW-08, SWMW-24, SWMW-40, and SWMW-139, represent the edge of the saturated groundwater areas on OU-1A. In addition, the groundwater analysis completed for the west-central portion of OU-1A indicated that the saturated thickness in the northern portion of the area was approximately 2 ft or less. The bedrock surface has been well defined, and the groundwater table as identified at OU-1A in Figure 3 represents the limits of the three saturated regions (Arcadis 2020).

Based on the inferred bedrock potentiometry (Figure 4), the hydraulic gradient lies in the western region slope toward the bedrock fault that underlies the creek itself. Fishkill Creek is a gaining stream and is hydraulically connected to the groundwater flow at the site. In most areas of the facility where overburden groundwater is present, there is no confining layer, and the bedrock and overburden groundwater are hydraulically connected (Parsons 2018).

2.2 Historical Groundwater Results

This sampling investigation will include both overburden and bedrock monitoring wells that have recorded VOCs, SVOCs, and metals concentrations greater than the NYSDEC Class GA Groundwater Standards and Guidance Values published in the TOGS standards.

2.2.1 OU-1A Historical Groundwater Results

Groundwater contamination at OU-1A is split into four main plumes/areas: the Building 51 area, Building 45/55 area, Building 36 area, and Buildings 58/83 area. A total of 62 monitoring wells has been observed on OU-1A with VOCs, SVOCs, and/or metals impacts. The historical analytical results presented in Appendices B-1 and B-2 present the exact detection concentrations while information presented below focuses on the impacts detected at concentrations greater than the NYSDEC TOGS standards.

Building 51 Area:

Seven overburden and 19 bedrock monitoring wells from the Building 51 area have VOCs, SVOCs, and/or metals impacts above the NYSDEC TOGS standards. Based on the historical analytical results (Appendices B-1 and B-2), chlorinated VOC impacts are present south of the former Building 51 area in overburden groundwater and impacts mainly occur near Buildings 41, 32, and 51 in bedrock groundwater. Aromatic VOCs (benzene, toluene, ethylbenzene, and xylenes, collectively BTEX) and SVOCs have been detected that exceed NYSDEC TOGS standards in both overburden and bedrock groundwater in this area as well. Arsenic, lead, and mercury have been detected at concentrations greater than the NYSDEC TOGS standards in overburden groundwater in the Building 51 area. In bedrock groundwater, arsenic and lead have not been detected; however, mercury was detected at concentrations greater than the NYSDEC TOGS standard. Other metals such as aluminum, iron, manganese, and sodium have been detected in this area and are likely attributed to background conditions.

Per historical analytical results (Appendix B-1), overburden monitoring wells:

- ITMW-5, SWMW-62, and SWMW-15 have had concentrations of VOCs, SVOCs, and metals greater than the NYSDEC TOGS standards.
- SWMW-58 and SWMW-67 have had historical VOCs impacts.
- Upgradient monitoring well SWMW-69 has had no VOCs, SVOCs, or metals detections greater than the NYSDEC TOGS standards to date.
- SWMW-113 has only had VOCs concentrations greater than the NYSDEC TOGS standards.

An approximate overburden plume boundary in the Building 51 area based on the above VOCs, SVOCs, and metals observations is presented on Figures 5A, 5B, and 5C.

Per historical analytical results (Appendix B-2), bedrock monitoring wells:

- ITMW-6 and SWMW-111 have had concentrations of VOCs, SVOCs, and metals greater than the NYSDEC TOGS standards.
- SWMW-126, SWMW-41, SWMW-56, SWMW-66, and SWMW-112 have had concentrations of VOCs and SVOCs greater than the NYSDEC TOGS standards.
- SWMW-13, SWMW-107, and SWMW-110 have only had historical VOCs impacts above NYSDEC TOGS standards.
- Upgradient wells SWMW-68 and SWMW-119 have only had historical VOCs impacts observed above NYSDEC TOGS standards.
- SWMW-104 and SWMW-70 have had no detections of VOCs, SVOCs, and metals greater than the NYSDEC TOGS standards.
- Inferred downgradient monitoring wells SWMW-109 and SWMW-103 have had no VOCs or SVOCs impacts above NYSDEC TOGS standards observed historically.
- SMWW-106 has not been sampled in the past.
- Downgradient monitoring well SWMW-122 has had no VOCs, SVOCs, or metals impacts observed.
- SWMW-14 has had historical VOCs and metals impacts.
- SWMW-41 has had 1,4-dioxane observed at levels exceeding the NYSDOH maximum contaminant limit.

An approximate bedrock aquifer plume boundary for VOCs, SVOCs, and metals is presented on Figures 6A, 6B, and 6C.

Building 45/55 Area:

Ten overburden and three bedrock monitoring wells from the Building 45/55 area have observed VOCs and/or SVOCs impacts. Based on the historical analytical results (Appendices B-1 and B-2), chlorinated VOC impacts are present in the former Building 45/55 area in both overburden and bedrock groundwater. Aromatic VOCs impacts are found in an isolated spot in both overburden and bedrock groundwater at the southwestern side of Building 55. SVOC impacts have been observed within the overburden and bedrock groundwater around Building 45 and only the overburden aquifer of the Building 55 area. Metals have not been detected greater than the TOGS standards in either the overburden or bedrock groundwater aquifers around Building 45/55.

Per historical analytical results (Appendix B-1), overburden monitoring wells:

- ITMW-25, SWMW-10, SWMW-28, ITMW-24, and SWMW-48 have had concentrations of VOCs and SVOCs greater than the NYSDEC TOGS standards.
- ITMW-24, SWMW-24, SB35-3R SB35-4R, and SWMW-48 have had concentrations of SVOCs greater than the NYSDEC TOGS standards.
- SWMW-08 has not been sampled in the past.
- SWMW-23, SWMW-25, and SWMS 65 have had only historical VOCs impacts above NYSDEC TOGS standards.
- Inferred downgradient monitoring well SB35-1R has had no VOCs or SVOCs detections greater than the NYSDEC TOGS standards.

A rough overburden aquifer plume boundary in the Building 45/55 area based on the above VOCs and SVOCs observations is presented on Figures 5A, 5B, and 5C.

Per historical analytical results (Appendix B-2), bedrock monitoring wells:

- SWMW-27 and SWMW-28 have had VOCs and SVOCs detections greater than the NYSDEC TOGS standards.
- SWMW-44 has only had VOCs impacts above NYSDEC TOGS standards historically.
- Upgradient monitoring well SWMW-01 has had VOCs and SVOCs detections less than the NYSDEC TOGS standards.
- Monitoring well SWMW-64 has observed VOCs detections less than the NYSDEC TOGS standards.
- SWMW-118 has had no historical VOCs or SVOCs impact observations historically.

A rough bedrock aquifer plume boundary for VOCs and SVOCs for the Building 45/55 area is presented on Figures 6A, 6B, and 6C.

Buildings 58/83 Area:

Four overburden and seven bedrock monitoring wells from the Buildings 58/83 area have observed VOCs and/or SVOCs impacts above NYSDEC TOGS standards. Based on the historical analytical results (Appendices B-1 and B-2), chlorinated and aromatic VOC impacts are present near the Buildings 58/83 area in both overburden and bedrock groundwater. SVOC polycyclic aromatic hydrocarbons (PAHs) have been detected at a few isolated spots in bedrock groundwater; however, they are not present in the overburden groundwater. Metals have not been detected at greater than the NYSDEC TOGS standards in the overburden or bedrock groundwater in the Buildings 58/83 area.

Per historical analytical results (Appendix B-1), overburden monitoring wells:

- GT-2, Unknown-1, Unknown-2, and Unknown-3 indicate VOC concentrations are greater than the NYSDEC TOGS standards.

A rough overburden plume boundary in the Buildings 58/83 area based on the above VOCs observations is presented on Figures 5A, 5B, and 5C.

Per historical analytical results (Appendix B-2), bedrock monitoring wells:

- ITMW-14, GT-1, and SWMW-125 indicate VOCs and SVOCs concentrations are greater than the NYSDEC TOGS standards.

- ITMW-13, SWMW-2, SWMW-114, and BR-2 have had concentrations of VOCs greater than the NYSDEC TOGS standards with no exceedances to the SVOC NYSDEC TOGS standards.
- Upgradient monitoring well SWMW-05 has had no VOCs or SVOCs detections greater than the NYSDEC TOGS standards.
- Downgradient monitoring wells SWMW-49 and SWMW-124 have had no VOCs or SVOCs detections greater than the NYSDEC TOGS standards.

A rough bedrock aquifer plume boundary for VOCs and SVOCs for the Buildings 58/83 area is presented on Figures 6A, 6B, and 6C.

Building 36 Area:

Five bedrock monitoring wells from the Building 36 area have observed groundwater VOCs and/or SVOCs impacts above the NYSDEC TOGS standards. Based on the historical analytical results (Appendices B-1 and B-2), VOC impacts are present near the Building 36 area in bedrock groundwater while SVOCs PAHs have been detections at only a few isolated spots in the bedrock groundwater. Metals have not been detected greater than the NYSDEC TOGS standards in the bedrock groundwater around Building 36. No overburden monitoring wells are present around Building 36.

Per historical analytical results (Appendix B-2), bedrock monitoring wells:

- ITMW-22, ITMW-31, SWMW-45, and SWMW-55 have had concentrations of both VOCs and SVOCs greater than the NYSDEC TOGS standards.
- SWMW-123 has had concentrations of only VOCs greater than the GA standards.
- Upgradient monitoring wells ITMW-12 and ITMW-29 have had no VOCs or SVOCs detections greater than the NYSDEC TOGS standards.

A rough bedrock aquifer plume boundary for VOCs and SVOCs for the Buildings 36 area is presented on Figures 6A, 6B, and 6C.

2.2.2 OU-1C Historical Groundwater Results

Ten overburden monitoring wells from the OU-1C parcel have observed VOCs, SVOCs, and metals (arsenic and lead) impacts above the NYSDEC TOGS standards. Based on historical analytical results presented in Appendix B-3, aromatic VOCs, SVOCs, arsenic, and lead impacts are limited to a central location, where light non-aqueous phase liquid (LNAPL) has also been detected. Other metals, such as aluminum, antimony, arsenic, cadmium, chromium, iron, lead, magnesium, manganese, nickel, selenium, sodium, and thallium, have been detected in multiple monitoring wells at greater than the NYSDEC TOGS standards and are likely naturally occurring in groundwater and/or may be a result of sampling methodology/field conditions during sample collection. No bedrock monitoring wells are present on the OU-1C parcel.

Per historical analytical results (Appendix B-3), overburden monitoring wells:

- SWMW-21 and SWMW-30 have had concentrations of VOCs, SVOCs, and metal greater than the NYSDEC TOGS standards.
- SWMW-31, SWMW-32, SWMW-60, and SWMW-71 have had concentrations of VOCs and metals greater than the NYSDEC TOGS standards.
- SWMW-29, SWMW-50, SWMW-61, and SWMW-74 have had historical metals impacts.

- Monitoring well SWMW-20 has only had SVOCs concentrations greater than the NYSDEC TOGS standards.
- Inferred downgradient monitoring well SWMW-38 has had VOCs and metals detections less than the NYSDEC TOGS standards, below the NYSDEC TOGS standards.
- SWMW-72 and SWMW-73 have had detections of VOCs and metals but only at concentrations below the NYSDEC TOGS standards.
- SWMW-37 has had no historical VOCs, SVOCs, or metals impacts observed historically.

A rough overburden plume boundary for OU-1C based on the above VOCs, SVOCs, and metals laboratory analytical observations is presented on Figures 5A, 5B, and 5C.

2.3 Proposed Groundwater Investigation Sampling Locations

This sampling investigation will include both overburden and bedrock monitoring wells having recorded VOCs, SVOCs, 1,4-dioxane, and metals concentrations greater than the NYSDEC TOGS standards. Groundwater monitoring wells with observed exceedances have been proposed for sampling while considering a few key features, including but not limited to:

- Concentration of observed impacts;
- Period of time having exceedance impacts;
- Proximity to adjacent monitoring wells having similar exceedances (compounds as well as concentrations);
- Screen intervals of monitoring wells in close proximity (both like screen intervals as well as differing screen intervals in bedrock monitoring wells); and
- Varying depth of bedrock monitoring wells even when near another bedrock monitoring well.
- Recommendation from the NYSDEC

In addition to proposed impacted groundwater monitoring well sampling, upgradient and downgradient monitoring wells near the areas of observed impacts are proposed to be included in the sampling program to support delineation boundaries and to aid in developing quality groundwater isopleth figures as requested by NYSDEC. For the monitoring wells with inferred downgradient sampling locations, the exact COC compounds to be analyzed have been determined based on the impacts in the upgradient or potential source area monitoring wells they are delineating. Delineation monitoring wells are chosen for sampling to better confirm and possibly refine the current boundaries of VOCs, SVOCs, and metals impacts on site. Table 1 presents the proposed monitoring wells, analyses, sampling rationale, analytes, key well construction information, and analysis detections. A proposed sampling order is also provided in Table 1. Figures 5A, 5B, and 5C show the locations identified for sampling of overburden VOCs, SVOCs (including1,4-dioxane), and metals. Figures 6A, 6B, and 6C show the locations identified for sampling of bedrock VOCs, SVOCs (including 1,4-dioxane), and metals. All proposed well locations are shown on Figure 7.

2.3.1 OU-1A Proposed Sampling Locations

Based on the identification of key COCs present at each area (Buildings 51, 45/55, 36, and 58/83), overburden and bedrock monitoring wells described above having historical VOCs, SVOCs, and/or metals impacts in known

plume areas as well as inferred downgradient and/or upgradient monitoring wells with delineation designations are proposed for sampling. Table 1 presents the proposed monitoring wells to be sampled on the OU-1A parcel.

2.3.2 OU-1C Proposed Sampling Locations

Based on the observation of VOC, SVOCs, and metals impacts at the OU-1C parcel, known plume area monitoring wells as well as downgradient overburden monitoring wells, SWMW-20, SWMW-21, SWMW-30, SWMW-31, SWMW-32, SWMW-38, SWMW-60, SWMW-61, and SWMW-71, while upgradient overburden delineation monitoring wells, SWMW-29, SWMW-37, SWMW-72, and SWMW-74 have been proposed for VOCs, SVOCs, and/or metals sampling. During the September 2020 sitewide groundwater monitoring event, monitoring wells SWMW-60 and SWMW-61 were found to be damaged/inaccessible and monitoring well SWMW-21 contained LNAPL. These monitoring wells are proposed within this Work Plan; however, if LNAPL is found to be present of if wells are inaccessible, an adjacent alternate monitoring well may be selected, which will be decided in the field based on conditions and communications with project management staff. Table 1 presents the proposed monitoring wells to be sampled on the OU-1C parcel.

3 Sampling Methodology

This section identifies the methodology used for groundwater sampling. All field activities will take place in accordance with the Arcadis Technical Guidance Documents presented in Appendix C as well as the Arcadis Site-Specific Health and Safety Plan (HASP; Arcadis 2021) presented in Appendix D. In addition, the Arcadis COVID-19 Guidance for Field and Embedded Staff attached to the HASP provides additional detail pertaining to the precautions surrounding and management of COVID-19 that will be followed.

3.1 Groundwater Sampling

Prior to purging and sampling, water level measurements will be recorded at all monitoring wells. Groundwater samples will be collected with a peristaltic method via the vacuum jug method in accordance with NYSDEC Arcadis Standard Groundwater Sampling for Monitoring Wells Guidance (Appendix C-1). The monitoring wells will be purged using either dedicated high-density polyethylene (HDPE) bailer and/or pumps (peristaltic or monsoon pump) with dedicated polyurethane tubing. Monitoring wells will be purged until three to five well volumes of water are removed. If a well dewaters during purging and three well volumes are not purged, that well will be allowed to recharge up to 80 percent (%) of the static water column. After water levels have recharged to 80% of the static water column, groundwater samples will be collected.

The following parameters will be measured and recorded at the start, after each well volume is removed, and before sample collection using a YSI 556 water-quality meter:

- pH
- temperature
- conductivity
- dissolved oxygen
- oxidation-reduction potential
- turbidity.

Samples proposed within this Work Plan that include metals analysis will be laboratory filtered for any samples not able to be stabilized below 50 Nephelometric turbidity units (NTUs) at the end of three to five well volumes of purging.

Well sampling data will be recorded on the Groundwater Sampling Log using the fulcrum app presented in the Appendix C-1 Arcadis Standard Groundwater Sample for Monitoring Wells Guidance document, and photographs will be taken to document appropriate equipment and sampling. Groundwater samples will be transferred directly from the dedicated tubing into the appropriate certified pre-cleaned bottles. When transferring samples, care will be taken not to touch the tubing to the sample container. Each sample will be given a unique alphanumeric identifier (i.e., Sample ID: SWMW-##-W-YYMMDD).

Groundwater samples will be placed in a cooler maintained at 4 ± 2 degrees Celsius (°C) with ice and submitted to the laboratory. Chain-of-custody documentation will accompany the samples from the time of collection until the samples are delivered to Pace Analytical, a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory, located in Mount Juliet, Tennessee. Groundwater samples will be labeled using the nomenclature presented above in this Work Plan. All sample labels will be weatherproof and contain the following information:

- Project name and number
- Sampler name or initials
- Sample identification
- Sample date and time (in 24-hour format)
- Laboratory analysis methods required for a sample jar
- Preservatives added to sample jar
- Sample matrix (water)
- Turnaround-time.

Adhesive sample labels will be placed directly on the sample containers. If the labels do not adequately adhere due to moisture, the labels will be secured by placing a clear packaging tape over the label. Groundwater samples will be wrapped and packaged sufficiently to prevent cross-contamination and to ensure that containers remain intact during shipment. Sufficient ice will be used to ensure that samples are received by the laboratory at optimal temperature (0 to 6°C). Groundwater samples will be shipped in a cooler provided by the laboratory; the cooler will be taped and secured with duct tape and will have the appropriate labeling to be declared as dangerous goods to the shipping carrier.

3.2 Decontamination Procedure

Decontamination will be performed prior to and after each use of a piece of equipment and will be conducted in buckets on plastic sheeting. Decontamination will be performed in accordance with the Arcadis guidance document Groundwater and Soil Sampling Equipment Decontamination provided in Appendix C-2. All equipment will be washed in potable water and phosphate-free detergent (e.g., Alconox). The sampling equipment will then be rinsed by a distilled water rinse. Between rinses, equipment will be placed on polyethylene sheets or aluminum foil if necessary. Decontaminated equipment will not be placed directly on the ground surface. To minimize the time spent on the field and reduce the opportunity for cross-contamination, the sampling team will have sufficient

clean equipment available to complete a sampling round without excessive delays. Disposable equipment (tubing) intended for one-time use will not be decontaminated but will be packaged for appropriate disposal.

3.3 Waste Management

Investigation-derived waste (IDW) generated during sampling activities will be collected either in 55-gallon drums directly or in a temporary holding tank and then transferred to a drum at the on-site drum storage area prior to off-site disposal. IDW will be characterized and disposed of in a manner meeting the selected disposal facility's Resource Conservation and Recovery Act Subtitle C or D permit. Disposable materials utilized for sampling will be disposed of off-site as solid municipal waste. All non-IDW wastes will be removed from the site immediately upon completion of field activities.

4 Data Quality Objectives for Laboratory Analysis

4.1 Analytical Methods

Groundwater samples will be submitted to Pace Analytical, an NYSDOH-ELAP certified laboratory, for analysis of VOCs by SW-846 Methods 8260C and 8260-SIM and United States Environmental Protection Agency (USEPA) Method 524, SVOCs by SW-846 Methods 8270D, 8270-SIM, and 8270-LL-PAH, 1,4-dioxane by 8270-MOD, and metals by SW-846 Method 6020B. A summary of the analytical methods, sample containers, sample preservation, and holding times is presented below in Table 2. Laboratory standard operating procedures are included as Appendix E.

Table 2: Analytical Methods Summary

Matrix	Analyte/ Analytical Group	Analytical Method	Sample Container Volume and Type	Sample Preservation	Preparation Holding Time	Analytical Holding Time
Groundwater	VOCs	SW-846 Method 8260C	Three pre-cleaned 40ml Amber w/ HCl	HCl and cool to <6°C	14 days from collection	14 days from collection
		SW-846 Method 8260-SIM	Three pre-cleaned 40ml Amber w/ HCl	HCl and cool to <6°C		
		USEPA Method 524.2	Three pre-cleaned 40ml Amber w/ HCl	HCl and cool to <6°C		
	SVOCs	SW-846 Method 8270D	Two pre-cleaned 100ml Amber No Preservative	Cool to <6°C	7 days from collection	Within 40 days after the extraction
		SW-846 Method 8270D-SIM	Two pre-cleaned 100ml Amber No Preservative	Cool to <6°C		
		SW-846 Method 8270--LL-PAH	Three pre-cleaned 40ml Amber No Preservation	Cool to <6°C		
	1,4-Dioxane	8270-MOD	Two pre-cleaned 100ml Amber No Preservative	Cool to <6°C	7 days from collection	Within 40 days after the extraction
	Metals	SW-846 Method 6020B	One pre – cleaned 250ml HDPE w/ HNO3	HNO3 and cool to <6°C	180 days from collection	180 days from collection

Notes:
HCl = hydrochloric acid
HNO3 = nitric acid
ml = milliliters

4.2 Quality Assurance and Quality Control (QA/QC)

Field QA/QC samples will be collected and submitted at the following frequencies:

- Field duplicate samples will be collected and submitted at a frequency of one per day and one for every 20 or fewer field samples (whichever is more frequent), for each matrix, and each target analyte (10%). At a minimum, one field duplicate will be collected per site and per day of sampling at that site.
- Matrix spike (MS)/matrix spike duplicate (MSD) samples will be collected at a frequency of one MS/MSD set for every 20 or fewer field samples (5%). At a minimum, one MS/MSD sample will be collected per day.
- Equipment rinse blanks will be collected and submitted to verify the effectiveness of the decontamination procedures on reused, non-disposable equipment. One rinse blank will be collected per day of sampling and will be submitted for all analyses collected that day while reusable equipment is being used. The laboratory-

provided analyte-free water will be poured over/through the decontaminated field equipment prior to the collection of environmental samples.

- A trip blank will be submitted with each cooler containing samples for volatile analyses (gasoline-range organics by AK101, petroleum-related VOCs by SW8260C, and VOCs by USEPA 624). This will assess whether samples have been exposed to non-site-related VOCs during the shipping and field handling procedures.

Appropriate wells for duplicate and MS/MSD sample collection will be collected based on historical results as well as on the field observations of contamination. Table 3 below shows the anticipated number of samples, including QA/QC, for the proposed sampling.

Table 3: Quality Assurance Sample Summary

Matrix	Analyte/ Analytical Group	Frequency of Sample Collection[1]					
		Field Samples	Field Duplicates	Matrix Spikes	Matrix Spike Duplicates	Equipment Blanks	Field Blanks
Groundwater	VOCs	78	5	5	5	5	5
	SVOCs	43	5	5	5	5	5
	1,4-Dioxane	7	1	1	1	1	1
	Metals	20	5	5	5	5	5
Notes:							

[1] Final number and identifications of QA/QC samples listed are tentative and may vary based on the progression of daily field activities.
NA = not applicable

4.3 Data Usability Summary Report

The laboratory will provide a Category B data deliverable package, and Arcadis will perform a third-party data validation effort on all sample results packages. After completion of the Tier III evaluation, a data usability summary report (DUSR) will be prepared for the groundwater samples by the data validation group. The DUSR will be carried out to evaluate whether the quality control measures implemented during the field and laboratory analytical programs as reported are representative and free of error. The DUSR will be used to update the laboratory results, summary tables for the investigation summary report, and the Electronic Data Deliverable (EDD) that will be submitted to the NYSDEC EQuIS Database. A copy of the DUSR will be provided in the final summary report.

5 Well Redevelopment

In September 2020, Arcadis performed a sitewide groundwater gauging event that included an inspection of well conditions to determine if maintenance and/or redevelopment would be required for monitoring wells onsite including those identified within this sampling work plan. Arcadis identified multiple wells requiring maintenance primarily due to missing lid bolts, damaged J plugs and/or inoperable locks. In addition, a few wells would benefit from redevelopment due to sediment build-up at the bottom of the well. Six wells in this work plan are recommended to be redeveloped based on having greater than 10% of their screen or 10% of the total water column accessible due to suspected sediment build-up (if greater than one foot of calculated sediment build-up is suspected). As part of the September 2020 event, Arcadis personnel replaced all monitoring well locks. Details of identified maintenance needs are presented on Table 4, attached.

Prior to conducting groundwater sampling as detailed within this work plan, Arcadis proposes to complete well redevelopment and maintenance needed to prepare monitoring wells for the best possible sampling conditions. As mentioned above, six monitoring wells have been identified as needing redevelopment, while one monitoring well, SWMW-61, may need to be fully replaced based on damage observed. If necessary, approved abandonment and reinstallation methods will be implemented. Monitoring wells will be repaired prior to sampling and sediment that has settled in the well will be removed using either surge and purge or air lifting redevelopment methods. In total, 30 monitoring wells have been identified as requiring maintenance, primarily the replacement of missing or repair of stripped monitoring well lid bolts. Well maintenance activities proposed are identified on Table 4. Due to well SWMW-61 being identified as damaged preventing access, SWMW-61 maintenance will involve abandoned and reinstalling this well.

Following the redevelopment, groundwater in the wells will be given time to equilibrate before sampling is performed. As presented in Section 3, all sampling activities will take place in accordance with NYSDEC Regulations and Arcadis Guidelines.

6 Schedule and Reporting

The sitewide groundwater sampling event will be scheduled for implementation within 30 days of receipt of NYSDEC's approval of this Work Plan. Submittal of the validated data, isopleth figures, analysis of the SVOC and metal impacts to groundwater, DUSR, and data packages will be provided to the NYSDEC within 2 months following sampling completion. All analytical data generated as part of this Work Plan will be submitted to the NYSDEC in the approved EDD format. Upon request, copies of field notes and groundwater sampling forms may be provided.

7 References

Arcadis. 2020. Remedial Investigation Report, Former Texaco Research Center, Beacon (Glenham), New York. Revision 1. June.

Arcadis. 2021. Site Specific Health and Safety Plan. Former Texaco Research Center. Revision 4. February 8.

Parsons. 2006. Closure Report – Phase II RCRA Facility Assessment – Sampling Visit Interim Corrective Measure: Inactive Line Abandonment, Former Texaco Research Center, Beacon, New York. October.

Parsons. 2018. Comprehensive Groundwater Summary Report, Former Texaco Research Center, Beacon (Glenham), New York. July.

Parsons. 2019. Remedial Investigation Report. Former Texaco Research Center, Beacon (Glenham), New York. August.

Tables

Table 1
Monitoring Well Locations Proposed for Sampling
Chevron Environmental Management Company
Former Texaco Research Center Beacon
45 Old Glenham Road
Glenham, New York

Well ID	Well Type	Well Depth (ft bgs)	Well Screen Start Depth (ft bgs)	Well Screen End Depth (ft bgs)	VOC Detected	SVOC Detected	Metals Detected	VOC Analysis Proposed SW-846 8260C, SW-846 8260C SIM EPA 524.2	SVOC Analysis Proposed SW-846 8270D, SW-846 8270D SIM SW-846 8270-LL-PAH	Metals Analysis Proposed SW-846 6020B	Supplemental 1,4-Dioxane Sampling SW-846 8270 MOD	Rationale[1]	Sampling Order
B-51													
Overburden B51													
SWMW-58	O	30.00	5.00	30.00	X			X		X		Solvent VOCs detected in 2013, Delineation for Metals	3
SWMW-15	O	25.00	5.00	25.00	X	X	X	X	X	X		Petroleum & Solvent VOCs, SVOCs, & Metals detected in 2013	4
ITMW-5	O	30.00	10.00	30.00	X	X	X	X				Solvent VOCs, SVOCs, & Metals detected in 2013. Only VOC Sampling proposed based on the adjacent impacted well proximity.	7
SWMW-69								X	X	X		No detections, Delineation for VOCs, SVOCs, and Metals	1
SWMW-67	O	27.00	3.00	27.00	X			X		X		Solvent VOCs detected in 2013, Delineation for Metals	2
SWMW-62	O	19.00	4.00	19.00	X	X	X	X	X	X		Solvent VOCs, & SVOCs detected in 2013, Metals detected historically	6
SWMW-113	O	30.00	20.00	30.00	X			X	X		X	Solvent VOCs detected in 2013, Delineation for SVOCS, NYSDEC Recommended Supplemental 1,4-Dioxane	5
Bedrock B51													
SWMW-104	B	65.00	45.00	65.00				X				No Detections, Delineation for VOCs	8
SWMW-103	B	65.00	55.00	65.00				X	X			No Detections, Delineation for VOCs, SVOCs	11
SWMW-111	B	60.00	40.00	60.00	X	X	X	X	X	X	X	Solvent VOCs & SVOCs detected in 2013, Metals detected historically, Supplemental 1,4-Dioxane	21
ITMW-6	B	48.00	28.00	48.00	X	X	X	X	X	X	X	Benzene & Solvent VOCs & SVOCs detected in 2013, Metals detected historically, NYSDEC Recommended Supplemental 1,4-Dioxane	20
SWMW-68	B	51.00	31.00	51.00	X			X				Solvent VOCs detected in 2013 & Delineation for SVOCs	17
SWMW-56	B	55.00	35.00	55.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	18
SWMW-66	B	62.00	43.00	63.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	19
SWMW-109	B	35.00	25.00	35.00				X	X		X	Delineation for VOCs, SVOCs, Supplemental 1,4-Dioxane	13
SWMW-122	B	100.00	50.00	100.00				X				No Detections, Delineation for VOCs	14
SWMW-110	B	65.00	45.00	65.00	X			X				Solvent VOCs detected in 2013	16
SWMW-119	B	70.00	50.00	70.00	X			X	X			Solvent VOCs detected in 2013, Delineation for SVOCs	15
SWMW-70	B	46.00	26.00	46.00				X				No Detections, Delineation for VOCs	12
SWMW-106	B	65.50	43.00	63.00				X	X			Not sampled previously	9
SWMW-13	B	71.00	46.00	71.00	X			X				Solvent VOCs detected in 2013	10
SWMW-41	B	45.00	25.00	45.00	X	X		X	X			Petroleum & Solvent VOCs & SVOCs detected in 2013	25
SWMW-112	B	65.00	55.00	65.00	X	X		X	X		X	Petroleum & Solvent VOCs & SVOCs detected in 2013, NYSDEC Recommended Supplemental 1,4-Dioxane	24
SWMW-126	B	50.00	40.00	50.00	X	X		X	X		X	Benzene & Solvent VOCs & SVOCs detected in 2013, NYSDEC Recommended Supplemental 1,4-Dioxane	23
SWMW-107	B				X							Solvent VOCs detected in 2013, Not sampled previously for SVOCs, Metals. Abandoned.	
SWMW-14	B	40.00	26.00	41.00	X		X	X	X	X	X	Solvent VOCs detected in 2013, Metals detected historically, Delineation for SVOCs, NYSDEC Recommended Supplemental 1,4-Dioxane	22
B-45/55													
Overburden B45													
SB35-3R	O	10.00	3.00	10.00		X		X	X			SVOCs detected in 2013. Delineation of VOCs	29
SB35-1R	O	12.50	3.00	13.00				X	X			No Detections, Delineation for VOCs and SVOCs	26
SWMW-28	O	16.50	4.00	17.00	X	X		X	X			SVOCs detected in 2013, Solvent VOCs detected historically	30
SWMW-65	O	16.00	7.00	17.00	X			X	X			Solvent VOCs detected in 2013, delineation for SVOCs	27
SB35-4R	O	14.00	4.00	14.00		X		X	X			SVOCs detected in 2013. Delineation of VOCs	28
Bedrock B45													
SWMW-118	B	75.00	61.00	76.00				X	X			No Detections, Delineation for VOCs, SVOCs	31
SWMW-64	B	40.00	31.00	41.00				X				No Detections, Delineation for VOCs	32
ITMW-28*	B	20.00	9.00	19.00	X	X		X	X			Petroleum & Solvent VOCs & SVOCs detected historically	33
SWMW-27	B	56.00	26.00	56.00	X	X		X	X			SVOCs detected in 2013, Benzene & Solvent VOCs detected historically	34
Overburden B55													
SWMW-48	O	10.00	4.00	10.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	40
SWMW-10	O	9.00	4.00	9.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	41
SWMW-25*		10.50	4.00	11.00		X		X	X			SVOCs detected in 2013, delineation for VOCs	38
SWMW-23*		9.00	4.00	9.00				X	X			Not sampled previously, delineation for VOCs, SVOCs	35
ITMW-24	O	15.00	5.00	15.00	X	X		X	X			Solvent VOCs detected in 2013, SVOCS detected historically	39
SWMW-08		8.00	4.00	8.00				X	X			Not Sampled previously	36
SWMW-24	O	9.50	4.00	10.00		X		X	X			SVOCs detected historically	37
ITMW-25	O	25.00	15.00	25.00	X	X		X	X			Petroleum & Solvent VOCs & SVOCs detected in 2013	42
Bedrock B55													
SWMW-44	B	30.00	15.00	30.00	X			X				Solvent VOCs detected in 2013	44
SWMW-1	B	30.00	15.00	30.00				X	X			No Detections, Delineation for VOCs, SVOCs	43

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Former Texaco Research Center Beacon
45 Old Glenham Road
Glenham, New York

Well ID	Well Type	Well Depth (ft bgs)	Well Screen Start Depth (ft bgs)	Well Screen End Depth (ft bgs)	VOC Detected	SVOC Detected	Metals Detected	VOC Analysis Proposed SW-846 8260C, SW-846 8260C SIM EPA 524.2	SVOC Analysis Proposed SW-846 8270D, SW-846 8270D SIM SW-846 8270-LL-PAH	Metals Analysis Proposed SW-846 6020B	Supplemental 1,4-Dioxane Sampling SW-846 8270 MOD	Rationale[1]	Sampling Order
B-58/83													
Overburden B58/83													
GT-2	O	9.00	4.00	9.00	X			X				Benzene & Solvent VOCs detected in 2013	46
Unknown Well 1	O	8.65	0.00	8.65	X							Solvent VOCs detected in 2013. Sampling not proposed based on the adjacent impacted well proximity.	
Unknown Well 2	O	8.00	0.00	8.00	X			X				Petroleum & Solvent VOCs detected in 2013	47
Unknown Well 3	O	7.35	0.00	7.35	X							Solvent VOCs detected in 2013. Sampling not proposed based on the adjacent impacted well proximity.	
SWMW-59	O	10.00	4.00	10.00			X	X				Metals Detected historically, Metals sampling not proposed due to lack of evidence of significant plume. Delineation for VOCs	45
Bedrock B58/83													
SWMW-49	B	30.00	10.00	30.00				X				No Detections, Delineation for VOCs	48
SWMW-114	B	45.00	40.00	45.00	X			X				Solvent VOCs detected in 2013	55
SWMW-125	B	39.00	29.00	39.00	X	X		X	X			Benzene & Solvent VOCs & SVOCs detected in 2013	54
ITMW-13	B	20.00	10.00	20.00	X			X				Solvent VOCs detected in 2013	56
ITMW-14	B	20.00	10.00	20.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	53
SWMW-2	B	23.00	13.00	23.00	X			X				Solvent VOCs detected in 2013	52
SWMW-124	B	62.00	42.00	62.00				X				No Detections, Delineation for VOCs	50
BR-2	B	31.50	17.00	32.00	X			X				Benzene & Solvent VOCs detected historically.	57
GT-1	B	30.00	15.00	30.00				X				No Detections, Delineation for VOCs	51
SWMW-5	B	30.00	16.00	31.00				X				No Detections, Delineation for VOCs	49
B-36													
Overburden B36													
SWMW-54	O	9.00	4.00	10.00				X				No Detections, Delineation for VOCs	58
Bedrock B36													
SWMW-45	B	31.00	17.00	32.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	61
SWMW-55	B	20.00	10.00	20.00	X	X		X	X			Solvent VOCs & SVOCs detected in 2013	63
SWMW-123	B	80.00	50.00	80.00	X			X				Petroleum & Solvent VOCs detected in 2013	62
ITMW-29	B	20.00	10.00	20.00				X	X			No Detections, Delineation for VOCs, SVOCs	60
ITMW-31	B	40.00	10.00	40.00	X	X		X	X			Petroleum & Solvent VOCs detected in 2013, SVOCs detected historically	64
ITMW-22	B	40.00	10.21	40.00	X	X		X				Petroleum & Solvent VOCs detected in 2013, SVOCs detected historically. Only VOC Sampling proposed based on the adjacent impacted well proximity.	65
ITMW-12	B	20.00	10.00	20.00				X	X			No Detections, Delineation for VOCs, SVOCs	59
OU-1C													
Overburden South of Creek													
SWMW-72	O	12.00	4.00	13.00				X		X		No Detections, Delineation for VOCs and Metals	66
SWMW-60	O	12.00	3.00	12.00	X		X	X		X		Petroleum VOCs & Metals detected in 2013	74
SWMW-21*	O	12.00	3.00	12.00	X	X	X	X	X	X		Petroleum VOCs, SVOCs, & Metals detected in 2013	73
SWMW-61*	O	12.00	3.00	12.00			X	X		X		Metals detected in 2013, Delineation for VOCs	68
SWMW-50	O	13.00	3.00	13.00			X					Metals detected in 2013. Sampling not proposed based on the adjacent impacted well proximity.	
SWMW-71*	O	13.00	3.00	13.00	X		X	X		X		Petroleum VOCs & Metals detected in 2013	70
SWMW-73	O	12.00	2.00	12.00								No Detections. Sampling not proposed based on the adjacent impacted well proximity.	
SWMW-74	O	18.00	2.00	18.00			X	X		X		Metals detected in 2013. Delineation for VOCs	67
SWMW-20	O	12.00	3.00	12.00		X		X	X	X		SVOCs detected in 2013, Delineation for VOCs and Metals	69
SWMW-30	O	12.00	3.00	12.00	X	X	X	X	X	X		Petroleum VOCs, SVOCs, & Metals detected in 2013	72
SWMW-31	O	9.00	3.00	9.00	X		X	X		X		Petroleum VOCs & Metals detected in 2013	71
SWMW-32	O	12.00	3.00	12.00	X		X	X				Petroleum VOCs & Metals detected in 2013. Only VOC Sampling proposed based on the adjacent impacted well proximity.	78
SWMW-38	O	12.00	3.00	12.00				X		X		No Detections, Delineation for VOCs and Metals	76
SWMW-37	O	10.00	3.00	10.00				X		X		No Detections, Delineation for VOCs and Metals	75
SWMW-29	O	10.00	3.00	10.00			X	X		X		Metals detected in 2013. Delineation for VOCs	77
								78	**43**	**20**	**7**		

Notes:

[1] Sampling rationale described is based on historical analytical results provided in the Appendices B-1, B-2, and B-3 and September 2020 groundwater potentiometric maps (Figures 3 and 4).

* Monitoring wells are planned to be sampled. However, access issues during September 2020 site-wide event were identified and may still prevent Arcadis from sampling. Arcadis will attempt to sample these wells. If an access issue is encountered during the field activities, Arcadis will attempt to supplement the monitoring well meeting the same justification parameters for known impacts and/or gradient location.

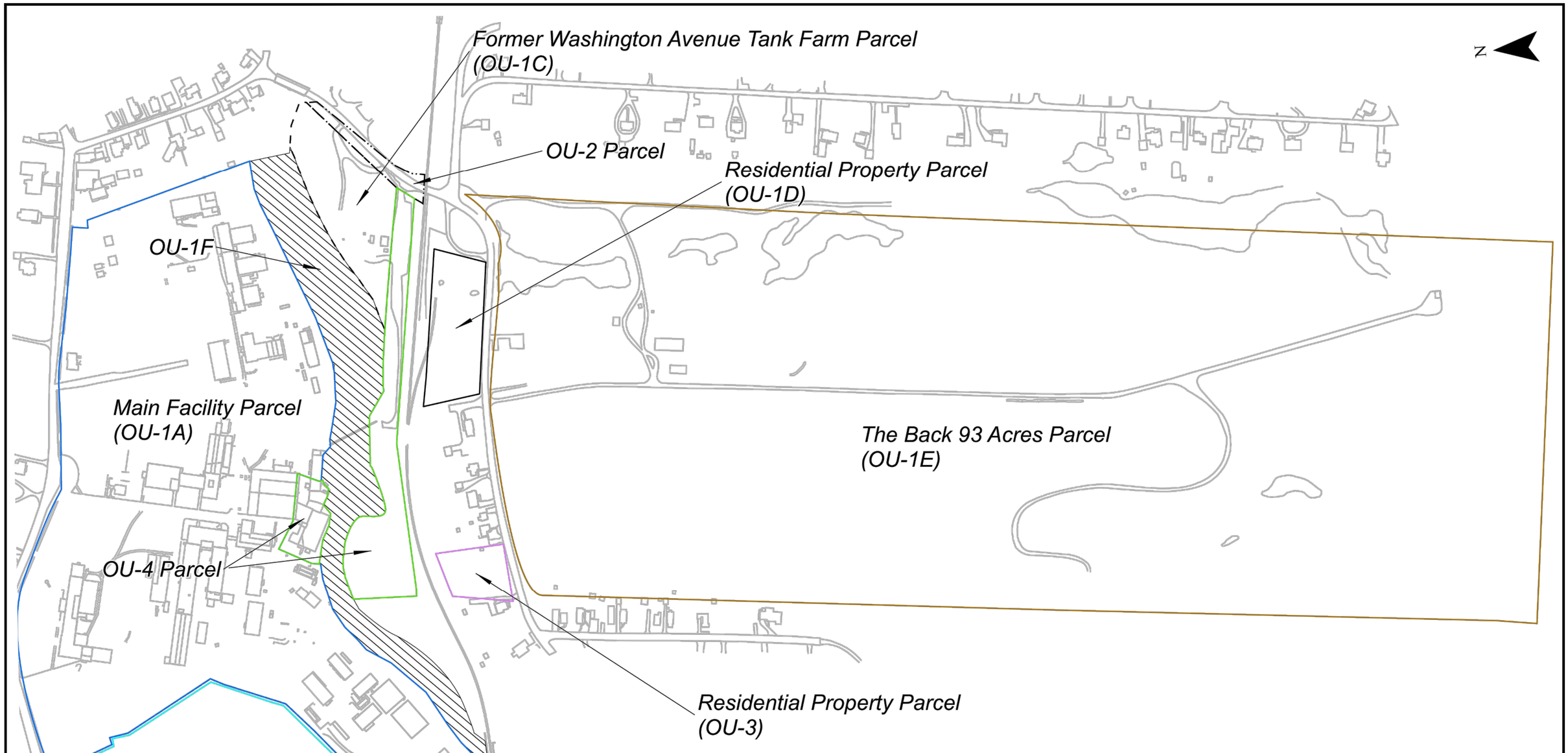
ft bgs = feet below ground surface
SVOC = semi-volatile organic compound
VOC = volatile organic compound

Table 4
Well Redevelopment and Maintenance
Chevron Environmental Management Company
45 Old Glenham Road
Beacon (Glenham), NY

Well ID	Ground Elevation (Ft.-MSL)	TOC Elevation (Ft.-MSL)	Well Depth (Ft.-BGS)	Casing Diameter (Inches)	Casing Length (Ft.-BGS)	Screen Length (Ft.)	Well Screen Start Depth (Ft.-BGS)	Well Screen End Depth (Ft.-BGS)	2020 DTB (ft BTOC)	2020 DTB (ft BGS)	% Sediment in Screen	2020 DTW (ft BTOC)	2020 DTW (ft BGS)	% Sediment in Column	Development Required?	Identified Maintenance Needs
Well Redevelopment																
SB35-4R	185.66	185.22	14.00	2.00	4.00	10.00	4.00	14.00	12.9	13.34	7%	9.71	10.15	17%	X*	Well Redevelopment
SWMW-10	231.40	231.19	9.00	2.00	3.50	5.50	4.00	9.00	7.92	8.13	17%	5.13	5.34	24%	X*	Well Redevelopment
SWMW-21	203.83	206.11	12.00	2.00	5.28	9.00	3.00	12.00	8.78	6.50	61%	8.87	6.59	102%	X	Well Redevelopment
SWMW-54	230.57	229.93	9.00	2.00	3.50	5.50	4.00	10.00	6.48	7.12	38%	6.15	6.79	85%	X	Well Redevelopment
SWMW-66	219.32	218.82	62.00	2.00	42.00	20.00	43.00	63.00	59.17	59.67	12%	21.94	22.44	6%	X	Well Redevelopment
SWMW-106	223.92	225.98	65.50	2.00	47.56	20.00	43.00	63.00	63.00	60.94	20%	37.45	35.39	15%	X	Well Redevelopment
Maintenance Only																
GT-2	217.38	217.06	9.00	2.00	4.00	5.00	4.00	9.00	8.44	8.76	5%	5.51	5.83	8%		Install Bolts and Ring
ITMW-5	220.49	220.18	30.00	2.00	10.00	20.00	10.00	30.00	28.42	28.73	6%	13.75	14.06	8%		Install Bolts
ITMW-6	220.56	220.16	48.00	2.00	28.00	20.00	28.00	48.00	46.6	47.00	5%	23.53	23.93	4%		Install Bolts
ITMW-9	241.88	241.57	23.00	2.00	13.00	10.00	13.00	23.00	22.8	23.11	-1%	14.71	15.02	-1%		Install Bolts
ITMW-25	232.43	232.09	25.00	2.00	15.00	10.00	15.00	25.00	25.3	25.64	-6%	12.78	13.12	-5%		Install Bolts
SWMW-1	229.03	228.85	30.00	2.00	15.00	15.00	15.00	30.00	28.98	29.16	6%	3.92	4.10	3%		Install Bolts and Replace J-plug
SWMW-5	220.00	219.82	30.00	2.00	15.00	15.00	16.00	31.00	29.52	29.70	2%	4.03	4.21	1%		Install Bolts
SWMW-25	232.81	232.61	10.50	2.00	3.50	7.00	4.00	11.00	10.32	10.52	0%	5.6	5.80	0%		Install Bolts and Replace J-plug
SWMW-28	185.84	185.61	16.50	2.00	3.50	13.00	4.00	17.00	15.69	15.92	5%	9.98	10.21	9%		Install Bolts
SWMW-41	206.48	206.02	45.00	2.00	25.00	20.00	25.00	45.00	43.95	44.41	3%	10	10.46	2%		Install Bolts
SWMW-44	231.70	231.53	30.00	2.00	15.00	15.00	15.00	30.00	29.42	29.59	3%	5.07	5.24	2%		Install Bolts and Replace Well Pads
SWMW-45	230.60	229.99	31.00	2.00	16.00	15.00	17.00	32.00	30.66	31.27	-2%	14.23	14.84	-2%		Install Bolts
SWMW-56	221.11	221.09	55.00	2.00	35.00	20.00	35.00	55.00	54.96	54.98	0%	23.52	23.54	0%		Install Bolts
SWMW-62	206.41	206.07	19.00	2.00	4.00	15.00	4.00	19.00	18.54	18.88	1%	9.81	10.15	1%		Install Bolts
SWMW-65	186.32	185.81	16.00	2.00	6.00	10.00	7.00	17.00	15.5	16.01	0%	8.57	9.08	0%		Install Bolts
SWMW-111	218.26	217.92	60.00	2.00	40.00	20.00	40.00	60.00	60.49	60.83	-4%	22	22.34	-2%		Install Bolts
SWMW-112	207.04	206.72	65.00	2.00	55.00	10.00	55.00	65.00	64.75	65.07	-1%	10.55	10.87	0%		Install Bolts
SWMW-113	206.76	206.48	30.00	2.00	20.00	10.00	20.00	30.00	30.48	30.76	-8%	10.07	10.35	-4%		Install Bolts
SWMW-123	230.52	230.39	80.00	2.00	50.00	30.00	50.00	80.00	80.19	80.32	-1%	18.31	18.44	-1%		Install Bolts
SWMW-124	216.39	216.05	62.00	2.00	42.00	20.00	42.00	62.00	62.31	62.65	-3%	5.93	6.27	-1%		Replace Vault, Well Pads, Well Lid, and J-plug
Innaccesible																
ITMW-28	189.68	191.06	20.00	2.00	10.00	10.00	9.00	19.00	--	--	--	--	--	--		Remove Boulder Blocking Well
SWMW-61	201.40	203.76	12.00	2.00	5.36	9.00	3.00	12.00	--	--	--	--	--	--		Abandon Well and Reinstall
SWMW-69	226.44	228.41	22.00	2.00	4.97	19.00	3.00	22.00	--	--	--	--	--	--		Replace Well Pads and Outer Casing

Notes
Wells were selected for redevlopment if their Sediment Accumulation exceeded 10% of either the Water Column or Screen Interval
Only Wells within the sampling program identified as requiring maintenance and/or redevelopment are shown within this table
*Wells were identified as containing less than 1ft of sediment, but low water levels indicate the % of the water column covered by sediment is >10%

Figures



Old Corresponding Area Designation

OU-1A: Northwest Area, Northeast Area, Building 51 Area, Building 45/55 Area, Building 36 Area, and Building 58/83 Area
OU-1B: Church Parcel Area
OU-1C: Former Washington Avenue Tank Farm Parcel
OU-1D: Rail Siding Area
OU-1E: Recreational Area
OU-1F: Fishkill Creek
OU-2: 0.233 acres to be dedicated to the Town of Fishkill.
OU-3: Residential Property Parcel
OU-4: Access Easement, Undeveloped Property and Former Mill Buildings.

Parcels

description, name

- OU-1A Main Facility Parcel
- OU-1B Church Property Parcel
- OU-1C Former Washington Avenue Tank Farm Parcel
- OU-1D Residential Property Parcel
- OU-1F Fishkill Creek
- OU-2 Road Parcel
- OU-3 Residential Property Parcel
- OU-4 Hydroelectric Facility & Dam Parcel
- OU-1E The Back 93 Acres Parcel

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO BEACON RESEARCH CENTER
BEACON, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

SITE LAYOUT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 DOCS\ANA-CHEVRON CORPORATION\BEACON-SITE VISIT AND ONBOARDING ACTIVITIES\2019\B0048866.0000\01-DWG\ECSWP-FIG1-SITE LAYOUT.dwg LAYOUT: 1 SAVED: 3/27/2019 9:16 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE:
---- PLOTTED: 3/27/2019 9:17 PM BY: MEYER, JULIE
XREFS: IMAGES: PROJECTNAME: ----
ecswp-titleblock-tb

CITY:CRANBURY-NJ DIV/GROUP:MDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\jmeyer\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2020\30043615\01-DWG\RIR-FIG1-2-SITE PLAN V2.dwg LAYOUT: 1-2 SAVED: 5/21/2020 10:22 PM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 5/21/2020 10:23 PM BY:
MEYER, JULIE
XREFS: IMAGES:
BEACON-BASEMAP
RIR-TITLEBLOCK-LB
PROJECTNAME: ---

OLD GLENHAM ROAD
RED SCHOOL HOUSE RD
ROCKY GLEN RD (Private)
SCHOOL STREET
MAPLE STREET
METRONORTH RAILROAD
FISHKILL CREEK
DAM WATER FALL
WASHINGTON AVENUE
MATCHLINE: NORTH OF CREEK

OU-1A
OU-1B
OU-1C
OU-1D
OU-1E
OU-1F
OU-2
OU-3
OU-4

B-1, B-2, B-3, B-4, B-5, B-6, B-26, B-28, B-29, B-30, B-31, B-36, B-37, B-38, B-39, B-40, B-41, B-42, B-44, B-49, B-50, B-52, B-54, B-55, B-56, B-57, B-58, B-65, B-67, B-68, B-69, B-70, B-74, B-77, B-79 AUX, B-82, B-85, B-86, B-87, B-88, B-91

BLDG 68-I, BLDG 68-II, BLDG 68-III

FOI 1, FOI 2, FOI 3, FOI 4, FOI 5, FOI 6, FOI 7, FOI 8, FOI 9
T1, T2, T3, T4, T5, T6
U1, U2, U3, U4, U5, U6, U7, U8, U9, U10, U11, U12
A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18
D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16, D17, D18, D19, D20, D22, D23

LEGEND:

- PROPERTY LINE
- FENCE
- RAILROAD
- WETLAND
- STREAM
- INDUSTRIAL WASTE SEWER LINE
- PRODUCT SERVICE LINE
- HISTORICAL DRUM STORAGE AREA
- FOI — FORMER FEATURES OF INTEREST
- U — FORMER UNDERGROUND STORAGE TANK (UST)
- A — FORMER ABOVEGROUND STORAGE TANK (AST)
- D — FORMER DRUM STORAGE LOCATION
- T — FORMER TRANSFORMER LOCATION

PARCELS	
LEGEND	DESCRIPTION, NAME
	OU-1 MAIN FACILITY PARCEL
	OU-1B CHURCH PROPERTY PARCEL
	OU-1C FORMER WASHINGTON AVENUE TANK FARM PARCEL
	OU-1D RESIDENTIAL PROPERTY PARCEL
	OU-1F FISHKILL CREEK
	OU-2 ROAD PARCEL
	OU-3 RESIDENTIAL PROPERTY PARCEL
	OU-4 HYDROELECTRIC FACILITY & DAM PARCEL
	OU-1E THE BACK 93 ACRE PARCEL

NOTE:

1. INDUSTRIAL WASTE SEWER LINE, PRODUCT SERVICE LINE, HISTORICAL DRUM STORAGE AREA, TANKS AND FEATURES OF INTEREST ARE APPROXIMATE AND DIGITIZED FROM GROUNDWATER SCIENCES CORPORATION'S PHASE II ENVIRONMENTAL ASSESSMENT, DATED JUNE 2005.

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
2. WELL AND BORING ELEVATIONS ARE REFERENCED TO A SITE VERTICAL DATUM ESTABLISHED BY TEXACO IN 1957, HEREINAFTER REFERRED TO AS THE TEXACO DATUM, THIS DATUM IS 1.07' BELOW NAVD 1988.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

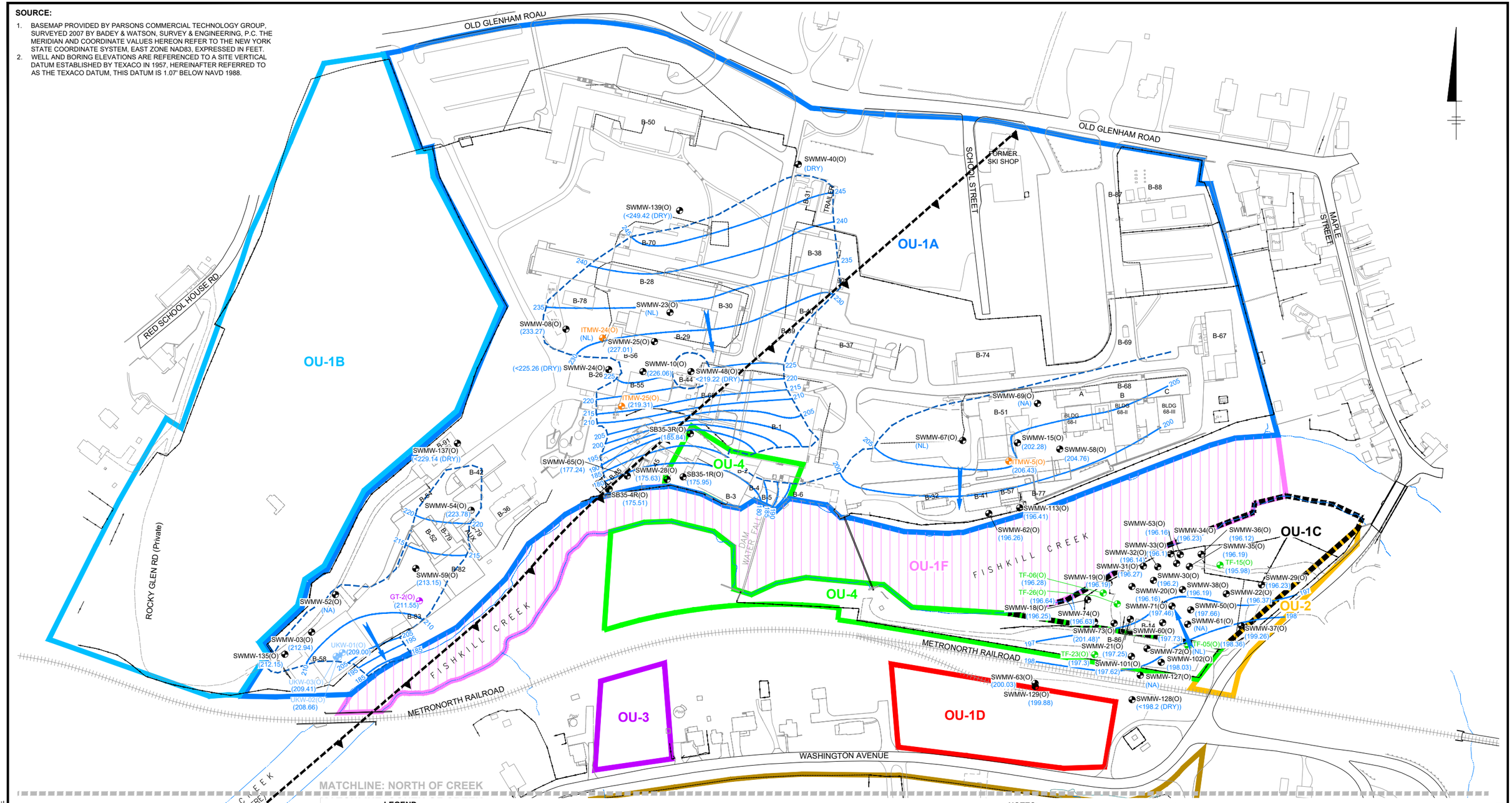
SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
2. WELL AND BORING ELEVATIONS ARE REFERENCED TO A SITE VERTICAL DATUM ESTABLISHED BY TEXACO IN 1957, HEREINAFTER REFERRED TO AS THE TEXACO DATUM, THIS DATUM IS 1.07' BELOW NAVD 1988.



LEGEND:

- FENCE
- RAILROAD
- WETLAND
- STREAM
- (O) MONITORING WELL - OVERBURDEN
- SWMW 2006-2009 PARSONS STATEWIDE RFI AND SUPPLEMENTAL RFI
- ITMW 2000-2001 IT COMPANY ENVIRONMENTAL SITE ASSESSMENT
- BR / GT 1991-1992 GROUNDWATER TECHNOLOGY BUILDING 83 RFI
- TF 1983-1984 TANK FARM INVESTIGATION
- UKW UNKNOWN MONITORING WELLS
- 221.28 GROUNDWATER ELEVATION, IN FEET
- 210 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- REVERSE FAULT, SAW TEETH ON OVERTHRUST BEDROCK
- LIMITS OF SATURATED OVERBURDEN
- * THIS DATA POINT IS ANOMALOUS BASED ON REVIEW OF HISTORIC DATA AT THIS LOCTION; THERE FOR NOT USED IN CONTOURING

PARCELS

LEGEND	DESCRIPTION, NAME
	OU-1A MAIN FACILITY PARCEL
	OU-1B CHURCH PROPERTY PARCEL
	OU-1C FORMER WASHINGTON AVENUE TANK FARM PARCEL
	OU-1D RESIDENTIAL PROPERTY PARCEL
	OU-1F FISHKILL CREEK
	OU-1E THE BACK 93 ACRE PARCEL
	OU-2 ROAD PARCEL
	OU-3 RESIDENTIAL PROPERTY PARCEL
	OU-4 HYDROELECTRIC FACILITY & DAM PARCEL

NOTES:

1. SWMW = SITEWIDE MONITORING WELL
2. ITMW = IT CORPORATION MONITORING WELL
3. TF = TANK FARM MONITORING WELL
4. UNKW = UNKNOWN MONITORING WELL
5. GAUGING EVENT SPANNED THREE DAYS, 9/2/2020 THROUGH 9/4/2020.
6. NA = WELL NOT ACCESSIBLE DURING THIS EVENT.
7. NL = WELL NOT ABLE TO BE LOCATED DURING THIS EVENT.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

OVERBURDEN POTENTIOMETRIC SURFACE - SEPTEMBER 2020

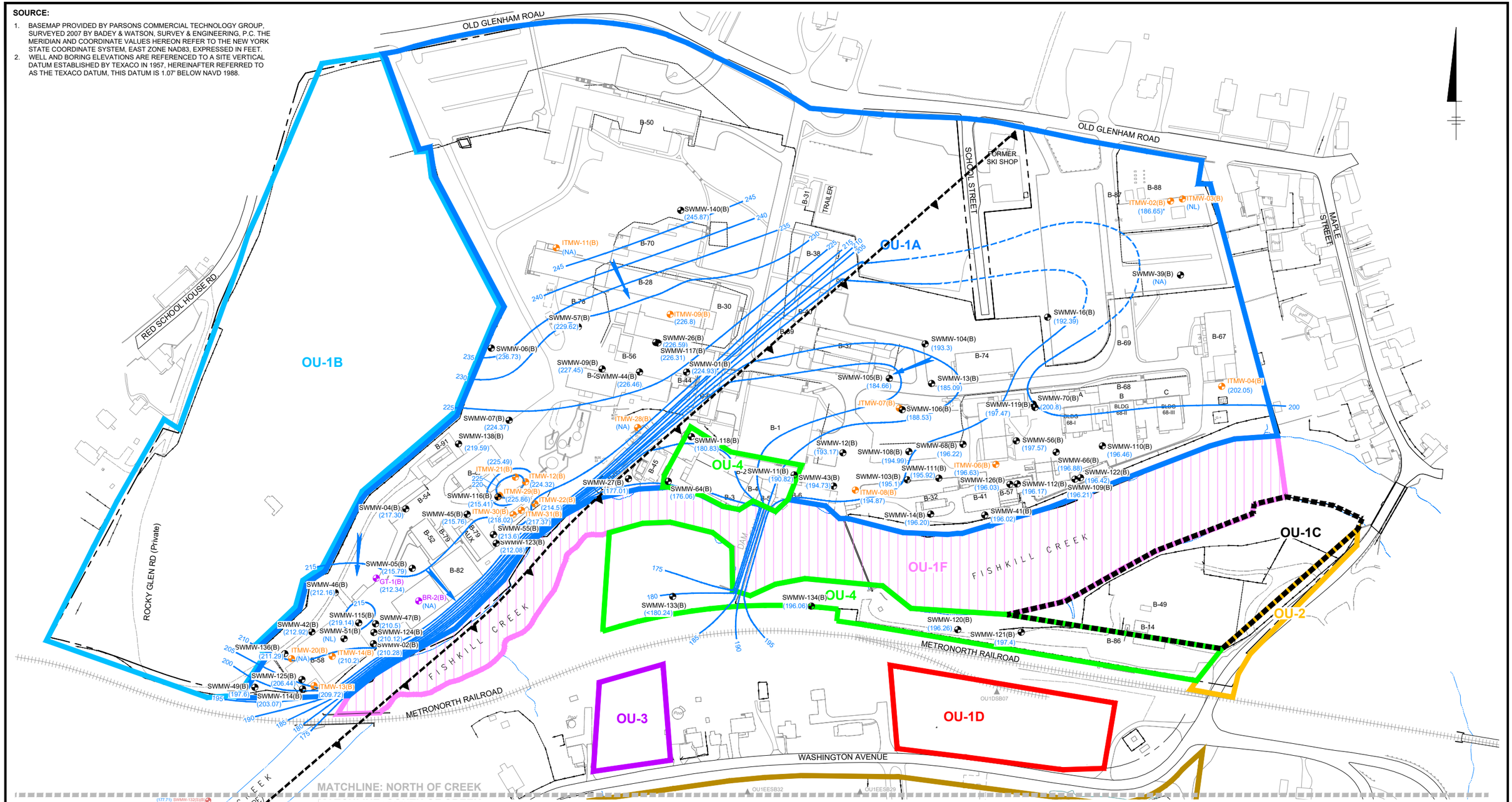
ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

CITY:GRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\jmeyer\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2020\30043815\01-DWG\GWWP-FIG3-LIMIT OF SAT OVERBURDEN POT-SEP 2020.dwg LAYOUT: 3 SAVED: 12/11/2020 9:27 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ----
PLOTTED: 12/11/2020 9:30 AM BY: MEYER, JULIE
XREFS: IMAGES: PROJECTNAME: ---
BEACON-BASEMAP
GW INV WP TB

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
2. WELL AND BORING ELEVATIONS ARE REFERENCED TO A SITE VERTICAL DATUM ESTABLISHED BY TEXACO IN 1957, HEREINAFTER REFERRED TO AS THE TEXACO DATUM, THIS DATUM IS 1.07' BELOW NAVD 1988.



LEGEND:

- FENCE
- RAILROAD
- WETLAND
- STREAM
- (B) MONITORING WELL - BEDROCK
- SWMW 2006-2009 PARSONS STATEWIDE RFI AND SUPPLEMENTAL RFI
- SWMW-### 2013 ADJACENT PROPERTY MONITORING WELLS
- ITMW 2000-2001 IT COMPANY ENVIRONMENTAL SITE ASSESSMENT
- BR / GT 1991-1992 GROUNDWATER TECHNOLOGY BUILDING 83 RFI
- UKW UNKNOWN MONITORING WELLS
- 221.28 GROUNDWATER ELEVATION, IN FEET
- * DEEP BEDROCK WELLS, VALUES NOT USED IN CONTOURING
- 210 GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- REVERSE FAULT, SAW TEETH ON OVERTHRUST BEDROCK

PARCELS

LEGEND	DESCRIPTION, NAME
	OU-1 MAIN FACILITY PARCEL
	OU-1B CHURCH PROPERTY PARCEL
	OU-1C FORMER WASHINGTON AVENUE TANK FARM PARCEL
	OU-1D RESIDENTIAL PROPERTY PARCEL
	OU-1F FISHKILL CREEK
	OU-2 ROAD PARCEL
	OU-3 RESIDENTIAL PROPERTY PARCEL
	OU-4 HYDROELECTRIC FACILITY & DAM PARCEL
	OU-1E THE BACK 93 ACRE PARCEL

NOTES:

1. SWMW = SITEWIDE MONITORING WELL
2. ITMW = IT CORPORATION MONITORING WELL
3. TF = TANK FARM MONITORING WELL
4. UNKW = UNKNOWN MONITORING WELL
5. ADJACENT PROPERTY WELLS (WELLS 130-132) WERE GAUGED DURING A SEPARATE EVENT ON 9/21/2020. NOT USED IN CONTOURING, BUT INCLUDED FOR CLARITY.
6. GAUGING EVENT SPANNED THREE DAYS, 9/2/2020 THROUGH 9/4/2020.
7. NA = WELL NOT ACCESSIBLE DURING THIS EVENT.
8. NL = WELL NOT ABLE TO BE LOCATED DURING THIS EVENT.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

INFERRED BEDROCK POTENTIOMETRIC SURFACE - SEPTEMBER 2020

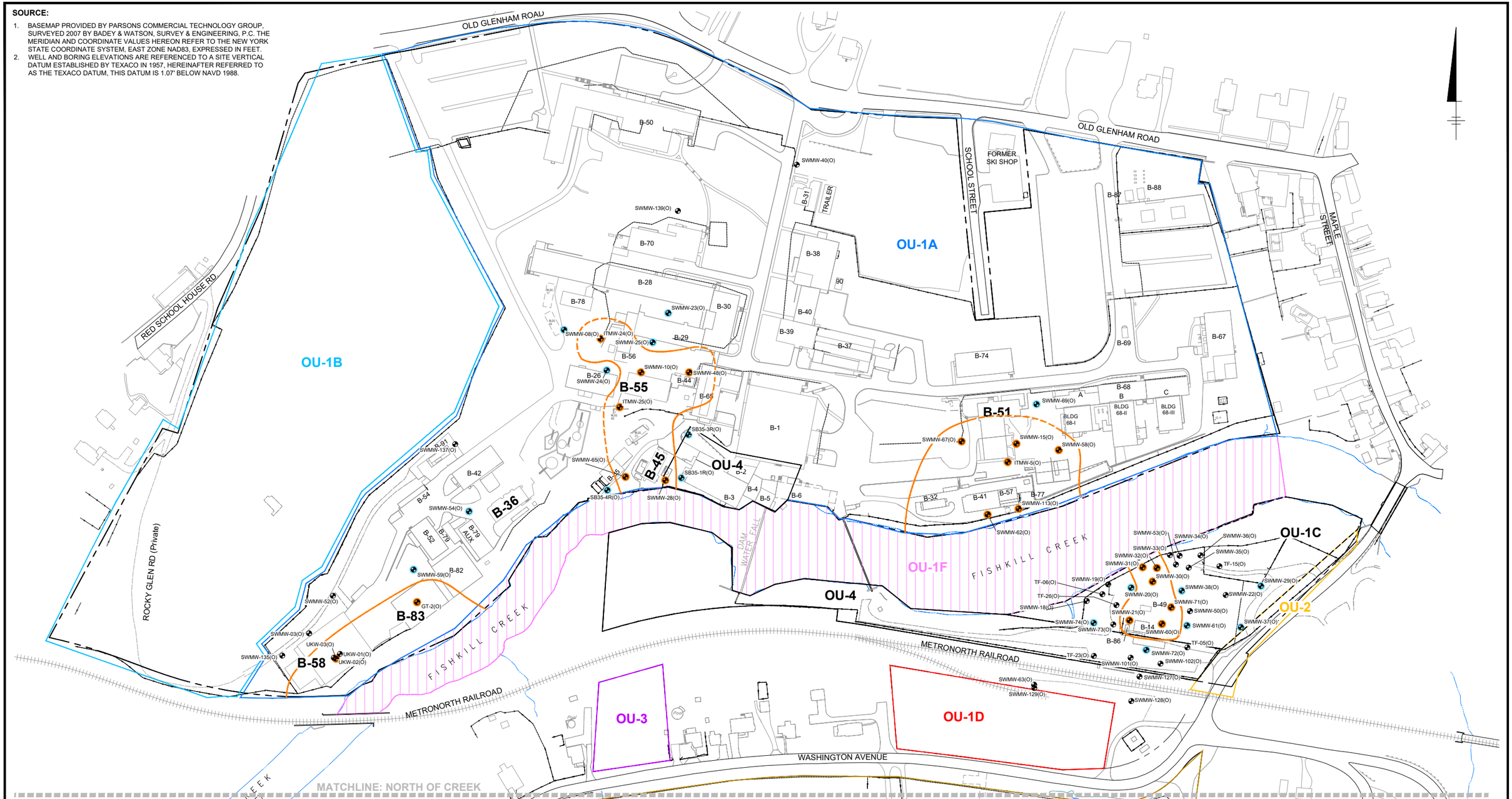
ARCADIS Design & Consultancy for natural and built assets

FIGURE 4

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(On)ON=*;OFF=*REF*
C:\Users\jmeyer\BM 380\Acadsv\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021\01\DWG\GWWP-FIG 4-INFERRED BEDROCK POT-SEP 2020.dwg LAYOUT: 4 SAVED: 3/3/2021 10:36 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/3/2021
10:36 AM BY: MEYER, JULIE
XREFS: IMAGES: PROJECTNAME: ----
BEACON-BASEMAP
GW INV WP TB

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
2. WELL AND BORING ELEVATIONS ARE REFERENCED TO A SITE VERTICAL DATUM ESTABLISHED BY TEXACO IN 1957, HEREINAFTER REFERRED TO AS THE TEXACO DATUM, THIS DATUM IS 1.07' BELOW NAVD 1988.



LEGEND:

- FENCE
- RAILROAD
- WETLAND
- STREAM
- (O) MONITORING WELL - OVERBURDEN
- SWMW 2006-2009 PARSONS STATEWIDE RFI AND SUPPLEMENTAL RFI
- ITMW 2000-2001 IT COMPANY ENVIRONMENTAL SITE ASSESSMENT
- BR / GT 1991-1992 GROUNDWATER TECHNOLOGY BUILDING 83 RFI
- TF 1983-1984 TANK FARM INVESTIGATION
- UKW UNKNOWN MONITORING WELLS
- VOCS
- DELINEATION WELL FOR VOCS
- INFERRED PLUME BOUNDARY

PARCELS

LEGEND	DESCRIPTION, NAME
	OU-1A MAIN FACILITY PARCEL
	OU-1B CHURCH PROPERTY PARCEL
	OU-1C FORMER WASHINGTON AVENUE TANK FARM PARCEL
	OU-1D RESIDENTIAL PROPERTY PARCEL
	OU-1F FISHKILL CREEK
	OU-1E THE BACK 93 ACRE PARCEL
	OU-2 ROAD PARCEL
	OU-3 RESIDENTIAL PROPERTY PARCEL
	OU-4 HYDROELECTRIC FACILITY & DAM PARCEL

NOTES:

1. SWMW = SITEWIDE MONITORING WELL
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6. SOLID LINES INDICATE THAT NOT ENOUGH ANALYTICAL DATA IS AVAILABLE TO DEFINE THAT EDGE OF THE PLUME AREA.
7. WELLS RINGED WITH LIGHTER COLORS INDICATE THAT SAMPLING WILL OCCUR FOR THE PURPOSE OF DELINEATION.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

OVERBURDEN GROUNDWATER RATIONALE - VOC

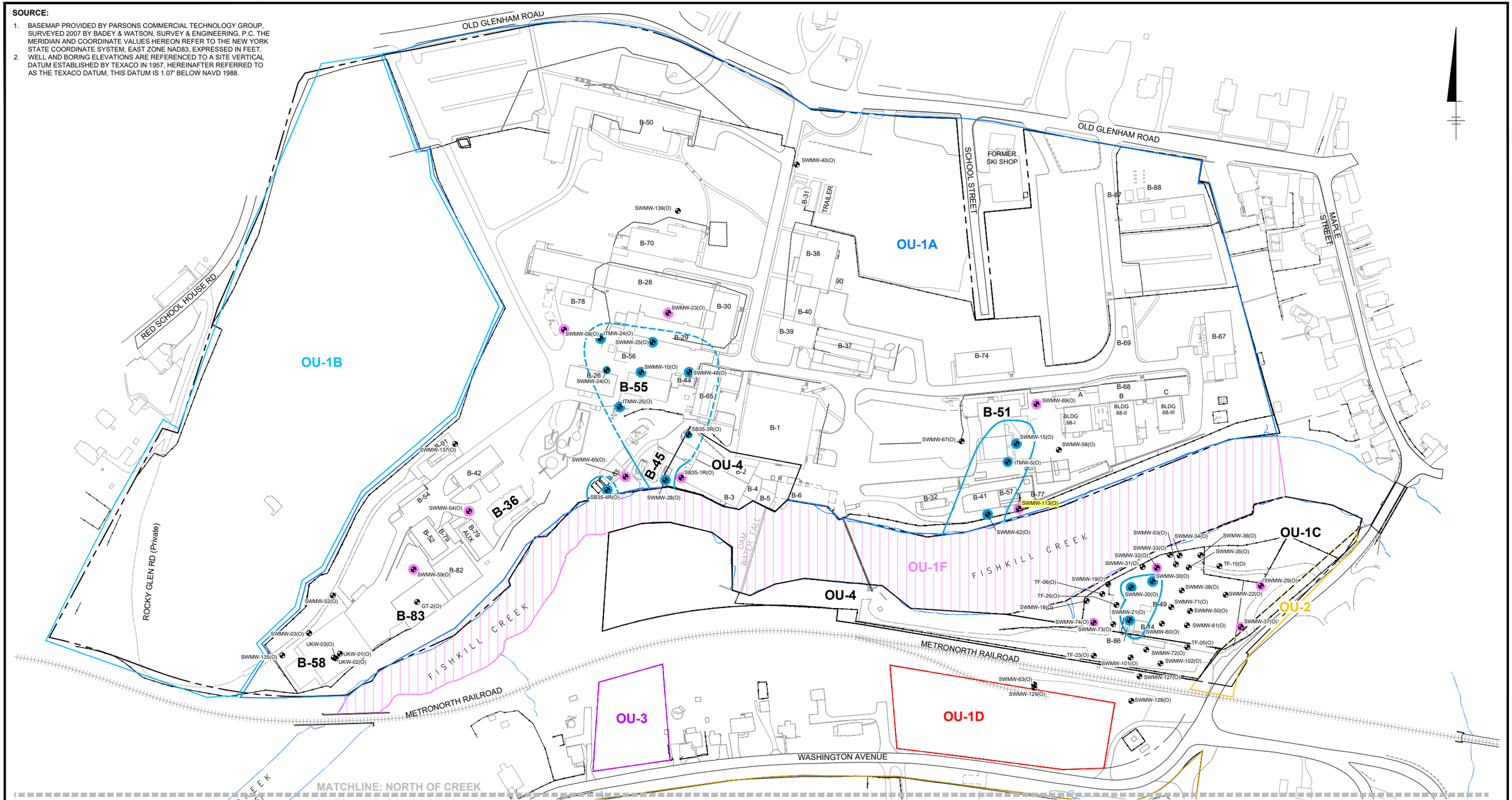
ARCADIS Design & Consultancy for natural and built assets

FIGURE
5A

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021\01-DWG\GWWP-FIG 5A-OVERBURDEN GW RATIONAL-VOC.dwg LAYOUT: 5A SAVED: 3/3/2021 8:00 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/29/2021 11:04 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ----
BEACON-BASEMAP
GW INV WP TB

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
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- UKW UNKNOWN MONITORING WELLS
- SVOCS
- DELINEATION WELL FOR SVOCS
- INFERRED PLUME BOUNDARY
- UKW DELINEATION WELL FOR 1,4-DIOXANE

PARCELS

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GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

OVERBURDEN GROUNDWATER RATIONALE -SVOCs

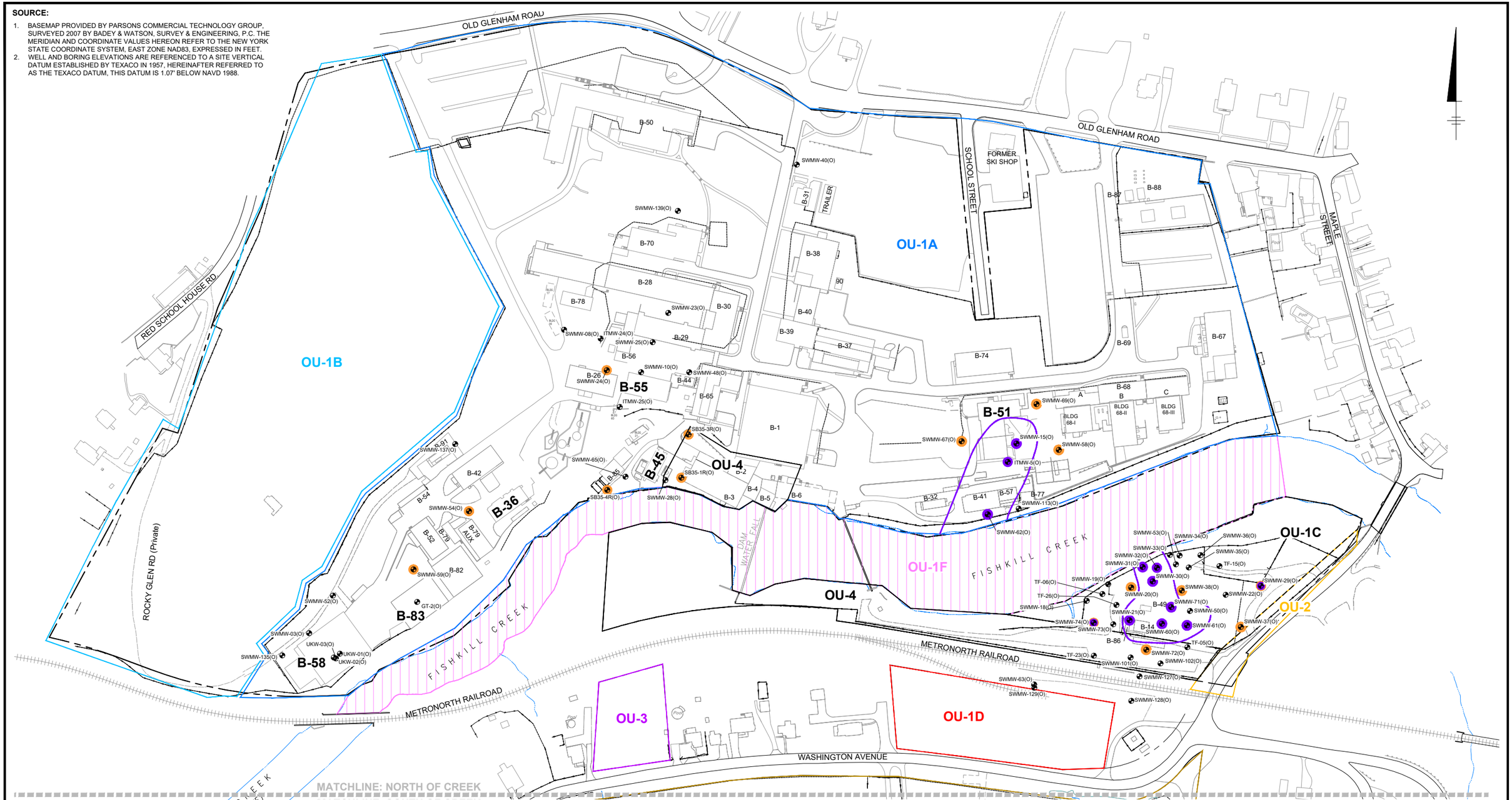
ARCADIS Design & Consultancy for natural and built assets

FIGURE
5B

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021101-DWG\GWWP-FIG 5B-OVERBURDEN GW RATIONAL-SVOC.dwg LAYOUT: 5B SAVED: 3/3/2021 8:03 AM ACADVER: 23.1S (LMS TECH) PAGESETUP:---- PLOTSTYLETABLE:---- PLOTTED:
3/29/2021 11:06 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ----
BEACON-BASEMAP
GW INV WP TB

SOURCE:

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- METALS
- DELINEATION WELL FOR METALS
- INFERRED PLUME BOUNDARY

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GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

OVERBURDEN GROUNDWATER RATIONALE - METALS

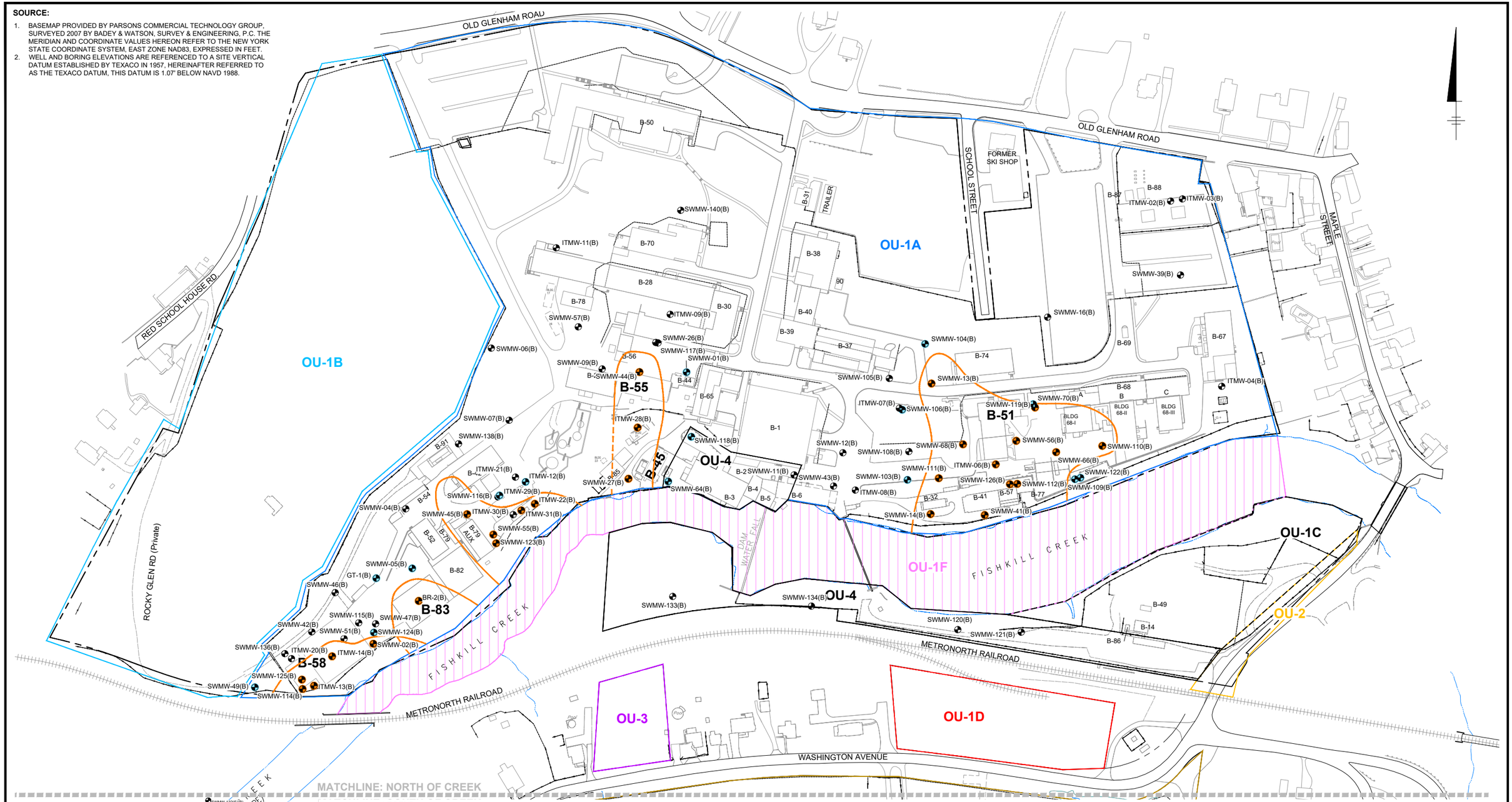
ARCADIS Design & Consultancy for natural and built assets

FIGURE
5C

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\BM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021101-DWG\GWWP-FIG 5C-OVERBURDEN GW RATIONAL-METALS.dwg LAYOUT: 5C SAVED: 2/22/2021 7:08 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/29/2021 11:11 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ----
BEACON-BASEMAP
GW INV WP TB

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
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FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

BEDROCK GROUNDWATER RATIONALE - VOCs

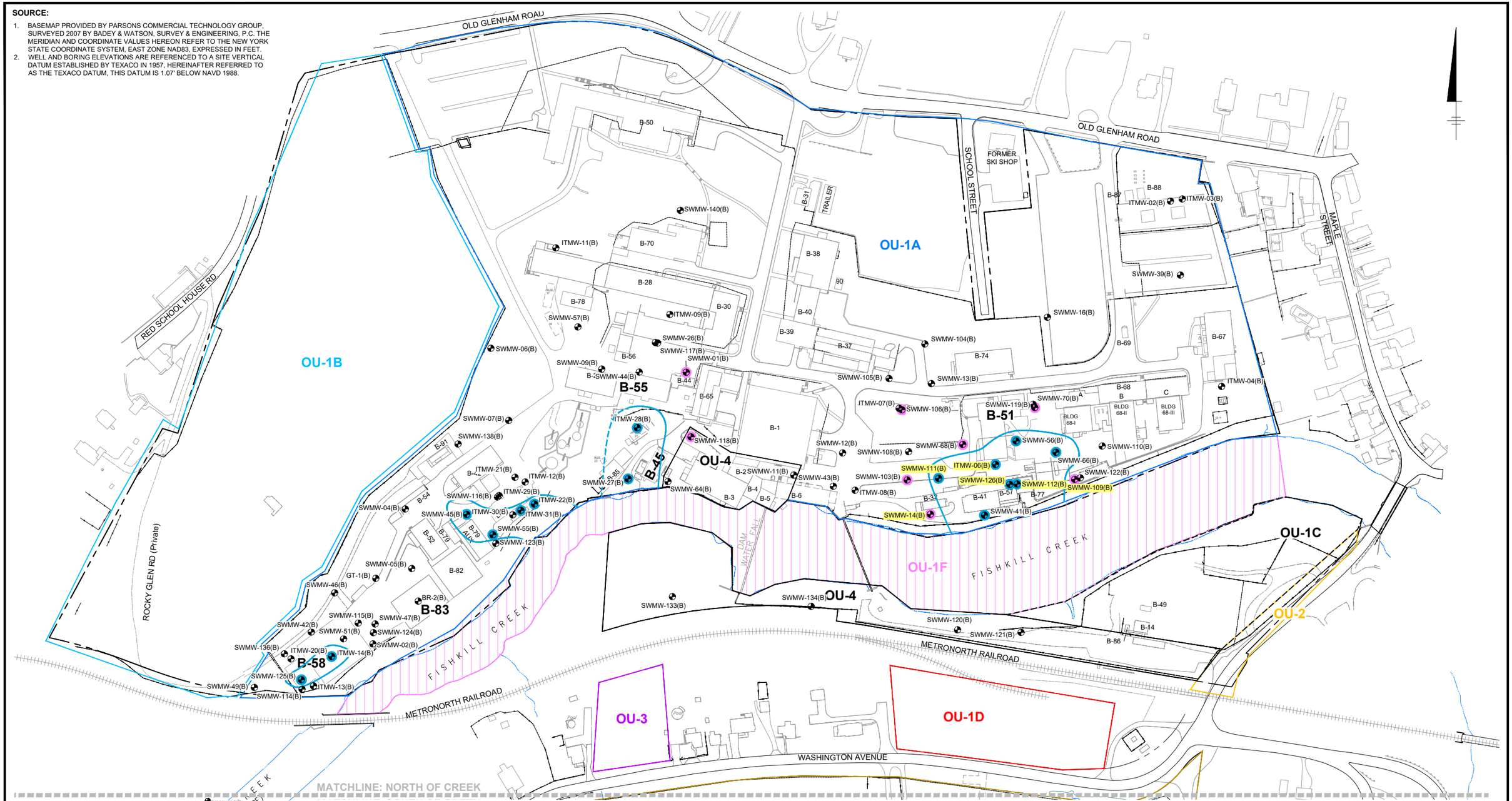
ARCADIS Design & Consultancy for natural and built assets

FIGURE
6A

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021101-DWG\GWWP-FIG 6A-BEDROCK GW RATIONALE-VOC.dwg LAYOUT: 6A SAVED: 3/3/2021 7:43 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/29/2021
11:17 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ----
BEACON-BASEMAP
GW INV WP TB

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1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
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CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

BEDROCK GROUNDWATER RATIONALE - SVOCs

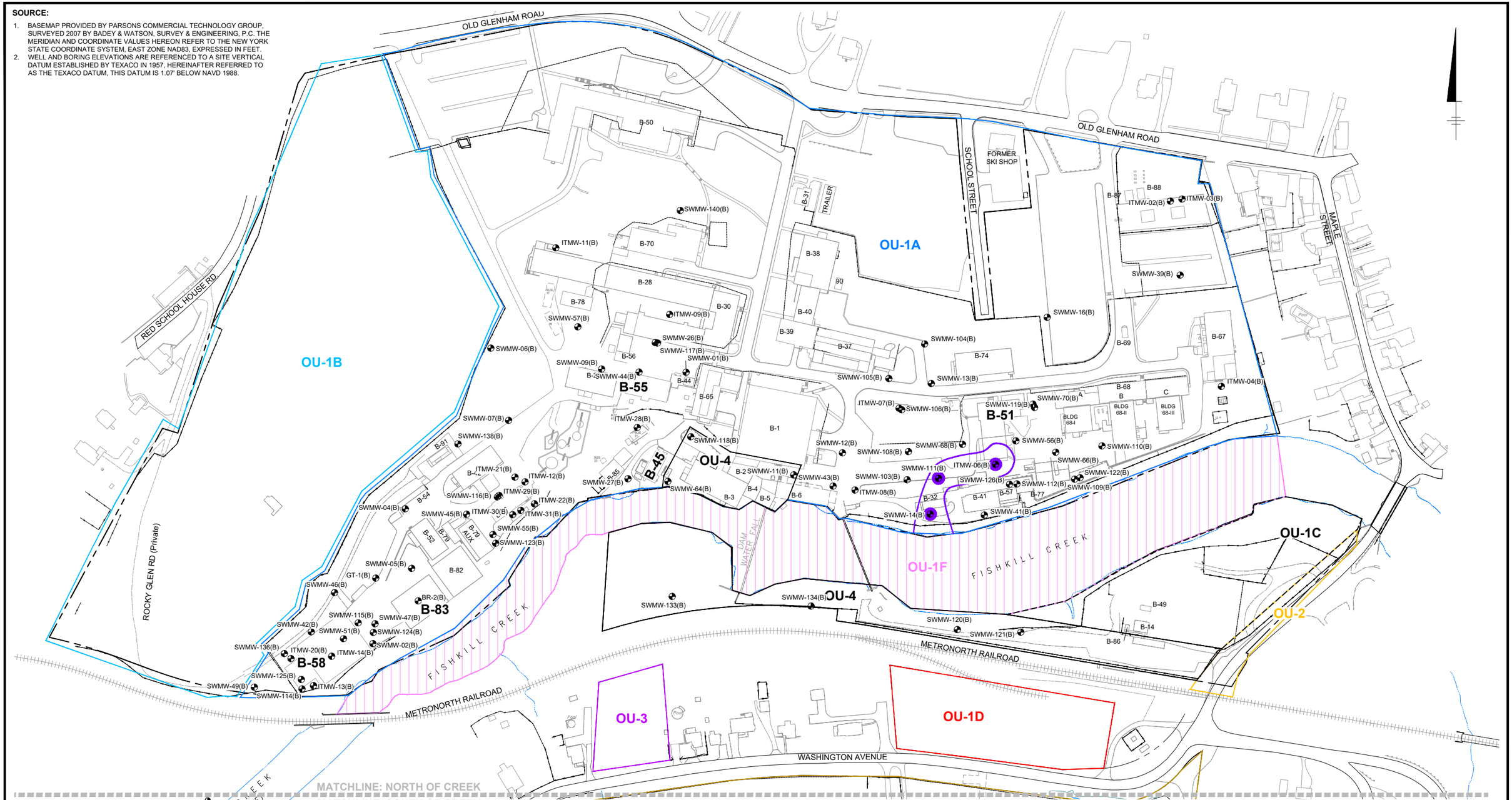
ARCADIS Design & Consultancy for natural and built assets

FIGURE
6B

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021\01-DWG\GWIWP-FIG 6B-BEDROCK GW RATIONALE-SVOC.dwg LAYOUT: 6B SAVED: 3/3/2021 7:48 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/29/2021
11:32 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ---
BEACON-BASEMAP
GW INV WP TB

SOURCE:

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CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

BEDROCK GROUNDWATER RATIONALE - METALS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6C

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\20210101-DWG\GWIWP-FIG 6C-BEDROCK GW RATIONALE-METALS.dwg LAYOUT: 6C SAVED: 3/3/2021 7:54 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 3/29/2021 11:37 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ---
BEACON-BASEMAP
GW INV WP TB

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OLD GLENHAM ROAD
RED SCHOOL HOUSE RD
ROCKY GLEN RD (Private)
SCHOOL STREET
MAPLE STREET
FORMER SKI SHOP
TRAILER
DAM
WATER FALL
FISHKILL CREEK
METRONORTH RAILROAD
WASHINGTON AVENUE
OU-1A
OU-1B
OU-1C
OU-1D
OU-1F
OU-2
OU-3
OU-4
B-55
B-51
B-83
B-58
B-36
B-45
B-50
B-70
B-28
B-78
B-30
B-56
B-26
B-44
B-65
B-1
B-42
B-54
B-52
B-19
B-79 AUX
B-82
B-31
B-38
B-40
B-39
B-37
B-74
B-69
B-67
B-68
B-87
B-88
B-49
B-14
B-86
B-2
B-3
B-4
B-5
B-6
B-32
B-41
B-57
B-77
B-91
BLDG 68-I
BLDG 68-II
BLDG 68-III
MATCHLINE: NORTH OF CREEK
FISHKILL CREEK (APPROXIMATED HERE)

LEGEND:

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- STREAM
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- (O) PROPOSED GROUNDWATER SAMPLING LOCATION - OVERBURDEN
- (B) PROPOSED GROUNDWATER SAMPLING LOCATIONS - BEDROCK

PARCELS

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3. TF = TANK FARM MONITORING WELL
4. UNKW = UNKNOWN MONITORING WELL
5. ROUGH PLUME AREAS FOR VOCS, SVOCS AND METALS ARE GENERATED BASED ON THE INFERRED GROUNDWATER FLOW AND HISTORICAL ANALYTICAL RESULTS.
6. SOLID LINES INDICATE THAT NOT ENOUGH ANALYTICAL DATA IS AVAILABLE TO DEFINE THAT EDGE OF THE PLUME AREA.
7. WELLS RINGED WITH LIGHTER COLORS INDICATE THAT SAMPLING WILL OCCUR FOR THE PURPOSE OF DELINEATION.

0 100' 200'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK
GROUNDWATER INVESTIGATION WORK PLAN

PROPOSED GROUNDWATER SAMPLING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 7

CITY:GRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\JDLoving\IBM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021\01-DWG\GW\WP-FIG 7-PROPOSED SAMPLING LOCATIONS.dwg LAYOUT: 7 SAVED: 3/29/2021 11:44 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/29/2021 11:45 AM BY: LOVING, JEFF
XREFS: IMAGES: PROJECTNAME: ---
BEACON-BASEMAP
GW INV WP TB

Appendix A

NYSDEC Revised Remedial Investigation Report Comment Letter

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 11th Floor, Albany, NY 12233-7014
P: (518) 402-9662 I F: (518) 402-9679
www.dec.ny.gov

Sent via E-mail

October 2, 2020

Mark R. Hendrickson
Project Manager
Chevron Environmental Management Company
Specialty EM Business Unit
1500 Louisiana Street
Houston, Texas 77002
mhendrickson@chevron.com

Re: Remedial Investigation Report, Revision 1, June 2020
Former Texaco Research Center Site, Site No. 3-14-004
Town of Fishkill, Dutchess County

Dear Mr. Hendrickson,

The New York State Department of Environmental Conservation (the Department) in consultation with the New York State Department of Health has completed its review of the Remedial Investigation Report (RI Report), Revision 1, dated June 2020 submitted by Arcadis on behalf of Chevron Environmental Management Company for the site listed above. In accordance with 6 NYCRR Part 375-1.6(d)(3) the Department requests the following modifications be made to the RI Report:

The modifications provided below are separated into two groups. Report Modifications are changes which must be made to the RI Report, Revision 1 document. These changes may be made by adding to or replacing applicable portions of the RI Report, Revision 1. Upon incorporation of these modifications, the Department will consider the RI Report complete.

Supplemental Modifications are tasks which must be completed as part of the Remedial Investigation for the site but may be provided to the Department for review separately or in addendums to the RI Report. These tasks may be completed concurrently with the Feasibility Study for the site.

Report Modifications:

Report Modification 1, Groundwater Isopleths: Groundwater concentration contour figures for key constituents of concern which display concentration gradients must be

included in the RI Report. These figures were previously provided in Appendix H of the August 2019 version of the RI Report and must be amended to the final RI Report.

Report Modification 2, 3D Figure Format and Functionality: 3D figures provided with the RI Report are difficult to navigate in pdf format. A single frame version of each 3D figure must be generated for the RI Report. The single frame version must zoom to the most relevant angle of each figure. Figure sizes should be increased as appropriate so that single frame pdf versions of 3D figures are legible.

Report Modification 3, Soil Vapor Intrusion Figure: Detected concentrations of constituents encountered in soil vapor samples must be presented on a figure in the RI Report. The Department and NYSDOH will review detected concentrations of constituents in soil vapor to determine if additional sampling or action is necessary.

Report Modification 4, Status of Storage Tanks: The RI Report must include the current status of all storage tanks listed in Table 2.

Report Modification 5, Monitoring Well Summary Table: The monitoring well summary table Chevron provided to the Department by e-mail on June 5, 2019 must be incorporated into the RI Report.

Report Modification 6, 1,4-Dioxane: The RI Report must identify 1,4-Dioxane as a constituent of concern for the site based on its presence in groundwater samples collected from OU-1A and OU-1E. The presence of 1,4-Dioxane in OU-1A is likely associated with co-located levels of 1,1,1-TCA and will be addressed in the remedy selection process. At this time, the presence of 1,4-Dioxane in OU-1E may be addressed by the addition of 1,4-Dioxane to the semi-annual groundwater monitoring program currently in place for OU-1E. The Department requests that 1,4-Dioxane samples at wells DB-8A and DB-17 be added to the semi-annual groundwater monitoring program at this time.

Report Modification 7, Section 8.1.8: The RI Report must state that a Human Health Exposure Assessment (HHEA) will be completed in accordance with DER-10, Appendix 3B.

<u>Supplemental Modifications:</u>

Supplemental Modification 1, Human Health Exposure Assessment (HHEA): Based on a review of the data provided in the RI Report (including a review of background soil data summarized in Tables 3-8A and 3-8B), the Department recommends that the qualitative HHEA be completed based on the comparisons of concentrations to Department Standards, Criteria, and Guidelines currently included in the RI Report. The Department's SCGs take into consideration quantitative risk assessment

Supplemental Modification 2, Constituent of Concern, Acetone: Acetone must be identified as a constituent of concern only in cases where concentrations cannot be attributed to lab contamination. Following review, the status of acetone as a contaminant of concern for the site should be reconsidered.

Supplemental Modification 3, Site Constituents of Concern Evaluation: The Department generally concurs with the identification of site constituents of concerns (COCs) as identified in Section 2.1 of the RI Report. As identified above, 1,4-Dioxane must be added as a COC and acetone's status as a COC must be reviewed further. Given the historic use and nature of contamination at the site, a review of all other constituents detected above SCGs needs to be completed to determine if these constituents are COCs.

Supplemental Modification 4, SVOC and Metal Impacts to Subsurface Soil and Groundwater: The RI Report illustrates metal and SVOC concentrations above Protection of Groundwater SCOs and the locations where metals and SVOCs exceed groundwater standards. From these illustrations, it is difficult to tell which metals and SVOCs in soil are contributing to groundwater impacts. A more thorough analysis is needed of the connection between elevated SVOC and metal concentrations in soils and groundwater. Groundwater concentration isopleth maps should be generated for key SVOC and metal constituents for comparison to soil data.

Supplemental Modification 5, Operable Unit 2: Characterization of Operable Unit 2 (OU-2) will be necessary in order to confirm that OU-2 is not impacted by site contaminants. This characterization may be deferred at this time and is not required for completion of the RI Report. It is recommended that OU-2 be combined with the adjacent OU-1C for the Feasibility Study phase of the remedial program for the site. If present, impacts to OU-2 soil and groundwater would most likely originate in OU-1C. The proposed realignment of Washington Ave and the Washington Ave bridge may result in greater ease of access to OU-2 during subsequent phases of the remedial program.

In accordance with 6 NYCRR Part 375-1.6(d)(3), the Department requests that Chevron notify the Department within 15 days of receipt of this letter whether it accepts the Department's modifications provided above.

The Department requests that Chevron provide a revised RI Report incorporating Report Modifications within 30 days of receipt of this letter. The Department further requests that within 45 days of receipt of this letter, Chevron provide a revised project schedule which includes supplemental modification tasks and implementation of feasibility studies for each Operable Unit.

If you have any questions or concerns, please feel free to contact me at (518) 402-9662.

Sincerely,

William Bennett

William Bennett
Professional Engineer 1
Remedial Bureau C
Division of Environmental Remediation

ec: Mark Hendrickson, Chevron (mhendrickson@chevron.com)
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Appendix B

Historical Site Data

APPENDIX B-1

OU-1A Overburden Analytical Results

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	GT-2 1113255 5487985 10/2/2008 GT-2(10-2-08) REG	GT-2 1195373 5985321 5/19/2010 GT-2(5-19-10) REG	GT-2 1341939 6821817 10/11/2012 GT-2(101112) REG	GT-2 1395751 7086906 6/7/2013 GT-2(060713) REG	GT-2 1460835 7400682 3/19/2014 GT-2-031914 REG	GT-2 1479522 7487858 6/4/2014 GT-2-060414 REG	GT-2 1503937 7602493 9/16/2014 CVX-0030-02 REG	GT-2 1516213 7662958 11/4/2014 CVX-0034-10 REG	GT-2 1548024 7819746 3/24/2015 CVX-0046-01 REG	GT-2 1569290 7929748 6/15/2015 CVX-0047-01 REG	GT-2 1593311 8049698 9/15/2015 CVX-0062-01 REG	GT-2 1608498 8129227 11/10/2015 GT-2-W-4.00-151110 REG	GT-2 1669977 8417060 6/8/2016 GT-2-W-4.00-160608 REG	ITMW-24 995867 4806970 6/30/2006 ITMW-24 REG	ITMW-24 1114221 5493849 10/8/2008 ITMW-24(10-8-08) REG	ITMW-24 1195186 5984076 5/18/2010 ITMW-24(5-18-10) REG	ITMW-24 1343539 6830363 10/18/2012 ITMW-24(101812) REG
Volatile Organic Compounds																				
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	5	4 J	2	3	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.8	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	2 J	2 J	1	1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	11	10	7	9	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.7 J
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
Acetone	67-64-1	50	NA	10 J	< 6	< 6	< 6	--	--	--	--	--	--	--	--	--	--	< 6	< 6	< 6
Benzene	71-43-2	1	NA	95	71	97	140	150	220	120	160	89	120	120	100	97	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	160	240	180	290	260	340	300	330	340	360	220	270	370	3 J	19	10	3 J
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	--	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	1 J	2 J	1 J	3 J	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	1 J	2 J	1 J	2 J	--	--	--	--	--	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	< 2	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	2 J	< 0.8	2 J	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																				
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 10	< 10	< 11	--	--	--	--	--	--	--	--	--	< 21	< 21	< 10	< 9

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	GT-2 1113255 5487985 10/2/2008 GT-2(10-2-08) REG	GT-2 1195373 5985321 5/19/2010 GT-2(5-19-10) REG	GT-2 1341939 6821817 10/11/2012 GT-2(101112) REG	GT-2 1395751 7086906 6/7/2013 GT-2(060713) REG	GT-2 1460835 7400682 3/19/2014 GT-2-031914 REG	GT-2 1479522 7487858 6/4/2014 GT-2-060414 REG	GT-2 1503937 7602493 9/16/2014 CVX-0030-02 REG	GT-2 1516213 7662958 11/4/2014 CVX-0034-10 REG	GT-2 1548024 7819746 3/24/2015 CVX-0046-01 REG	GT-2 1569290 7929748 6/15/2015 CVX-0047-01 REG	GT-2 1593311 8049698 9/15/2015 CVX-0062-01 REG	GT-2 1608498 8129227 11/10/2015 GT-2-W-4.00-151110 REG	GT-2 1669977 8417060 6/8/2016 GT-2-W-4.00-160608 REG	ITMW-24 995867 4806970 6/30/2006 ITMW-24 REG	ITMW-24 1114221 5493849 10/8/2008 ITMW-24(10-8-08) REG	ITMW-24 1195186 5984076 5/18/2010 ITMW-24(5-18-10) REG	ITMW-24 1343539 6830363 10/18/2012 ITMW-24(101812) REG
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	0.7 J	1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	0.2 J	1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.09
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	2 J	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 11	--	--	--	--	--	--	--	--	--	< 11	< 10	< 10	< 9
Acenaphthene	83-32-9	20	NA	1 J	2 J	3	2	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.09
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	0.3 J	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.1 J
Anthracene	120-12-7	50	NA	< 1	< 1	0.9	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.1 J
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	1	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.2 J
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	0.7	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.3 J
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	1	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.5
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	0.5	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.3 J
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	0.4 J	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.2 J
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	6	8	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	2 J	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 1	0.7 J	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	< 1	< 1	1	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.2 J
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	15	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.09
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	0.9 J	0.8 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 1	4	0.2 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.3 J
Fluorene	86-73-7	50	NA	< 1	1 J	3	2	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.09
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.09
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	0.4 J	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.2 J
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	3 J	< 1	0.7	3	--	--	--	--	--	--	--	--	--	< 1	2 J	< 1	< 0.09
Nitrobenzene	98-95-3	0.4	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	59-50-7	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
Pentachlorophenol	87-86-5	1	NA	< 3	< 3	< 1	< 1	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0.9
Phenanthrene	85-01-8	50	NA	< 1	< 1	2	0.2 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.1 J
Phenol	108-95-2	1	NA	< 1	3 J	1	3	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5
Pyrene	129-00-0	50	NA	1 J	< 1	4	0.3 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	0.4 J
Metals																				
Arsenic	7440-38-2	25	NA	17.2 J	8.6 J	43.2	9.9 J	--	--	--	--	--	--	--	--	--	< 10	< 10.2	< 7.2	18.1 J
Lead	7439-92-1	25	NA	< 6.9	< 6.9	69.9	14.5 J	--	--	--	--	--	--	--	--	--	< 6.9	< 6.9	< 6.9	49.3
Mercury	7439-97-6	0.7	NA	< 0.056	< 0.056	0.098 J	< 0.070	--	--	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.056	0.26

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	GT-2	ITMW-24	ITMW-24	ITMW-24	ITMW-24
Sample Delivery Group (SDG)				1113255	1195373	1341939	1395751	1460835	1479522	1503937	1516213	1548024	1569290	1593311	1608498	1669977	995867	1114221	1195186	1343539
Lab Sample ID				5487985	5985321	6821817	7086906	7400682	7487858	7602493	7662958	7819746	7929748	8049698	8129227	8417060	4806970	5493849	5984076	6830363
Sample Date				10/2/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	9/16/2014	11/4/2014	3/24/2015	6/15/2015	9/15/2015	11/10/2015	6/8/2016	6/30/2006	10/8/2008	5/18/2010	10/18/2012
Field Sample ID				GT-2(10-2-08)	GT-2(5-19-10)	GT-2(101112)	GT-2(060713)	GT-2-031914	GT-2-060414	CVX-0030-02	CVX-0034-10	CVX-0046-01	CVX-0047-01	CVX-0062-01	GT-2-W-4.00-151110	GT-2-W-4.00-160608	ITMW-24	ITMW-24(10-8-08)	ITMW-24(5-18-10)	ITMW-24(101812)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019																	

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25
Sample Delivery Group (SDG)				1398234	1462188	1547125	1669538	1669538		1114664	1137957	1195186	1342157	1398230	1462188	1479931	1504322
Lab Sample ID				7098432	7407266	7815458	8415279	8415292	NA	5496347	5633598	5984075	6822984	7098417	7407274	7489806	7604422
Sample Date				6/18/2013	3/25/2014	3/20/2015	6/7/2016	6/7/2016	7/28/2000	10/9/2008	3/26/2009	5/18/2010	10/12/2012	6/18/2013	3/25/2014	6/5/2014	9/17/2014
Field Sample ID				ITMW-24(061813)	ITMW-24-032514	CVX-0045-01	ITMW-24-W-5.00	ITMW-124-WD-5.00	ITMW-24-0-0-07282000-W	ITMW-25(10-9-08)	ITMW-25(3-26-09)	ITMW-25(5-18-10)	ITMW-25(101212)	ITMW-25(061813)	ITMW-25-032514	ITMW-25-060514	CVX-0031-01
Sample Purpose				REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	--	--	--	--	< 1	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	--	--	--	--	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	--	--	--	--	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	--	--	--	--	< 5	< 1	< 1	< 1	< 1	< 1	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	< 5	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.6	--	--	--	--	< 5	14	12	9	9	8	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.6	--	--	--	--	< 5	< 1	< 1	< 1	0.5 J	< 0.5	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.6	--	--	--	--	4.8	13	13	10	10	9	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	--	--	--	--	< 50	4 J	< 3	< 3	< 3	< 3	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	--	--	--	--	< 50	< 3	< 3	< 3	< 3	< 3	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	--	--	--	--	< 50	< 3	< 3	< 3	< 3	< 3	--	--	--
Acetone	67-64-1	50	NA	< 6	--	--	--	--	< 50	< 6	< 6	10 J	< 6	< 6	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	220	170	280	830	280	340	480	800
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	< 2	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Bromoform	75-25-2	50	NA	< 1	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	--	--	--	--	< 5	< 1	< 1	< 1	< 1	< 1	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--
Chlorobenzene	108-90-7	5	NA	6	12	6	5	5	36.6	88	86	110	120	60	63	77	110
Chloroethane	75-00-3	5	NA	< 1	--	--	--	--	< 5	< 1	< 1	< 1	< 1	< 1	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	--	--	--	--	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	--	--	--	--	< 10	< 1	< 1	< 1	< 1	< 1	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	--	--	--	--	< 0.5	< 1	< 1	< 1	< 1	< 1	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	--	--	--	--	< 5	18	11	17	20	< 0.8	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	--	--	--	--	17.9 B	< 2	< 2	< 2	< 2	< 2	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	--	--	--	< 5	< 1	< 1	< 1	< 1	< 1	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	--	--	--	--	< 1	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Toluene	108-88-3	5	NA	< 0.7	--	--	--	--	< 5	1 J	1 J	3 J	8	3 J	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	--	--	--	--	< 0.5	< 1	< 1	< 1	< 1	< 1	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	< 5	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	--	--	--	--	< 10	9	7	13	20	8	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.6	--	--	--	--	--	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 11	--	--	--	--	--	< 21	< 20	< 10	< 10	< 11	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25
Sample Delivery Group (SDG)				1398234	1462188	1547125	1669538	1669538		1114664	1137957	1195186	1342157	1398230	1462188	1479931	1504322
Lab Sample ID				7098432	7407266	7815458	8415279	8415292	NA	5496347	5633598	5984075	6822984	7098417	7407274	7489806	7604422
Sample Date				6/18/2013	3/25/2014	3/20/2015	6/7/2016	6/7/2016	7/28/2000	10/9/2008	3/26/2009	5/18/2010	10/12/2012	6/18/2013	3/25/2014	6/5/2014	9/17/2014
Field Sample ID				ITMW-24(061813)	ITMW-24-032514	CVX-0045-01	ITMW-24-W-5.00	ITMW-124-WD-5.00	ITMW-24-0-0-07282000-W	ITMW-25(10-9-08)	ITMW-25(3-26-09)	ITMW-25(5-18-10)	ITMW-25(101212)	ITMW-25(061813)	ITMW-25-032514	ITMW-25-060514	CVX-0031-01
Sample Purpose				REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	--	--	--	< 3	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	--	--	--	< 3	< 2	< 2	< 2	< 2	< 2	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 6	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.6	--	--	--	--	< 2	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.6	--	--	--	--	< 1	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.6	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 11	--	--	--	--	--	< 10	< 10	< 10	< 10	< 11	--	--	--
Acenaphthene	83-32-9	20	NA	< 0.1	--	--	--	--	< 1	60	54	60	63	49	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.1	--	--	--	--	< 1	15	14	16	17	12	--	--	--
Anthracene	120-12-7	50	NA	< 0.1	--	--	--	--	< 1	< 1	1 J	2 J	1	0.6	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	--	--	--	--	< 1	1 J	2 J	1 J	1	0.5 J	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	0.8	0.4 J	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	0.5	0.2 J	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	0.4 J	0.1 J	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	0.2 J	< 0.1	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.6	--	--	--	--	< 3	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	--	--	--	1.1 B	< 2	< 2	2 J	< 2	< 2	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	--	--	--
Carbazole	86-74-8	NA	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	0.7 J	< 0.5	--	--	--
Chrysene	218-01-9	0.002	NA	< 0.1	--	--	--	--	< 1	1 J	2 J	1 J	1	0.6	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.6	--	--	--	--	--	< 1	< 1	< 1	0.6 J	< 0.5	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	--	--	--
Fluoranthene	206-44-0	50	NA	< 0.1	--	--	--	--	< 1	1 J	2 J	2 J	2	1	--	--	--
Fluorene	86-73-7	50	NA	< 0.1	--	--	--	--	< 1	4 J	3 J	4 J	4	3	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.6	--	--	--	--	< 2	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 6	--	--	--	--	< 1	< 5	< 5	< 5	< 5	< 5	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	0.2 J	< 0.1	--	--	--
Isophorone	78-59-1	50	NA	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.6	--	--	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
Naphthalene	91-20-3	10	NA	< 0.1	--	--	--	--	< 1	5	2 J	5 J	13	3	--	--	--
Nitrobenzene	98-95-3	0.4	NA	< 0.6	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	< 0.6	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
Pentachlorophenol	87-86-5	1	NA	< 1	--	--	--	--	--	< 3	< 3	< 3	< 1	< 1	--	--	--
Phenanthrene	85-01-8	50	NA	< 0.1	--	--	--	--	< 1	6	6	13	10	5	--	--	--
Phenol	108-95-2	1	NA	< 0.6	--	--	--	--	--	6	6	6	2	18	--	--	--
Pyrene	129-00-0	50	NA	< 0.1	--	--	--	--	< 1	4 J	5	4 J	5	3	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	< 6.8	--	--	--	--	--	< 10.2	< 10.0	< 7.2	8.5 J	< 6.8	--	--	--
Lead	7439-92-1	25	NA	< 4.7	--	--	--	--	--	< 6.9	< 6.9	< 6.9	9.1 J	< 4.7	--	--	--
Mercury	7439-97-6	0.7	NA	< 0.070	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-24	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25
Sample Delivery Group (SDG)				1398234	1462188	1547125	1669538	1669538		1114664	1137957	1195186	1342157	1398230	1462188	1479931	1504322
Lab Sample ID				7098432	7407266	7815458	8415279	8415292	NA	5496347	5633598	5984075	6822984	7098417	7407274	7489806	7604422
Sample Date				6/18/2013	3/25/2014	3/20/2015	6/7/2016	6/7/2016	7/28/2000	10/9/2008	3/26/2009	5/18/2010	10/12/2012	6/18/2013	3/25/2014	6/5/2014	9/17/2014
Field Sample ID				ITMW-24(061813)	ITMW-24-032514	CVX-0045-01	ITMW-24-W-5.00	ITMW-124-WD-5.00	ITMW-24-0-0-07282000-W	ITMW-25(10-9-08)	ITMW-25(3-26-09)	ITMW-25(5-18-10)	ITMW-25(101212)	ITMW-25(061813)	ITMW-25-032514	ITMW-25-060514	CVX-0031-01
Sample Purpose				REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																
Report Units are in ug/L.																	
Grey Background: Result Exceeds TOGS or Tapwater RSL																	
< : Not detected at the laboratory method detection limit.																	
J : Result detected between the reporting limit and the method detection limit.																	
--: Not analyzed for																	
NA: Standard not Applicable																	

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5
Sample Delivery Group (SDG)				1516585	1547125	1570188	1592070	1608899	1669538		995866	1022233	1115029	1195720	1342893	1398940	1463182	1546899
Lab Sample ID				7664705	7815459	7933920	8043665	8131657	8415280	NA	4806962	4962198	5498260	5987999	6826955	7103156	7412718	7813893
Sample Date				11/5/2014	3/20/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	7/28/2000	6/30/2006	1/18/2007	10/14/2008	5/21/2010	10/16/2012	6/20/2013	3/28/2014	3/19/2015
Field Sample ID				CVX-0035-01	CVX-0045-02	CVX-0049-01	CVX-0060-01	ITMW-25-W-15.00-151111	ITMW-25-W-15.00	ITMW-25-0-0-07282000-W	ITMW-5	ITMW-5011807	ITMW-5(10-14-08)	ITMW-5(5-21-10)	ITMW-5(101612)	ITMW-5(062013)	ITMW-5-032814	CVX-0044-01
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019															
Volatile Organic Compounds																		
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	< 1	2 J	< 0.8	< 0.8	< 0.8	< 0.8	1 J	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	< 2	2 J	1 J	2 J	< 0.8	< 0.8	3 J	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	< 5	< 1	< 1	1 J	< 1	< 1	< 1	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	< 1	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	< 1	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	< 5	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	8	--	--	--	20.8	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	< 1	--	--	--	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	9	--	--	--	< 2	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	< 50	--	< 3	< 3	< 3	< 3	< 3	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	< 50	--	< 3	< 3	< 3	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	< 50	--	< 3	< 3	< 3	< 3	< 3	--	--
Acetone	67-64-1	50	NA	--	--	--	--	--	--	< 50	--	< 6	< 6	< 6	< 6	< 6	--	--
Benzene	71-43-2	1	NA	850	< 0.5	270	160	340	570	467	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	< 2	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	< 5	--	< 1	< 1	< 1	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	200	< 0.5	70	49	57	73	170	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	< 5	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	< 10	< 1	< 1	< 1	< 1	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 5	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	< 2	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	--	--	14	--	--	--	101	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	4	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	17.7 B	< 2	< 2	< 2	< 2	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	--	22	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	< 5	--	< 1	< 1	< 1	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	< 1	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	--	--	4	--	--	--	< 5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	< 5	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	8	7	5 J	2 J	2 J	5 J	6	6
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	< 5	< 2	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	--	26	--	--	--	36.6	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Semivolatile Organic Compounds																		
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3	< 0.5	< 0.6	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	< 21	< 20	< 19	< 11	< 9	< 11	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5
Sample Delivery Group (SDG)				1516585	1547125	1570188	1592070	1608899	1669538		995866	1022233	1115029	1195720	1342893	1398940	1463182	1546899
Lab Sample ID				7664705	7815459	7933920	8043665	8131657	8415280	NA	4806962	4962198	5498260	5987999	6826955	7103156	7412718	7813893
Sample Date				11/5/2014	3/20/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	7/28/2000	6/30/2006	1/18/2007	10/14/2008	5/21/2010	10/16/2012	6/20/2013	3/28/2014	3/19/2015
Field Sample ID				CVX-0035-01	CVX-0045-02	CVX-0049-01	CVX-0060-01	ITMW-25-W-15.00-151111	ITMW-25-W-15.00	ITMW-25-0-0-07282000-W	ITMW-5	ITMW-5011807	ITMW-5(10-14-08)	ITMW-5(5-21-10)	ITMW-5(101612)	ITMW-5(062013)	ITMW-5-032814	CVX-0044-01
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019															
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.9	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	< 3	< 2	< 2	< 2	< 2	< 0.4	< 0.5	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	0.1 J	< 0.1	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	< 4	< 2	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	< 6	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 0.5	< 0.6	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.6	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	< 10	< 10	< 10	< 11	< 9	< 11	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	59.4	< 1	< 1	< 1	< 1	0.3 J	< 0.1	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	21.1	< 1	< 1	< 1	< 1	0.6	0.2 J	--	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	5	< 1	< 1	< 1	< 1	0.7	0.1 J	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	2	0.7	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	3	0.9	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	4	2	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	3	0.9	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	2	0.7	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	35.1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	1.6 B	< 2	< 2	< 2	< 2	5	< 2	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	0.5 J	< 0.6	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	3	1	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	0.5 J	0.1 J	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	< 1	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	1.4	< 1	< 1	< 1	< 1	5	2	--	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	17.4	< 1	< 1	< 1	< 1	0.3 J	< 0.1	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.09	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	< 1	< 5	< 5	< 5	< 5	< 5	< 6	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	17.7	< 1	< 1	< 1	< 1	< 0.9	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	2	0.8	--	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	18.4	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 0.5	< 0.6	--	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	28.9	< 1	< 1	< 1	< 1	< 0.5 J	< 0.1	--	--
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	--	--	1.6	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3	< 0.9	< 1	--	--
Phenanthrene	85-01-8	50	NA	--	--	--	--	--	--	34.6	< 1	< 1	< 1	< 1	2	0.9	--	--
Phenol	108-95-2	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.6	--	--
Pyrene	129-00-0	50	NA	--	--	--	--	--	--	2.4	< 1	< 1	< 1	< 1	4	1	--	--
Metals																		
Arsenic	7440-38-2	25	NA	--	--	--	--	--	--	--	< 10	< 10	< 10.2	< 7.2	17.1 J	42.9	--	--
Lead	7439-92-1	25	NA	--	--	--	--	--	--	--	< 6.9	< 6.9	< 6.9	< 6.9	138	448	--	--
Mercury	7439-97-6	0.7	NA	--	--	--	--	--	--	--	< 0.090 J	< 0.056	< 0.056	< 0.056	3	11.8	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
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Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-25	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5	ITMW-5
Sample Delivery Group (SDG)				1516585	1547125	1570188	1592070	1608899	1669538		995866	1022233	1115029	1195720	1342893	1398940	1463182	1546899
Lab Sample ID				7664705	7815459	7933920	8043665	8131657	8415280	NA	4806962	4962198	5498260	5987999	6826955	7103156	7412718	7813893
Sample Date				11/5/2014	3/20/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	7/28/2000	6/30/2006	1/18/2007	10/14/2008	5/21/2010	10/16/2012	6/20/2013	3/28/2014	3/19/2015
Field Sample ID				CVX-0035-01	CVX-0045-02	CVX-0049-01	CVX-0060-01	ITMW-25-W-15.00-151111	ITMW-25-W-15.00	ITMW-25-0-0-07282000-W	ITMW-5	ITMW-5011807	ITMW-5(10-14-08)	ITMW-5(5-21-10)	ITMW-5(101612)	ITMW-5(062013)	ITMW-5-032814	CVX-0044-01
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																	

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-5 1670992 8421615 6/10/2016 ITMW-5-W-10.00-160610 REG	ITMW-5 NA 3/1/2000 ITMW-05-0-0-03012000-W REG	ITMW-5 NA 8/28/2000 ITMW-05-0-0-08282000-W REG	PCFGW-001 1341936 6821794 10/10/2012 PCFGW-1(10-10-12) REG	PCFGW-002 1341936 6821795 10/10/2012 PCFGW-2(10-10-12) REG	PCFGW-010 1341936 6821791 10/10/2012 PCFGW-10(10-10-12) REG	PCFGW-011 1341936 6821789 10/10/2012 PCFGW-11(10-10-12) REG	PCFGW-012 1341936 6821788 10/10/2012 PCFGW-12(10-10-12) REG	PCFGW-013 1341936 6821790 10/10/2012 PCFGW-13(10-10-12) REG	PCFGW-014 1340582 6815132 10/5/2012 PCFGW-14(10-5-12) REG	PCFGW-015 1340582 6815133 10/5/2012 PCFGW-15(10-5-12) REG
Volatile Organic Compounds														
1,1 Dichloroethene	**75-35-4**	**5**	**NA**	--	< 5	< 1	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	**71-55-6**	**5**	**NA**	--	2 J	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	**79-34-5**	**5**	**NA**	--	< 5	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	**79-00-5**	**1**	**NA**	--	< 5	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	**75-34-3**	**5**	**NA**	--	2 J	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	**87-61-6**	**NA**	**7**	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	**120-82-1**	**5**	**NA**	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
1,2-Dibromo-3-chloropropane (DBCP)	**96-12-8**	**NA**	**0.00033**	--	< 10	< 5	--	--	--	--	--	--	--	--
1,2-Dibromoethane	**106-93-4**	**NA**	**0.0075**	--	< 5	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	**95-50-1**	**3**	**NA**	--	< 5	< 5	< 5	1	< 0.5	1	61 J	0.9 J	< 5	< 5
1,2-Dichloroethane	**107-06-2**	**0.6**	**NA**	--	< 5	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	**540-59-0**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	**78-87-5**	**1**	**NA**	--	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	**541-73-1**	**3**	**NA**	--	< 5	< 5	< 5	5	< 0.5	3	91 J	3	< 5	< 5
1,4-Dichlorobenzene	**106-46-7**	**3**	**NA**	--	< 5	< 2	< 5	5	< 0.5	3	160	3	< 5	< 5
2-Butanone (Methyl ethyl ketone)	**78-93-3**	**50**	**NA**	--	< 10	< 50	< 3	6 J	< 3	14	< 3	< 3	< 3	3 J
2-Hexanone	**591-78-6**	**50**	**NA**	--	< 10	< 50	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	**108-10-1**	**NA**	**6300**	--	< 10	< 50	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	**67-64-1**	**50**	**NA**	--	3 JB	< 50	< 6	33	< 6	5,800	16 J	9 J	< 6	46
Benzene	**71-43-2**	**1**	**NA**	1	< 5	< 1	< 0.5	1 J	< 0.5	2 J	4 J	0.8 J	< 0.5	2 J
Bromochloromethane	**74-97-5**	**NA**	**83**	--	< 5	< 2	--	--	--	--	--	--	--	--
Bromodichloromethane	**75-27-4**	**50**	**NA**	--	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	**75-25-2**	**50**	**NA**	--	< 5	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	**74-83-9**	**5**	**NA**	--	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	**75-15-0**	**60**	**NA**	--	< 5	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	**56-23-5**	**5**	**NA**	--	< 5	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	**108-90-7**	**5**	**NA**	0.9 J	< 5	< 4	< 0.8	290	< 0.8	390	1,300	140	< 0.8	< 0.8
Chloroethane	**75-00-3**	**5**	**NA**	--	< 10	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	**67-66-3**	**7**	**NA**	--	< 5	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	**74-87-3**	**5**	**NA**	--	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	**156-59-2**	**5**	**NA**	110	< 5	< 5	2 J	< 0.8	< 0.8	< 0.8	2 J	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	**10061-01-5**	**0.4**	**NA**	--	< 5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	**124-48-1**	**50**	**NA**	--	< 5	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Diisopropyl ether	**108-20-3**	**NA**	**1500**	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	**637-92-3**	**NA**	**NA**	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	**100-41-4**	**5**	**NA**	--	< 5	5	< 0.8	< 0.8	< 0.8	19	51	1 J	< 0.8	< 0.8
m,p-Xylenes	**XYLENES-MP**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	**1634-04-4**	**10**	**NA**	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	**75-09-2**	**5**	**NA**	--	< 5	< 5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	**95-47-6**	**NA**	**190**	--	--	--	--	--	--	--	--	--	--	--
Styrene	**100-42-5**	**5**	**NA**	--	< 5	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	**994-05-8**	**NA**	**NA**	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	**75-65-0**	**NA**	**NA**	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	**127-18-4**	**5**	**NA**	--	< 5	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	**108-88-3**	**5**	**NA**	--	< 5	< 5	< 0.7	< 0.7	< 0.7	3 J	7	< 0.7	< 0.7	1 J
trans-1,2-Dichloroethene	**156-60-5**	**5**	**NA**	--	< 5	--	< 0.8	< 0.8	< 0.8	< 0.8	0.9 J	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	**10061-02-6**	**0.4**	**NA**	--	< 5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	**79-01-6**	**5**	**NA**	66	3 J	6.3	21	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	**75-69-4**	**5**	**NA**	--	< 10	< 5	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	**75-01-4**	**2**	**NA**	1	< 10	< 1	< 1	< 1	< 1	< 1	2 J	< 1	< 1	< 1
Xylene (total)	**1330-20-7**	**5**	**NA**	--	< 15	< 10	< 0.8	< 0.8	< 0.8	10	35	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**NA**	**1.7**	--	< 5	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	--	--	--	< 100	< 10	< 10	< 10	< 1,000	< 11	< 100	< 100

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-5 1670992 8421615 6/10/2016 ITMW-5-W-10.00-160610 REG	ITMW-5 NA 3/1/2000 ITMW-05-0-0-03012000-W REG	ITMW-5 NA 8/28/2000 ITMW-05-0-0-08282000-W REG	PCFGW-001 1341936 6821794 10/10/2012 PCFGW-1(10-10-12) REG	PCFGW-002 1341936 6821795 10/10/2012 PCFGW-2(10-10-12) REG	PCFGW-010 1341936 6821791 10/10/2012 PCFGW-10(10-10-12) REG	PCFGW-011 1341936 6821789 10/10/2012 PCFGW-11(10-10-12) REG	PCFGW-012 1341936 6821788 10/10/2012 PCFGW-12(10-10-12) REG	PCFGW-013 1341936 6821790 10/10/2012 PCFGW-13(10-10-12) REG	PCFGW-014 1340582 6815132 10/5/2012 PCFGW-14(10-5-12) REG	PCFGW-015 1340582 6815133 10/5/2012 PCFGW-15(10-5-12) REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 5	< 1	< 10	< 1	< 1	< 1	< 100	< 1	< 10	< 10
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 5	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2-Chloronaphthalene	91-58-7	10	NA	--	< 5	< 3	< 4	< 0.4	< 0.4	< 0.4	< 40	< 0.4	< 4	< 4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	< 5	4	< 0.5	2	< 50	< 0.5	< 5	< 5
2-Methyl-Naphthalene	91-57-6	NA	36	--	< 5	--	< 1	1	0.2 J	66	8,400	1	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 25	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 10	< 3	< 20	< 2	< 2	< 2	< 200	< 2	< 20	< 20
3-Nitroaniline	99-09-2	5	NA	--	< 25	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	< 50	< 5	< 5	< 5	< 500	< 5	< 50	< 50
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 5	< 2	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
4-Chloroaniline	106-47-8	5	NA	--	< 5	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	< 5	< 0.5	< 0.5	< 0.5	97 J	< 0.5	< 5	< 5
4-Nitroaniline	100-01-6	5	NA	--	< 25	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
4-Nitrophenol	100-02-7	1	NA	--	--	--	< 100	< 10	< 10	< 10	< 1,000	< 11	< 100	< 100
Acenaphthene	83-32-9	20	NA	--	< 5	< 1	< 1	0.3 J	< 0.1	0.3 J	53	1	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	< 5	< 1	< 1	0.4 J	< 0.1	0.2 J	100	2	< 1	9
Anthracene	120-12-7	50	NA	--	< 5	< 1	< 1	0.2 J	< 0.1	< 0.1	32 J	1	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	19 J	1	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	15 J	0.8	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	20 J	1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	25 J	0.8	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	10 J	0.4 J	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 5	< 3	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	< 10	1.4 B	88	9	< 2	3 J	730	100	99	120
Butylbenzylphthalate	85-68-7	50	NA	--	< 10	< 1	< 20	< 2	< 2	< 2	< 200	< 2	< 20	< 20
Carbazole	86-74-8	NA	NA	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
Chrysene	218-01-9	0.002	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	19 J	1	< 1	1 J
Di-n-butylphthalate	84-74-2	50	NA	--	< 10	< 1	< 20	< 2	< 2	< 2	< 200	< 2	< 20	< 20
Di-n-octylphthalate	117-84-0	50	NA	--	< 10	< 1	< 20	< 2	< 2	< 2	< 200	< 2	< 20	< 20
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	< 10	0.2 J	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	< 5	--	< 5	0.6 J	< 0.5	0.8 J	180	2	< 5	< 5
Diethylphthalate	84-66-2	50	NA	--	< 10	< 1	< 20	< 2	< 2	< 2	< 200	< 2	< 20	< 20
Dimethyl phthalate	131-11-3	50	NA	--	< 10	< 1	< 20	< 2	< 2	< 2	< 200	< 2	< 20	< 20
Fluoranthene	206-44-0	50	NA	--	< 5	< 1	< 1	0.2 J	< 0.1	< 0.1	53	3	1 J	< 1
Fluorene	86-73-7	50	NA	--	< 5	< 1	< 1	0.8	< 0.1	0.8	210	2	< 1	4 J
Hexachlorobenzene	118-74-1	0.04	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	< 10	< 0.1	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 5	< 2	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 5	< 1	< 50	< 5	< 5	< 5	< 500	< 5	< 50	< 50
Hexachloroethane	67-72-1	5	NA	--	< 5	< 1	< 10	< 1	< 1	< 1	< 100	< 1	< 10	< 10
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 5	< 1	< 1	< 0.1	< 0.1	< 0.1	11 J	0.5 J	< 1	< 1
Isophorone	78-59-1	50	NA	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 5	< 2	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
Naphthalene	91-20-3	10	NA	--	< 5	< 1	< 1	4	0.3 J	15	1,500	1	< 1	< 1
Nitrobenzene	98-95-3	0.4	NA	--	< 5	< 1	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
Pentachlorophenol	87-86-5	1	NA	--	--	--	< 10	< 1	< 1	< 1	< 100	< 1	< 10	< 10
Phenanthrene	85-01-8	50	NA	--	< 5	< 1	< 1	0.5	< 0.1	0.8	340	2	< 1	< 1
Phenol	108-95-2	1	NA	--	--	--	< 5	< 0.5	< 0.5	< 0.5	< 50	< 0.5	< 5	< 5
Pyrene	129-00-0	50	NA	--	< 5	< 1	< 1	0.2 J	< 0.1	< 0.1	49 J	3	1 J	3 J
Metals														
Arsenic	7440-38-2	25	NA	--	< 0.0	--	262	< 6.8	26.5	140	398	251	20.7	269
Lead	7439-92-1	25	NA	--	0.01	--	725	24.4	75.5	339	2,870	837	214	194
Mercury	7439-97-6	0.7	NA	--	< 0.0	--	3.8	< 0.070	0.32	0.91 J	4.6	10.1	1.5	1.2 J

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-5	ITMW-5	ITMW-5	PCFGW-001	PCFGW-002	PCFGW-010	PCFGW-011	PCFGW-012	PCFGW-013	PCFGW-014	PCFGW-015
Sample Delivery Group (SDG)				1670992			1341936	1341936	1341936	1341936	1341936	1341936	1340582	1340582
Lab Sample ID				8421615	NA	NA	6821794	6821795	6821791	6821789	6821788	6821790	6815132	6815133
Sample Date				6/10/2016	3/1/2000	8/28/2000	10/10/2012	10/10/2012	10/10/2012	10/10/2012	10/10/2012	10/10/2012	10/5/2012	10/5/2012
Field Sample ID				ITMW-5-W-10.00-160610	ITMW-05-0-0-03012000-W	ITMW-05-0-0-08282000-W	PCFGW-1(10-10-12)	PCFGW-2(10-10-12)	PCFGW-10(10-10-12)	PCFGW-11(10-10-12)	PCFGW-12(10-10-12)	PCFGW-13(10-10-12)	PCFGW-14(10-5-12)	PCFGW-15(10-5-12)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	PCFGW-016 1336016 6790794 9/13/2012 PCFGW-16(9-13-12) REG	PCFGW-021 1336016 6790791 9/13/2012 PCFGW-21(9-13-12) REG	PCFGW-036 1343738 6831555 10/19/2012 PCFGW-36(10-19-12) REG	PCFGW-053 1340582 6815130 10/5/2012 PCFGW-53(10-5-12) REG	PCFGW-054 1340582 6815126 10/4/2012 PCFGW-54(10-4-12) REG	PCFGW-055 1340582 6815121 10/3/2012 PCFGW-55(10-3-12) REG	PCFGW-056 1340582 6815118 10/2/2012 PCFGW-56(10-2-12) REG	PCFGW-057 1340582 6815115 10/1/2012 PCFGW-57(10-1-12) REG	PCFGW-072 1340582 6815128 10/5/2012 PCFGW-72(10-5-12) REG	PCFGW-074 1340582 6815120 10/3/2012 PCFGW-74(10-3-12) REG	PCFGW-075 1340582 6815129 10/5/2012 PCFGW-75(10-5-12) REG	PCFGW-085 1340582 6815127 10/5/2012 PCFGW-85(10-5-12) REG
Volatile Organic Compounds															
1,1 Dichloroethene	**75-35-4**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	2 J	240	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	**71-55-6**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	2 J	900	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	**79-34-5**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	**79-00-5**	**1**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	**75-34-3**	**5**	**NA**	< 1	< 1	< 1	< 1	2 J	220	< 1	2 J	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	**87-61-6**	**NA**	**7**	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	**120-82-1**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
1,2-Dibromo-3-chloropropane (DBCP)	**96-12-8**	**NA**	**0.00033**	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	**106-93-4**	**NA**	**0.0075**	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	**95-50-1**	**3**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
1,2-Dichloroethane	**107-06-2**	**0.6**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	**540-59-0**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	**78-87-5**	**1**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	**541-73-1**	**3**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
1,4-Dichlorobenzene	**106-46-7**	**3**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2-Butanone (Methyl ethyl ketone)	**78-93-3**	**50**	**NA**	< 3	11	< 3	< 3	< 3	< 3	4 J	< 3	< 3	< 3	< 3	< 3
2-Hexanone	**591-78-6**	**50**	**NA**	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	**108-10-1**	**NA**	**6300**	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	**67-64-1**	**50**	**NA**	15 J	43	11 J	3,500	< 6	< 6	30	< 6	< 6	< 6	< 6	< 6
Benzene	**71-43-2**	**1**	**NA**	< 0.5	3 J	< 0.5	< 0.5	< 0.5	10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	**74-97-5**	**NA**	**83**	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	**75-27-4**	**50**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	**75-25-2**	**50**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	**74-83-9**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	**75-15-0**	**60**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	**56-23-5**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	**108-90-7**	**5**	**NA**	4 J	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	**75-00-3**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	2 J	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	**67-66-3**	**7**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 0.8	2 J	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	**74-87-3**	**5**	**NA**	< 1	2 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	**156-59-2**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	**10061-01-5**	**0.4**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	**124-48-1**	**50**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Diisopropyl ether	**108-20-3**	**NA**	**1500**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	**637-92-3**	**NA**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	**100-41-4**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
m,p-Xylenes	**XYLENES-MP**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	**1634-04-4**	**10**	**NA**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	**75-09-2**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	**95-47-6**	**NA**	**190**	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	**100-42-5**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	**994-05-8**	**NA**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	**75-65-0**	**NA**	**NA**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	**127-18-4**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	15	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	**108-88-3**	**5**	**NA**	< 0.7	3 J	< 0.7	< 0.7	< 0.7	29	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	**156-60-5**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	**10061-02-6**	**0.4**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	**79-01-6**	**5**	**NA**	8	4 J	< 1	< 1	< 1	8	< 1	2 J	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	**75-69-4**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	**75-01-4**	**2**	**NA**	< 1	< 1	< 1	< 1	< 1	1 J	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	**1330-20-7**	**5**	**NA**	< 0.8	0.9 J	< 0.8	< 0.8	< 0.8	3 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	< 100	< 100	< 10	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 9	< 100

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	PCFGW-016 1336016 6790794 9/13/2012 PCFGW-16(9-13-12) REG	PCFGW-021 1336016 6790791 9/13/2012 PCFGW-21(9-13-12) REG	PCFGW-036 1343738 6831555 10/19/2012 PCFGW-36(10-19-12) REG	PCFGW-053 1340582 6815130 10/5/2012 PCFGW-53(10-5-12) REG	PCFGW-054 1340582 6815126 10/4/2012 PCFGW-54(10-4-12) REG	PCFGW-055 1340582 6815121 10/3/2012 PCFGW-55(10-3-12) REG	PCFGW-056 1340582 6815118 10/2/2012 PCFGW-56(10-2-12) REG	PCFGW-057 1340582 6815115 10/1/2012 PCFGW-57(10-1-12) REG	PCFGW-072 1340582 6815128 10/5/2012 PCFGW-72(10-5-12) REG	PCFGW-074 1340582 6815120 10/3/2012 PCFGW-74(10-3-12) REG	PCFGW-075 1340582 6815129 10/5/2012 PCFGW-75(10-5-12) REG	PCFGW-085 1340582 6815127 10/5/2012 PCFGW-85(10-5-12) REG
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 10	< 10	< 1	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 0.9	< 10
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 4	< 4	< 0.4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 0.4	< 4
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	< 1	< 1	0.2 J	< 1	< 1	< 1	< 1	2 J	< 1	< 1	< 0.09	< 1
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 20	< 20	< 2	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 2	< 20
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 50	< 50	< 5	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 5	< 50
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 100	< 100	< 10	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 9	< 100
Acenaphthene	**83-32-9**	**20**	**NA**	< 1	< 1	2	< 1	< 1	< 1	< 1	2 J	< 1	< 1	< 0.09	< 1
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 1	< 1	0.1 J	< 1	< 1	< 1	< 1	4 J	< 1	< 1	< 0.09	< 1
Anthracene	**120-12-7**	**50**	**NA**	< 1	< 1	2	< 1	< 1	< 1	< 1	5	< 1	< 1	< 0.09	< 1
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	< 1	< 1	4	1 J	< 1	< 1	< 1	18	< 1	< 1	< 0.09	< 1
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	< 1	< 1	4	< 1	< 1	< 1	< 1	18	< 1	< 1	< 0.09	< 1
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	< 1	< 1	5	2 J	< 1	< 1	< 1	23	< 1	< 1	< 0.09	< 1
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	4 J	< 1	2	< 1	< 1	< 1	< 1	12	< 1	< 1	< 0.09	< 1
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	< 1	< 1	2	< 1	< 1	< 1	< 1	10	< 1	< 1	< 0.09	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	270	87	19	2,800	180	30 J	56	280	< 20	< 20	4 J	52
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 20	< 20	12	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 2	< 20
Carbazole	**86-74-8**	**NA**	**NA**	< 5	< 5	2	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
Chrysene	**218-01-9**	**0.002**	**NA**	< 1	< 1	4	2 J	< 1	< 1	< 1	19	< 1	< 1	< 0.09	< 1
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 20	< 20	2 J	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 2	< 20
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 20	< 20	< 2	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 2	< 20
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 1	< 1	0.7	< 1	< 1	< 1	< 1	3 J	< 1	< 1	< 0.09	< 1
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 5	< 5	0.6 J	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
Diethylphthalate	**84-66-2**	**50**	**NA**	< 20	< 20	< 2	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 2	< 20
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 20	< 20	< 2	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 2	< 20
Fluoranthene	**206-44-0**	**50**	**NA**	4 J	< 1	10	3 J	< 1	< 1	< 1	36	< 1	< 1	< 0.09	2 J
Fluorene	**86-73-7**	**50**	**NA**	< 1	< 1	0.9	< 1	< 1	< 1	< 1	2 J	< 1	< 1	< 0.09	< 1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.09	< 1
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 50	< 50	< 5	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 5	< 50
Hexachloroethane	**67-72-1**	**5**	**NA**	< 10	< 10	< 1	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 0.9	< 10
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	< 1	< 1	2	< 1	< 1	< 1	< 1	10	< 1	< 1	< 0.09	< 1
Isophorone	**78-59-1**	**50**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
Naphthalene	**91-20-3**	**10**	**NA**	< 1	< 1	0.4 J	< 1	< 1	< 1	< 1	3 J	< 1	< 1	< 0.09	< 1
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 10	< 10	2 J	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 0.9	< 10
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	6	1 J	< 1	< 1	< 1	20	< 1	< 1	< 0.09	< 1
Phenol	**108-95-2**	**1**	**NA**	< 5	< 5	< 0.5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 0.5	< 5
Pyrene	**129-00-0**	**50**	**NA**	5	< 1	8	2 J	1 J	< 1	< 1	32	< 1	< 1	< 0.09	3 J
Metals															
Arsenic	**7440-38-2**	**25**	**NA**	704	475	17.6 J	49.9	68.7	9.5 J	63.4	390	14.0 J	57.2	7.1 J	146
Lead	**7439-92-1**	**25**	**NA**	2,040	2,980	140	794	297	74.9	243	4,900	68.7	252	50	531
Mercury	**7439-97-6**	**0.7**	**NA**	16.9	32.1	0.96	8.4	2.1	0.31	0.91 J	89.6	0.094 J	0.38	0.072 J	2.7

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	PCFGW-016	PCFGW-021	PCFGW-036	PCFGW-053	PCFGW-054	PCFGW-055	PCFGW-056	PCFGW-057	PCFGW-072	PCFGW-074	PCFGW-075	PCFGW-085
Sample Delivery Group (SDG)				1336016	1336016	1343738	1340582	1340582	1340582	1340582	1340582	1340582	1340582	1340582	1340582
Lab Sample ID				6790794	6790791	6831555	6815130	6815126	6815121	6815118	6815115	6815128	6815120	6815129	6815127
Sample Date				9/13/2012	9/13/2012	10/19/2012	10/5/2012	10/4/2012	10/3/2012	10/2/2012	10/1/2012	10/5/2012	10/3/2012	10/5/2012	10/5/2012
Field Sample ID				PCFGW-16(9-13-12)	PCFGW-21(9-13-12)	PCFGW-36(10-19-12)	PCFGW-53(10-5-12)	PCFGW-54(10-4-12)	PCFGW-55(10-3-12)	PCFGW-56(10-2-12)	PCFGW-57(10-1-12)	PCFGW-72(10-5-12)	PCFGW-74(10-3-12)	PCFGW-75(10-5-12)	PCFGW-85(10-5-12)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				PCFGW-089	PCFGW-089	PCFGW-090	PCFGW-090	PCFGW-092	PCFGW-099	PCFGW-107	PCFGW-108	PCFGW-110	PCFGW-112	PCFGW-121	PCFGW-122
Sample Delivery Group (SDG)				1338916	1340582	1340582	1340582	1340582	1340582	1340582	1340582	1336016	1336016	1341936	1341936
Lab Sample ID				6806638	6815119	6815116	6815117	6815125	6815131	6815134	6815135	6790793	6790795	6821793	6821792
Sample Date				9/27/2012	10/1/2012	10/2/2012	10/2/2012	10/4/2012	10/5/2012	10/5/2012	10/5/2012	9/13/2012	9/13/2012	10/10/2012	10/10/2012
Field Sample ID				PCFGW-89(9-27-12)	PCFGW-89(10-1-12)	PCFGW-90(10-2-12)	PCFGW-190(10-2-12)	PCFGW-92(10-4-12)	PCFGW-99(10-5-12)	PCFGW-107(10-5-12)	PCFGW-108(10-5-12)	PCFGW-110(9-13-12)	PCFGW-112(9-13-12)	PCFGW-121(10-10-12)	PCFGW-122(10-10-12)
Sample Purpose				REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	--	< 0.8	< 0.8	32	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	--	3 J	2 J	23	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	--	1 J	< 1	25	< 1	< 1	< 1	< 1	< 2	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	0.8 J
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	2
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	--	< 3	< 3	< 3	< 3	9 J	< 3	19	18 J	< 3	5 J
2-Hexanone	591-78-6	50	NA	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 6	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 6	< 3	< 3
Acetone	67-64-1	50	NA	< 6	--	< 6	< 6	< 6	13 J	61	9 J	110	26 J	7 J	12 J
Benzene	71-43-2	1	NA	< 0.5	--	< 0.5	< 0.5	2 J	< 0.5	< 0.5	< 0.5	5 J	3 J	0.5 J	1 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Bromoform	75-25-2	50	NA	1 J	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	--	< 1	< 1	< 1	< 1	1 J	< 1	< 1	< 2	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	--	< 0.8	< 0.8	21	< 0.8	< 0.8	< 0.8	< 0.8	1,100	< 0.8	14
Chloroethane	75-00-3	5	NA	< 1	--	< 1	< 1	4 J	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	--	3 J	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	0.9 J
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	16	< 0.8	< 0.8
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 4	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	< 10	< 10	< 10	56 J	< 10	< 10	< 10	< 20	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	--	< 0.8	< 0.8	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	2 J	4 J	< 0.7	0.9 J
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	2 J	--	3 J	2 J	2 J	< 1	< 1	< 1	< 1	14	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	--	< 1	< 1	2 J	< 1	< 1	< 1	< 1	< 2	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2 J	3 J	0.9 J	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	< 100	< 100	< 100	< 10	< 100	< 10	< 100	< 100	< 100	< 10	< 10

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	PCFGW-089 1338916 6806638 9/27/2012 PCFGW-89(9-27-12) REG	PCFGW-089 1340582 6815119 10/1/2012 PCFGW-89(10-1-12) REG	PCFGW-090 1340582 6815116 10/2/2012 PCFGW-90(10-2-12) REG	PCFGW-090 1340582 6815117 10/2/2012 PCFGW-190(10-2-12) FD	PCFGW-092 1340582 6815125 10/4/2012 PCFGW-92(10-4-12) REG	PCFGW-099 1340582 6815131 10/5/2012 PCFGW-99(10-5-12) REG	PCFGW-107 1340582 6815134 10/5/2012 PCFGW-107(10-5-12) REG	PCFGW-108 1340582 6815135 10/5/2012 PCFGW-108(10-5-12) REG	PCFGW-110 1336016 6790793 9/13/2012 PCFGW-110(9-13-12) REG	PCFGW-112 1336016 6790795 9/13/2012 PCFGW-112(9-13-12) REG	PCFGW-121 1341936 6821793 10/10/2012 PCFGW-121(10-10-12) REG	PCFGW-122 1341936 6821792 10/10/2012 PCFGW-122(10-10-12) REG
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	--	< 10	< 10	< 10	< 1	< 10	< 1	< 10	< 10	< 10	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	--	< 4	< 4	< 4	< 0.4	< 4	< 0.4	< 4	< 4	< 4	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	--	1 J	< 1	< 1	2	< 1	< 0.1	< 1	1 J	440	< 0.1	1
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	--	< 20	< 20	< 20	< 2	< 20	< 2	< 20	< 20	< 20	< 2	< 2
3-Nitroaniline	**99-09-2**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	--	< 50	< 50	< 50	< 5	< 50	< 5	< 50	< 50	< 50	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
4-Chloroaniline	**106-47-8**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
4-Nitroaniline	**100-01-6**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
4-Nitrophenol	**100-02-7**	**1**	**NA**	--	< 100	< 100	< 100	< 10	< 100	< 10	< 100	< 100	< 100	< 10	< 10
Acenaphthene	**83-32-9**	**20**	**NA**	--	1 J	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.7
Acenaphthylene	**208-96-8**	**NA**	**NA**	--	7	< 1	< 1	< 0.1	< 1	0.4 J	< 1	< 1	< 1	< 0.1	0.8
Anthracene	**120-12-7**	**50**	**NA**	--	5	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	10	< 0.1	0.1 J
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	--	26	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	8	< 0.1	0.1 J
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	--	27	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	6	< 0.1	< 0.1
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	--	37	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	8	< 0.1	0.1 J
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	--	17	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	6	< 0.1	< 0.1
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	--	13	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	4 J	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	--	860	< 20	< 20	5 J	68	7	160	< 20	200	2 J	25
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	--	< 20	< 20	< 20	< 2	< 20	< 2	< 20	< 20	< 20	< 2	< 2
Carbazole	**86-74-8**	**NA**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
Chrysene	**218-01-9**	**0.002**	**NA**	--	26	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	8	< 0.1	0.1 J
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	--	< 20	< 20	< 20	< 2	< 20	< 2	< 20	< 20	< 20	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	--	< 20	< 20	< 20	< 2	< 20	< 2	< 20	< 20	< 20	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	--	5 J	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1
Dibenzofuran	**132-64-9**	**NA**	**7.9**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	1 J
Diethylphthalate	**84-66-2**	**50**	**NA**	--	< 20	< 20	< 20	< 2	< 20	< 2	< 20	< 20	< 20	< 2	< 2
Dimethyl phthalate	**131-11-3**	**50**	**NA**	--	< 20	< 20	< 20	< 2	< 20	< 2	< 20	< 20	< 20	< 2	< 2
Fluoranthene	**206-44-0**	**50**	**NA**	--	53	1 J	< 1	< 0.1	< 1	< 0.1	< 1	2 J	29	< 0.1	0.3 J
Fluorene	**86-73-7**	**50**	**NA**	--	2 J	< 1	< 1	< 0.1	< 1	0.2 J	< 1	1 J	28	< 0.1	1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	--	< 1	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	--	< 50	< 50	< 50	< 5	< 50	< 5	< 50	< 50	< 50	< 5	< 5
Hexachloroethane	**67-72-1**	**5**	**NA**	--	< 10	< 10	< 10	< 1	< 10	< 1	< 10	< 10	< 10	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	--	13	< 1	< 1	< 0.1	< 1	< 0.1	< 1	< 1	4 J	< 0.1	< 0.1
Isophorone	**78-59-1**	**50**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
Naphthalene	**91-20-3**	**10**	**NA**	--	3 J	< 1	< 1	< 0.1	< 1	< 0.1	< 1	1 J	160	0.2 J	1
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	< 5	< 5	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	< 10	< 10	< 10	< 1	< 10	< 1	< 10	< 10	< 10	< 1	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	--	21	< 1	< 1	0.1 J	< 1	< 0.1	< 1	< 1	53	< 0.1	0.9
Phenol	**108-95-2**	**1**	**NA**	--	< 5	< 5	< 5	< 0.5	< 5	< 0.5	< 5	11	< 5	< 0.5	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	--	49	1 J	1 J	< 0.1	< 1	< 0.1	< 1	2 J	22	< 0.1	0.3 J
Metals															
Arsenic	**7440-38-2**	**25**	**NA**	--	147	70.4	102	< 6.8	87.4	< 6.8	89.4 J	311	442	102	166
Lead	**7439-92-1**	**25**	**NA**	--	1,170	1,830	1,370	17.7	297	23.4	231	7,400	2,090	1,390	2,590
Mercury	**7439-97-6**	**0.7**	**NA**	--	13.5	13.2	11.8	< 0.070	2.6	< 0.070	0.99 J	79.1	7.3	2.4	4

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	PCFGW-089	PCFGW-089	PCFGW-090	PCFGW-090	PCFGW-092	PCFGW-099	PCFGW-107	PCFGW-108	PCFGW-110	PCFGW-112	PCFGW-121	PCFGW-122
Sample Delivery Group (SDG)				1338916	1340582	1340582	1340582	1340582	1340582	1340582	1340582	1336016	1336016	1341936	1341936
Lab Sample ID				6806638	6815119	6815116	6815117	6815125	6815131	6815134	6815135	6790793	6790795	6821793	6821792
Sample Date				9/27/2012	10/1/2012	10/2/2012	10/2/2012	10/4/2012	10/5/2012	10/5/2012	10/5/2012	9/13/2012	9/13/2012	10/10/2012	10/10/2012
Field Sample ID				PCFGW-89(9-27-12)	PCFGW-89(10-1-12)	PCFGW-90(10-2-12)	PCFGW-190(10-2-12)	PCFGW-92(10-4-12)	PCFGW-99(10-5-12)	PCFGW-107(10-5-12)	PCFGW-108(10-5-12)	PCFGW-110(9-13-12)	PCFGW-112(9-13-12)	PCFGW-121(10-10-12)	PCFGW-122(10-10-12)
Sample Purpose				REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name															

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				PCFGW-123	PCFGW-123	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-3R	SB35-3R	SB35-3R	SB35-3R
Sample Delivery Group (SDG)				1341936	1341936	995867	1021819	1114664	1195373	1341939	1397510		995867	1114664	1397510	
Lab Sample ID				6821796	6821800	4806973	4959998	5496346	5985315	6821825	7095172	NA	4806972	5496349	7095173	NA
Sample Date				10/11/2012	10/11/2012	6/30/2006	1/16/2007	10/9/2008	5/19/2010	10/11/2012	6/14/2013	6/6/1997	6/30/2006	10/10/2008	6/14/2013	6/6/1997
Field Sample ID				PCFGW-123(10-11-12)	PCFGW-1123(10-11-12)	SB35-1R	SB35-1R011607	SR35-1R(10-9-08)	SB35-1R(5-19-10)	SB35-1R(101112)	SB35-1R(061413)	SB-35-1R-0-0-06061997-W	SB35-3R	SR35-3R(10-10-08)	SB35-3R(061413)	SB-35-3R-0-0-06061997-W
Sample Purpose				REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 5	< 0.5	< 1	< 1	1 J	1 J	< 0.5	< 0.5	3 J	< 1	< 1	< 0.5	< 10
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	< 0.8	--	--	--	--	--	--	< 0.8	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
1,4-Dichlorobenzene	106-46-7	3	NA	< 5	< 0.5	< 1	< 1	1 J	< 1	< 0.5	< 0.5	2 J	< 1	< 1	< 0.5	< 10
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	--	< 3	< 3	< 3	< 3	< 3	--	--	< 3	< 3	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	--	< 3	< 3	< 3	< 3	< 3	--	--	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	--	< 3	< 3	< 3	< 3	< 3	--	--	< 3	< 3	--
Acetone	67-64-1	50	NA	13 J	13 J	--	< 6	< 6	< 6	< 6	< 6	--	--	< 6	< 6	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	1 J	< 0.5	< 0.5	2 J	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	--
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	< 1	< 1	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	2 J	< 0.8	1 J	3 J	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	--
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 1	< 0.8	< 0.8	< 0.8	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	--	--	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 1	< 0.7	< 0.7	< 0.7	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	< 2	--	--	--	--	--	--	< 2	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	--
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	3.3	< 0.8	< 0.8	< 0.8	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
2,4-Dichlorophenol	120-83-2	5	NA	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
2,4-Dimethylphenol	105-67-9	50	NA	< 5	< 0.5	< 3	< 3	< 3	< 3	< 0.5	< 0.5	--	< 3	< 3	< 0.5	--
2,4-Dinitrophenol	51-28-5	10	NA	< 100	< 10	< 21	< 20	< 19	< 10	< 10	< 10	--	< 21	< 20	< 10	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	PCFGW-123 1341936 6821796 10/11/2012 PCFGW-123(10-11-12) REG	PCFGW-123 1341936 6821800 10/11/2012 PCFGW-1123(10-11-12) FD	SB35-1R 995867 4806973 6/30/2006 SB35-1R REG	SB35-1R 1021819 4959998 1/16/2007 SB35-1R011607 REG	SB35-1R 1114664 5496346 10/9/2008 SR35-1R(10-9-08) REG	SB35-1R 1195373 5985315 5/19/2010 SB35-1R(5-19-10) REG	SB35-1R 1341939 6821825 10/11/2012 SB35-1R(101112) REG	SB35-1R 1397510 7095172 6/14/2013 SB35-1R(061413) REG	SB35-1R NA 6/6/1997 SB-35-1R-0-0-06061997-W REG	SB35-3R 995867 4806972 6/30/2006 SB35-3R REG	SB35-3R 1114664 5496349 10/10/2008 SR35-3R(10-10-08) REG	SB35-3R 1397510 7095173 6/14/2013 SB35-3R(061413) REG	SB35-3R NA 6/6/1997 SB-35-3R-0-0-06061997-W REG
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 11	< 1	< 1	< 1	< 10
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 4	< 0.4	< 2	< 2	< 2	< 2	< 0.4	< 0.4	< 11	< 2	< 2	< 0.4	< 10
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	2 J	< 1	< 1	< 0.1	< 10
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 56	< 1	< 1	< 0.5	< 52
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 22	< 2	< 2	< 2	< 21
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 56	< 1	< 1	< 0.5	< 52
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	--
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 5	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 11	< 2	< 2	< 0.5	< 10
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 5	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2	< 0.5	--
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 56	< 1	< 1	< 0.5	< 52
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 100	< 10	< 11	< 10	< 10	< 10	< 10	< 10	--	< 11	< 10	< 10	--
Acenaphthene	**83-32-9**	**20**	**NA**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Anthracene	**120-12-7**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	2 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	2 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	3 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	0.1 J	< 10
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	2 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	1 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	170	4 J	< 2	< 2	< 2	6	< 2	< 2	< 11	< 2	< 2	< 2	< 10
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 11	< 2	< 2	< 2	< 10
Carbazole	**86-74-8**	**NA**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
Chrysene	**218-01-9**	**0.002**	**NA**	2 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	0.1 J	< 10
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 11	< 2	< 2	< 2	< 10
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 11	< 2	< 2	< 2	< 10
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
Diethylphthalate	**84-66-2**	**50**	**NA**	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 11	< 2	< 2	< 2	1 J
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 20	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 11	< 2	< 2	< 2	< 10
Fluoranthene	**206-44-0**	**50**	**NA**	4 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	0.2 J	< 10
Fluorene	**86-73-7**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 11	< 5	< 5	< 5	< 10
Hexachloroethane	**67-72-1**	**5**	**NA**	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 11	< 1	< 1	< 1	< 10
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	1 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	< 0.1	< 10
Isophorone	**78-59-1**	**50**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 5	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 11	< 2	< 2	< 0.5	< 10
Naphthalene	**91-20-3**	**10**	**NA**	< 1	0.2 J	< 1	< 1	< 1	< 1	< 0.1	< 0.1	1 J	< 1	< 1	< 0.1	< 10
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 11	< 1	< 1	< 0.5	< 10
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 10	< 1	< 3	< 3	< 3	< 3	< 1	< 1	--	< 3	< 3	< 1	--
Phenanthrene	**85-01-8**	**50**	**NA**	2 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	0.1 J	< 10
Phenol	**108-95-2**	**1**	**NA**	< 5	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	--
Pyrene	**129-00-0**	**50**	**NA**	4 J	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 11	< 1	< 1	0.3 J	< 10
Metals																
Arsenic	**7440-38-2**	**25**	**NA**	121	69.1	< 10	< 10	< 10.2	< 7.2	< 6.8	< 6.8	< 4.5	< 10	< 10.2	< 6.8	< 4.5
Lead	**7439-92-1**	**25**	**NA**	556	376	< 6.9	< 6.9	< 6.9	< 6.9	< 5.1	< 5.1	< 1.6	< 6.9	< 6.9	6.3 J	< 1.6
Mercury	**7439-97-6**	**0.7**	**NA**	2.4	2.3	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	0.06 B	< 0.056	< 0.056	0.13 J	< 0.06

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				PCFGW-123	PCFGW-123	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-1R	SB35-3R	SB35-3R	SB35-3R	SB35-3R
Sample Delivery Group (SDG)				1341936	1341936	995867	1021819	1114664	1195373	1341939	1397510		995867	1114664	1397510	
Lab Sample ID				6821796	6821800	4806973	4959998	5496346	5985315	6821825	7095172	NA	4806972	5496349	7095173	NA
Sample Date				10/11/2012	10/11/2012	6/30/2006	1/16/2007	10/9/2008	5/19/2010	10/11/2012	6/14/2013	6/6/1997	6/30/2006	10/10/2008	6/14/2013	6/6/1997
Field Sample ID				PCFGW-123(10-11-12)	PCFGW-1123(10-11-12)	SB35-1R	SB35-1R011607	SR35-1R(10-9-08)	SB35-1R(5-19-10)	SB35-1R(101112)	SB35-1R(061413)	SB-35-1R-0-0-06061997-W	SB35-3R	SR35-3R(10-10-08)	SB35-3R(061413)	SB-35-3R-0-0-06061997-W
Sample Purpose				REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SB35-3R	SB35-4R	SB35-4R	SB35-4R	SB35-4R	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10
Sample Delivery Group (SDG)				NA	995867	1114664	1397510	NA	1022020	1114224	1195186	1342157	1398230	1462188	1479164	1504322	1516585
Lab Sample ID				11/9/1999	4806974	5496348	7095175	6/6/1997	4961231	5493862	5984078	6822983	7098412	7407271	7486619	7604424	7664706
Sample Date				SB-35-3R-0-0-11091999-W	6/30/2006	10/9/2008	6/14/2013	SB-35-4R-0-0-06061997-W	1/17/2007	10/8/2008	5/18/2010	10/12/2012	6/18/2013	3/25/2014	6/3/2014	9/17/2014	11/5/2014
Field Sample ID				REG	SB35-4R	SR35-4R(10-9-08)	SB35-4R(061413)	REG	SWMW-10011707	SWMW-10(10-8-08)	SWMW-10(5-18-10)	SWMW-10(101212)	SWMW-10(061813)	SWMW-10-032514	SWMW-10-060314	CVX-0031-03	CVX-0035-02
Sample Purpose					REG	REG	REG		REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 5	< 0.8	< 0.8	< 0.8	--	3 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 5	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 5	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	4 J	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	< 5	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	4 J	< 1	< 1	< 0.5	2 J	19	3 J	6	3	6	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	< 0.8	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 5	< 1	< 1	< 0.5	< 10	4 J	3 J	3 J	2	2	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 5	< 1	< 1	< 0.5	< 10	14	6	9	4	5	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 10	--	< 3	< 3	--	7 J	7 J	< 3	< 3	4 J	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 10	--	< 3	< 3	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 10	--	< 3	< 3	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
Acetone	67-64-1	50	NA	< 10	--	< 6	< 6	--	16 J	13 J	17 J	< 6	< 6	--	--	--	--
Benzene	71-43-2	1	NA	8	< 0.5	< 0.5	< 0.5	< 1	3 J	1 J	2 J	1 J	1 J	1 J	1	1	1
Bromochloromethane	74-97-5	NA	83	< 5	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromoform	75-25-2	50	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 10	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 5	--	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chlorobenzene	108-90-7	5	NA	8	< 0.8	< 0.8	< 0.8	--	560	340	320	200	200	250	190	270	280
Chloroethane	75-00-3	5	NA	< 10	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chloroform	67-66-3	7	NA	< 5	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 10	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 5	--	< 0.8	< 0.8	--	17	1 J	< 0.8	6	6	16	2	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 1	3 J	< 0.8	3 J	< 0.8	< 0.8	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	3 JB	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 5	--	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 5	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Toluene	108-88-3	5	NA	< 5	< 0.7	< 0.7	< 0.7	< 1	1 J	< 0.7	1 J	1 J	2 J	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 5	--	< 0.8	< 0.8	--	< 0.8	< 0.8	4 J	< 0.8	0.8 J	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 5	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 5	< 1	< 1	< 1	--	100	1 J	< 1	5	4 J	27	1	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	< 10	< 2	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 10	< 1	< 1	< 1	--	3 J	< 1	< 1	1 J	1 J	5 J	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	2 J	< 0.8	< 0.8	< 0.8	< 1	3 J	0.9 J	2 J	< 0.8	< 0.8	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	< 3	< 3	< 0.5	--	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	< 21	< 20	< 10	--	< 20	< 20	< 10	< 10	< 10	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
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Glenham, NY

Location ID				SB35-3R	SB35-4R	SB35-4R	SB35-4R	SB35-4R	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10
Sample Delivery Group (SDG)				NA	995867	1114664	1397510	NA	1022020	1114224	1195186	1342157	1398230	1462188	1479164	1504322	1516585
Lab Sample ID				11/9/1999	4806974	5496348	7095175	6/6/1997	4961231	5493862	5984078	6822983	7098412	7407271	7486619	7604424	7664706
Sample Date				SB-35-3R-0-0-11091999-W	6/30/2006	10/9/2008	6/14/2013	SB-35-4R-0-0-06061997-W	1/17/2007	10/8/2008	5/18/2010	10/12/2012	6/18/2013	3/25/2014	6/3/2014	9/17/2014	11/5/2014
Field Sample ID				REG	SB35-4R	SR35-4R(10-9-08)	SB35-4R(061413)	REG	SWMW-10011707	SWMW-10(10-8-08)	SWMW-10(5-18-10)	SWMW-10(101212)	SWMW-10(061813)	SWMW-10-032514	SWMW-10-060314	CVX-0031-03	CVX-0035-02
Sample Purpose					REG	REG	REG		REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	< 2	< 2	< 0.4	< 10	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	< 1	< 1	< 0.5	--	< 1	5	1 J	< 0.5	< 0.5	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	< 1	< 1	< 0.1	< 10	5 J	2 J	7	4	0.2 J	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 1	< 1	< 0.5	< 53	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 2	< 2	< 2	< 21	< 2	< 2	< 2	< 2	< 2	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	< 1	< 1	< 0.5	< 53	< 1	< 1	1 J	< 0.5	< 0.5	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	< 5	< 5	< 5	--	< 5	< 5	< 5	8 J	< 5	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 2	< 2	< 0.5	< 10	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	< 2	< 2	< 0.5	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	< 1	< 1	< 0.5	< 53	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	< 11	< 10	< 10	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Acenaphthene	83-32-9	20	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	0.4 J	0.2 J	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	0.9	0.3 J	--	--	--	--
Anthracene	120-12-7	50	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	0.8	0.2 J	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	2	0.5 J	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 1	< 1	0.1 J	< 10	< 1	< 1	< 1	2	0.6	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 1	< 1	0.1 J	< 10	< 1	< 1	< 1	3	0.8	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	2	0.5	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	1	0.3 J	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	< 2	< 2	< 2	< 10	4 J	< 2	4 J	5	< 5 J	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	< 2	< 2	< 2	< 10	< 2	< 2	< 2	3 J	< 2	--	--	--	--
Carbazole	86-74-8	NA	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Chrysene	218-01-9	0.002	NA	--	< 1	< 1	0.1 J	< 10	< 1	< 1	< 1	2	0.6	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	0.4 J	0.1 J	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	0.5 J	< 0.5	--	--	--	--
Diethylphthalate	84-66-2	50	NA	--	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Fluoranthene	206-44-0	50	NA	--	< 1	< 1	0.2 J	< 10	< 1	< 1	< 1	4	0.9	--	--	--	--
Fluorene	86-73-7	50	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	0.6	0.4 J	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	< 5	--	--	--	--
Hexachloroethane	67-72-1	5	NA	--	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 1	< 1	< 0.1	< 10	< 1	< 1	< 1	2	0.4 J	--	--	--	--
Isophorone	78-59-1	50	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 2	< 2	< 0.5	< 10	< 2	< 2	< 2	0.9 J	< 0.5	--	--	--	--
Naphthalene	91-20-3	10	NA	--	< 1	< 1	< 0.1	< 10	5	3 J	4 J	< 0.1	< 0.1	--	--	--	--
Nitrobenzene	98-95-3	0.4	NA	--	< 1	< 1	< 0.5	< 10	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	--	< 3	< 3	< 1	--	< 3	< 3	< 3	< 1	< 1	--	--	--	--
Phenanthrene	85-01-8	50	NA	--	< 1	< 1	0.1 J	< 10	< 1	< 1	< 1	2	0.4 J	--	--	--	--
Phenol	108-95-2	1	NA	--	< 1	< 1	< 0.5	--	12	< 1	2 J	< 0.5	< 0.5	--	--	--	--
Pyrene	129-00-0	50	NA	--	< 1	< 1	0.2 J	< 10	< 1	< 1	< 1	3	0.7	--	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	--	< 10	< 10.2	< 6.8	< 4.5	< 10	< 10.2	< 7.2	60.9	< 6.8	--	--	--	--
Lead	7439-92-1	25	NA	--	< 6.9	< 6.9	5.9 J	< 1.6	< 6.9	< 6.9	7.3 J	1,490	24.5	--	--	--	--
Mercury	7439-97-6	0.7	NA	--	< 0.056	< 0.056	< 0.070	< 0.06	< 0.056	< 0.056	< 0.056	0.22	< 0.070	--	--	--	--

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Chevron Environmental Management Company
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Location ID				SB35-3R	SB35-4R	SB35-4R	SB35-4R	SB35-4R	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10
Sample Delivery Group (SDG)					995867	1114664	1397510		1022020	1114224	1195186	1342157	1398230	1462188	1479164	1504322	1516585
Lab Sample ID				NA	4806974	5496348	7095175	NA	4961231	5493862	5984078	6822983	7098412	7407271	7486619	7604424	7664706
Sample Date				11/9/1999	6/30/2006	10/9/2008	6/14/2013	6/6/1997	1/17/2007	10/8/2008	5/18/2010	10/12/2012	6/18/2013	3/25/2014	6/3/2014	9/17/2014	11/5/2014
Field Sample ID				SB-35-3R-0-0-11091999-W	SB35-4R	SR35-4R(10-9-08)	SB35-4R(061413)	SB-35-4R-0-0-06061997-W	SWMW-10011707	SWMW-10(10-8-08)	SWMW-10(5-18-10)	SWMW-10(101212)	SWMW-10(061813)	SWMW-10-032514	SWMW-10-060314	CVX-0031-03	CVX-0035-02
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
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Location ID				SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113
Sample Delivery Group (SDG)				1547125	1570188	1592070	1608899	1669538	1124672	1137957	1195720	1342157	1343207	1398940	1462877	1480247
Lab Sample ID				7815460	7933921	8043666	8131658	8415283	5557892	5633602	5987989	6822988	6828412	7103153	7410812	7491525
Sample Date				3/20/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	12/10/2008	3/26/2009	5/21/2010	10/12/2012	10/17/2012	6/20/2013	3/27/2014	6/6/2014
Field Sample ID				CVX-0045-03	CVX-0049-02	CVX-0060-02	SWMW-10-W-4.00-151111	SWMW-10-W-4.00	SWMW-113G(12-10-08)	SWMW-113(3-26-09)	SWMW-113(5-21-10)	SWMW-113(101212)	SWMW-113(101712)	SWMW-113(062013)	SWMW-113-032714	SWMW-113-060614
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	2 J	2 J	2 J	1 J	4 J	1 J	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	2 J	< 0.8	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	14	6	7	4 J	2 J	5 J	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	< 1	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	4 J	--	--	--	--	< 1	1 J	0.6 J	< 0.5	< 0.5	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	1 J	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	4 J	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	--	--
Acetone	67-64-1	50	NA	--	--	--	--	--	< 6	< 6	< 6	< 6	< 6	< 6	--	--
Benzene	71-43-2	1	NA	1	< 0.5	1	1	1	< 0.5	0.8 J	0.9 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	200	82	220	140	210	< 0.8	1 J	2 J	1 J	< 0.8	1 J	0.8 J	1
Chloroethane	75-00-3	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	13	< 0.5	< 0.5	< 0.5	< 0.5	62	39	47	23	4 J	37	25	57
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	--	< 0.5	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	--	< 0.5	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	29	0.7 J	< 0.5	< 0.5	< 0.5	25	22	21	12	23	18	13	24
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	4	< 0.5	< 0.5	< 0.5	< 0.5	2 J	4 J	2 J	< 1	< 1	< 1	< 0.5	0.9 J
Xylene (total)	1330-20-7	5	NA	--	< 0.5	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	< 3	< 3	< 0.5	< 0.5	< 0.5	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	< 19	< 10	< 10	< 10	< 11	--	--

Appendix B-1
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Location ID				SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113
Sample Delivery Group (SDG)				1547125	1570188	1592070	1608899	1669538	1124672	1137957	1195720	1342157	1343207	1398940	1462877	1480247
Lab Sample ID				7815460	7933921	8043666	8131658	8415283	5557892	5633602	5987989	6822988	6828412	7103153	7410812	7491525
Sample Date				3/20/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	12/10/2008	3/26/2009	5/21/2010	10/12/2012	10/17/2012	6/20/2013	3/27/2014	6/6/2014
Field Sample ID				CVX-0045-03	CVX-0049-02	CVX-0060-02	SWMW-10-W-4.00-151111	SWMW-10-W-4.00	SWMW-113G(12-10-08)	SWMW-113(3-26-09)	SWMW-113(5-21-10)	SWMW-113(101212)	SWMW-113(101712)	SWMW-113(062013)	SWMW-113-032714	SWMW-113-060614
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	< 2	< 2	< 0.4	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	< 2	< 2	< 0.5	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	< 2	< 2	< 0.5	< 0.5	< 0.5	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	< 10	< 10	< 10	< 10	< 11	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	2 J	1 J	1	< 0.5	0.8 J	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	37	< 2	< 2	< 2	< 2	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	6	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	< 2	< 2	< 0.5	< 0.5	< 0.5	--	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	0.1 J	< 0.1	--	--
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	--	--	< 3	< 3	< 1	< 1	< 1	--	--
Phenanthrene	85-01-8	50	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Phenol	108-95-2	1	NA	--	--	--	--	--	--	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Pyrene	129-00-0	50	NA	--	--	--	--	--	--	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Metals																
Arsenic	7440-38-2	25	NA	--	--	--	--	--	--	< 10.0	< 7.2	< 6.8	< 6.8	< 6.8	--	--
Lead	7439-92-1	25	NA	--	--	--	--	--	--	< 6.9	< 6.9	< 5.1	6.6 J	< 4.7	--	--
Mercury	7439-97-6	0.7	NA	--	--	--	--	--	--	< 0.056	< 0.056	< 0.070	< 0.070	< 0.060	--	--

Appendix B-1
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Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-10	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113
Sample Delivery Group (SDG)				1547125	1570188	1592070	1608899	1669538	1124672	1137957	1195720	1342157	1343207	1398940	1462877	1480247
Lab Sample ID				7815460	7933921	8043666	8131658	8415283	5557892	5633602	5987989	6822988	6828412	7103153	7410812	7491525
Sample Date				3/20/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	12/10/2008	3/26/2009	5/21/2010	10/12/2012	10/17/2012	6/20/2013	3/27/2014	6/6/2014
Field Sample ID				CVX-0045-03	CVX-0049-02	CVX-0060-02	SWMW-10-W-4.00-151111	SWMW-10-W-4.00	SWMW-113G(12-10-08)	SWMW-113(3-26-09)	SWMW-113(5-21-10)	SWMW-113(101212)	SWMW-113(101712)	SWMW-113(062013)	SWMW-113-032714	SWMW-113-060614
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code															

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-135	SWMW-139	SWMW-15	SWMW-15	SWMW-15
Sample Delivery Group (SDG)				1504703	1517227	1546494	1570188	1592070	1609238	1670544	1670544	1397265	1397265	1021535	1115029	1195720
Lab Sample ID				7606264	7668617	7811608	7933933	8043671	8133664	8419279	8419280	7093599	7093588	4958656	5498261	5988000
Sample Date				9/18/2014	11/7/2014	3/18/2015	6/17/2015	9/10/2015	11/12/2015	6/9/2016	6/9/2016	6/13/2013	6/13/2013	1/12/2007	10/14/2008	5/21/2010
Field Sample ID				CVX-0032-08	CVX-0037-05	CVX-0043-02	CVX-0049-14	CVX-0060-07	SWMW-113-W-20.00-151112	SWMW-113-W-20.00-160609	SWMW-113-WD-20.00-160609	SWMW-135(061313)	SWMW-139(061313)	SWMW-15011207	SWMW-15(10-14-08)	SWMW-15(5-21-10)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	22	3 J	3 J
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	14	2 J	3 J
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	180	48	52
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	160	79	78
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	2 J	1 J	2 J
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	15	10	17
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	55	< 3	5 J	13	8 J
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3	4 J
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	92	--	12 J	21	19 J
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5 J	< 0.5	< 0.5	< 0.5	< 0.5	110	64	120
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	1 J
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	1	2	1	3	3	3	3	3	< 0.8	< 0.8	98	200	380
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	610	340	460
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	24	15	18	22	22	14	18	19	< 0.8	< 0.8	24	9	3 J
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	61	71	44
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	0.8 J	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	--	--	--	--	--	--	< 0.7	< 0.7	46	9	31
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	8	9	12	12	12	7	8	9	< 1	< 1	9	10	3 J
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 0.5	0.6 J	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	12	7	10
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	150	66	160
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 20	< 19	< 10

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-113 1504703 7606264 9/18/2014 CVX-0032-08 REG	SWMW-113 1517227 7668617 11/7/2014 CVX-0037-05 REG	SWMW-113 1546494 7811608 3/18/2015 CVX-0043-02 REG	SWMW-113 1570188 7933933 6/17/2015 CVX-0049-14 REG	SWMW-113 1592070 8043671 9/10/2015 CVX-0060-07 REG	SWMW-113 1609238 8133664 11/12/2015 SWMW-113-W-20.00-151112 REG	SWMW-113 1670544 8419279 6/9/2016 SWMW-113-W-20.00-160609 REG	SWMW-113 1670544 8419280 6/9/2016 SWMW-113-WD-20.00-160609 FD	SWMW-135 1397265 7093599 6/13/2013 SWMW-135(061313) REG	SWMW-139 1397265 7093588 6/13/2013 SWMW-139(061313) REG	SWMW-15 1021535 4958656 1/12/2007 SWMW-15011207 REG	SWMW-15 1115029 5498261 10/14/2008 SWMW-15(10-14-08) REG	SWMW-15 1195720 5988000 5/21/2010 SWMW-15(5-21-10) REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	< 0.4	< 0.4	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	2 J	2 J	12
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	< 0.1	< 0.1	5 J	4 J	25
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	1 J	< 1	2 J
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	3 J	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	1 J
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	2 J	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	< 2	7	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	1 J	2 J
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	1 J
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 2	< 2	< 2
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	25	12	110
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 1	< 1	< 1
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 3	< 3	< 3
Phenanthrene	85-01-8	50	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Phenol	108-95-2	1	NA	--	--	--	--	--	--	--	--	< 0.5	< 0.5	4 J	< 1	8
Pyrene	129-00-0	50	NA	--	--	--	--	--	--	--	--	< 0.1	< 0.1	< 1	< 1	< 1
Metals																
Arsenic	7440-38-2	25	NA	--	--	--	--	--	--	--	--	< 6.8	< 6.8	< 10	< 10.2	30.9
Lead	7439-92-1	25	NA	--	--	--	--	--	--	--	--	< 4.7	141	< 6.9	< 6.9	8.2 J
Mercury	7439-97-6	0.7	NA	--	--	--	--	--	--	--	--	< 0.070	0.11 J	< 0.056	< 0.056	< 0.056

Appendix B-1
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Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-113	SWMW-135	SWMW-139	SWMW-15	SWMW-15	SWMW-15
Sample Delivery Group (SDG)				1504703	1517227	1546494	1570188	1592070	1609238	1670544	1670544	1397265	1397265	1021535	1115029	1195720
Lab Sample ID				7606264	7668617	7811608	7933933	8043671	8133664	8419279	8419280	7093599	7093588	4958656	5498261	5988000
Sample Date				9/18/2014	11/7/2014	3/18/2015	6/17/2015	9/10/2015	11/12/2015	6/9/2016	6/9/2016	6/13/2013	6/13/2013	1/12/2007	10/14/2008	5/21/2010
Field Sample ID				CVX-0032-08	CVX-0037-05	CVX-0043-02	CVX-0049-14	CVX-0060-07	SWMW-113-W-20.00-151112	SWMW-113-W-20.00-160609	SWMW-113-WD-20.00-160609	SWMW-135(061313)	SWMW-139(061313)	SWMW-15011207	SWMW-15(10-14-08)	SWMW-15(5-21-10)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-15 1342893 6826960 10/16/2012 SWMW-15(101612) REG	SWMW-15 1398940 7103158 6/20/2013 SWMW-15(062013) REG	SWMW-15 1463182 7412717 3/28/2014 SWMW-15-032814 REG	SWMW-15 1480953 7494461 6/10/2014 SWMW-15-061014 REG	SWMW-15 1504703 7606255 9/18/2014 CVX-0032-02 REG	SWMW-15 1516918 7666471 11/6/2014 CVX-0036-01 REG	SWMW-15 1546899 7813894 3/19/2015 CVX-0044-02 REG	SWMW-15 1570520 7935717 6/18/2015 CVX-0050-03 REG	SWMW-15 1592327 8044999 9/11/2015 CVX-0061-02 REG	SWMW-15 1609238 8133669 11/12/2015 SWMW-15-W-5.00-151112 REG	SWMW-15 1670544 8419271 6/9/2016 SWMW-15-W-5.00-160609 REG	SWMW-24 1022435 4963406 1/19/2007 SWMW-24011907 REG	SWMW-24 1114224 5493858 10/8/2008 SWMW-24(10-8-08) REG	SWMW-24 1195186 5984074 5/18/2010 SWMW-24(5-18-10) REG
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	1 J	1 J	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	1 J	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	24	25	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	70	75	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 5	2	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	12	22	--	--	--	--	--	--	--	--	--	6	2 J	2 J
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	--	--	--	--	--	--	--	--	--	12	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	12	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	6 J	--	--	--	--	--	--	--	--	--	33	12 J	9 J
Benzene	71-43-2	1	NA	25	70	37	46	27	9	80	8	10	51	3	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	180	340	280	260	120	150	550	100	46	270	39	39	9	2 J
Chloroethane	75-00-3	5	NA	70	200	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	6	2 J	4	4	5	6	3	5	1	5	3	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	15	88	--	--	--	--	--	--	--	--	--	5	1 J	< 0.8
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	2 J	11	--	--	--	--	--	--	--	--	--	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	4 J	< 1	3	2	4	4	3	4	1	3	2	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	1 J	2 J	0.9 J	2	2	< 0.5	2	< 0.5	< 0.5	1	< 0.5	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	11	110	--	--	--	--	--	--	--	--	--	2 J	< 0.8	< 0.8
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 100	< 11	--	--	--	--	--	--	--	--	--	< 20	< 21	< 10

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-15 1342893 6826960 10/16/2012 SWMW-15(101612) REG	SWMW-15 1398940 7103158 6/20/2013 SWMW-15(062013) REG	SWMW-15 1463182 7412717 3/28/2014 SWMW-15-032814 REG	SWMW-15 1480953 7494461 6/10/2014 SWMW-15-061014 REG	SWMW-15 1504703 7606255 9/18/2014 CVX-0032-02 REG	SWMW-15 1516918 7666471 11/6/2014 CVX-0036-01 REG	SWMW-15 1546899 7813894 3/19/2015 CVX-0044-02 REG	SWMW-15 1570520 7935717 6/18/2015 CVX-0050-03 REG	SWMW-15 1592327 8044999 9/11/2015 CVX-0061-02 REG	SWMW-15 1609238 8133669 11/12/2015 SWMW-15-W-5.00-151112 REG	SWMW-15 1670544 8419271 6/9/2016 SWMW-15-W-5.00-160609 REG	SWMW-24 1022435 4963406 1/19/2007 SWMW-24011907 REG	SWMW-24 1114224 5493858 10/8/2008 SWMW-24(10-8-08) REG	SWMW-24 1195186 5984074 5/18/2010 SWMW-24(5-18-10) REG
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 10	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 4	< 0.4	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 5	5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	6	32	--	--	--	--	--	--	--	--	--	6	< 1	< 1
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 20	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 50	< 5	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 5	3	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 100	< 11	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10
Acenaphthene	**83-32-9**	**20**	**NA**	1 J	0.7	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Acenaphthylene	**208-96-8**	**NA**	**NA**	3 J	0.2 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Anthracene	**120-12-7**	**50**	**NA**	3 J	0.3 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	8	0.4 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	10	0.4 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	17	0.8	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	9	0.4 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	6	0.3 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	69	9	--	--	--	--	--	--	--	--	--	< 2	< 2	4 J
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 20	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Carbazole	**86-74-8**	**NA**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Chrysene	**218-01-9**	**0.002**	**NA**	12	0.6	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 20	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	66	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	3 J	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Diethylphthalate	**84-66-2**	**50**	**NA**	< 20	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 20	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Fluoranthene	**206-44-0**	**50**	**NA**	15	0.6	--	--	--	--	--	--	--	--	--	1 J	< 1	< 1
Fluorene	**86-73-7**	**50**	**NA**	2 J	1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 1	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 50	< 5	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5
Hexachloroethane	**67-72-1**	**5**	**NA**	< 10	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	7	0.3 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Isophorone	**78-59-1**	**50**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Naphthalene	**91-20-3**	**10**	**NA**	50	120	--	--	--	--	--	--	--	--	--	4 J	< 1	< 1
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 10	< 1	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	6	0.3 J	--	--	--	--	--	--	--	--	--	1 J	< 1	< 1
Phenol	**108-95-2**	**1**	**NA**	< 5	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Pyrene	**129-00-0**	**50**	**NA**	15	1	--	--	--	--	--	--	--	--	--	1 J	< 1	< 1
Metals																	
Arsenic	**7440-38-2**	**25**	**NA**	249	42.4	--	--	--	--	--	--	--	--	--	< 10	< 10.2	67.3
Lead	**7439-92-1**	**25**	**NA**	1,210	112	--	--	--	--	--	--	--	--	--	< 6.9	< 6.9	26.7
Mercury	**7439-97-6**	**0.7**	**NA**	1	0.83	--	--	--	--	--	--	--	--	--	< 0.056	< 0.056	0.27

Appendix B-1
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Former Texaco Research Center Beacon
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Location ID				SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-15	SWMW-24	SWMW-24	SWMW-24
Sample Delivery Group (SDG)				1342893	1398940	1463182	1480953	1504703	1516918	1546899	1570520	1592327	1609238	1670544	1022435	1114224	1195186
Lab Sample ID				6826960	7103158	7412717	7494461	7606255	7666471	7813894	7935717	8044999	8133669	8419271	4963406	5493858	5984074
Sample Date				10/16/2012	6/20/2013	3/28/2014	6/10/2014	9/18/2014	11/6/2014	3/19/2015	6/18/2015	9/11/2015	11/12/2015	6/9/2016	1/19/2007	10/8/2008	5/18/2010
Field Sample ID				SWMW-15(101612)	SWMW-15(062013)	SWMW-15-032814	SWMW-15-061014	CVX-0032-02	CVX-0036-01	CVX-0044-02	CVX-0050-03	CVX-0061-02	SWMW-15-W-5.00-151112	SWMW-15-W-5.00-160609	SWMW-24011907	SWMW-24(10-8-08)	SWMW-24(5-18-10)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-24	SWMW-24	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-28	SWMW-28	SWMW-28	SWMW-28
Sample Delivery Group (SDG)				1342157	1398234	1022020	1114224	1195719	1342157	1398230	1462188	1547125	1669538	1021819	1114664	1195373	1341939
Lab Sample ID				6822985	7098429	4961228	5493868	5987986	6822986	7098404	7407267	7815463	8415284	4959991	5496352	5985320	6821827
Sample Date				10/12/2012	6/18/2013	1/17/2007	10/8/2008	5/21/2010	10/12/2012	6/18/2013	3/25/2014	3/20/2015	6/7/2016	1/16/2007	10/10/2008	5/19/2010	10/11/2012
Field Sample ID				SWMW-24(101212)	SWMW-24(061813)	SWMW-25011707	SWMW-25(10-8-08)	SWMW-25(5-21-10)	SWMW-25(101212)	SWMW-25(061813)	SWMW-25-032514	CVX-0045-06	SWMW-25-W-4.00	SWMW-28011607	SWMW-28(10-10-08)	SWMW-28(5-19-10)	SWMW-28(101112)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	1 J	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	2 J	1 J	1 J	0.8 J
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	0.6 J
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 0.5	< 1	1 J	< 1	< 0.5	< 0.5	--	--	--	5 J	5	4 J	3
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	--	--	--	6 J	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	10	12	1 J	3 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	11	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	23	44	12	37
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	3 J	2 J	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	--	--	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	< 0.7	1 J	< 0.7	0.9 J
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	1 J	2 J	< 0.8	2 J
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 0.5	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 10	< 21	< 21	< 10	< 10	< 10	--	--	--	< 20	< 20	< 10	< 9

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-24 1342157 6822985 10/12/2012 SWMW-24(101212) REG	SWMW-24 1398234 7098429 6/18/2013 SWMW-24(061813) REG	SWMW-25 1022020 4961228 1/17/2007 SWMW-25011707 REG	SWMW-25 1114224 5493868 10/8/2008 SWMW-25(10-8-08) REG	SWMW-25 1195719 5987986 5/21/2010 SWMW-25(5-21-10) REG	SWMW-25 1342157 6822986 10/12/2012 SWMW-25(101212) REG	SWMW-25 1398230 7098404 6/18/2013 SWMW-25(061813) REG	SWMW-25 1462188 7407267 3/25/2014 SWMW-25-032514 REG	SWMW-25 1547125 7815463 3/20/2015 CVX-0045-06 REG	SWMW-25 1669538 8415284 6/7/2016 SWMW-25-W-4.00 REG	SWMW-28 1021819 4959991 1/16/2007 SWMW-28011607 REG	SWMW-28 1114664 5496352 10/10/2008 SWMW-28(10-10-08) REG	SWMW-28 1195373 5985320 5/19/2010 SWMW-28(5-19-10) REG	SWMW-28 1341939 6821827 10/11/2012 SWMW-28(101112) REG
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 0.9
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 0.4	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	< 0.1	< 0.1	< 1	< 1	< 1	0.4 J	< 0.1	--	--	--	5 J	3 J	2 J	4
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	< 2	< 2	< 2	< 0.5
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 10	< 10	< 10	< 11	< 10	< 10	< 10	--	--	--	< 10	< 10	< 10	< 9
Acenaphthene	**83-32-9**	**20**	**NA**	< 0.1	< 0.1	< 1	< 1	< 1	2	< 0.1	--	--	--	< 1	< 1	< 1	1
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 0.1	< 0.1	< 1	< 1	< 1	3	< 0.1	--	--	--	< 1	< 1	< 1	0.7
Anthracene	**120-12-7**	**50**	**NA**	< 0.1	< 0.1	< 1	< 1	< 1	6	< 0.1	--	--	--	2 J	< 1	< 1	1
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	0.1 J	< 0.1	< 1	< 1	< 1	12	0.3 J	--	--	--	4 J	2 J	< 1	3
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	0.2 J	< 0.1	< 1	< 1	< 1	11	0.4 J	--	--	--	3 J	2 J	< 1	3
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	0.2 J	< 0.1	< 1	< 1	< 1	14	0.5 J	--	--	--	4 J	2 J	< 1	3
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	0.2 J	< 0.1	< 1	< 1	< 1	7	0.3 J	--	--	--	2 J	2 J	< 1	2
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	0.1 J	< 0.1	< 1	< 1	< 1	6	0.2 J	--	--	--	2 J	< 1	< 1	2
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	3 J	< 2	< 2	< 2
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Carbazole	**86-74-8**	**NA**	**NA**	< 0.5	< 0.5	< 1	< 1	2 J	2	< 0.5	--	--	--	2 J	< 1	< 1	0.5 J
Chrysene	**218-01-9**	**0.002**	**NA**	0.2 J	< 0.1	< 1	< 1	< 1	11	0.4 J	--	--	--	5 J	2 J	< 1	3
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 0.1	< 0.1	< 1	< 1	< 1	2	< 0.1	--	--	--	< 1	< 1	< 1	0.5
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 0.5	< 0.5	< 1	< 1	< 1	2	< 0.5	--	--	--	1 J	< 1	< 1	0.5 J
Diethylphthalate	**84-66-2**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Fluoranthene	**206-44-0**	**50**	**NA**	0.3 J	< 0.1	< 1	< 1	< 1	29	0.6	--	--	--	9	4 J	1 J	6
Fluorene	**86-73-7**	**50**	**NA**	< 0.1	< 0.1	< 1	< 1	< 1	4	< 0.1	--	--	--	2 J	< 1	< 1	1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	< 1	< 1	< 1	< 0.09
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	< 5
Hexachloroethane	**67-72-1**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	0.1 J	< 0.1	< 1	< 1	< 1	7	0.3 J	--	--	--	1 J	1 J	< 1	2
Isophorone	**78-59-1**	**50**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	2 J	< 2	< 2	< 0.5
Naphthalene	**91-20-3**	**10**	**NA**	< 0.1	< 0.1	< 1	< 1	< 1	0.4 J	< 0.1	--	--	--	4 J	< 1	< 1	1
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 1	< 3	< 3	< 3	< 1	< 1	--	--	--	< 3	< 3	< 3	< 0.9
Phenanthrene	**85-01-8**	**50**	**NA**	0.1 J	< 0.1	< 1	< 1	< 1	24	0.2 J	--	--	--	8	3 J	< 1	4
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	0.3 J	< 0.1	< 1	< 1	< 1	22	0.5	--	--	--	10	4 J	2 J	6
Metals																	
Arsenic	**7440-38-2**	**25**	**NA**	125	< 6.8	< 10	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	< 10	12.8 J	< 7.2	31.5
Lead	**7439-92-1**	**25**	**NA**	77.4	< 4.7	< 6.9	< 6.9	< 6.9	73	30.8	--	--	--	11.1 J	< 6.9	16.3	46.8
Mercury	**7439-97-6**	**0.7**	**NA**	0.19 J	< 0.070	< 0.056	< 0.056	0.063 J	0.18 J	0.13 J	--	--	--	< 0.056	< 0.056	< 0.056	0.15 J

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-24	SWMW-24	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-25	SWMW-28	SWMW-28	SWMW-28	SWMW-28
Sample Delivery Group (SDG)				1342157	1398234	1022020	1114224	1195719	1342157	1398230	1462188	1547125	1669538	1021819	1114664	1195373	1341939
Lab Sample ID				6822985	7098429	4961228	5493868	5987986	6822986	7098404	7407267	7815463	8415284	4959991	5496352	5985320	6821827
Sample Date				10/12/2012	6/18/2013	1/17/2007	10/8/2008	5/21/2010	10/12/2012	6/18/2013	3/25/2014	3/20/2015	6/7/2016	1/16/2007	10/10/2008	5/19/2010	10/11/2012
Field Sample ID				SWMW-24(101212)	SWMW-24(061813)	SWMW-25011707	SWMW-25(10-8-08)	SWMW-25(5-21-10)	SWMW-25(101212)	SWMW-25(061813)	SWMW-25-032514	CVX-0045-06	SWMW-25-W-4.00	SWMW-28011607	SWMW-28(10-10-08)	SWMW-28(5-19-10)	SWMW-28(101112)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-3	SWMW-3	SWMW-3	SWMW-3
Sample Delivery Group (SDG)				1397510	1462188	1479931	1504922	1516585	1547125	1570188	1593311	1609238	1670992	1022233	1022233	1113054	1397270
Lab Sample ID				7095171	7407276	7489807	7607784	7664707	7815464	7933922	8049708	8133667	8421617	4962182	4962183	5487059	7093620
Sample Date				6/14/2013	3/25/2014	6/5/2014	9/19/2014	11/5/2014	3/20/2015	6/17/2015	9/15/2015	11/12/2015	6/10/2016	1/18/2007	1/18/2007	9/30/2008	6/13/2013
Field Sample ID				SWMW-28(061413)	SWMW-28-032514	SWMW-28-060514	CVX-0033-01	CVX-0035-03	CVX-0045-07	CVX-0049-03	CVX-0062-08	SWMW-28-W-4.00-151112	SWMW-28-W-4.00-160610	SWMW-3011807	SWMW-103011807	SWMW-3(9-30-08)	SWMW-3(061313)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	< 1	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	--	--	--	--	--	< 1	--	--	--	< 1	< 1	< 0.9	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	--	--	--	--	--	< 1	--	--	--	< 1	< 1	< 0.9	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	--	--	--	--	--	< 1	--	--	--	< 1	< 1	< 0.9	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	1	--	--	--	--	--	3 J	--	--	--	< 1	< 1	< 0.9	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	--	--	--	--	--	--	--	--	--	< 6	< 6	< 6	--
Benzene	71-43-2	1	NA	0.5 J	3 J	3	3	3	9	2	3	3	2	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	5	17	22	27	25	21	17	24	17	18	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	--	--	--	--	--	< 0.5	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	< 0.5	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	< 0.5	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	--	--	--	--	--	< 0.5	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	--	--	--	--	--	< 0.5	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 10	--	--	--	--	--	--	--	--	--	< 20	< 20	< 19	< 10

Appendix B-1
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Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-3	SWMW-3	SWMW-3	SWMW-3
Sample Delivery Group (SDG)				1397510	1462188	1479931	1504922	1516585	1547125	1570188	1593311	1609238	1670992	1022233	1022233	1113054	1397270
Lab Sample ID				7095171	7407276	7489807	7607784	7664707	7815464	7933922	8049708	8133667	8421617	4962182	4962183	5487059	7093620
Sample Date				6/14/2013	3/25/2014	6/5/2014	9/19/2014	11/5/2014	3/20/2015	6/17/2015	9/15/2015	11/12/2015	6/10/2016	1/18/2007	1/18/2007	9/30/2008	6/13/2013
Field Sample ID				SWMW-28(061413)	SWMW-28-032514	SWMW-28-060514	CVX-0033-01	CVX-0035-03	CVX-0045-07	CVX-0049-03	CVX-0062-08	SWMW-28-W-4.00-151112	SWMW-28-W-4.00-160610	SWMW-3011807	SWMW-103011807	SWMW-3(9-30-08)	SWMW-3(061313)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	0.2 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
4-Chloroaniline	106-47-8	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
4-Nitrophenol	100-02-7	1	NA	< 10	--	--	--	--	--	--	--	--	--	< 10	< 10	< 9	< 10
Acenaphthene	83-32-9	20	NA	0.5 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Acenaphthylene	208-96-8	NA	NA	0.7	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Anthracene	120-12-7	50	NA	1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	6	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	3	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	2	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	0.8 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
Chrysene	218-01-9	0.002	NA	6	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	0.7	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Dibenzofuran	132-64-9	NA	7.9	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
Diethylphthalate	84-66-2	50	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	11	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Fluorene	86-73-7	50	NA	0.6	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	3	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Isophorone	78-59-1	50	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	0.4 J	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Nitrobenzene	98-95-3	0.4	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
p-Chloro-m-cresol	59-50-7	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
Pentachlorophenol	87-86-5	1	NA	< 1	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 1
Phenanthrene	85-01-8	50	NA	7	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Phenol	108-95-2	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.5
Pyrene	129-00-0	50	NA	10	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9	< 0.1
Metals																	
Arsenic	7440-38-2	25	NA	7.7 J	--	--	--	--	--	--	--	--	--	18.3 J	< 10	< 10.2	< 6.8
Lead	7439-92-1	25	NA	15.3	--	--	--	--	--	--	--	--	--	26.3	< 6.9	8.6 J	6.5 J
Mercury	7439-97-6	0.7	NA	0.11 J	--	--	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-28	SWMW-3	SWMW-3	SWMW-3	SWMW-3
Sample Delivery Group (SDG)				1397510	1462188	1479931	1504922	1516585	1547125	1570188	1593311	1609238	1670992	1022233	1022233	1113054	1397270
Lab Sample ID				7095171	7407276	7489807	7607784	7664707	7815464	7933922	8049708	8133667	8421617	4962182	4962183	5487059	7093620
Sample Date				6/14/2013	3/25/2014	6/5/2014	9/19/2014	11/5/2014	3/20/2015	6/17/2015	9/15/2015	11/12/2015	6/10/2016	1/18/2007	1/18/2007	9/30/2008	6/13/2013
Field Sample ID				SWMW-28(061413)	SWMW-28-032514	SWMW-28-060514	CVX-0033-01	CVX-0035-03	CVX-0045-07	CVX-0049-03	CVX-0062-08	SWMW-28-W-4.00-151112	SWMW-28-W-4.00-160610	SWMW-3011807	SWMW-103011807	SWMW-3(9-30-08)	SWMW-3(061313)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-40	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-52
Sample Delivery Group (SDG)				1398940	1022020	1114224	1398230	1462188	1479522	1504322	1516585	1548024	1570188	1592070	1608899	1669538	1022233
Lab Sample ID				7103152	4961227	5493867	7098410	7407273	7487853	7604423	7664708	7819761	7933923	8043669	8131656	8415290	4962192
Sample Date				6/20/2013	1/17/2007	10/8/2008	6/18/2013	3/25/2014	6/4/2014	9/17/2014	11/5/2014	3/24/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	1/18/2007
Field Sample ID				SWMW-40(062013)	SWMW-48011707	SWMW-48(10-8-08)	SWMW-48(061813)	SWMW-48-032514	SWMW-48-060414	CVX-0031-02	CVX-0035-04	CVX-0046-13	CVX-0049-04	CVX-0060-05	SWMW-48-W-4.00-151111	SWMW-48-W-4.00	SWMW-52011807
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	< 1	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	< 1	--	--	--	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 1	< 1	0.7 J	--	--	--	--	--	< 1	--	--	--	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	1 J	1 J	1	--	--	--	--	--	< 1	--	--	--	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	13	3 J	7	--	--	--	--	--	2 J	--	--	--	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	--	--	--	--	--	--	--	--	--	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	33	51	10	15	< 0.5	12	21	1	< 0.5	< 0.5	< 0.5	3	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	< 0.5	--	--	--	< 0.8
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	< 0.5	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	< 0.5	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	< 0.5	--	--	--	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	< 0.5	--	--	--	< 0.8
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 3	< 3	< 0.5	--	--	--	--	--	--	--	--	--	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 11	< 20	< 19	< 11	--	--	--	--	--	--	--	--	--	< 21

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-40 1398940 7103152 6/20/2013 SWMW-40(062013) REG	SWMW-48 1022020 4961227 1/17/2007 SWMW-48011707 REG	SWMW-48 1114224 5493867 10/8/2008 SWMW-48(10-8-08) REG	SWMW-48 1398230 7098410 6/18/2013 SWMW-48(061813) REG	SWMW-48 1462188 7407273 3/25/2014 SWMW-48-032514 REG	SWMW-48 1479522 7487853 6/4/2014 SWMW-48-060414 REG	SWMW-48 1504322 7604423 9/17/2014 CVX-0031-02 REG	SWMW-48 1516585 7664708 11/5/2014 CVX-0035-04 REG	SWMW-48 1548024 7819761 3/24/2015 CVX-0046-13 REG	SWMW-48 1570188 7933923 6/17/2015 CVX-0049-04 REG	SWMW-48 1592070 8043669 9/10/2015 CVX-0060-05 REG	SWMW-48 1608899 8131656 11/11/2015 SWMW-48-W-4.00-151111 REG	SWMW-48 1669538 8415290 6/7/2016 SWMW-48-W-4.00 REG	SWMW-52 1022233 4962192 1/18/2007 SWMW-52011807 REG
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 2	< 2	< 0.4	--	--	--	--	--	--	--	--	--	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 2	< 2	< 0.5	--	--	--	--	--	--	--	--	--	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	< 2	< 2	< 0.5	--	--	--	--	--	--	--	--	--	< 2
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4-Nitrophenol	100-02-7	1	NA	< 11	< 10	< 10	< 11	--	--	--	--	--	--	--	--	--	< 10
Acenaphthene	83-32-9	20	NA	< 0.1	< 1	< 1	0.4 J	--	--	--	--	--	--	--	--	--	< 1
Acenaphthylene	208-96-8	NA	NA	< 0.1	< 1	< 1	0.3 J	--	--	--	--	--	--	--	--	--	< 1
Anthracene	120-12-7	50	NA	< 0.1	< 1	< 1	0.2 J	--	--	--	--	--	--	--	--	--	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	< 1	< 1	0.3 J	--	--	--	--	--	--	--	--	--	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	< 1	< 1	0.4 J	--	--	--	--	--	--	--	--	--	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	< 1	< 1	0.6	--	--	--	--	--	--	--	--	--	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	< 1	< 1	0.4 J	--	--	--	--	--	--	--	--	--	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	< 1	< 1	0.2 J	--	--	--	--	--	--	--	--	--	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Carbazole	86-74-8	NA	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Chrysene	218-01-9	0.002	NA	< 0.1	< 1	< 1	0.5 J	--	--	--	--	--	--	--	--	--	< 1
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Dibenzofuran	132-64-9	NA	7.9	< 0.5	1 J	< 1	0.9 J	--	--	--	--	--	--	--	--	--	< 1
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Fluoranthene	206-44-0	50	NA	< 0.1	< 1	< 1	0.7	--	--	--	--	--	--	--	--	--	< 1
Fluorene	86-73-7	50	NA	< 0.1	< 1	< 1	2	--	--	--	--	--	--	--	--	--	< 1
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	< 1	< 1	0.3 J	--	--	--	--	--	--	--	--	--	< 1
Isophorone	78-59-1	50	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 2	< 2	< 0.5	--	--	--	--	--	--	--	--	--	< 2
Naphthalene	91-20-3	10	NA	< 0.1	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Nitrobenzene	98-95-3	0.4	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
p-Chloro-m-cresol	59-50-7	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Pentachlorophenol	87-86-5	1	NA	< 1	< 3	< 3	< 1	--	--	--	--	--	--	--	--	--	< 3
Phenanthrene	85-01-8	50	NA	< 0.1	< 1	< 1	0.3 J	--	--	--	--	--	--	--	--	--	< 1
Phenol	108-95-2	1	NA	< 0.5	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Pyrene	129-00-0	50	NA	< 0.1	< 1	< 1	0.7	--	--	--	--	--	--	--	--	--	< 1
Metals																	
Arsenic	7440-38-2	25	NA	8.0 J	< 10	< 10.2	< 6.8	--	--	--	--	--	--	--	--	--	< 10
Lead	7439-92-1	25	NA	28.5	< 6.9	< 6.9	8.1 J	--	--	--	--	--	--	--	--	--	< 6.9
Mercury	7439-97-6	0.7	NA	< 0.060	< 0.056	< 0.056	< 0.070	--	--	--	--	--	--	--	--	--	< 0.056

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-40	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-48	SWMW-52
Sample Delivery Group (SDG)				1398940	1022020	1114224	1398230	1462188	1479522	1504322	1516585	1548024	1570188	1592070	1608899	1669538	1022233
Lab Sample ID				7103152	4961227	5493867	7098410	7407273	7487853	7604423	7664708	7819761	7933923	8043669	8131656	8415290	4962192
Sample Date				6/20/2013	1/17/2007	10/8/2008	6/18/2013	3/25/2014	6/4/2014	9/17/2014	11/5/2014	3/24/2015	6/17/2015	9/10/2015	11/11/2015	6/7/2016	1/18/2007
Field Sample ID				SWMW-40(062013)	SWMW-48011707	SWMW-48(10-8-08)	SWMW-48(061813)	SWMW-48-032514	SWMW-48-060414	CVX-0031-02	CVX-0035-04	CVX-0046-13	CVX-0049-04	CVX-0060-05	SWMW-48-W-4.00-151111	SWMW-48-W-4.00	SWMW-52011807
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-52	SWMW-52	SWMW-54	SWMW-54	SWMW-54	SWMW-54	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58
Sample Delivery Group (SDG)				1113054	1397265	1022020	1113255	1113255	1397270	1021328	1115029	1195720	1342893	1342893	1399165	1462877
Lab Sample ID				5487056	7093586	4961238	5487993	5488004	7093618	4957587	5498266	5988002	6826962	6826963	7104475	7410808
Sample Date				9/30/2008	6/13/2013	1/17/2007	10/2/2008	10/2/2008	6/13/2013	1/11/2007	10/14/2008	5/21/2010	10/16/2012	10/16/2012	6/21/2013	3/27/2014
Field Sample ID				SWMW-52(9-30-08)	SWMW-52(061313)	SWMW-54011707	SWMW-54(10-2-08)	SWMW-154(10-2-08)	SWMW-54(061313)	SWMW58011107	SWMW-58(10-14-08)	SWMW-58(5-21-10)	SWMW-58(101612)	SWMW-158(101612)	SWMW-58(062113)	SWMW-58-032714
Sample Purpose				REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	FD	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.9 J	< 0.8	< 0.8	< 0.8	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
Acetone	67-64-1	50	NA	< 6	--	< 6	< 6	< 6	--	< 6	< 6	< 6	< 6	< 6	< 6	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	< 0.8	< 0.8	< 0.8	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	4 J	13	29	33	33	44	17
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	1 J	4 J	4 J	3 J	2 J	4 J	13	17	17	43	14
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 0.5	< 3	< 3	< 3	< 0.5	< 3	< 3	< 3	< 0.5	< 0.5	< 0.5	--
2,4-Dinitrophenol	51-28-5	10	NA	< 19	< 10	< 20	< 19	< 19	< 10	< 21	< 20	< 10	< 9	< 9	< 10	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-52 1113054 5487056 9/30/2008 SWMW-52(9-30-08) REG	SWMW-52 1397265 7093586 6/13/2013 SWMW-52(061313) REG	SWMW-54 1022020 4961238 1/17/2007 SWMW-54011707 REG	SWMW-54 1113255 5487993 10/2/2008 SWMW-54(10-2-08) REG	SWMW-54 1113255 5488004 10/2/2008 SWMW-154(10-2-08) FD	SWMW-54 1397270 7093618 6/13/2013 SWMW-54(061313) REG	SWMW-58 1021328 4957587 1/11/2007 SWMW58011107 REG	SWMW-58 1115029 5498266 10/14/2008 SWMW-58(10-14-08) REG	SWMW-58 1195720 5988002 5/21/2010 SWMW-58(5-21-10) REG	SWMW-58 1342893 6826962 10/16/2012 SWMW-58(101612) REG	SWMW-58 1342893 6826963 10/16/2012 SWMW-158(101612) FD	SWMW-58 1399165 7104475 6/21/2013 SWMW-58(062113) REG	SWMW-58 1462877 7410808 3/27/2014 SWMW-58-032714 REG
2,4-Dinitrotoluene	121-14-2	5	NA	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.9	< 0.9	< 1	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
3-Nitroaniline	99-09-2	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
4-Chloroaniline	106-47-8	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	--
4-Nitroaniline	100-01-6	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
4-Nitrophenol	100-02-7	1	NA	< 9	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 9	< 9	< 10	--
Acenaphthene	83-32-9	20	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Acenaphthylene	208-96-8	NA	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Anthracene	120-12-7	50	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	< 2	2 J	< 2	< 2	< 2	< 2	< 2	< 2	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
Carbazole	86-74-8	NA	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
Chrysene	218-01-9	0.002	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Dibenzofuran	132-64-9	NA	7.9	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
Fluoranthene	206-44-0	50	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Fluorene	86-73-7	50	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--
Hexachloroethane	67-72-1	5	NA	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.9	< 0.9	< 1	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Isophorone	78-59-1	50	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	--
Naphthalene	91-20-3	10	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.8	< 0.09	< 0.1	--
Nitrobenzene	98-95-3	0.4	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
p-Chloro-m-cresol	59-50-7	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
Pentachlorophenol	87-86-5	1	NA	< 3	< 1	< 3	< 3	< 3	< 1	< 3	< 3	< 3	< 0.9	< 0.9	< 1	--
Phenanthrene	85-01-8	50	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Phenol	108-95-2	1	NA	< 0.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
Pyrene	129-00-0	50	NA	< 0.9	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	--
Metals																
Arsenic	7440-38-2	25	NA	< 10.2	< 6.8	< 10	< 10.2	< 10.2	< 6.8	< 10	< 10.2	< 7.2	7.3 J	7.1 J	< 6.8	--
Lead	7439-92-1	25	NA	< 6.9	< 4.7	18.4	7.9 J	11.5 J	7.1 J	< 6.9	< 6.9	< 6.9	13.0 J	13.2 J	< 4.7	--
Mercury	7439-97-6	0.7	NA	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	< 0.060	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-52	SWMW-52	SWMW-54	SWMW-54	SWMW-54	SWMW-54	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58
Sample Delivery Group (SDG)				1113054	1397265	1022020	1113255	1113255	1397270	1021328	1115029	1195720	1342893	1342893	1399165	1462877
Lab Sample ID				5487056	7093586	4961238	5487993	5488004	7093618	4957587	5498266	5988002	6826962	6826963	7104475	7410808
Sample Date				9/30/2008	6/13/2013	1/17/2007	10/2/2008	10/2/2008	6/13/2013	1/11/2007	10/14/2008	5/21/2010	10/16/2012	10/16/2012	6/21/2013	3/27/2014
Field Sample ID				SWMW-52(9-30-08)	SWMW-52(061313)	SWMW-54011707	SWMW-54(10-2-08)	SWMW-154(10-2-08)	SWMW-54(061313)	SWMW58011107	SWMW-58(10-14-08)	SWMW-58(5-21-10)	SWMW-58(101612)	SWMW-158(101612)	SWMW-58(062113)	SWMW-58-032714
Sample Purpose				REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	FD	REG	REG
Parameter Name	Parameter Code															

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-59	SWMW-59	SWMW-59	SWMW-62
Sample Delivery Group (SDG)				1462877	1480953	1504703	1516918	1516918	1546899	1570520	1592327	1609238	1670544	1022435	1113255	1397265	480-163807-1
Lab Sample ID				7410809	7494458	7606257	7666473	7666481	7813896	7935722	8045001	8133670	8419273	4963411	5487990	7093580	480-163807-2
Sample Date				3/27/2014	6/10/2014	9/18/2014	11/6/2014	11/6/2014	3/19/2015	6/18/2015	9/11/2015	11/12/2015	6/9/2016	1/19/2007	10/2/2008	6/13/2013	12/5/2019
Field Sample ID				SWMW-1058-032714	SWMW-58-061014	CVX-0032-04	CVX-0036-03	CVX-0036-08	CVX-0044-04	CVX-0050-08	CVX-0061-04	SWMW-58-W-5.00-151112	SWMW-58-W-5.00-160609	SWMW-59011907	SWMW-59(10-2-08)	SWMW-59(061313)	SWMW-62-W-191205
Sample Purpose				FD	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	--
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 6	< 6	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	--
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	5	NA	34	40	37	43	42	32	38	4	37	30	< 0.8	< 0.8	< 0.8	--
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.7	< 0.7	< 0.7	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	22	28	26	28	27	32	29	9	31	27	< 1	< 1	< 1	--
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	--
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.40
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 0.5	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	--	--	< 20	< 19	< 10	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-58 1462877 7410809 3/27/2014 SWMW-1058-032714 FD	SWMW-58 1480953 7494458 6/10/2014 SWMW-58-061014 REG	SWMW-58 1504703 7606257 9/18/2014 CVX-0032-04 REG	SWMW-58 1516918 7666473 11/6/2014 CVX-0036-03 REG	SWMW-58 1516918 7666481 11/6/2014 CVX-0036-08 FD	SWMW-58 1546899 7813896 3/19/2015 CVX-0044-04 REG	SWMW-58 1570520 7935722 6/18/2015 CVX-0050-08 REG	SWMW-58 1592327 8045001 9/11/2015 CVX-0061-04 REG	SWMW-58 1609238 8133670 11/12/2015 SWMW-58-W-5.00-151112 REG	SWMW-58 1670544 8419273 6/9/2016 SWMW-58-W-5.00-160609 REG	SWMW-59 1022435 4963411 1/19/2007 SWMW-59011907 REG	SWMW-59 1113255 5487990 10/2/2008 SWMW-59(10-2-08) REG	SWMW-59 1397265 7093580 6/13/2013 SWMW-59(061313) REG	SWMW-62 480-163807-1 480-163807-2 12/5/2019 SWMW-62-W-191205 REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	--	--	2 J	< 2	< 2	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 1	--
Phenanthrene	85-01-8	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Phenol	108-95-2	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5	--
Pyrene	129-00-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1	--
Metals																	
Arsenic	7440-38-2	25	NA	--	--	--	--	--	--	--	--	--	--	30.4	< 10.2	< 6.8	--
Lead	7439-92-1	25	NA	--	--	--	--	--	--	--	--	--	--	844	142	79.6	--
Mercury	7439-97-6	0.7	NA	--	--	--	--	--	--	--	--	--	--	0.084 J	< 0.056	0.17 J	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-58	SWMW-59	SWMW-59	SWMW-59	SWMW-62
Sample Delivery Group (SDG)				1462877	1480953	1504703	1516918	1516918	1546899	1570520	1592327	1609238	1670544	1022435	1113255	1397265	480-163807-1
Lab Sample ID				7410809	7494458	7606257	7666473	7666481	7813896	7935722	8045001	8133670	8419273	4963411	5487990	7093580	480-163807-2
Sample Date				3/27/2014	6/10/2014	9/18/2014	11/6/2014	11/6/2014	3/19/2015	6/18/2015	9/11/2015	11/12/2015	6/9/2016	1/19/2007	10/2/2008	6/13/2013	12/5/2019
Field Sample ID				SWMW-1058-032714	SWMW-58-061014	CVX-0032-04	CVX-0036-03	CVX-0036-08	CVX-0044-04	CVX-0050-08	CVX-0061-04	SWMW-58-W-5.00-151112	SWMW-58-W-5.00-160609	SWMW-59011907	SWMW-59(10-2-08)	SWMW-59(061313)	SWMW-62-W-191205
Sample Purpose				FD	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62
Sample Delivery Group (SDG)				1021819	1114665	1195597	1342157	1398940	1462877	1480247	1504703	1517227	1546494	1570188	1592070	1608899	1670992
Lab Sample ID				4959988	5496360	5987004	6822987	7103155	7410814	7491523	7606268	7668612	7811610	7933931	8043676	8131660	8421609
Sample Date				1/16/2007	10/10/2008	5/20/2010	10/12/2012	6/20/2013	3/27/2014	6/6/2014	9/18/2014	11/7/2014	3/18/2015	6/17/2015	9/10/2015	11/11/2015	6/10/2016
Field Sample ID				SWMW-62011607	SWMW-62(10-10-08)	SWMW-62(5-20-10)	SWMW-62(101212)	SWMW-62(062013)	SWMW-62-032714	SWMW-62-060614	CVX-0032-12	CVX-0037-03	CVX-0043-04	CVX-0049-12	CVX-0060-09	SWMW-62-W-4.00-151111	SWMW-62-W-4.00-160610
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	35	33	23	62	56	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	55	32	39	130	170	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	13	10	8	12	10	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	1 J	< 0.8	< 0.8	1 J	2 J	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	1 J	2 J	2 J	3 J	3 J	2	4	2	1 J	2	1	2	1	1
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	0.5 J	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	0.9 J	< 0.8	2 J	2 J	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	3 J	5 J	4 J	8	9	6	7	6	4	8	5	7	4	5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	1 J	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 21	< 10	< 10	< 11	--	--	--	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-62 1021819 4959988 1/16/2007 SWMW-62011607 REG	SWMW-62 1114665 5496360 10/10/2008 SWMW-62(10-10-08) REG	SWMW-62 1195597 5987004 5/20/2010 SWMW-62(5-20-10) REG	SWMW-62 1342157 6822987 10/12/2012 SWMW-62(101212) REG	SWMW-62 1398940 7103155 6/20/2013 SWMW-62(062013) REG	SWMW-62 1462877 7410814 3/27/2014 SWMW-62-032714 REG	SWMW-62 1480247 7491523 6/6/2014 SWMW-62-060614 REG	SWMW-62 1504703 7606268 9/18/2014 CVX-0032-12 REG	SWMW-62 1517227 7668612 11/7/2014 CVX-0037-03 REG	SWMW-62 1546494 7811610 3/18/2015 CVX-0043-04 REG	SWMW-62 1570188 7933931 6/17/2015 CVX-0049-12 REG	SWMW-62 1592070 8043676 9/10/2015 CVX-0060-09 REG	SWMW-62 1608899 8131660 11/11/2015 SWMW-62-W-4.00-151111 REG	SWMW-62 1670992 8421609 6/10/2016 SWMW-62-W-4.00-160610 REG
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	< 11	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	2 J	1 J	< 1	2	1	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	4 J	< 2	< 2	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 1	0.2 J	0.2 J	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	0.4	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	< 3	< 3	< 3	< 1	< 1	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	50	NA	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	50	NA	< 1	< 1	< 1	0.2 J	0.2 J	--	--	--	--	--	--	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	30.3	22.8	< 7.2	51.2	< 6.8	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	25	NA	132	37.5	< 6.9	181	6.8 J	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	0.7	NA	19.2	0.49	1.4	2	0.47	--	--	--	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62	SWMW-62
Sample Delivery Group (SDG)				1021819	1114665	1195597	1342157	1398940	1462877	1480247	1504703	1517227	1546494	1570188	1592070	1608899	1670992
Lab Sample ID				4959988	5496360	5987004	6822987	7103155	7410814	7491523	7606268	7668612	7811610	7933931	8043676	8131660	8421609
Sample Date				1/16/2007	10/10/2008	5/20/2010	10/12/2012	6/20/2013	3/27/2014	6/6/2014	9/18/2014	11/7/2014	3/18/2015	6/17/2015	9/10/2015	11/11/2015	6/10/2016
Field Sample ID				SWMW-62011607	SWMW-62(10-10-08)	SWMW-62(5-20-10)	SWMW-62(101212)	SWMW-62(062013)	SWMW-62-032714	SWMW-62-060614	CVX-0032-12	CVX-0037-03	CVX-0043-04	CVX-0049-12	CVX-0060-09	SWMW-62-W-4.00-151111	SWMW-62-W-4.00-160610
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-67
Sample Delivery Group (SDG)				1021819	1114664	1397510	1462188	1479522	1479522	1504922	1516585	1547125	1570188	1593311	1609238	1670992	480-163807-1
Lab Sample ID				4959999	5496354	7095170	7407275	7487854	7487859	7607785	7664710	7815470	7933925	8049711	8133666	8421618	480-163807-3
Sample Date				1/16/2007	10/10/2008	6/14/2013	3/25/2014	6/4/2014	6/4/2014	9/19/2014	11/5/2014	3/20/2015	6/17/2015	9/15/2015	11/12/2015	6/10/2016	12/5/2019
Field Sample ID				SWMW-65011607	SWMW-65(10-10-08)	SWMW-65(061413)	SWMW-65-032514	SWMW-65-060414	SWMW-165-060414	CVX-0033-02	CVX-0035-06	CVX-0045-10	CVX-0049-06	CVX-0062-11	SWMW-65-W-7.00-151112	SWMW-65-W-7.00-160610	SWMW-67-W-191205
Sample Purpose				REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	1 J	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	6	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	15	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	1 J	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	5	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	--	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	27	< 0.8	0.9 J	1	< 0.5	3	< 0.5	< 0.5	6	< 0.5	1	--
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	0.9 J	2 J	9	--	--	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	6	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7 J	< 0.5	< 0.5	--
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	0.6 J	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	13	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	1 J	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	8	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6 J	< 0.5	< 0.5	--
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	2 J	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	2 J	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	< 0.40
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 19	< 10	--	--	--	--	--	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-65 1021819 4959999 1/16/2007 SWMW-65011607 REG	SWMW-65 1114664 5496354 10/10/2008 SWMW-65(10-10-08) REG	SWMW-65 1397510 7095170 6/14/2013 SWMW-65(061413) REG	SWMW-65 1462188 7407275 3/25/2014 SWMW-65-032514 REG	SWMW-65 1479522 7487854 6/4/2014 SWMW-65-060414 REG	SWMW-65 1479522 7487859 6/4/2014 SWMW-165-060414 FD	SWMW-65 1504922 7607785 9/19/2014 CVX-0033-02 REG	SWMW-65 1516585 7664710 11/5/2014 CVX-0035-06 REG	SWMW-65 1547125 7815470 3/20/2015 CVX-0045-10 REG	SWMW-65 1570188 7933925 6/17/2015 CVX-0049-06 REG	SWMW-65 1593311 8049711 9/15/2015 CVX-0062-11 REG	SWMW-65 1609238 8133666 11/12/2015 SWMW-65-W-7.00-151112 REG	SWMW-65 1670992 8421618 6/10/2016 SWMW-65-W-7.00-160610 REG	SWMW-67 480-163807-1 480-163807-3 12/5/2019 SWMW-67-W-191205 REG
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	0.8	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	4 J	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 1	< 1	2	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	0.4	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	< 3	< 3	< 1	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	50	NA	< 1	< 1	0.1 J	--	--	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	1	NA	< 1	< 1	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	50	NA	< 1	< 1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	< 10	< 10.2	< 6.8	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	25	NA	< 6.9	< 6.9	< 5.1	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	0.7	NA	< 0.056	< 0.056	< 0.070	--	--	--	--	--	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
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Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-65	SWMW-67
Sample Delivery Group (SDG)				1021819	1114664	1397510	1462188	1479522	1479522	1504922	1516585	1547125	1570188	1593311	1609238	1670992	480-163807-1
Lab Sample ID				4959999	5496354	7095170	7407275	7487854	7487859	7607785	7664710	7815470	7933925	8049711	8133666	8421618	480-163807-3
Sample Date				1/16/2007	10/10/2008	6/14/2013	3/25/2014	6/4/2014	6/4/2014	9/19/2014	11/5/2014	3/20/2015	6/17/2015	9/15/2015	11/12/2015	6/10/2016	12/5/2019
Field Sample ID				SWMW-65011607	SWMW-65(10-10-08)	SWMW-65(061413)	SWMW-65-032514	SWMW-65-060414	SWMW-165-060414	CVX-0033-02	CVX-0035-06	CVX-0045-10	CVX-0049-06	CVX-0062-11	SWMW-65-W-7.00-151112	SWMW-65-W-7.00-160610	SWMW-67-W-191205
Sample Purpose				REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-67 480-163807-1 480-163807-8 12/5/2019 FD-1-WF1-191205 FD	SWMW-67 1021819 4959986 1/16/2007 SWMW-67011607 REG	SWMW-67 1115029 5498254 10/14/2008 SWMW-67(10-14-08) REG	SWMW-67 1195720 5987996 5/21/2010 SWMW-67(5-21-10) REG	SWMW-67 1342893 6826953 10/16/2012 SWMW-67(101612) REG	SWMW-67 1399165 7104476 6/21/2013 SWMW-67(062113) REG	SWMW-67 1462188 7407278 3/25/2014 SWMW-67-032514 REG	SWMW-67 1480953 7494455 6/10/2014 SWMW-67-061014 REG	SWMW-67 1504322 7604427 9/17/2014 CVX-0031-06 REG	SWMW-67 1516918 7666475 11/6/2014 CVX-0036-05 REG	SWMW-67 1546899 7813903 3/19/2015 CVX-0044-11 REG	SWMW-67 1570520 7935724 6/18/2015 CVX-0050-10 REG	SWMW-67 1592327 8045002 9/11/2015 CVX-0061-05 REG	SWMW-67 1609238 8133671 11/12/2015 SWMW-67-W-3.00-151112 REG
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	--	< 0.8	0.9 J	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	0.9 J	1 J	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	1 J	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	--	< 6	< 6	< 6	< 6	< 6	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	--	1 J	1 J	< 0.8	< 0.8	0.9 J	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	--	240	300	110	130	200	39	100	39	61	18	83	77	62
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	< 0.40	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	< 21	< 22	< 10	< 9	< 10	--	--	--	--	--	--	--	--

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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-67 480-163807-1 480-163807-8 12/5/2019 FD-1-WF1-191205 FD	SWMW-67 1021819 4959986 1/16/2007 SWMW-67011607 REG	SWMW-67 1115029 5498254 10/14/2008 SWMW-67(10-14-08) REG	SWMW-67 1195720 5987996 5/21/2010 SWMW-67(5-21-10) REG	SWMW-67 1342893 6826953 10/16/2012 SWMW-67(101612) REG	SWMW-67 1399165 7104476 6/21/2013 SWMW-67(062113) REG	SWMW-67 1462188 7407278 3/25/2014 SWMW-67-032514 REG	SWMW-67 1480953 7494455 6/10/2014 SWMW-67-061014 REG	SWMW-67 1504322 7604427 9/17/2014 CVX-0031-06 REG	SWMW-67 1516918 7666475 11/6/2014 CVX-0036-05 REG	SWMW-67 1546899 7813903 3/19/2015 CVX-0044-11 REG	SWMW-67 1570520 7935724 6/18/2015 CVX-0050-10 REG	SWMW-67 1592327 8045002 9/11/2015 CVX-0061-05 REG	SWMW-67 1609238 8133671 11/12/2015 SWMW-67-W-3.00-151112 REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 1	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	< 10	< 11	< 10	< 9	< 10	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	--	< 1	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Nitrobenzene	98-95-3	0.4	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	--	< 3	< 3	< 3	< 0.9	< 1	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	50	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Phenol	108-95-2	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Pyrene	129-00-0	50	NA	--	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	--	< 10	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--	--	--	--
Lead	7439-92-1	25	NA	--	< 6.9	< 6.9	< 6.9	< 5.1	< 4.7	--	--	--	--	--	--	--	--
Mercury	7439-97-6	0.7	NA	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.060	--	--	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67	SWMW-67
Sample Delivery Group (SDG)				480-163807-1	1021819	1115029	1195720	1342893	1399165	1462188	1480953	1504322	1516918	1546899	1570520	1592327	1609238
Lab Sample ID				480-163807-8	4959986	5498254	5987996	6826953	7104476	7407278	7494455	7604427	7666475	7813903	7935724	8045002	8133671
Sample Date				12/5/2019	1/16/2007	10/14/2008	5/21/2010	10/16/2012	6/21/2013	3/25/2014	6/10/2014	9/17/2014	11/6/2014	3/19/2015	6/18/2015	9/11/2015	11/12/2015
Field Sample ID				FD-1-WF1-191205	SWMW-67011607	SWMW-67(10-14-08)	SWMW-67(5-21-10)	SWMW-67(101612)	SWMW-67(062113)	SWMW-67-032514	SWMW-67-061014	CVX-0031-06	CVX-0036-05	CVX-0044-11	CVX-0050-10	CVX-0061-05	SWMW-67-W-3.00-151112
Sample Purpose				FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code																

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-67	SWMW-69	SWMW-69	SWMW-69	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1
Sample Delivery Group (SDG)				1670544	1021328	1115029	1399165	1022233	1113054	1195374	1341939	1395751	1460835	1479522	1503937	1516213	1548024
Lab Sample ID				8419270	4957589	5498264	7104477	4962193	5487054	5985328	6821811	7086902	7400678	7487857	7602492	7662956	7819763
Sample Date				6/9/2016	1/11/2007	10/14/2008	6/21/2013	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	9/16/2014	11/4/2014	3/24/2015
Field Sample ID				SWMW-67-W-3.00-160609	SWMW69011107	SWMW-69(10-14-08)	SWMW-69(062113)	UNKNOWN#1011807	UNKNOWN#1(9-30-08)	UNK-1(5-19-10)	UNK-1(101112)	UNK-1(060713)	UNK-1-031914	UNK-01-060414	CVX-0030-01	CVX-0034-08	CVX-0046-15
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	--	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	< 0.8	< 0.8	< 0.8	21	4 J	6	< 0.8	2 J	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	< 1	< 1	< 1	35	14	30	4 J	8	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 1	< 1	< 0.5	39	28	27	9	13	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 1	< 1	< 0.5	4 J	3 J	2 J	2	2	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 1	< 1	< 0.5	39	26	23	23	21	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
Acetone	67-64-1	50	NA	--	29	< 6	< 6	< 6	< 6	< 6	< 6	< 6	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	1 J	0.6 J	< 0.5	0.6 J	< 0.5	3 J	< 0.5	< 0.5	< 0.5	0.8 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Bromoform	75-25-2	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	< 1	1 J	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 0.5	< 0.8	< 0.8	< 0.8	290	190	95	160	69	820	140	160	150	230
Chloroethane	75-00-3	5	NA	--	< 1	< 1	< 1	22	16	39	20	17	--	--	--	--	--
Chloroform	67-66-3	7	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	0.6 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	0.6 J	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	--	< 0.8	< 0.8	< 0.8	45	5	< 0.8	< 0.8	< 0.8	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Toluene	108-88-3	5	NA	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	110	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	0.5 J	0.7 J
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	< 0.8	< 0.8	< 0.8	7	3 J	0.9 J	< 0.8	< 0.8	--	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	< 4	< 3	< 0.5	< 3	< 3	< 3	< 0.5	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	< 24	< 19	< 10	< 21	< 19	< 10	< 9	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-67 1670544 8419270 6/9/2016 SWMW-67-W-3.00-160609 REG	SWMW-69 1021328 4957589 1/11/2007 SWMW69011107 REG	SWMW-69 1115029 5498264 10/14/2008 SWMW-69(10-14-08) REG	SWMW-69 1399165 7104477 6/21/2013 SWMW-69(062113) REG	Unknown Well 1 1022233 4962193 1/18/2007 UNKNOWN#1011807 REG	Unknown Well 1 1113054 5487054 9/30/2008 UNKNOWN#1(9-30-08) REG	Unknown Well 1 1195374 5985328 5/19/2010 UNK-1(5-19-10) REG	Unknown Well 1 1341939 6821811 10/11/2012 UNK-1(101112) REG	Unknown Well 1 1395751 7086902 6/7/2013 UNK-1(060713) REG	Unknown Well 1 1460835 7400678 3/19/2014 UNK-1-031914 REG	Unknown Well 1 1479522 7487857 6/4/2014 UNK-01-060414 REG	Unknown Well 1 1503937 7602492 9/16/2014 CVX-0030-01 REG	Unknown Well 1 1516213 7662956 11/4/2014 CVX-0034-08 REG	Unknown Well 1 1548024 7819763 3/24/2015 CVX-0046-15 REG
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	--	< 1	< 1	< 1	< 1	< 0.9	< 1	< 0.9	< 1	--	--	--	--	--
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	--	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	--	< 1	< 1	< 0.5	2 J	< 0.9	< 1	< 0.5	--	--	--	--	--	--
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	--	< 1	< 1	< 0.1	< 1	1 J	< 1	0.9	< 0.1	--	--	--	--	--
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
3-Nitroaniline	**99-09-2**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	--	< 6	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
4-Chloroaniline	**106-47-8**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	--	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	--	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	--	--	--	--	--	--
4-Nitroaniline	**100-01-6**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
4-Nitrophenol	**100-02-7**	**1**	**NA**	--	< 12	< 10	< 10	< 10	< 9	< 10	< 9	--	--	--	--	--	--
Acenaphthene	**83-32-9**	**20**	**NA**	--	< 1	< 1	< 0.1	1 J	2 J	< 1	1	0.9	--	--	--	--	--
Acenaphthylene	**208-96-8**	**NA**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	0.3 J	< 0.1	--	--	--	--	--
Anthracene	**120-12-7**	**50**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	0.2 J	0.2 J	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	--	6 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Carbazole	**86-74-8**	**NA**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
Chrysene	**218-01-9**	**0.002**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Dibenzofuran	**132-64-9**	**NA**	**7.9**	--	< 1	< 1	< 0.5	1 J	2 J	1 J	1	1 J	--	--	--	--	--
Diethylphthalate	**84-66-2**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Dimethyl phthalate	**131-11-3**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Fluoranthene	**206-44-0**	**50**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Fluorene	**86-73-7**	**50**	**NA**	--	< 1	< 1	< 0.1	2 J	3 J	1 J	2	2	--	--	--	--	--
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	--	< 6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--
Hexachloroethane	**67-72-1**	**5**	**NA**	--	< 1	< 1	< 1	< 1	< 0.9	< 1	< 0.9	< 1	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Isophorone	**78-59-1**	**50**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	--	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--
Naphthalene	**91-20-3**	**10**	**NA**	--	< 1	< 1	< 0.1	9	5	2 J	2	1	--	--	--	--	--
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	< 4	< 3	< 1	< 3	< 3	< 3	< 0.9	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	< 1	< 1	< 0.1	2 J	2 J	1 J	2	1	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	--	< 1	< 1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--
Metals																	
Arsenic	**7440-38-2**	**25**	**NA**	--	93.6	20.5	7.0 J	< 10	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	--	237	34.3	< 4.7	< 6.9	< 6.9	< 6.9	7.6 J	13.8 J	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	< 0.056	< 0.056	< 0.060	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-67	SWMW-69	SWMW-69	SWMW-69	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1
Sample Delivery Group (SDG)				1670544	1021328	1115029	1399165	1022233	1113054	1195374	1341939	1395751	1460835	1479522	1503937	1516213	1548024
Lab Sample ID				8419270	4957589	5498264	7104477	4962193	5487054	5985328	6821811	7086902	7400678	7487857	7602492	7662956	7819763
Sample Date				6/9/2016	1/11/2007	10/14/2008	6/21/2013	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	9/16/2014	11/4/2014	3/24/2015
Field Sample ID				SWMW-67-W-3.00-160609	SWMW69011107	SWMW-69(10-14-08)	SWMW-69(062113)	UNKNOWN#1011807	UNKNOWN#1(9-30-08)	UNK-1(5-19-10)	UNK-1(101112)	UNK-1(060713)	UNK-1-031914	UNK-01-060414	CVX-0030-01	CVX-0034-08	CVX-0046-15
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2
Sample Delivery Group (SDG)				1570206	1570520	1593311	1608498	1669977	1022233	1113054	1195374	1341939	1395751	1460835	1479522	1516213	1548024
Lab Sample ID				7934025	7935729	8049712	8129225	8417058	4962194	5487053	5985329	6821812	7086903	7400679	7487856	7662957	7819764
Sample Date				6/16/2015	6/18/2015	9/15/2015	11/10/2015	6/8/2016	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	11/4/2014	3/24/2015
Field Sample ID				CVX-0048-03	CVX-0050-15	CVX-0062-12	UNK-1-W-0.00-151110	UNK-1-W-0.00-160608	UNKNOWN#2011807	UNKNOWN#2(9-30-08)	UNK-2(5-19-10)	UNK-2(101112)	UNK-2(060713)	UNK-2-031914	UNK-02-060414	CVX-0034-09	CVX-0046-16
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	1 J	< 1	2 J	< 1	< 1	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	14	11	71	1	8	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	2 J	< 0.9	2 J	< 0.5	1	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	12	8	15	3	14	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
Acetone	67-64-1	50	NA	--	--	--	--	--	< 6	< 6	< 6	< 6	< 6	--	--	--	--
Benzene	71-43-2	1	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	0.7 J	< 0.5	< 0.5	< 0.5	< 0.5	0.8 J	< 0.5	< 0.5	1
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chlorobenzene	108-90-7	5	NA	--	73	47	120	78	260	92	90	83	140	150	38	22	830
Chloroethane	75-00-3	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	--	< 0.5	< 0.5	0.6 J	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	2 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Toluene	108-88-3	5	NA	--	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	--	0.6 J	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	1 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 0.5	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	< 21	< 19	< 10	< 10	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 1 1570206 7934025 6/16/2015 CVX-0048-03 REG	Unknown Well 1 1570520 7935729 6/18/2015 CVX-0050-15 REG	Unknown Well 1 1593311 8049712 9/15/2015 CVX-0062-12 REG	Unknown Well 1 1608498 8129225 11/10/2015 UNK-1-W-0.00-151110 REG	Unknown Well 1 1669977 8417058 6/8/2016 UNK-1-W-0.00-160608 REG	Unknown Well 2 1022233 4962194 1/18/2007 UNKNOWN#2011807 REG	Unknown Well 2 1113054 5487053 9/30/2008 UNKNOWN#2(9-30-08) REG	Unknown Well 2 1195374 5985329 5/19/2010 UNK-2(5-19-10) REG	Unknown Well 2 1341939 6821812 10/11/2012 UNK-2(101112) REG	Unknown Well 2 1395751 7086903 6/7/2013 UNK-2(060713) REG	Unknown Well 2 1460835 7400679 3/19/2014 UNK-2-031914 REG	Unknown Well 2 1479522 7487856 6/4/2014 UNK-02-060414 REG	Unknown Well 2 1516213 7662957 11/4/2014 CVX-0034-09 REG	Unknown Well 2 1548024 7819764 3/24/2015 CVX-0046-16 REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 1	< 1	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	< 5	< 5	< 5	< 5	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.5	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	< 11	< 9	< 10	< 10	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	1 J	< 0.9	1 J	0.4 J	2	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	0.3 J	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	< 2	< 2	5	< 2	< 2	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	1	--	--	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	1 J	< 0.9	2 J	0.4 J	3	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 1	< 1	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	5 J	< 0.9	< 1	0.2 J	1	--	--	--	--
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	--	< 3	< 3	< 3	< 1	--	--	--	--	--
Phenanthrene	85-01-8	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	0.2 J	--	--	--	--
Phenol	108-95-2	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--
Pyrene	129-00-0	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	--	--	--	--	--	< 10	< 10.2	11.9 J	16.2 J	< 6.8	--	--	--	--
Lead	7439-92-1	25	NA	--	--	--	--	--	< 6.9	< 6.9	12.8 J	18.3	15	--	--	--	--
Mercury	7439-97-6	0.7	NA	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 1	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2
Sample Delivery Group (SDG)				1570206	1570520	1593311	1608498	1669977	1022233	1113054	1195374	1341939	1395751	1460835	1479522	1516213	1548024
Lab Sample ID				7934025	7935729	8049712	8129225	8417058	4962194	5487053	5985329	6821812	7086903	7400679	7487856	7662957	7819764
Sample Date				6/16/2015	6/18/2015	9/15/2015	11/10/2015	6/8/2016	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	11/4/2014	3/24/2015
Field Sample ID				CVX-0048-03	CVX-0050-15	CVX-0062-12	UNK-1-W-0.00-151110	UNK-1-W-0.00-160608	UNKNOWN#2011807	UNKNOWN#2(9-30-08)	UNK-2(5-19-10)	UNK-2(101112)	UNK-2(060713)	UNK-2-031914	UNK-02-060414	CVX-0034-09	CVX-0046-16
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3
Sample Delivery Group (SDG)				1570206	1570520	1608498	1669977	1022233	1113054	1195374	1341939	1395751	1460835	1479522	1548024	1570206	1570520
Lab Sample ID				7934026	7935730	8129224	8417057	4962195	5487052	5985330	6821813	7086904	7400680	7487855	7819765	7934027	7935731
Sample Date				6/16/2015	6/18/2015	11/10/2015	6/8/2016	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	3/24/2015	6/16/2015	6/18/2015
Field Sample ID				CVX-0048-04	CVX-0050-16	UNK-2-W-0.00-151110	UNK-2-W-0.00-160608	UNKNOWN#3011807	UNKNOWN#3(9-30-08)	UNK-3(5-19-10)	UNK-3(101112)	UNK-3(060713)	UNK-3-031914	UNK-03-060414	CVX-0046-17	CVX-0048-05	CVX-0050-17
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	1 J	< 1	1 J	0.5 J	0.6 J	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	4 J	3 J	5 J	2	3	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
Acetone	67-64-1	50	NA	--	--	--	--	< 6	< 6	< 6	< 6	< 6	--	--	--	--	--
Benzene	71-43-2	1	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6 J	< 0.5	< 0.5	--	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	--	69	< 0.5	19	28	19	41	10	12	55	4	20	--	9
Chloroethane	75-00-3	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Chloroform	67-66-3	7	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	--	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.9 J	< 0.5	< 0.5	--	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Toluene	108-88-3	5	NA	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	--	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	--	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 0.5
Xylene (total)	1330-20-7	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	< 3	< 3	< 3	< 0.5	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	< 20	< 19	< 10	< 10	--	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 2 1570206 7934026 6/16/2015 CVX-0048-04 REG	Unknown Well 2 1570520 7935730 6/18/2015 CVX-0050-16 REG	Unknown Well 2 1608498 8129224 11/10/2015 UNK-2-W-0.00-151110 REG	Unknown Well 2 1669977 8417057 6/8/2016 UNK-2-W-0.00-160608 REG	Unknown Well 3 1022233 4962195 1/18/2007 UNKNOWN#3011807 REG	Unknown Well 3 1113054 5487052 9/30/2008 UNKNOWN#3(9-30-08) REG	Unknown Well 3 1195374 5985330 5/19/2010 UNK-3(5-19-10) REG	Unknown Well 3 1341939 6821813 10/11/2012 UNK-3(101112) REG	Unknown Well 3 1395751 7086904 6/7/2013 UNK-3(060713) REG	Unknown Well 3 1460835 7400680 3/19/2014 UNK-3-031914 REG	Unknown Well 3 1479522 7487855 6/4/2014 UNK-03-060414 REG	Unknown Well 3 1548024 7819765 3/24/2015 CVX-0046-17 REG	Unknown Well 3 1570206 7934027 6/16/2015 CVX-0048-05 REG	Unknown Well 3 1570520 7935731 6/18/2015 CVX-0050-17 REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	< 5	< 5	< 5	< 5	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	< 2	< 2	< 2	< 0.5	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	< 10	< 10	< 10	< 10	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	< 1	< 1	1 J	0.6	0.7	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Anthracene	120-12-7	50	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	0.1 J	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Carbazole	86-74-8	NA	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	< 1	< 1	< 1	< 0.5	0.7 J	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Fluorene	86-73-7	50	NA	--	--	--	--	1 J	< 1	2 J	0.8	1	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Isophorone	78-59-1	50	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--
Naphthalene	91-20-3	10	NA	--	--	--	--	< 1	< 1	< 1	0.3 J	0.3 J	--	--	--	--	--
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	< 3	< 3	< 3	< 1	--	--	--	--	--	--
Phenanthrene	85-01-8	50	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	0.1 J	--	--	--	--	--
Phenol	108-95-2	1	NA	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--	--	--	--	--
Pyrene	129-00-0	50	NA	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--
Metals																	
Arsenic	7440-38-2	25	NA	--	--	--	--	< 10	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--
Lead	7439-92-1	25	NA	--	--	--	--	< 6.9	< 6.9	< 6.9	10.3 J	9.3 J	--	--	--	--	--
Mercury	7439-97-6	0.7	NA	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--	--

Appendix B-1
OU-1A Overburden Goundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 2	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3	Unknown Well 3
Sample Delivery Group (SDG)				1570206	1570520	1608498	1669977	1022233	1113054	1195374	1341939	1395751	1460835	1479522	1548024	1570206	1570520
Lab Sample ID				7934026	7935730	8129224	8417057	4962195	5487052	5985330	6821813	7086904	7400680	7487855	7819765	7934027	7935731
Sample Date				6/16/2015	6/18/2015	11/10/2015	6/8/2016	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/4/2014	3/24/2015	6/16/2015	6/18/2015
Field Sample ID				CVX-0048-04	CVX-0050-16	UNK-2-W-0.00-151110	UNK-2-W-0.00-160608	UNKNOWN#3011807	UNKNOWN#3(9-30-08)	UNK-3(5-19-10)	UNK-3(101112)	UNK-3(060713)	UNK-3-031914	UNK-03-060414	CVX-0046-17	CVX-0048-05	CVX-0050-17
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019														

Report Units are in ug/L.

Grey Background: Result Exceeds TOGS or Tapwater RSL

< : Not detected at the laboratory method detection limit.

J : Result detected between the reporting limit and the method detection limit.

--: Not analyzed for

NA: Standard not Applicable

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 3 1593311 8049713 9/15/2015 CVX-0062-13 REG	Unknown Well 3 1669977 8417056 6/8/2016 UNK-3-W-0.00-160608 REG
Volatile Organic Compounds					
1,1 Dichloroethene	75-35-4	5	NA	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--
2-Hexanone	591-78-6	50	NA	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--
Acetone	67-64-1	50	NA	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--
Bromodichloromethane	75-27-4	50	NA	--	--
Bromoform	75-25-2	50	NA	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--
Carbon disulfide	75-15-0	60	NA	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--
Chlorobenzene	108-90-7	5	NA	9	13
Chloroethane	75-00-3	5	NA	--	--
Chloroform	67-66-3	7	NA	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--
Dibromochloromethane	124-48-1	50	NA	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--
Ethylbenzene	100-41-4	5	NA	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--
o-Xylene	95-47-6	NA	190	--	--
Styrene	100-42-5	5	NA	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--
Tetrachloroethene	127-18-4	5	NA	--	--
Toluene	108-88-3	5	NA	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	--
Semivolatile Organic Compounds					
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--
1,4-Dioxane	123-91-1	NA	0.46	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 3 1593311 8049713 9/15/2015 CVX-0062-13 REG	Unknown Well 3 1669977 8417056 6/8/2016 UNK-3-W-0.00-160608 REG
2,4-Dinitrotoluene	121-14-2	5	NA	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--
3-Nitroaniline	99-09-2	5	NA	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--
4-Chloroaniline	106-47-8	5	NA	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--
4-Nitroaniline	100-01-6	5	NA	--	--
4-Nitrophenol	100-02-7	1	NA	--	--
Acenaphthene	83-32-9	20	NA	--	--
Acenaphthylene	208-96-8	NA	NA	--	--
Anthracene	120-12-7	50	NA	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--
Carbazole	86-74-8	NA	NA	--	--
Chrysene	218-01-9	0.002	NA	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--
Diethylphthalate	84-66-2	50	NA	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--
Fluoranthene	206-44-0	50	NA	--	--
Fluorene	86-73-7	50	NA	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--
Hexachloroethane	67-72-1	5	NA	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--
Isophorone	78-59-1	50	NA	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--
Naphthalene	91-20-3	10	NA	--	--
Nitrobenzene	98-95-3	0.4	NA	--	--
p-Chloro-m-cresol	59-50-7	1	NA	--	--
Pentachlorophenol	87-86-5	1	NA	--	--
Phenanthrene	85-01-8	50	NA	--	--
Phenol	108-95-2	1	NA	--	--
Pyrene	129-00-0	50	NA	--	--
Metals					
Arsenic	7440-38-2	25	NA	--	--
Lead	7439-92-1	25	NA	--	--
Mercury	7439-97-6	0.7	NA	--	--

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 3	Unknown Well 3
Sample Delivery Group (SDG)				1593311	1669977
Lab Sample ID				8049713	8417056
Sample Date				9/15/2015	6/8/2016
Field Sample ID				CVX-0062-13	UNK-3-W-0.00-160608
Sample Purpose				REG	REG
Parameter Name	Parameter Code				

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

APPENDIX B-2

OU-1A Bedrock Analytical Results

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				BR-2	BR-2	BR-2	BR-2	BR-2	BR-2	BR-2	GT-1	GT-1	ITMW-11	ITMW-11	ITMW-11	ITMW-11	ITMW-12	ITMW-12
Sample Delivery Group (SDG)				995788	995788	1113255	1195373	1341939	1395751		1113255	1397265	995867	1114224	1398230		995788	1113255
Lab Sample ID				4806478	4806484	5487986	5985322	6821816	7086905	NA	5487984	7093584	4806967	5493870	7098407	NA	4806470	5487999
Sample Date				6/28/2006	6/28/2006	10/2/2008	5/19/2010	10/11/2012	6/7/2013	3/2/2000	10/2/2008	6/13/2013	6/30/2006	10/8/2008	6/18/2013	3/1/2000	6/28/2006	10/2/2008
Field Sample ID				BR-102	BR-2	BR-2(10-2-08)	BR-2(5-19-10)	BR-2(101112)	BR-2(060713)	BR-02-0-0-03022000-W	GT-1(10-2-08)	GT-1(061313)	ITMW-11	ITMW-11(10-8-08)	ITMW-11(061813)	ITMW-11-0-0-03012000-W	ITMW-12	ITMW-12(10-2-08)
Sample Purpose				FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019															
Volatile Organic Compounds																		
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	6 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	4 J	2 J
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	2 J	2 J	< 1	< 1	< 1	< 1	18 J	< 1	< 1	< 1	< 1	< 1	< 5	< 1	4 J
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	< 50	--	--	--	--	--	< 10	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	< 25	--	--	--	--	--	< 5	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	1 J	1 J	1 J	1 J	< 0.5	< 0.5	10 J	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	4 J
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	< 0.8	--	--	--	< 0.8	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 25	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
1,4-Dichlorobenzene	106-46-7	3	NA	2 J	2 J	5 J	3 J	1	0.7 J	6 J	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	< 3	< 3	< 3	< 3	< 50	< 3	< 3	--	< 3	< 3	< 10	--	< 3
2-Hexanone	591-78-6	50	NA	--	--	< 3	< 3	< 3	< 3	< 50	< 3	< 3	--	< 3	< 3	< 10	--	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	< 3	< 3	< 3	< 3	< 50	< 3	< 3	--	< 3	< 3	< 10	--	< 3
Acetone	67-64-1	50	NA	--	--	9 J	< 6	< 6	< 6	39 JB	< 6	--	--	11 J	< 6	15 B	--	< 6
Benzene	71-43-2	1	NA	3 J	3 J	20	10	< 0.5	< 0.5	< 25	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	4 J	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	< 25	--	--	--	--	--	< 5	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 10	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	< 1	< 1	< 1	< 1	< 25	< 1	< 1	--	< 1	< 1	< 5	--	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Chlorobenzene	108-90-7	5	NA	79	78	130	73	< 0.8	< 0.8	200	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 10	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 10	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	--	< 0.8	< 0.8	< 5	--	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	--	< 0.8	< 0.8	--	--	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	--	< 0.8	< 0.8	--	--	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	0.5 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	10 JB	< 2	< 2	< 2	< 2	< 2	< 5	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 25	< 1	< 1	--	< 1	< 1	< 5	--	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	--	< 0.8	< 0.8	--	--	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	< 10	< 10	< 10	< 10	--	< 10	< 10	--	< 10	< 10	--	--	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 25	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 5	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 25	< 0.8	< 0.8	--	< 0.8	< 0.8	< 5	--	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 25	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	< 2	< 2	--	--	--	--	< 50	--	--	< 2	--	--	< 10	< 2	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 50	< 1	< 1	< 1	< 1	< 1	< 10	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 75	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	7 J	3 J	0.9 J
Semivolatile Organic Compounds																		
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	< 5	--	--	--	--	--	< 5	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				BR-2	BR-2	BR-2	BR-2	BR-2	BR-2	BR-2	GT-1	GT-1	ITMW-11	ITMW-11	ITMW-11	ITMW-11	ITMW-12	ITMW-12
Sample Delivery Group (SDG)				995788	995788	1113255	1195373	1341939	1395751		1113255	1397265	995867	1114224	1398230		995788	1113255
Lab Sample ID				4806478	4806484	5487986	5985322	6821816	7086905	NA	5487984	7093584	4806967	5493870	7098407	NA	4806470	5487999
Sample Date				6/28/2006	6/28/2006	10/2/2008	5/19/2010	10/11/2012	6/7/2013	3/2/2000	10/2/2008	6/13/2013	6/30/2006	10/8/2008	6/18/2013	3/1/2000	6/28/2006	10/2/2008
Field Sample ID				BR-102	BR-2	BR-2(10-2-08)	BR-2(5-19-10)	BR-2(101112)	BR-2(060713)	BR-02-0-0-03022000-W	GT-1(10-2-08)	GT-1(061313)	ITMW-11	ITMW-11(10-8-08)	ITMW-11(061813)	ITMW-11-0-0-03012000-W	ITMW-12	ITMW-12(10-2-08)
Sample Purpose				FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019															
Volatile Organic Compounds																		
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 3	< 3	< 0.5	< 0.5	--	< 3	< 0.5	< 3	< 3	< 0.5	--	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 21	< 19	< 10	< 10	< 10	--	< 20	< 10	< 21	< 20	< 10	--	< 19	< 19
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 2	< 2	< 0.4	< 0.4	< 5	< 2	< 0.4	< 2	< 2	< 0.4	< 5	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 25	< 1	< 0.5	< 1	< 1	< 0.5	< 25	< 1	< 0.9
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 25	< 1	< 0.5	< 1	< 1	< 0.5	< 25	< 1	< 0.9
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 5	< 2	< 0.5	< 2	< 2	< 0.5	< 5	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	< 2	< 0.5	< 2	< 2	< 0.5	--	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 25	< 1	< 0.5	< 1	< 1	< 0.5	< 25	< 1	< 0.9
4-Nitrophenol	100-02-7	1	NA	< 10	< 11	< 10	< 10	< 10	< 10	--	< 10	< 10	< 11	< 10	< 10	--	< 10	< 9
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Anthracene	120-12-7	50	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	66	< 2	< 2	< 10	< 5 J	< 2	4 J	< 2	< 2	< 10	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 10	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 1	< 1	< 0.1	0.3 J	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Fluorene	86-73-7	50	NA	< 1	< 1	< 1	< 1	< 0.1	0.1 J	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 5	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Isophorone	78-59-1	50	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 5	< 2	< 0.5	< 2	< 2	< 0.5	< 5	< 2	< 2
Naphthalene	91-20-3	10	NA	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				BR-2	BR-2	BR-2	BR-2	BR-2	BR-2	BR-2	GT-1	GT-1	ITMW-11	ITMW-11	ITMW-11	ITMW-11	ITMW-12	ITMW-12
Sample Delivery Group (SDG)				995788	995788	1113255	1195373	1341939	1395751		1113255	1397265	995867	1114224	1398230		995788	1113255
Lab Sample ID				4806478	4806484	5487986	5985322	6821816	7086905	NA	5487984	7093584	4806967	5493870	7098407	NA	4806470	5487999
Sample Date				6/28/2006	6/28/2006	10/2/2008	5/19/2010	10/11/2012	6/7/2013	3/2/2000	10/2/2008	6/13/2013	6/30/2006	10/8/2008	6/18/2013	3/1/2000	6/28/2006	10/2/2008
Field Sample ID				BR-102	BR-2	BR-2(10-2-08)	BR-2(5-19-10)	BR-2(101112)	BR-2(060713)	BR-02-0-0-03022000-W	GT-1(10-2-08)	GT-1(061313)	ITMW-11	ITMW-11(10-8-08)	ITMW-11(061813)	ITMW-11-0-0-03012000-W	ITMW-12	ITMW-12(10-2-08)
Sample Purpose				FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019															
Volatile Organic Compounds																		
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 5	< 1	< 0.5	< 1	< 1	< 0.5	< 5	< 1	< 0.9
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 3	< 3	< 1	< 1	--	< 3	< 1	< 3	< 3	< 1	--	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 1	< 1	< 0.1	0.3 J	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 0.5	< 1	< 1	< 0.5	--	< 1	< 0.9
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 1	< 1	< 0.1	0.3 J	< 5	< 1	< 0.1	< 1	< 1	< 0.1	< 5	< 1	< 0.9
Polychlorinated Biphenyls†																		
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	< 0	--	--	--	--	--	--	--	--
Metals																		
Aluminum	**7429-90-5**	**100**	**NA**	204	126 J	90.4 J	102 J	599	359	3	315	< 82.8	114 J	< 80.2	< 82.8	--	273	140 J
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	< 0.0	< 9.7	< 5.3	< 9.7	14.8 J	< 5.3	--	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	< 10	< 10	< 10.2	13.7 J	9.0 J	< 6.8	< 0.0	< 10.2	< 6.8	< 10	< 10.2	< 6.8	--	16.5 J	< 10.2
Barium	**7440-39-3**	**1000**	**NA**	145	147	64.6	83.4	73.8	78.8	0.094	4.7 J	3.9 J	17.9	16.8	102	--	23.3	14.6
Beryllium	**7440-41-7**	**3**	**NA**	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	< 0.0	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	--	< 0.94	< 0.90
Cadmium	**7440-43-9**	**5**	**NA**	< 0.91	< 0.91	< 2.0	< 2.0	< 0.36	0.41 J	< 0.0	< 2.0	< 0.76	< 0.91	< 2.0	< 0.76	--	< 0.91	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	193,000	194,000	91,700	131,000	94,300	126,000	123	18,300	14,000	50,100	60,500	385,000	--	29,500	39,100
Chromium	**7440-47-3**	**50**	**NA**	< 2.3	< 2.3	< 3.0	< 3.4	26	2.1 J	< 0.0	230	76.6	< 2.3	< 3.0	3.4 J	--	< 2.3	< 3.0
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 2.1	< 2.1	1.4 J	< 0.66	< 0.0	< 2.1	< 1.3	< 2.1	< 2.1	< 1.3	--	< 2.1	< 2.1
Copper	**7440-50-8**	**200**	**NA**	< 2.2	< 2.2	< 2.7	2.8 J	4.5 J	< 2.1	< 0.0	3.4 J	4.0 J	< 2.2	< 2.7	< 2.7	--	< 2.2	< 2.7
Iron	**7439-89-6**	**300**	**NA**	718	1,000	753	2,350	3,270	1,570	4.5	1,090	397	209	123 J	139 J	--	714	181 J
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 6.9	< 6.9	< 5.1	15.1	< 0.0	< 6.9	< 4.7	< 6.9	< 6.9	5.9 J	--	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	25,800	25,900	15,600	22,800	15,100	17,300	20	4,150	3,160	8,190	9,940	50,000	--	4,170	5,600
Manganese	**7439-96-5**	**300**	**NA**	3,810	3,870	2,110	2,110	1,920	2,120	3.4	14.2	12	362	221	502	--	529	1,170
Nickel	**7440-02-0**	**100**	**NA**	16	12.7	7.5 J	2.4 J	12.2	1.5 J	< 0.0	16.8	49.5	< 5.6	< 5.6	< 1.5	--	< 5.6	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	2,050	2,130	2,060	2,170	2,090	3,600	2.3	1,150	838	1,920	2,820	5,270	--	2,170	2,510
Selenium	**7782-49-2**	**10**	**NA**	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	< 0.0	< 10.7	< 8.4	< 9.4	< 10.7	< 8.4	--	< 9.4	< 10.7
Silver	**7440-22-4**	**50**	**NA**	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	< 0.0	< 2.2	< 2.1	< 1.6	< 2.2	< 2.1	--	< 1.6	< 2.2
Sodium	**7440-23-5**	**20000**	**NA**	58,100	56,400	63,300	86,000	68,800	106,000	28.9	12,800	11,200	72,200	58,800	120,000	--	10,200	21,300
Thallium	**7440-28-0**	**0.5**	**NA**	< 13.5	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	< 0.0	< 14.0	< 5.4	< 13.5	< 14.0	< 5.4	--	< 13.5	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	< 1.5	< 1.5	< 2.5	< 2.5	2.2 J	< 1.3	< 0.0	< 2.5	< 2.0	< 1.5	< 2.5	< 2.0	--	< 1.5	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	< 18.0 J	< 42.5	68	47.9	388	75.8	0.14	13.3 J	3.6 J	14.8 J	24.8	2.2 J	--	< 19.7 J	23.2
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.058 J	< 0.084 J	< 0.056	< 0.056	< 0.070	< 0.070	0.0018	< 0.056	< 0.070	< 0.056	< 0.056	< 0.070	--	< 0.093 J	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-12	ITMW-12	ITMW-12	ITMW-12	ITMW-13	ITMW-13	ITMW-13	ITMW-13	ITMW-13	ITMW-13	ITMW-13	ITMW-13
Sample Delivery Group (SDG)				1397270				995788	1022233	1113054	1195374	1341939	1395751	1460835	1479931
Lab Sample ID				7093614	NA	NA	NA	4806479	4962196	5487060	5985332	6821814	7086900	7400677	7489812
Sample Date				6/13/2013	3/1/2000	4/18/2001	4/19/2001	6/28/2006	1/18/2007	9/30/2008	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/5/2014
Field Sample ID				ITMW-12(061313)	ITMW-12-0-0-03012000-W	ITMW-12-0-0-04182001-W	ITMW-12-0-0-04192001-W	ITMW-13	ITMW-13011807	ITMW-13(9-30-08)	ITMW-13(5-19-10)	ITMW-13(101112)	ITMW-13(060713)	ITMW-13-031914	ITMW-13-060514
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	2 J	2.6	--	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	58	43	--	20	8	7	6	1 J	2 J	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 5	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	2 J	39	34	--	120	40	55	43	31	27	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	< 1	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 5	< 1	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	< 10	< 1	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	< 5	< 1	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 5	0.8 J	< 10	79	56	63	37	13	12	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	26	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 5	< 1	< 10	1 J	1 J	1 J	< 1	0.8 J	0.7 J	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 5	< 1	< 10	8	7	7	5 J	6	6	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 10	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 10	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 10	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
Acetone	67-64-1	50	NA	--	4 JB	--	--	--	< 6	< 6	< 6	< 6	< 6	--	--
Benzene	71-43-2	1	NA	< 0.5	< 5	14	--	3 J	2 J	2 J	0.9 J	< 0.5	0.7 J	0.8 J	0.9 J
Bromochloromethane	74-97-5	NA	83	--	< 5	< 1	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 5	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 5	< 1	--	200	140	140	64	96	97	180	54
Chloroethane	75-00-3	5	NA	< 1	7 J	< 1	--	30	35	39	13	14	11	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 5	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 5	< 1	--	--	11	3 J	2 J	1 J	1 J	< 0.8	4
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	< 1	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	1 J	15	--	62	35	24	5 J	2 J	1 J	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	1.6	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 5	< 1	--	< 2	< 2	< 2	< 2	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	--	6.8	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 5	< 1	--	--	< 1	< 1	< 1	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 5	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	< 0.7	< 5	15	--	52	6	4 J	1 J	< 0.7	< 0.7	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 5	< 1	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 5	< 1	--	2 J	2 J	< 1	< 1	< 1	< 1	< 1	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	< 10	< 1	--	< 2	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 10	< 1	--	12	5 J	2 J	< 1	< 1	< 1	< 1	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 15	25	--	85	30	20	4 J	0.9 J	< 0.8	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	< 5	--	--	--	--	--	--	--	--	--	--

Appendix B-2
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-12 1397270 7093614 6/13/2013 ITMW-12(061313) REG	ITMW-12 NA 3/1/2000 ITMW-12-0-0-03012000-W REG	ITMW-12 NA 4/18/2001 ITMW-12-0-0-04182001-W REG	ITMW-12 NA 4/19/2001 ITMW-12-0-0-04192001-W REG	ITMW-13 995788 4806479 6/28/2006 ITMW-13 REG	ITMW-13 1022233 4962196 1/18/2007 ITMW-13011807 REG	ITMW-13 1113054 5487060 9/30/2008 ITMW-13(9-30-08) REG	ITMW-13 1195374 5985332 5/19/2010 ITMW-13(5-19-10) REG	ITMW-13 1341939 6821814 10/11/2012 ITMW-13(101112) REG	ITMW-13 1395751 7086900 6/7/2013 ITMW-13(060713) REG	ITMW-13 1460835 7400677 3/19/2014 ITMW-13-031914 REG	ITMW-13 1479931 7489812 6/5/2014 ITMW-13-060514 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	--	--	--	< 3	< 3	< 3	< 3	< 0.5	< 0.5	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 10	--	--	--	< 21	< 20	< 19	< 10	< 9	< 10	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.9	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 5	--	< 10	< 2	< 2	< 2	< 2	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	--	--	--	< 1	1 J	1 J	< 1	< 0.5	< 0.5	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	< 5	--	1 J	1 J	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 25	--	< 25	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 10	--	< 20	< 2	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 25	--	< 25	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 5	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 5	--	< 10	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	--	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 25	--	< 25	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	--	--	--	< 11	< 10	< 9	< 10	< 9	< 10	--	--
Acenaphthene	83-32-9	20	NA	< 0.1	< 5	--	< 10	3 J	4 J	3 J	1 J	1	2	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	0.1 J	0.1 J	--	--
Anthracene	120-12-7	50	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 10	--	48	< 2	4 J	< 2	13	< 2	< 2	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 10	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
Chrysene	218-01-9	0.002	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 10	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 10	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.5	< 5	--	< 10	< 1	1 J	1 J	< 1	0.6 J	1	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 10	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 10	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Fluorene	86-73-7	50	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	0.4 J	0.8	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 5	< 1	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	--	< 10	< 5	< 5	< 5	< 5	< 5	< 5	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.9	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Isophorone	78-59-1	50	NA	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 5	--	< 10	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--
Naphthalene	91-20-3	10	NA	< 0.1	< 5	2.3	2 J	8	5	7	< 1	0.2 J	0.6	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-12 1397270 7093614 6/13/2013 ITMW-12(061313) REG	ITMW-12 NA 3/1/2000 ITMW-12-0-0-03012000-W REG	ITMW-12 NA 4/18/2001 ITMW-12-0-0-04182001-W REG	ITMW-12 NA 4/19/2001 ITMW-12-0-0-04192001-W REG	ITMW-13 995788 4806479 6/28/2006 ITMW-13 REG	ITMW-13 1022233 4962196 1/18/2007 ITMW-13011807 REG	ITMW-13 1113054 5487060 9/30/2008 ITMW-13(9-30-08) REG	ITMW-13 1195374 5985332 5/19/2010 ITMW-13(5-19-10) REG	ITMW-13 1341939 6821814 10/11/2012 ITMW-13(101112) REG	ITMW-13 1395751 7086900 6/7/2013 ITMW-13(060713) REG	ITMW-13 1460835 7400677 3/19/2014 ITMW-13-031914 REG	ITMW-13 1479931 7489812 6/5/2014 ITMW-13-060514 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	--	--	< 10	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	--	--	--	< 3	< 3	< 3	< 3	< 0.9	< 1	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	0.2 J	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.5	--	--	--	< 1	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	< 5	--	< 10	< 1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	1,090	--	--	--	1,340	1,340	2,090	338	907	345	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 5.3	--	--	--	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--	--
Arsenic	**7440-38-2**	**25**	**NA**	22.1	--	--	--	< 10	< 10	< 10.2	13.7 J	< 6.8	7.0 J	--	--
Barium	**7440-39-3**	**1000**	**NA**	38	--	--	--	44	43.3	62.1	49.6	176	687	--	--
Beryllium	**7440-41-7**	**3**	**NA**	0.81 J	--	--	--	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.76	--	--	--	< 0.91	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36	--	--
Calcium	**7440-70-2**	**NA**	**NA**	50,100	--	--	--	39,100	34,400	40,800	39,400	81,700	247,000	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 1.6	--	--	--	< 2.3	< 2.3	< 3.0	< 3.4	1.3 J	1.5 J	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 1.3	--	--	--	< 2.1	< 2.1	< 2.1	< 2.1	< 0.66	< 0.66	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	--	--	--	< 2.2	3.0 J	3.3 J	< 2.7	< 2.1	< 2.1	--	--
Iron	**7439-89-6**	**300**	**NA**	1,580	--	--	--	5,670	3,910	7,270	1,700	5,540	5,280	--	--
Lead	**7439-92-1**	**25**	**NA**	5.4 J	--	--	--	< 6.9	< 6.9	< 6.9	< 6.9	< 5.1	8.7 J	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	6,290	--	--	--	6,050	5,460	6,630	6,040	11,300	35,000	--	--
Manganese	**7439-96-5**	**300**	**NA**	2,300	--	--	--	1,800	1,420	1,900	1,370	1,910	4,940	8,330	2,040
Nickel	**7440-02-0**	**100**	**NA**	< 1.5	--	--	--	< 5.6	< 5.6	< 5.6	< 1.8	< 1.1	< 1.1	--	--
Potassium	**7440-09-7**	**NA**	**NA**	2,500	--	--	--	1,460	1,130	1,600	841	2,170	3,560	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 8.4	--	--	--	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.1	--	--	--	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--	--
Sodium	**7440-23-5**	**20000**	**NA**	10,400	--	--	--	5,340	4,100	6,850	18,400	87,800	419,000	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 5.4	--	--	--	< 13.5	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--	--
Vanadium	**7440-62-2**	**NA**	**86**	3.6 J	--	--	--	2.4 J	2.4 J	3.4 J	< 2.5	2.8 J	< 1.3	--	--
Zinc	**7440-66-6**	**2000**	**NA**	26.3	--	--	--	121	12.8 J	15.6 J	< 8.1	10.4 J	11.5 J	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	--	--	--	< 0.081 J	< 0.056	0.43	< 0.056	< 0.070	< 0.070	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-13 1503937 7602501 9/16/2014 CVX-0030-07 REG	ITMW-13 1516213 7662950 11/4/2014 CVX-0034-02 REG	ITMW-13 1516213 7662960 11/4/2014 CVX-0034-12 FD	ITMW-13 1548024 7819747 3/24/2015 CVX-0046-02 REG	ITMW-13 1569290 7929749 6/15/2015 CVX-0047-02 REG	ITMW-13 1593311 8049699 9/15/2015 CVX-0062-02 REG	ITMW-13 1608498 8129223 11/10/2015 ITMW-13-W-10.00-151110 REG	ITMW-13 1669977 8417055 6/8/2016 ITMW-13-W-10.00-160608 REG	ITMW-13 NA 3/2/2000 ITMW-13-0-0-03022000-W REG	ITMW-14 1195374 5985333 5/19/2010 ITMW-14(5-19-10) REG	ITMW-14 1341939 6821815 10/11/2012 ITMW-14(101112) REG	ITMW-14 1395751 7086901 6/7/2013 ITMW-14(060713) REG	ITMW-14 1479931 7489808 6/5/2014 ITMW-14-060514 REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	< 25	< 0.8	< 0.8	< 0.8	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	10 J	< 0.8	< 0.8	< 0.8	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	< 25	< 0.8	< 0.8	< 0.8	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	33	2 J	2 J	< 1	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	< 1	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	< 1	--	--	--	< 5	< 1	< 0.5	< 0.5	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	< 50	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	< 25	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	7	--	--	--	57	< 1	1	< 0.5	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	< 1	--	--	--	< 25	< 1	< 0.5	< 0.5	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	2 J	--	--	--	8 J	2 J	2	0.7 J	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	< 50	< 3	< 3	< 3	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	< 50	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	< 50	< 3	< 3	< 3	--
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	< 50	< 6	< 6	< 6	--
Benzene	71-43-2	1	NA	2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	7 J	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	< 25	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	< 50	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	5	NA	240	36	38	31	16	20	11	4	65	6	3 J	1 J	59
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	< 50	< 1	< 1	< 1	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	< 25	< 0.8	< 0.8	< 0.8	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	18 J	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 25	< 0.8	< 0.8	< 0.8	1
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	< 0.5	--	--	--	94	< 0.8	< 0.8	< 0.8	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	< 0.5	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	10 JB	< 2	< 2	< 2	--
o-Xylene	95-47-6	NA	190	--	--	--	--	< 0.5	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	< 25	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	5	NA	--	--	--	--	< 0.5	--	--	--	340	< 0.7	< 0.7	< 0.7	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	< 25	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 25	< 1	< 1	< 1	2
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	< 50	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 50	< 1	< 1	< 1	0.9 J
Xylene (total)	1330-20-7	5	NA	--	--	--	--	< 0.5	--	--	--	180	< 0.8	< 0.8	< 0.8	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	< 5	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-13 1503937 7602501 9/16/2014 CVX-0030-07 REG	ITMW-13 1516213 7662950 11/4/2014 CVX-0034-02 REG	ITMW-13 1516213 7662960 11/4/2014 CVX-0034-12 FD	ITMW-13 1548024 7819747 3/24/2015 CVX-0046-02 REG	ITMW-13 1569290 7929749 6/15/2015 CVX-0047-02 REG	ITMW-13 1593311 8049699 9/15/2015 CVX-0062-02 REG	ITMW-13 1608498 8129223 11/10/2015 ITMW-13-W-10.00-151110 REG	ITMW-13 1669977 8417055 6/8/2016 ITMW-13-W-10.00-160608 REG	ITMW-13 NA 3/2/2000 ITMW-13-0-0-03022000-W REG	ITMW-14 1195374 5985333 5/19/2010 ITMW-14(5-19-10) REG	ITMW-14 1341939 6821815 10/11/2012 ITMW-14(101112) REG	ITMW-14 1395751 7086901 6/7/2013 ITMW-14(060713) REG	ITMW-14 1479931 7489808 6/5/2014 ITMW-14-060514 REG
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	--	< 3	< 0.5	< 0.5	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	--	< 12	< 10	< 10	--
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 1	< 1	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	< 5	< 2	< 0.4	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	< 5	< 1	< 0.1	< 0.1	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 0.5	< 0.5	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	< 10	< 2	< 2	< 2	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 0.5	< 0.5	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	--	< 6	< 5	< 5	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	< 5	< 2	< 0.5	< 0.5	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	--	< 2	< 0.5	< 0.5	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	< 25	< 1	< 0.5	< 0.5	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	--	< 12	< 10	< 10	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	5	< 1	0.4 J	< 0.1	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.1	< 0.1	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.2 J	< 0.1	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.2 J	0.2 J	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	< 5	< 1	0.4 J	0.3 J	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.3 J	0.3 J	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.4 J	0.5 J	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.1 J	0.1 J	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	< 10	6	310	< 2	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	< 10	< 2	< 2	< 2	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.3 J	0.3 J	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	< 10	< 2	< 2	< 2	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	< 10	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	< 5	< 1	< 0.1	< 0.1	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	< 10	< 2	< 2	< 2	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	< 10	< 2	< 2	< 2	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.8	0.5 J	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.5	< 0.1	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.1	< 0.1	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	< 5	< 6	< 5	< 5	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 1	< 1	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	< 5	< 1	0.3 J	0.4 J	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	< 5	< 2	< 0.5	< 0.5	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	< 5	< 1	< 0.1	< 0.1	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-13 1503937 7602501 9/16/2014 CVX-0030-07 REG	ITMW-13 1516213 7662950 11/4/2014 CVX-0034-02 REG	ITMW-13 1516213 7662960 11/4/2014 CVX-0034-12 FD	ITMW-13 1548024 7819747 3/24/2015 CVX-0046-02 REG	ITMW-13 1569290 7929749 6/15/2015 CVX-0047-02 REG	ITMW-13 1593311 8049699 9/15/2015 CVX-0062-02 REG	ITMW-13 1608498 8129223 11/10/2015 ITMW-13-W-10.00-151110 REG	ITMW-13 1669977 8417055 6/8/2016 ITMW-13-W-10.00-160608 REG	ITMW-13 NA 3/2/2000 ITMW-13-0-0-03022000-W REG	ITMW-14 1195374 5985333 5/19/2010 ITMW-14(5-19-10) REG	ITMW-14 1341939 6821815 10/11/2012 ITMW-14(101112) REG	ITMW-14 1395751 7086901 6/7/2013 ITMW-14(060713) REG	ITMW-14 1479931 7489808 6/5/2014 ITMW-14-060514 REG
Volatile Organic Compounds																	
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	--	--	< 5	< 1	< 0.5	< 0.5	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	--	--	--	< 3	< 1	< 1	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	--	--	< 5	< 1	< 0.1	< 0.1	--
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	--	--	--	< 1	< 0.5	< 0.5	--
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	--	--	< 5	< 1	0.8	0.7	--
Polychlorinated Biphenyls†																	
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																	
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	--	--	153	14,300	3,300	8,530	--
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	--	--	< 0.0	< 9.7	< 3.5	< 3.5	--
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	--	--	0.12	< 7.2	8.6 J	< 6.8	--
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	--	--	1.1	84.3	48.1	73.2	--
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	--	--	0.012	< 1.4	< 0.67	1.3 J	--
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	--	--	0.009	< 2.0	< 0.36	0.67 J	--
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	--	--	177	30,100	39,100	38,400	--
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	--	--	0.1	48.4	20.5	51.4	--
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	--	--	0.072	6.8	2.0 J	4.2 J	--
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	--	--	0.11	21.9	5.4 J	12.8	--
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	--	--	25	44,300	20,500	18,700	--
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	--	--	0.13	6.9 J	11.4 J	33.6	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	--	--	25	10,300	8,320	9,930	--
Manganese	**7439-96-5**	**300**	**NA**	3,720	2,880	2,890	7,290	5,670	6,240	7,450	1,320	25	3,050	3,870	1,710	3,950
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	--	--	< 25	11	< 1.1	5.5 J	--
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	--	--	25	4,490	2,710	3,190	--
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	--	--	< 0.0	< 8.9	< 7.5	< 7.5	--
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	--	--	< 0.0	< 2.3	< 1.2	< 1.2	--
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	--	--	50	7,850	14,400	39,000	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	--	--	< 25	< 14.0	< 5.7	< 5.7	--
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	--	--	57	20.9	6.4	15.4	--
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	--	--	--	211	54.2	216	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	--	--	33	< 0.056	< 0.070	< 0.070	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-14	ITMW-14	ITMW-14	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-20
Sample Delivery Group (SDG)				1548024	1669977		995788	1014758	1021328	1021328	1115029	1196041	1343207	1398579		995788
Lab Sample ID				7819748	8417061	NA	4806474	4919103	4957585	4957586	5498269	5989881	6828413	7100139	NA	4806480
Sample Date				3/24/2015	6/8/2016	3/2/2000	6/29/2006	6/29/2006	1/11/2007	1/11/2007	10/14/2008	5/25/2010	10/17/2012	6/19/2013	3/1/2000	6/28/2006
Field Sample ID				CVX-0046-03	ITMW-14(2)-W-10.00-160608	ITMW-14-0-0-03022000-W	ITMW-2	ITMW-2	ITMW2011107	ITMW102011107	ITMW-2(10-14-08)	ITMW-02(5-25-10)	ITMW-2(101712)	ITMW-2(061913)	ITMW-02-0-0-03012000-W	ITMW-20
Sample Purpose				REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	< 50	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	170	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	< 50	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	110	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	< 100	--	--	--	--	--	--	--	--	< 10	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	< 50	--	--	--	--	--	--	--	--	< 5	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	150	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	< 0.8	< 0.8	--	--	--	--	--	--	--	< 0.8
1,2-Dichloropropane	78-87-5	1	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	< 50	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	23 J	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	< 100	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 10	--
2-Hexanone	591-78-6	50	NA	--	--	< 100	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 10	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	< 100	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 10	--
Acetone	67-64-1	50	NA	--	--	120 B	--	--	< 6	< 6	< 6	< 6	< 6	< 6	4 JB	--
Benzene	71-43-2	1	NA	< 1	< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	< 50	--	--	--	--	--	--	--	--	< 5	--
Bromodichloromethane	75-27-4	50	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Bromoform	75-25-2	50	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	< 100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 10	< 1
Carbon disulfide	75-15-0	60	NA	--	--	< 50	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 5	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Chlorobenzene	108-90-7	5	NA	62	44	180	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
Chloroethane	75-00-3	5	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 10	< 1
Chloroform	67-66-3	7	NA	--	--	< 50	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	< 100	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 10	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	2 J	2	330	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	--
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	--	--	56	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	110	6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	23 JB	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	1 JB	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	< 50	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 5	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	< 50	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8
Toluene	108-88-3	5	NA	--	--	24 J	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 5	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	< 50	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 5	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	< 50	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 0.5	820	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	< 100	< 2	< 2	--	--	--	--	--	--	< 10	< 2
Vinyl chloride (Chloroethene)	75-01-4	2	NA	1 J	0.6 J	45 J	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 10	< 1
Xylene (total)	1330-20-7	5	NA	--	--	180	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 15	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	< 5	--	--	--	--	--	--	--	--	< 5	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-14	ITMW-14	ITMW-14	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-2	ITMW-20
Sample Delivery Group (SDG)				1548024	1669977		995788	1014758	1021328	1021328	1115029	1196041	1343207	1398579		995788
Lab Sample ID				7819748	8417061	NA	4806474	4919103	4957585	4957586	5498269	5989881	6828413	7100139	NA	4806480
Sample Date				3/24/2015	6/8/2016	3/2/2000	6/29/2006	6/29/2006	1/11/2007	1/11/2007	10/14/2008	5/25/2010	10/17/2012	6/19/2013	3/1/2000	6/28/2006
Field Sample ID				CVX-0046-03	ITMW-14(2)-W-10.00-160608	ITMW-14-0-0-03022000-W	ITMW-2	ITMW-2	ITMW2011107	ITMW102011107	ITMW-2(10-14-08)	ITMW-02(5-25-10)	ITMW-2(101712)	ITMW-2(061913)	ITMW-02-0-0-03012000-W	ITMW-20
Sample Purpose				REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	< 3	--	< 3	< 3	< 3	< 3	< 0.5	< 0.6	--	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	< 20	--	< 19	< 19	< 20	< 10	< 10	< 11	--	< 20
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 1	< 1	< 5	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	< 5	< 2	--	< 2	< 2	< 2	< 2	< 0.4	< 0.4	< 5	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	< 25	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 25	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	< 25	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 25	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	< 5	--	< 5	< 5	< 5	< 5	< 5	< 6	--	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	< 5	< 2	--	< 2	< 2	< 2	< 2	< 0.5	< 0.6	< 5	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	< 2	--	< 2	< 2	< 2	< 2	< 0.5	< 0.6	--	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	< 25	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 25	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	--	< 10	--	< 9	< 10	< 10	< 10	< 10	< 11	--	< 10
Acenaphthene	83-32-9	20	NA	--	--	11	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Acenaphthylene	208-96-8	NA	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Anthracene	120-12-7	50	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	< 10	< 2	--	5 J	6	< 2	< 2	< 2	< 2	< 10	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2
Carbazole	86-74-8	NA	NA	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
Chrysene	218-01-9	0.002	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	2 J
Diethylphthalate	84-66-2	50	NA	--	--	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 10	< 2
Fluoranthene	206-44-0	50	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Fluorene	86-73-7	50	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	2 J
Hexachlorobenzene	118-74-1	0.04	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	< 6	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 1	< 1	< 5	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Isophorone	78-59-1	50	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	< 5	5 J	--	< 2	< 2	< 2	< 2	< 0.5	< 0.6	< 5	< 2
Naphthalene	91-20-3	10	NA	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-14 1548024 7819748 3/24/2015 CVX-0046-03 REG	ITMW-14 1669977 8417061 6/8/2016 ITMW-14(2)-W-10.00-160608 REG	ITMW-14 NA 3/2/2000 ITMW-14-0-0-03022000-W REG	ITMW-2 995788 4806474 6/29/2006 ITMW-2 REG	ITMW-2 1014758 4919103 6/29/2006 ITMW-2 REG	ITMW-2 1021328 4957585 1/11/2007 ITMW2011107 REG	ITMW-2 1021328 4957586 1/11/2007 ITMW102011107 FD	ITMW-2 1115029 5498269 10/14/2008 ITMW-2(10-14-08) REG	ITMW-2 1196041 5989881 5/25/2010 ITMW-02(5-25-10) REG	ITMW-2 1343207 6828413 10/17/2012 ITMW-2(101712) REG	ITMW-2 1398579 7100139 6/19/2013 ITMW-2(061913) REG	ITMW-2 NA 3/1/2000 ITMW-02-0-0-03012000-W REG	ITMW-20 995788 4806480 6/28/2006 ITMW-20 REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	< 5	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	< 3	--	< 3	< 3	< 3	< 3	< 1	< 1	--	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	38	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Phenol	**108-95-2**	**1**	**NA**	--	--	--	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.6	--	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	< 5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	< 5	< 1
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	--	--	15.6	297	--	1,450	1,780	< 80.2	< 80.2	4,830	1,060	--	< 80.2
Antimony	**7440-36-0**	**3**	**NA**	--	--	< 0.0	< 9.7	--	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 5.3	--	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	--	--	0.019	< 10	--	< 10	< 10	< 10.2	< 7.2	10.1 J	< 6.8	--	< 10
Barium	**7440-39-3**	**1000**	**NA**	--	--	0.074	102	--	82.2	83.9	76.4	61.8	101	69.2	--	6.6
Beryllium	**7440-41-7**	**3**	**NA**	--	--	< 0.0	< 0.94	--	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	< 0.94
Cadmium	**7440-43-9**	**5**	**NA**	--	--	< 0.0	< 0.91	--	< 0.91	< 0.91	< 2.0	< 2.0	< 0.36	< 0.76	--	< 0.91
Calcium	**7440-70-2**	**NA**	**NA**	--	--	47.9	215,000	--	174,000	171,000	167,000	138,000	152,000	132,000	--	31,100
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	2.5 J	--	7.1 J	7.5 J	< 3.0	< 3.4	16.9	6.4 J	--	< 2.3
Cobalt	**7440-48-4**	**5**	**NA**	--	--	< 2	< 2.1	--	< 2.1	< 2.1	< 2.1	< 2.1	1.6 J	< 1.3	--	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	0.027	2.8 J	--	8.4 J	10	< 2.7	< 2.7	8.3 J	< 2.7	--	< 2.2
Iron	**7439-89-6**	**300**	**NA**	--	--	2	1,090	--	6,180	6,960	375	110 J	15,100	2,730	--	1,130
Lead	**7439-92-1**	**25**	**NA**	--	--	2	< 6.9	--	< 6.9	< 6.9	< 6.9	< 6.9	8.8 J	< 4.7	--	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	< 5	84,700	--	66,900	65,700	65,500	51,800	61,900	50,400	--	5,130
Manganese	**7439-96-5**	**300**	**NA**	10,600	4,940	< 1	194	--	76.1	100	4.0 J	2.7 J	194	33.1	--	2,660
Nickel	**7440-02-0**	**100**	**NA**	--	--	5	< 5.6	--	< 5.6	< 5.6	< 5.6	< 1.8	4.9 J	3.1 J	--	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	--	--	3.5	3,310	--	2,340	2,440	2,180	2,050	3,200	2,130	--	684
Selenium	**7782-49-2**	**10**	**NA**	--	--	< 0.0	< 9.4	--	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 8.4	--	< 9.4
Silver	**7440-22-4**	**50**	**NA**	--	--	< 0.0	< 1.6	--	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 2.1	--	< 1.6
Sodium	**7440-23-5**	**20000**	**NA**	--	--	5.9	148,000	--	157,000	157,000	142,000	147,000	149,000	145,000	--	4,200
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	< 0.0	< 13.5	--	< 13.5	< 13.5	< 14.0	< 14.0	7.0 J	< 5.4	--	< 13.5
Vanadium	**7440-62-2**	**NA**	**86**	--	--	< 0.0	< 1.5	--	3.7 J	4.6 J	< 2.5	< 2.5	14.1	3.3 J	--	< 1.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	0.1	< 12.0 J	--	14.5 J	17.7 J	< 8.1	< 8.1	22.6	10.7 J	--	< 10.7 J
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	< 5	< 0.059 J	--	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	< 0.092 J

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-20 1113054 5487048 9/30/2008 ITMW-20(9-30-08) REG	ITMW-20 1397270 7093623 6/13/2013 ITMW-20(061313) REG	ITMW-20 NA 7/28/2000 ITMW-20-0-0-07282000-W REG	ITMW-21 995788 4806486 6/28/2006 ITMW-21 REG	ITMW-21 1113255 5487998 10/2/2008 ITMW-21(10-2-08) REG	ITMW-21 1397265 7093598 6/13/2013 ITMW-21(061313) REG	ITMW-21 NA 4/18/2001 ITMW-21-0-0-04182001-W REG	ITMW-21 NA 4/19/2001 ITMW-21-0-0-04192001-W REG	ITMW-21 NA 7/28/2000 ITMW-21-0-0-07282000-W REG	ITMW-22 995788 4806471 6/28/2006 ITMW-22 REG	ITMW-22 1022020 4961243 1/17/2007 ITMW-22011707 REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 1	< 0.8	< 0.8	< 0.8	< 1	--	< 1	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	0.9 J	--	< 5	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 2	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 1	--	< 2	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	--	5.8	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	< 1	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 10	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	< 5	--	--	--	< 1	--	< 5	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	< 1	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 0.5	< 5	< 1	< 0.9	< 0.5	< 1	< 10	< 5	2 J	3 J
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 2	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	< 0.8	--	--	--	--	--	< 0.8	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 0.5	< 5	< 1	< 0.9	< 0.5	< 1	< 10	< 5	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 0.5	< 2	< 1	< 0.9	< 0.5	< 1	< 10	< 2	< 1	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 50	--	< 3	< 3	--	--	< 50	--	6 J
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 50	--	< 3	< 3	--	--	< 50	--	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 50	--	< 3	< 3	--	--	< 50	--	< 3
Acetone	67-64-1	50	NA	< 6	--	< 50	--	< 6	--	--	--	< 50	--	27
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.5	< 1	--	< 1	1 J	10
Bromochloromethane	74-97-5	NA	83	--	--	< 2	--	--	--	< 1	--	< 2	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 2	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 5	--	< 1	< 1	--	--	< 5	--	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 2	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 4	< 0.8	< 0.8	< 0.8	< 1	--	< 4	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	--	< 5	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 2	< 0.8	< 0.8	< 0.8	< 1	--	< 2	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 10	< 1	< 1	< 1	< 1	--	< 10	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 5	--	< 0.8	< 0.8	< 1	--	< 5	--	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	--	< 0.5	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 2	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	< 1	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--	--	--	--	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--	--	--	--	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	1.2	--	< 5	110	68
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	< 1	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	--	--	--	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	23.4 B	< 2	< 2	< 2	< 1	--	21.6 B	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	< 1	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 5	--	< 1	< 1	< 1	--	< 5	--	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	--	< 0.8	< 0.8	--	--	--	--	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	--	< 10	< 10	--	--	--	--	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 1	< 0.8	< 0.8	< 0.8	< 1	--	< 1	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 5	< 0.7	< 0.7	< 0.7	1.1	--	< 5	2 J	4 J
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 1	--	--	--	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	--	< 0.5	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	< 5	< 2	--	--	< 1	--	< 5	< 2	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 10	< 0.8	< 0.8	< 0.8	1.9	--	< 10	56	52
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-20	ITMW-20	ITMW-20	ITMW-21	ITMW-21	ITMW-21	ITMW-21	ITMW-21	ITMW-21	ITMW-22	ITMW-22
Sample Delivery Group (SDG)				1113054	1397270		995788	1113255	1397265				995788	1022020
Lab Sample ID				5487048	7093623	NA	4806486	5487998	7093598	NA	NA	NA	4806471	4961243
Sample Date				9/30/2008	6/13/2013	7/28/2000	6/28/2006	10/2/2008	6/13/2013	4/18/2001	4/19/2001	7/28/2000	6/28/2006	1/17/2007
Field Sample ID				ITMW-20(9-30-08)	ITMW-20(061313)	ITMW-20-0-0-07282000-W	ITMW-21	ITMW-21(10-2-08)	ITMW-21(061313)	ITMW-21-0-0-04182001-W	ITMW-21-0-0-04192001-W	ITMW-21-0-0-07282000-W	ITMW-22	ITMW-22011707
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 0.5	--	< 3	< 3	< 0.5	--	--	--	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 10	--	< 20	< 19	< 10	--	--	--	< 19	< 20
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 0.9	< 1	--	< 10	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 0.4	< 4	< 2	< 2	< 0.4	--	< 10	< 3	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 0.1	--	< 1	< 0.9	< 0.1	--	< 10	--	< 1	1 J
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	< 25	--	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 4	< 2	< 2	< 2	--	< 20	< 4	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	< 25	--	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	--	< 5	< 5	< 5	--	< 10	--	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	< 10	--	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 0.5	< 1	< 2	< 2	< 0.5	--	< 10	< 1	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 0.5	--	< 2	< 2	< 0.5	--	--	--	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	< 25	--	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	--	< 10	< 9	< 10	--	--	--	< 10	< 10
Acenaphthene	83-32-9	20	NA	< 1	0.1 J	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Anthracene	120-12-7	50	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 0.5	< 3	< 1	< 0.9	< 0.5	--	< 10	< 3	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	1.2 B	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 1	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
Chrysene	218-01-9	0.002	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 1	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 1	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	< 10	--	< 1	< 1
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 1	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Fluorene	86-73-7	50	NA	< 1	0.3 J	3.5	< 1	< 0.9	< 0.1	--	< 10	1.7	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 0.5	< 2	< 1	< 0.9	< 0.5	< 1	< 10	< 1	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 1	< 5	< 5	< 5	--	< 10	< 1	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 0.9	< 1	--	< 10	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Isophorone	78-59-1	50	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 0.5	< 2	< 2	< 2	< 0.5	--	< 10	< 2	< 2	< 2
Naphthalene	91-20-3	10	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 10	< 1	13	14

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-20 1113054 5487048 9/30/2008 ITMW-20(9-30-08) REG	ITMW-20 1397270 7093623 6/13/2013 ITMW-20(061313) REG	ITMW-20 NA 7/28/2000 ITMW-20-0-0-07282000-W REG	ITMW-21 995788 4806486 6/28/2006 ITMW-21 REG	ITMW-21 1113255 5487998 10/2/2008 ITMW-21(10-2-08) REG	ITMW-21 1397265 7093598 6/13/2013 ITMW-21(061313) REG	ITMW-21 NA 4/18/2001 ITMW-21-0-0-04182001-W REG	ITMW-21 NA 4/19/2001 ITMW-21-0-0-04192001-W REG	ITMW-21 NA 7/28/2000 ITMW-21-0-0-07282000-W REG	ITMW-22 995788 4806471 6/28/2006 ITMW-22 REG	ITMW-22 1022020 4961243 1/17/2007 ITMW-22011707 REG
Volatile Organic Compounds														
Nitrobenzene	98-95-3	0.4	NA	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	--	< 10	< 1	< 1	< 1
p-Chloro-m-cresol	59-50-7	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
Pentachlorophenol	87-86-5	1	NA	< 3	< 1	--	< 3	< 3	< 1	--	--	--	< 3	< 3
Phenanthrene	85-01-8	50	NA	< 1	< 0.1	2.5	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Phenol	108-95-2	1	NA	< 1	< 0.5	--	< 1	< 0.9	< 0.5	--	--	--	< 1	< 1
Pyrene	129-00-0	50	NA	< 1	< 0.1	< 1	< 1	< 0.9	< 0.1	--	< 10	< 1	< 1	< 1
Polychlorinated Biphenyls†														
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	7429-90-5	100	NA	< 80.2	321	--	82.3 J	< 80.2	< 82.8	--	--	--	< 80.2	< 80.2
Antimony	7440-36-0	3	NA	< 9.7	< 5.3	--	< 9.7	< 9.7	< 5.3	--	--	--	< 9.7	< 9.7
Arsenic	7440-38-2	25	NA	< 10.2	< 6.8	--	12.7 J	< 10.2	20.6	--	--	--	< 10	< 10
Barium	7440-39-3	1000	NA	4.4 J	7.4	--	15.8	16.5	18.8	--	--	--	15.6	11.8
Beryllium	7440-41-7	3	NA	< 0.90	< 0.67	--	< 0.94	< 0.90	< 0.67	--	--	--	< 0.94	< 0.94
Cadmium	7440-43-9	5	NA	< 2.0	< 0.76	--	< 0.91	< 2.0	< 0.76	--	--	--	< 0.91	< 0.91
Calcium	7440-70-2	NA	NA	32,900	30,200	--	20,800	27,400	34,700	--	--	--	30,100	21,500
Chromium	7440-47-3	50	NA	< 3.0	< 1.6	--	< 2.3	< 3.0	< 1.6	--	--	--	< 2.3	< 2.3
Cobalt	7440-48-4	5	NA	< 2.1	< 1.3	--	< 2.1	< 2.1	< 1.3	--	--	--	< 2.1	< 2.1
Copper	7440-50-8	200	NA	< 2.7	< 2.7	--	< 2.2	< 2.7	< 2.7	--	--	--	< 2.2	< 2.2
Iron	7439-89-6	300	NA	2,330	1,660	--	761	59.7 J	134 J	--	--	--	8,250	1,810
Lead	7439-92-1	25	NA	< 6.9	5.3 J	--	< 6.9	< 6.9	< 4.7	--	--	--	< 6.9	< 6.9
Magnesium	7439-95-4	35000	NA	5,600	5,650	--	3,580	3,840	4,970	--	--	--	5,220	4,140
Manganese	7439-96-5	300	NA	2,850	2,690	--	36.2	55.3	7.6	--	--	--	1,880	2,400
Nickel	7440-02-0	100	NA	< 5.6	< 1.5	--	< 5.6	< 5.6	< 1.5	--	--	--	< 5.6	< 5.6
Potassium	7440-09-7	NA	NA	718	642	--	2,390	2,760	2,290	--	--	--	1,140	1,140
Selenium	7782-49-2	10	NA	< 10.7	< 8.4	--	< 9.4	< 10.7	< 8.4	--	--	--	< 9.4	< 9.4
Silver	7440-22-4	50	NA	< 2.2	< 2.1	--	< 1.6	< 2.2	< 2.1	--	--	--	< 1.6	< 1.6
Sodium	7440-23-5	20000	NA	4,690	4,510	--	35,400	36,100	20,400	--	--	--	5,820	6,530
Thallium	7440-28-0	0.5	NA	< 14.0	< 5.4	--	< 13.5	< 14.0	< 5.4	--	--	--	< 13.5	< 13.5
Vanadium	7440-62-2	NA	86	< 2.5	< 2.0	--	3.2 J	< 2.5	2.8 J	--	--	--	< 1.5	1.5 J
Zinc	7440-66-6	2000	NA	< 8.1	11.4 J	--	< 55.9	12.6 J	394	--	--	--	105	< 14.7 J
Mercury	7439-97-6	0.7	NA	< 0.056	< 0.070	--	< 0.076 J	< 0.056	< 0.070	--	--	--	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-22 1113255 5488006 10/2/2008 ITMW-22(10-2-08) REG	ITMW-22 1195597 5987011 5/20/2010 ITMW-22(5-20-10) REG	ITMW-22 1341939 6821822 10/11/2012 ITMW-22(101112) REG	ITMW-22 1397270 7093616 6/13/2013 ITMW-22(061313) REG	ITMW-22 NA 4/18/2001 ITMW-22-0-0-04182001-W REG	ITMW-22 NA 4/19/2001 ITMW-22-0-0-04192001-W REG	ITMW-22 NA 7/28/2000 ITMW-22-0-0-07282000-W REG	ITMW-28 995867 4806971 6/30/2006 ITMW-28 REG	ITMW-28 1021820 4960002 1/16/2007 ITMW-28011607 REG	ITMW-28 1114664 5496350 10/10/2008 ITMW-28(10-10-08) REG	ITMW-28 NA 7/28/2000 ITMW-28-0-0-07282000-W REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	18	< 0.8	< 0.8	< 0.8	10	--	5.2	15	9	5 J	6.3
1,1,1-Trichloroethane	71-55-6	5	NA	10	< 0.8	< 0.8	< 0.8	4	--	6	< 0.8	< 0.8	< 0.8	< 5
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1	< 1	< 2
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 1	--	< 2	< 0.8	< 0.8	< 0.8	< 2
1,1-Dichloroethane	75-34-3	5	NA	85	< 1	2 J	< 1	30	--	55.9	< 1	< 1	< 1	< 5
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	< 1	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 10	< 1	< 1	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	< 1	--	< 5	--	--	--	< 5
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	< 1	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	160	4 J	13	2	58 D	21	49.3	96	100	44	64.8
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1	< 1	< 2
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	85	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	2 J	< 1	< 0.5	< 0.5	0.81 J	< 10	< 5	3 J	3 J	2 J	< 5
1,4-Dichlorobenzene	106-46-7	3	NA	24	< 1	3	< 0.5	26	3 J	8.5	33	35	18	28.1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	12	35	13	3 J	--	--	< 50	--	3 J	3 J	< 50
2-Hexanone	591-78-6	50	NA	< 3	< 3	6 J	< 3	--	--	< 50	--	< 3	< 3	< 50
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	42	5 J	< 3	--	--	< 50	--	< 3	< 3	< 50
Acetone	67-64-1	50	NA	98	31	40	--	--	--	< 50	--	7 J	6 J	< 50
Benzene	71-43-2	1	NA	55	< 0.5	10	< 0.5	560 D	--	555	14	11	11	9.2
Bromochloromethane	74-97-5	NA	83	--	--	--	--	< 1	--	< 2	--	--	--	< 2
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1	< 1	< 2
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	< 5	--	< 1	< 1	< 5
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1	< 1	< 2
Chlorobenzene	108-90-7	5	NA	53	< 0.8	5 J	< 0.8	21	--	44.4	280	250	220	211 E
Chloroethane	75-00-3	5	NA	110	< 1	3 J	< 1	5.6	--	31.6	< 1	< 1	< 1	< 5
Chloroform	67-66-3	7	NA	4 J	< 0.8	< 0.8	< 0.8	1.7	--	< 2	< 0.8	< 0.8	< 0.8	< 2
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	--	< 10	< 1	< 1	< 1	< 10
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 1	--	< 5	--	91	41	77.2
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	< 0.5	< 1	< 1	< 1	< 0.5
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	--	< 2	< 1	< 1	< 1	< 2
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	< 1	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	42	< 0.8	3 J	< 0.8	580 D	--	26.6	1 J	0.9 J	< 0.8	< 5
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	160 D	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	2 J	< 0.5	< 0.5	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	0.8 J	--	24 B	< 2	< 2	< 2	16.8 B
o-Xylene	95-47-6	NA	190	--	--	--	--	250 D	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	< 5	--	< 1	< 1	< 5
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	--	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 1	--	< 1	< 0.8	< 0.8	< 0.8	< 1
Toluene	108-88-3	5	NA	8	< 0.7	2 J	< 0.7	340 D	--	40.8	2 J	1 J	1 J	6.5
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 1	--	--	--	42	12	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	< 0.5	< 1	< 1	< 1	< 0.5
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	--	< 1	130	91	61	110
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	1.2	--	< 5	< 2	--	--	< 5
Vinyl chloride (Chloroethene)	75-01-4	2	NA	2 J	< 1	< 1	< 1	< 1	--	< 1	81	32	18	32.4
Xylene (total)	1330-20-7	5	NA	39	< 0.8	7	< 0.8	980 D	--	93.6	1 J	4 J	1 J	< 10
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-22 1113255 5488006 10/2/2008 ITMW-22(10-2-08) REG	ITMW-22 1195597 5987011 5/20/2010 ITMW-22(5-20-10) REG	ITMW-22 1341939 6821822 10/11/2012 ITMW-22(101112) REG	ITMW-22 1397270 7093616 6/13/2013 ITMW-22(061313) REG	ITMW-22 NA 4/18/2001 ITMW-22-0-0-04182001-W REG	ITMW-22 NA 4/19/2001 ITMW-22-0-0-04192001-W REG	ITMW-22 NA 7/28/2000 ITMW-22-0-0-07282000-W REG	ITMW-28 995867 4806971 6/30/2006 ITMW-28 REG	ITMW-28 1021820 4960002 1/16/2007 ITMW-28011607 REG	ITMW-28 1114664 5496350 10/10/2008 ITMW-28(10-10-08) REG	ITMW-28 NA 7/28/2000 ITMW-28-0-0-07282000-W REG
Volatile Organic Compounds														
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	< 3	< 3	< 0.5	< 0.5	--	--	--	< 3	< 3	< 3	--
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	< 19	< 10	< 10	< 11	--	--	--	< 21	< 20	< 20	--
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 1	< 1	< 1	< 1	--	< 10	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 1	< 1	< 1	< 1	< 1
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 2	< 2	< 0.4	< 0.4	--	< 10	< 3	< 2	< 2	< 2	< 3
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	1 J	1 J	--
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	6	< 1	< 0.1	0.4 J	--	15	--	< 1	< 1	< 1	--
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 25	--	< 1	< 1	< 1	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 2	< 2	< 2	< 2	--	< 20	< 3	< 2	< 2	< 2	< 3
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 25	--	< 1	< 1	< 1	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 5	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	--
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 2	< 1	< 1	< 1	< 2
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	--	< 1	< 1	< 1	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 2	< 2	< 0.5	< 0.5	--	< 10	< 1	< 2	< 2	< 2	< 1
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 2	< 2	< 0.5	< 0.5	--	--	--	< 2	< 2	< 2	--
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 25	--	< 1	< 1	< 1	--
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 10	< 10	< 10	< 11	--	--	--	< 11	< 10	< 10	--
Acenaphthene	**83-32-9**	**20**	**NA**	1 J	< 1	1	0.5 J	--	1 J	< 1	6	13	3 J	10.6
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	5 J	11	3 J	11.5
Anthracene	**120-12-7**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	2 J	< 1	< 1
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	1 J	< 1	1.2
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 1	< 1	< 1	< 1	< 1
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 1	< 1	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 3	< 1	< 1	< 1	< 3
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	< 6	< 2	4 J	< 2	--	5 J	< 1	< 2	< 2	< 2	1.5 B
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 2	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2	< 2	< 1
Carbazole	**86-74-8**	**NA**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
Chrysene	**218-01-9**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	1 J	< 1	1.1
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 2	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2	< 2	< 1
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 2	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2	< 2	< 1
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
Dibenzofuran	**132-64-9**	**NA**	**7.9**	1 J	< 1	< 0.5	< 0.5	--	1 J	--	< 1	< 1	< 1	--
Diethylphthalate	**84-66-2**	**50**	**NA**	< 2	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2	< 2	1.8
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 2	< 2	< 2	< 2	--	< 10	< 1	< 2	< 2	< 2	< 1
Fluoranthene	**206-44-0**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	2 J	3 J	< 1	1.3
Fluorene	**86-73-7**	**50**	**NA**	< 1	< 1	0.5	0.3 J	--	< 10	< 1	< 1	1 J	< 1	1.1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 10	< 2	< 1	< 1	< 1	< 2
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 5	< 5	< 5	< 5	--	< 10	< 1	< 5	< 5	< 5	< 1
Hexachloroethane	**67-72-1**	**5**	**NA**	< 1	< 1	< 1	< 1	--	< 10	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 10	< 1	< 1	< 1	< 1	< 1
Isophorone	**78-59-1**	**50**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 1	< 1	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 1	< 1	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 2	< 2	< 0.5	< 0.5	--	< 10	< 2	< 2	< 2	< 2	< 2
Naphthalene	**91-20-3**	**10**	**NA**	17	9	1	5	130 D	67	< 1	< 1	< 1	< 1	1.2

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-22 1113255 5488006 10/2/2008 ITMW-22(10-2-08) REG	ITMW-22 1195597 5987011 5/20/2010 ITMW-22(5-20-10) REG	ITMW-22 1341939 6821822 10/11/2012 ITMW-22(101112) REG	ITMW-22 1397270 7093616 6/13/2013 ITMW-22(061313) REG	ITMW-22 NA 4/18/2001 ITMW-22-0-0-04182001-W REG	ITMW-22 NA 4/19/2001 ITMW-22-0-0-04192001-W REG	ITMW-22 NA 7/28/2000 ITMW-22-0-0-07282000-W REG	ITMW-28 995867 4806971 6/30/2006 ITMW-28 REG	ITMW-28 1021820 4960002 1/16/2007 ITMW-28011607 REG	ITMW-28 1114664 5496350 10/10/2008 ITMW-28(10-10-08) REG	ITMW-28 NA 7/28/2000 ITMW-28-0-0-07282000-W REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 10	< 1	< 1	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	< 1	< 1	< 1	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 1	< 1	--	--	--	< 3	< 3	< 3	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	0.2 J	< 0.1	--	< 10	< 1	< 1	2 J	< 1	1.8
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	0.5 J	< 0.5	--	--	--	< 1	< 1	< 1	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	0.2 J	< 0.1	--	< 10	< 1	3 J	6	2 J	1.8
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	< 80.2	< 80.2	142 J	< 82.8	--	--	--	< 80.2	< 80.2	< 80.2	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	< 9.7	< 9.7	< 9.7	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	< 10	< 10	< 10.2	--
Barium	**7440-39-3**	**1000**	**NA**	50.1	10.7	27.9	20.5	--	--	--	535	626	325	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	< 0.94	< 0.94	< 0.90	--
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 2.0	< 0.36	< 0.76	--	--	--	< 0.91	1.0 J	< 2.0	--
Calcium	**7440-70-2**	**NA**	**NA**	58,800	21,600	26,600	30,300	--	--	--	113,000	104,000	65,400	--
Chromium	**7440-47-3**	**50**	**NA**	< 3.0	< 3.4	< 1.1	< 1.6	--	--	--	< 2.3	< 2.3	< 3.0	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 0.66	< 1.3	--	--	--	< 2.1	< 2.1	< 2.1	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	< 2.7	< 2.1	< 2.7	--	--	--	< 2.2	2.6 J	< 2.7	--
Iron	**7439-89-6**	**300**	**NA**	9,820	317	9,540	240	--	--	--	92.0 J	< 52.2	< 52.2	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 5.1	4.9 J	--	--	--	< 6.9	< 6.9	< 6.9	--
Magnesium	**7439-95-4**	**35000**	**NA**	9,030	4,130	6,040	5,720	--	--	--	17,500	17,500	10,400	--
Manganese	**7439-96-5**	**300**	**NA**	6,150	2,200	5,330	2,500	--	--	--	4,020	2,040	1,890	--
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 1.8	< 1.1	< 1.5	--	--	--	< 5.6	< 5.6	< 5.6	--
Potassium	**7440-09-7**	**NA**	**NA**	1,670	639	2,520	1,210	--	--	--	3,890	3,280	2,830	--
Selenium	**7782-49-2**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--	< 9.4	< 9.4	< 10.7	--
Silver	**7440-22-4**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--	< 1.6	< 1.6	< 2.2	--
Sodium	**7440-23-5**	**20000**	**NA**	12,700	5,280	9,220	4,610	--	--	--	161,000	123,000	125,000	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 14.0	< 5.7	< 5.4	--	--	--	< 13.5	< 13.5	< 14.0	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 2.5	2.0 J	< 2.0	--	--	--	3.8 J	10.3	6.2	--
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	< 8.1	3.1 J	4.4 J	--	--	--	34.5	< 16.0 J	< 8.1	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	< 0.056	< 0.056	< 0.056	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-29 995788 4806469 6/28/2006 ITMW-29 REG	ITMW-29 1113255 5487994 10/2/2008 ITMW-29(10-2-08) REG	ITMW-29 1397270 7093617 6/13/2013 ITMW-29(061313) REG	ITMW-29 NA 4/18/2001 ITMW-29-0-0-04182001-W REG	ITMW-29 NA 4/19/2001 ITMW-29-0-0-04192001-W REG	ITMW-30 995788 4806473 6/28/2006 ITMW-30 REG	ITMW-30 1022020 4961241 1/17/2007 ITMW-30011707 REG	ITMW-30 1113255 5488000 10/2/2008 ITMW-30(10-2-08) REG	ITMW-30 1195597 5987012 5/20/2010 ITMW-30(5-20-10) REG	ITMW-30 1343539 6830361 10/18/2012 ITMW-30(101812) REG	ITMW-30 1397270 7093615 6/13/2013 ITMW-30(061313) REG	ITMW-30 1461101 7401980 3/20/2014 ITMW-30-032014 REG	ITMW-30 1548024 7819749 3/24/2015 CVX-0046-04 REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	0.9 J	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	1 J	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	< 1	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 1	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	< 1	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	< 1	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 0.5	2.6	< 10	2 J	1 J	< 1	< 1	< 0.5	0.6 J	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	< 0.8	--	--	--	--	< 0.8	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	< 1	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 0.5	< 1	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	< 3	< 3	--	--	--	3 J	< 3	< 3	< 3	< 3	--	--
2-Hexanone	591-78-6	50	NA	--	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
Acetone	67-64-1	50	NA	--	7 J	--	--	--	--	31	14 J	16 J	< 6	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	0.6 J	--	2 J	2 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	< 1	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	--	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	1.9	--	3 J	3 J	4 J	1 J	2 J	1 J	4 J	2
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	--	< 0.8	< 0.8	< 1	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	< 1	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	2.6	--	8	11	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	9.3	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 1	--	< 2	< 2	< 2	< 2	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	--	--	1.2	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	< 10	< 10	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	1.5	--	< 0.7	0.9 J	< 0.7	< 0.7	< 0.7	< 0.7	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	< 0.8	< 0.8	< 1	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	< 2	--	--	< 1	--	< 2	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	2.3	--	10	14	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-29 995788 4806469 6/28/2006 ITMW-29 REG	ITMW-29 1113255 5487994 10/2/2008 ITMW-29(10-2-08) REG	ITMW-29 1397270 7093617 6/13/2013 ITMW-29(061313) REG	ITMW-29 NA 4/18/2001 ITMW-29-0-0-04182001-W REG	ITMW-29 NA 4/19/2001 ITMW-29-0-0-04192001-W REG	ITMW-30 995788 4806473 6/28/2006 ITMW-30 REG	ITMW-30 1022020 4961241 1/17/2007 ITMW-30011707 REG	ITMW-30 1113255 5488000 10/2/2008 ITMW-30(10-2-08) REG	ITMW-30 1195597 5987012 5/20/2010 ITMW-30(5-20-10) REG	ITMW-30 1343539 6830361 10/18/2012 ITMW-30(101812) REG	ITMW-30 1397270 7093615 6/13/2013 ITMW-30(061313) REG	ITMW-30 1461101 7401980 3/20/2014 ITMW-30-032014 REG	ITMW-30 1548024 7819749 3/24/2015 CVX-0046-04 REG
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	--	--	< 3	< 3	< 3	< 3	< 0.5	< 0.5	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 20	< 10	--	--	< 19	< 22	< 19	< 10	< 10	< 10	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	--	< 10	< 0.9	< 1	< 1	< 1	< 1	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	--	< 10	< 2	< 2	< 2	< 2	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.1	--	1 J	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	--	< 25	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	--	< 20	< 2	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	--	< 25	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	--	--	< 5	< 5	< 5	< 5	< 5	< 5	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	--	< 10	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	--	< 25	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	--	--	< 9	< 11	< 10	< 10	< 10	< 10	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	0.3 J	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	--	1 J	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Dibenzofuran	132-64-9	NA	7.9	1 J	1 J	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Fluorene	86-73-7	50	NA	2 J	1 J	0.1 J	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	0.4 J	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 1	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	--	< 10	< 5	< 5	< 5	< 5	< 5	< 5	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	--	< 10	< 0.9	< 1	< 1	< 1	< 1	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	--	< 10	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--
Naphthalene	91-20-3	10	NA	< 1	< 1	< 0.1	1.1	< 10	< 0.9	2 J	< 1	< 1	< 0.1	< 0.1	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-29 995788 4806469 6/28/2006 ITMW-29 REG	ITMW-29 1113255 5487994 10/2/2008 ITMW-29(10-2-08) REG	ITMW-29 1397270 7093617 6/13/2013 ITMW-29(061313) REG	ITMW-29 NA 4/18/2001 ITMW-29-0-0-04182001-W REG	ITMW-29 NA 4/19/2001 ITMW-29-0-0-04192001-W REG	ITMW-30 995788 4806473 6/28/2006 ITMW-30 REG	ITMW-30 1022020 4961241 1/17/2007 ITMW-30011707 REG	ITMW-30 1113255 5488000 10/2/2008 ITMW-30(10-2-08) REG	ITMW-30 1195597 5987012 5/20/2010 ITMW-30(5-20-10) REG	ITMW-30 1343539 6830361 10/18/2012 ITMW-30(101812) REG	ITMW-30 1397270 7093615 6/13/2013 ITMW-30(061313) REG	ITMW-30 1461101 7401980 3/20/2014 ITMW-30-032014 REG	ITMW-30 1548024 7819749 3/24/2015 CVX-0046-04 REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	--	< 10	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 1	--	--	< 3	< 3	< 3	< 3	< 1	< 1	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 0.5	--	--	< 0.9	< 1	< 1	< 1	< 0.5	< 0.5	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 0.1	--	< 10	< 0.9	< 1	< 1	< 1	< 0.1	< 0.1	--	--
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	< 80.2	< 80.2	120 J	--	--	147 J	< 80.2	< 80.2	< 80.2	< 74.3	199 J	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 5.3	--	--	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 5.3	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10	< 10.2	8.3 J	--	--	10.1 J	31.8	< 10.2	12.0 J	35.8	< 6.8	--	--
Barium	**7440-39-3**	**1000**	**NA**	13.1	25.8	18.9	--	--	29.4	26.2	18.3	20.1	40.9	31.5	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.94	< 0.90	< 0.67	--	--	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.91	< 2.0	< 0.76	--	--	< 0.91	< 0.91	< 2.0	< 2.0	< 0.36	< 0.76	--	--
Calcium	**7440-70-2**	**NA**	**NA**	23,400	33,600	41,800	--	--	26,300	23,400	27,500	23,800	44,800	34,300	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 2.3	< 3.0	< 1.6	--	--	< 2.3	< 2.3	< 3.0	< 3.4	2.3 J	< 1.6	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 1.3	--	--	< 2.1	< 2.1	< 2.1	< 2.1	< 0.66	< 1.3	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.2	< 2.7	< 2.7	--	--	< 2.2	< 2.2	< 2.7	< 2.7	< 2.1	< 2.7	--	--
Iron	**7439-89-6**	**300**	**NA**	419	290	662	--	--	1,310	1,200	1,040	899	3,520	848	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 4.7	--	--	< 6.9	< 6.9	< 6.9	< 6.9	< 5.1	< 4.7	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	3,580	5,330	6,120	--	--	5,370	4,450	5,140	4,560	7,290	6,200	--	--
Manganese	**7439-96-5**	**300**	**NA**	376	688	252	--	--	1,560	1,660	1,210	1,100	1,750	1,290	1,970	2,500
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 5.6	< 1.5	--	--	< 5.6	< 5.6	< 5.6	< 1.8	< 1.1	< 1.5	--	--
Potassium	**7440-09-7**	**NA**	**NA**	2,520	3,960	5,070	--	--	1,630	1,270	1,370	1,020	2,530	1,910	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 9.4	< 10.7	< 8.4	--	--	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 8.4	--	--
Silver	**7440-22-4**	**50**	**NA**	< 1.6	< 2.2	< 2.1	--	--	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 2.1	--	--
Sodium	**7440-23-5**	**20000**	**NA**	41,100	80,200	37,400	--	--	18,700	12,800	18,500	12,900	29,600	23,600	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 13.5	< 14.0	< 5.4	--	--	< 13.5	< 13.5	< 14.0	< 14.0	< 30 J	< 5.4	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 1.5	< 2.5	< 2.0	--	--	1.6 J	< 1.5	< 2.5	< 2.5	2.3 J	2.3 J	--	--
Zinc	**7440-66-6**	**2000**	**NA**	< 25.9	10.0 J	20.6	--	--	113	< 15.1 J	< 8.1	< 8.1	< 2.0	3.3 J	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.098 J	< 0.056	< 0.070	--	--	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-30 1669538 8415281 6/7/2016 ITMW-30-W-11.00 REG	ITMW-30 NA 4/18/2001 ITMW-30-0-0-04182001-W REG	ITMW-30 NA 4/19/2001 ITMW-30-0-0-04192001-W REG	ITMW-31 995788 4806472 6/28/2006 ITMW-31 REG	ITMW-31 1022020 4961242 1/17/2007 ITMW-31011707 REG	ITMW-31 1113255 5488001 10/2/2008 ITMW-31(10-2-08) REG	ITMW-31 1195597 5987013 5/20/2010 ITMW-31(5-20-10) REG	ITMW-31 1341939 6821823 10/11/2012 ITMW-31(101112) REG	ITMW-31 1397265 7093590 6/13/2013 ITMW-31(061313) REG	ITMW-31 1461101 7401981 3/20/2014 ITMW-31-032014 REG	ITMW-31 1548024 7819750 3/24/2015 CVX-0046-05 REG	ITMW-31 1669538 8415282 6/7/2016 ITMW-31-W-10.00 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	--	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	< 1	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	< 1	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	< 1	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	2.8	< 10	1 J	< 1	< 1	< 1	0.8 J	0.8 J	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	< 0.8	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 1	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 1	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	6 J	14	< 3	< 3	6 J	--	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--
Acetone	67-64-1	50	NA	--	--	--	--	80	130	62	< 6	13 J	--	--	--
Benzene	71-43-2	1	NA	< 0.5	1.8	--	13	11	8	2 J	2 J	2 J	2 J	1	1
Bromochloromethane	74-97-5	NA	83	--	< 1	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Bromoform	75-25-2	50	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Chlorobenzene	108-90-7	5	NA	2	7.5	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	1
Chloroethane	75-00-3	5	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Chloroform	67-66-3	7	NA	--	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 1	--	--	0.9 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Dibromochloromethane	124-48-1	50	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	< 1	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Ethylbenzene	100-41-4	5	NA	--	8.9	--	220	150	100	< 0.8	18	< 0.8	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	7.1	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	< 1	--	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
o-Xylene	95-47-6	NA	190	--	1.4	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	< 1	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	< 1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
Toluene	108-88-3	5	NA	--	4.2	--	31	17	8	0.8 J	1 J	1 J	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	< 1	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	< 1	--	< 2	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	10	--	270	140	67	3 J	6	8	--	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-30 1669538 8415281 6/7/2016 ITMW-30-W-11.00 REG	ITMW-30 NA 4/18/2001 ITMW-30-0-0-04182001-W REG	ITMW-30 NA 4/19/2001 ITMW-30-0-0-04192001-W REG	ITMW-31 995788 4806472 6/28/2006 ITMW-31 REG	ITMW-31 1022020 4961242 1/17/2007 ITMW-31011707 REG	ITMW-31 1113255 5488001 10/2/2008 ITMW-31(10-2-08) REG	ITMW-31 1195597 5987013 5/20/2010 ITMW-31(5-20-10) REG	ITMW-31 1341939 6821823 10/11/2012 ITMW-31(101112) REG	ITMW-31 1397265 7093590 6/13/2013 ITMW-31(061313) REG	ITMW-31 1461101 7401981 3/20/2014 ITMW-31-032014 REG	ITMW-31 1548024 7819750 3/24/2015 CVX-0046-05 REG	ITMW-31 1669538 8415282 6/7/2016 ITMW-31-W-10.00 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	< 3	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	< 20	< 21	< 20	< 10	< 10	< 10	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	2 J	8	5	5	2 J	1	3	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	< 25	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	< 20	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	< 25	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	< 25	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	--	--	--
Acenaphthene	83-32-9	20	NA	--	--	< 10	1 J	< 1	1 J	< 1	0.9	0.9	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	< 10	< 1	< 1	< 1	< 1	0.3 J	0.3 J	--	--	--
Anthracene	120-12-7	50	NA	--	--	< 10	< 1	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	10	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
Carbazole	86-74-8	NA	NA	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
Chrysene	218-01-9	0.002	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	< 10	1 J	< 1	1 J	< 1	1	1	--	--	--
Diethylphthalate	84-66-2	50	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	< 10	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--
Fluoranthene	206-44-0	50	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Fluorene	86-73-7	50	NA	--	--	< 10	2 J	1 J	2 J	1 J	2	2	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 1	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	< 10	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--
Hexachloroethane	67-72-1	5	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Isophorone	78-59-1	50	NA	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	< 10	6	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
Naphthalene	91-20-3	10	NA	--	3.8	2 J	31	25	16	8	6	8	--	--	--

Appendix B-2
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-30 1669538 8415281 6/7/2016 ITMW-30-W-11.00 REG	ITMW-30 NA 4/18/2001 ITMW-30-0-0-04182001-W REG	ITMW-30 NA 4/19/2001 ITMW-30-0-0-04192001-W REG	ITMW-31 995788 4806472 6/28/2006 ITMW-31 REG	ITMW-31 1022020 4961242 1/17/2007 ITMW-31011707 REG	ITMW-31 1113255 5488001 10/2/2008 ITMW-31(10-2-08) REG	ITMW-31 1195597 5987013 5/20/2010 ITMW-31(5-20-10) REG	ITMW-31 1341939 6821823 10/11/2012 ITMW-31(101112) REG	ITMW-31 1397265 7093590 6/13/2013 ITMW-31(061313) REG	ITMW-31 1461101 7401981 3/20/2014 ITMW-31-032014 REG	ITMW-31 1548024 7819750 3/24/2015 CVX-0046-05 REG	ITMW-31 1669538 8415282 6/7/2016 ITMW-31-W-10.00 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	< 10	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	< 3	< 3	< 3	< 3	< 1	< 1	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	< 10	< 1	1 J	1 J	< 1	1	1	--	--	--
Phenol	**108-95-2**	**1**	**NA**	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	--	--	< 10	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	< 80.2	< 80.2	420	< 80.2	160 J	< 82.8	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	18.3 J	21.8	16.2 J	15.8 J	12.4 J	10 J	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	15.4	9.1	14.9	17.8	30.9	25.2	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	< 0.91	< 0.91	< 2.0	< 2.0	< 0.36	< 0.76	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	37,000	28,500	42,300	31,700	43,900	44,500	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	< 2.3	< 2.3	< 3.0	< 3.4	< 1.1	< 1.6	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	< 2.1	< 2.1	< 2.1	< 2.1	< 0.66	< 1.3	--	--	--
Copper	**7440-50-8**	**200**	**NA**	--	--	--	< 2.2	< 2.2	< 2.7	< 2.7	< 2.1	< 2.7	--	--	--
Iron	**7439-89-6**	**300**	**NA**	--	--	--	2,480	1,610	3,130	2,180	1,290	1,980	--	--	--
Lead	**7439-92-1**	**25**	**NA**	--	--	--	< 6.9	< 6.9	< 6.9	< 6.9	< 5.1	< 4.7	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	4,920	3,810	5,260	4,110	5,460	5,850	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	1,990	--	--	1,610	1,140	1,590	1,180	1,520	1,700	1,350	1,510	2,380
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	< 5.6	< 5.6	< 5.6	< 1.8	< 1.1	< 1.5	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	1,940	1,210	1,560	932	1,850	1,530	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--
Silver	**7440-22-4**	**50**	**NA**	--	--	--	< 1.6	1.7 J	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	7,210	5,160	7,480	4,730	11,300	9,350	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	< 13.5	21.4	< 14.0	< 14.0	< 5.7	< 5.4	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	< 1.5	< 1.5	< 2.5	< 2.5	< 1.3	< 2.0	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	161	< 23.7	27.1	15.9 J	2.1 J	< 2.0	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	< 0.081 J	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
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Former Texaco Research Center Beacon
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-31 NA 4/18/2001 ITMW-31-0-0-04182001-W REG	ITMW-31 NA 4/19/2001 ITMW-31-0-0-04192001-W REG	ITMW-4 995788 4806475 6/29/2006 ITMW-4 REG	ITMW-4 1115029 5498265 10/14/2008 ITMW-4(10-14-08) REG	ITMW-4 1399165 7104478 6/21/2013 ITMW-4(062113) REG	ITMW-4 NA 3/1/2000 ITMW-04-0-0-03012000-W REG	ITMW-6 995867 4806963 6/30/2006 ITMW-6 REG	ITMW-6 1022233 4962199 1/18/2007 ITMW-6011807 REG	ITMW-6 1115029 5498259 10/14/2008 ITMW-6(10-14-08) REG	ITMW-6 1195720 5987998 5/21/2010 ITMW-6(5-21-10) REG	ITMW-6 1342893 6826956 10/16/2012 ITMW-6(101612) REG	ITMW-6 1398940 7103167 6/20/2013 ITMW-6(062013) REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 1	--	< 0.8	< 0.8	< 0.8	< 5	9	2 J	< 0.8	5	< 0.8	13
1,1,1-Trichloroethane	71-55-6	5	NA	< 1	--	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 1	--	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	1.3	--	< 1	< 1	< 1	< 5	19	7	3 J	9	< 1	19
1,2,3-Trichlorobenzene	87-61-6	NA	7	< 1	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	< 1	--	--	--	--	< 10	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	< 1	--	--	--	--	< 5	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	2.6	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	0.8 J
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	< 0.8	--	--	--	65	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	< 3	< 3	< 10	--	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	--	< 3	< 3	< 10	--	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	< 3	< 3	< 10	--	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	< 6	< 6	7 JB	--	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	19	--	< 0.5	< 0.5	< 0.5	< 5	3 J	2 J	2 J	1 J	< 0.5	2 J
Bromochloromethane	74-97-5	NA	83	< 1	--	--	--	--	< 5	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	--	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	< 1	< 1	< 5	--	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 1	--	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J
Chloroethane	75-00-3	5	NA	< 1	--	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 1	--	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	--	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 1	--	--	< 0.8	< 0.8	< 5	--	16	4 J	69	< 0.8	150
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	< 1	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	130 D	--	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	23	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	< 0.5	< 0.5	< 0.5	--	2 J	4 J	3 J	4 J	< 0.5	0.9 J
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 1	--	< 2	< 2	< 2	< 5	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	36	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	--	< 1	< 1	< 5	--	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 1	--	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	28	--	< 0.7	< 0.7	< 0.7	< 5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 1	--	--	< 0.8	< 0.8	< 5	--	0.8 J	< 0.8	4 J	< 0.8	15
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	--	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	--	< 1	< 1	< 1	< 5	27	2 J	< 1	19	1 J	140
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	< 1	--	< 2	--	--	< 10	< 2	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	--	< 1	< 1	< 1	< 10	2 J	3 J	< 1	3 J	< 1	3 J
Xylene (total)	1330-20-7	5	NA	220 D	--	< 0.8	< 0.8	< 0.8	< 15	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	< 5	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-31 NA 4/18/2001 ITMW-31-0-0-04182001-W REG	ITMW-31 NA 4/19/2001 ITMW-31-0-0-04192001-W REG	ITMW-4 995788 4806475 6/29/2006 ITMW-4 REG	ITMW-4 1115029 5498265 10/14/2008 ITMW-4(10-14-08) REG	ITMW-4 1399165 7104478 6/21/2013 ITMW-4(062113) REG	ITMW-4 NA 3/1/2000 ITMW-04-0-0-03012000-W REG	ITMW-6 995867 4806963 6/30/2006 ITMW-6 REG	ITMW-6 1022233 4962199 1/18/2007 ITMW-6011807 REG	ITMW-6 1115029 5498259 10/14/2008 ITMW-6(10-14-08) REG	ITMW-6 1195720 5987998 5/21/2010 ITMW-6(5-21-10) REG	ITMW-6 1342893 6826956 10/16/2012 ITMW-6(101612) REG	ITMW-6 1398940 7103167 6/20/2013 ITMW-6(062013) REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	--	< 3	< 3	< 0.5	--	< 3	< 3	< 3	< 3	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	--	< 19	< 19	< 10	--	< 21	< 20	< 19	< 10	< 10	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 10	< 1	< 0.9	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	--	< 10	< 2	< 2	< 0.4	< 5	< 2	< 2	< 2	< 2	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	--	3 J	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 25	< 1	< 0.9	< 0.5	< 25	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 20	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	< 25	< 1	< 0.9	< 0.5	< 25	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4-Chloroaniline	106-47-8	5	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 10	< 2	< 2	< 0.5	< 5	< 2	< 2	< 2	< 2	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	< 2	< 2	< 0.5	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5
4-Nitroaniline	100-01-6	5	NA	--	< 25	< 1	< 0.9	< 0.5	< 25	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4-Nitrophenol	100-02-7	1	NA	--	--	< 10	< 9	< 10	--	< 11	< 10	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.1 J	< 0.1
Acenaphthylene	208-96-8	NA	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.2 J	< 0.1
Anthracene	120-12-7	50	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.2 J	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.7	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.8	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	1	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.8	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.5	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	16	9	< 1	11	8	25
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	5 J	< 2	< 2	< 2	< 10	4 J	< 2	< 2	< 2	10	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	< 10	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chrysene	218-01-9	0.002	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.9	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	--	< 10	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	< 10	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.2 J	< 0.1
Dibenzofuran	132-64-9	NA	7.9	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Diethylphthalate	84-66-2	50	NA	--	< 10	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	< 10	< 2	< 2	< 2	9 J	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	2	< 0.1
Fluorene	86-73-7	50	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	< 10	< 1	< 0.9	< 1	< 5	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.8	< 0.1
Isophorone	78-59-1	50	NA	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 10	< 2	< 2	< 0.5	< 5	< 2	< 2	< 2	< 2	< 0.5	< 0.5
Naphthalene	91-20-3	10	NA	36	9 J	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1	< 0.1

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Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	< 10	< 1	< 0.9	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	< 3	< 3	< 1	--	< 3	< 3	< 3	< 3	< 1	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	0.7	< 0.1
Phenol	**108-95-2**	**1**	**NA**	--	--	< 1	< 0.9	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	--	< 10	< 1	< 0.9	< 0.1	< 5	< 1	< 1	< 1	< 1	1	< 0.1
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	--	--	2,490	4,610	3,820	16	< 80.2	249	94.0 J	91.0 J	3,870	452
Antimony	**7440-36-0**	**3**	**NA**	--	--	< 9.7	< 9.7	< 5.3	< 0.0	< 9.7	< 9.7	< 9.7	< 9.7	4.8 J	< 5.3
Arsenic	**7440-38-2**	**25**	**NA**	--	--	< 10	11.7 J	10.7 J	0.83	< 10	< 10	< 10.2	< 7.2	13.3 J	< 6.8
Barium	**7440-39-3**	**1000**	**NA**	--	--	21.9	32.7	27.5	0.12	112	113	47.5	131	112	81.4
Beryllium	**7440-41-7**	**3**	**NA**	--	--	< 0.94	< 0.90	< 0.67	< 0.0	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	--	--	< 0.91	< 2.0	< 0.76	< 0.0	< 0.91	< 0.91	< 2.0	< 2.0	2.0 J	< 0.76
Calcium	**7440-70-2**	**NA**	**NA**	--	--	289,000	235,000	228,000	1,740	86,500	96,000	84,400	123,000	50,300	88,900
Chromium	**7440-47-3**	**50**	**NA**	--	--	8.7 J	11.6 J	10.5 J	0.047	< 2.3	< 2.3	< 3.0	< 3.4	9.7 J	1.8 J
Cobalt	**7440-48-4**	**5**	**NA**	--	--	2.2 J	< 2.1	< 1.3	< 0.0	< 2.1	< 2.1	< 2.1	< 2.1	< 5 J	< 1.3
Copper	**7440-50-8**	**200**	**NA**	--	--	4.4 J	7.8 J	< 2.7	0.066	< 2.2	< 2.2	< 2.7	< 2.7	30.6	< 2.7
Iron	**7439-89-6**	**300**	**NA**	--	--	5,190	10,900	5,930	41.6	1,080	1,250	670	611	6,070	1,050
Lead	**7439-92-1**	**25**	**NA**	--	--	< 6.9	< 6.9	< 4.7	0.082	< 6.9	< 6.9	< 6.9	< 6.9	63.3	6.9 J
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	152,000	113,000	103,000	1,020	31,900	34,400	28,400	47,600	15,000	41,900
Manganese	**7439-96-5**	**300**	**NA**	--	--	195	187	98.2	2.1	1,360	1,610	1,940	1,970	316	593
Nickel	**7440-02-0**	**100**	**NA**	--	--	< 5.6	< 5.6	2.8 J	0.057	< 5.6	< 5.6	< 5.6	< 1.8	5.9 J	< 1.5
Potassium	**7440-09-7**	**NA**	**NA**	--	--	1,950	2,430	2,130	7.8	2,390	2,460	2,820	2,380	2,090	1,330
Selenium	**7782-49-2**	**10**	**NA**	--	--	< 9.4	< 10.7	< 8.4	0.005	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 8.4
Silver	**7440-22-4**	**50**	**NA**	--	--	< 1.6	< 2.2	< 2.1	< 0.0	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 2.1
Sodium	**7440-23-5**	**20000**	**NA**	--	--	8,650	8,460	5,880	33	64,200	79,000	79,600	92,900	12,000	31,200
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	< 13.5	< 14.0	< 5.4	< 0.0	< 13.5	< 13.5	< 14.0	< 14.0	< 30 J	< 5.4
Vanadium	**7440-62-2**	**NA**	**86**	--	--	10.7	14.8	10.8	0.062	< 1.5	< 1.5	< 2.5	< 2.5	11.5	< 2.0
Zinc	**7440-66-6**	**2000**	**NA**	--	--	< 56.3	110	86.7	0.98	19.7 J	< 8.1	10.3 J	< 8.1	130	18.7 J
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	< 0.062 J	< 0.056	< 0.060	0.0004	< 0.056	< 0.056	< 0.056	< 0.056	1.7	< 0.060

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-6 1462877 7410810 3/27/2014 ITMW-6-032714 REG	ITMW-6 1480953 7494457 6/10/2014 ITMW-6-061014 REG	ITMW-6 1504703 7606254 9/18/2014 CVX-0032-01 REG	ITMW-6 1504703 7606263 9/18/2014 CVX-0032-07 FD	ITMW-6 1516585 7664713 11/5/2014 CVX-0035-09 REG	ITMW-6 1546899 7813899 3/19/2015 CVX-0044-07 REG	ITMW-6 1570520 7935715 6/18/2015 CVX-0050-01 REG	ITMW-6 1593311 8049700 9/15/2015 CVX-0062-03 REG	ITMW-6 1609238 8133668 11/12/2015 ITMW-6-W-28.00-151112 REG	ITMW-6 1670992 8421616 6/10/2016 ITMW-6-W-28.00-160610 REG	ITMW-6 NA 3/1/2000 ITMW-06-0-0-03012000-W REG	ITMW-6 NA 8/28/2000 ITMW-06-0-0-08282000-W REG	ITMW-7 995866 4806960 6/30/2006 ITMW-7 REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	--	--	2 J	< 1	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	15
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	--	--	10	5.8	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	< 10	< 5	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	< 5	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 0.8
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 50	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 50	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	--	--	< 10	< 50	--
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	--	--	4 JB	< 50	--
Benzene	71-43-2	1	NA	1	1	2	2	1	1	1	1	1	< 0.5	5 J	4.2	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	< 5	< 2	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	26
Chlorobenzene	108-90-7	5	NA	0.9 J	1	0.7 J	0.7 J	< 0.5	1 J	1 J	< 0.5	< 0.5	< 0.5	< 5	< 4	< 0.8
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	--	--	2 J	< 5	< 1
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 10	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	100	130	80	83	46	110	110	29	30	< 0.5	9	9.1	--
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 0.5	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	--	< 0.8
Toluene	108-88-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 0.5	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	91	140	19	21	20	83	91	4	5	7	1 J	--	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 5	< 2
Vinyl chloride (Chloroethene)	75-01-4	2	NA	1 J	2	0.6 J	0.7 J	1	1	0.9 J	1	1	< 0.5	3 J	3	< 1
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	--	--	--	--	--	< 15	< 10	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	< 5	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-6 1462877 7410810 3/27/2014 ITMW-6-032714 REG	ITMW-6 1480953 7494457 6/10/2014 ITMW-6-061014 REG	ITMW-6 1504703 7606254 9/18/2014 CVX-0032-01 REG	ITMW-6 1504703 7606263 9/18/2014 CVX-0032-07 FD	ITMW-6 1516585 7664713 11/5/2014 CVX-0035-09 REG	ITMW-6 1546899 7813899 3/19/2015 CVX-0044-07 REG	ITMW-6 1570520 7935715 6/18/2015 CVX-0050-01 REG	ITMW-6 1593311 8049700 9/15/2015 CVX-0062-03 REG	ITMW-6 1609238 8133668 11/12/2015 ITMW-6-W-28.00-151112 REG	ITMW-6 1670992 8421616 6/10/2016 ITMW-6-W-28.00-160610 REG	ITMW-6 NA 3/1/2000 ITMW-06-0-0-03012000-W REG	ITMW-6 NA 8/28/2000 ITMW-06-0-0-08282000-W REG	ITMW-7 995866 4806960 6/30/2006 ITMW-7 REG
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 21
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	--	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 3	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	--	--	< 5	--	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 25	--	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 3	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 25	--	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	--	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	--	--	< 25	--	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 10
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	--	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	--	--	< 5	2.3	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 3	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	--	--	< 10	4.3 B	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 1	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 1	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 1	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	--	--	< 5	--	< 1
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 1	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 1	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 2	< 2
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-6 1462877 7410810 3/27/2014 ITMW-6-032714 REG	ITMW-6 1480953 7494457 6/10/2014 ITMW-6-061014 REG	ITMW-6 1504703 7606254 9/18/2014 CVX-0032-01 REG	ITMW-6 1504703 7606263 9/18/2014 CVX-0032-07 FD	ITMW-6 1516585 7664713 11/5/2014 CVX-0035-09 REG	ITMW-6 1546899 7813899 3/19/2015 CVX-0044-07 REG	ITMW-6 1570520 7935715 6/18/2015 CVX-0050-01 REG	ITMW-6 1593311 8049700 9/15/2015 CVX-0062-03 REG	ITMW-6 1609238 8133668 11/12/2015 ITMW-6-W-28.00-151112 REG	ITMW-6 1670992 8421616 6/10/2016 ITMW-6-W-28.00-160610 REG	ITMW-6 NA 3/1/2000 ITMW-06-0-0-03012000-W REG	ITMW-6 NA 8/28/2000 ITMW-06-0-0-08282000-W REG	ITMW-7 995866 4806960 6/30/2006 ITMW-7 REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 5	< 1	< 1
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	0.32	--	< 80.2
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	10.6 J
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 10
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	--	--	--	--	0.096	--	20.1
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 0.94
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 0.91
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	74.2	--	93,700
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	0.01	--	< 2.3
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 2.2
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	--	--	--	--	0.85	--	< 52.2
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	--	--	--	--	30.1	--	39,400
Manganese	**7439-96-5**	**300**	**NA**	497	382	1,390	688	780	375	421	702	879	2,070	0.73	--	0.68 J
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	962
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 9.4
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 1.6
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	8,860
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 13.5
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 1.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	--	--	--	--	0.027	--	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.0	--	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-7	ITMW-7	ITMW-7	ITMW-8	ITMW-8	ITMW-8	ITMW-8	ITMW-8	ITMW-9	ITMW-9	ITMW-9	ITMW-9	ITMW-9
Sample Delivery Group (SDG)				1021535	1398579		995866	1114665	1114665	1399165		995867	995867	1022233	1114221	1398234
Lab Sample ID				4958649	7100133	NA	4806961	5496359	5496362	7104474	NA	4806968	4806969	4962197	5493848	7098431
Sample Date				1/12/2007	6/19/2013	3/1/2000	6/30/2006	10/10/2008	10/10/2008	6/21/2013	3/1/2000	6/30/2006	6/30/2006	1/18/2007	10/8/2008	6/18/2013
Field Sample ID				ITMW-07011207	ITMW-7(061913)	ITMW-07-0-0-03012000-W	ITMW-8	ITMW-8(10-10-08)	ITMW-108(10-10-08)	ITMW-8(062113)	ITMW-08-0-0-03012000-W	ITMW-9	ITMW-109	ITMW-9011807	ITMW-9(10-8-08)	ITMW-9(061813)
Sample Purpose				REG	REG	REG	REG	REG	FD	REG	REG	REG	FD	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	14	0.9 J	39	3 J	2 J	2 J	2 J	3 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	< 10	--	--	--	--	< 10	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	< 5	--	--	--	--	< 5	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	< 0.8	--	--	--	--	< 0.8	< 0.8	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 10	--	< 3	< 3	< 3	< 10	--	--	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 10	--	< 3	< 3	< 3	< 10	--	--	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 10	--	< 3	< 3	< 3	< 10	--	--	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 10	--	< 6	< 6	< 6	< 10	--	--	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	< 5	--	--	--	--	< 5	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 5	--	< 1	< 1	< 1	< 5	--	--	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	25	1 J	48	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	10	3 J	26	3 J	2 J	2 J	3 J	3 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 5	--	< 0.8	< 0.8	< 0.8	< 5	--	--	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	2 JB	< 2	< 2	< 2	< 2	1 JB	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 5	--	< 1	< 1	< 1	< 5	--	--	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	--	< 10	< 10	< 10	--	--	--	< 10	10 J	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 5	< 0.7	< 0.7	< 0.7	< 0.7	< 5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 5	--	< 0.8	< 0.8	< 0.8	< 5	--	--	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	< 10	< 2	--	--	--	< 10	< 2	< 2	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 10	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 15	< 0.8	< 0.8	< 0.8	< 0.8	< 15	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	< 5	--	--	--	--	< 5	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				ITMW-7	ITMW-7	ITMW-7	ITMW-8	ITMW-8	ITMW-8	ITMW-8	ITMW-8	ITMW-9	ITMW-9	ITMW-9	ITMW-9	ITMW-9
Sample Delivery Group (SDG)				1021535	1398579		995866	1114665	1114665	1399165		995867	995867	1022233	1114221	1398234
Lab Sample ID				4958649	7100133	NA	4806961	5496359	5496362	7104474	NA	4806968	4806969	4962197	5493848	7098431
Sample Date				1/12/2007	6/19/2013	3/1/2000	6/30/2006	10/10/2008	10/10/2008	6/21/2013	3/1/2000	6/30/2006	6/30/2006	1/18/2007	10/8/2008	6/18/2013
Field Sample ID				ITMW-07011207	ITMW-7(061913)	ITMW-07-0-0-03012000-W	ITMW-8	ITMW-8(10-10-08)	ITMW-108(10-10-08)	ITMW-8(062113)	ITMW-08-0-0-03012000-W	ITMW-9	ITMW-109	ITMW-9011807	ITMW-9(10-8-08)	ITMW-9(061813)
Sample Purpose				REG	REG	REG	REG	REG	FD	REG	REG	REG	FD	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	< 0.5	--	< 3	< 3	< 3	< 0.5	--	< 3	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	< 11	--	< 19	< 19	< 19	< 11	--	< 21	< 21	< 20	< 20	< 11
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	--	< 0.4	< 5	< 2	< 2	< 2	< 0.4	< 5	< 2	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 0.5	< 25	< 1	< 1	< 1	< 0.5	< 25	< 1	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 2	< 10	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	< 0.5	< 25	< 1	< 1	< 1	< 0.5	< 25	< 1	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	< 5	--	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 0.5	< 5	< 2	< 2	< 2	< 0.5	< 5	< 2	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	< 0.5	--	< 2	< 2	< 2	< 0.5	--	< 2	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	--	< 0.5	< 25	< 1	< 1	< 1	< 0.5	< 25	< 1	< 1	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	--	< 11	--	< 10	< 10	< 10	< 11	--	< 11	< 11	< 10	< 10	< 11
Acenaphthene	83-32-9	20	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Acenaphthylene	208-96-8	NA	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Anthracene	120-12-7	50	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	< 2	12 B	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 12	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	< 2	< 10	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	--	< 2	< 10	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	< 2	< 10	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Dibenzofuran	132-64-9	NA	7.9	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	--	< 2	< 10	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	< 2	< 10	< 2	< 2	< 2	< 2	< 10	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	< 0.1	9	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Fluorene	86-73-7	50	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	< 1	< 5	< 1	< 1	< 1	< 1	< 5	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Isophorone	78-59-1	50	NA	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 0.5	< 5	2 J	< 2	< 2	< 0.5	< 5	< 2	< 2	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-7 1021535 4958649 1/12/2007 ITMW-07011207 REG	ITMW-7 1398579 7100133 6/19/2013 ITMW-7(061913) REG	ITMW-7 NA 3/1/2000 ITMW-07-0-0-03012000-W REG	ITMW-8 995866 4806961 6/30/2006 ITMW-8 REG	ITMW-8 1114665 5496359 10/10/2008 ITMW-8(10-10-08) REG	ITMW-8 1114665 5496362 10/10/2008 ITMW-108(10-10-08) FD	ITMW-8 1399165 7104474 6/21/2013 ITMW-8(062113) REG	ITMW-8 NA 3/1/2000 ITMW-08-0-0-03012000-W REG	ITMW-9 995867 4806968 6/30/2006 ITMW-9 REG	ITMW-9 995867 4806969 6/30/2006 ITMW-109 FD	ITMW-9 1022233 4962197 1/18/2007 ITMW-9011807 REG	ITMW-9 1114221 5493848 10/8/2008 ITMW-9(10-8-08) REG	ITMW-9 1398234 7098431 6/18/2013 ITMW-9(061813) REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	< 0.5	< 5	< 1	< 1	< 1	< 0.5	< 5	< 1	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	< 1	--	< 3	< 3	< 3	< 1	--	< 3	< 3	< 3	< 3	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	--	< 0.1	< 5	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Phenol	**108-95-2**	**1**	**NA**	--	< 0.5	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	--	< 0.1	8	< 1	< 1	< 1	< 0.1	< 5	< 1	< 1	< 1	< 1	< 0.1
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	--	< 82.8	--	< 80.2	266	131 J	288	--	554	221	165 J	< 80.2	< 82.8
Antimony	**7440-36-0**	**3**	**NA**	--	< 5.3	--	< 9.7	< 9.7	< 9.7	< 5.3	--	< 9.7	< 9.7	< 9.7	< 9.7	< 5.3
Arsenic	**7440-38-2**	**25**	**NA**	--	< 6.8	--	< 10	< 10.2	< 10.2	< 6.8	--	< 10	< 10	< 10	< 10.2	< 6.8
Barium	**7440-39-3**	**1000**	**NA**	--	20.2	--	174	94.5	95.2	71.4	--	32.3	25.8	19.9	25.6	46.5
Beryllium	**7440-41-7**	**3**	**NA**	--	< 0.67	--	< 0.94	< 0.90	< 0.90	< 0.67	--	< 0.94	< 0.94	< 0.94	< 0.90	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	--	< 0.76	--	< 0.91	< 2.0	< 2.0	< 0.76	--	< 0.91	< 0.91	< 0.91	< 2.0	< 0.76
Calcium	**7440-70-2**	**NA**	**NA**	--	97,700	--	339,000	191,000	194,000	117,000	--	38,600	37,000	30,000	35,900	88,100
Chromium	**7440-47-3**	**50**	**NA**	--	2.6 J	--	< 2.3	< 3.0	< 3.0	1.8 J	--	3.2 J	< 2.3	< 2.3	< 3.0	3.8 J
Cobalt	**7440-48-4**	**5**	**NA**	--	< 1.3	--	< 2.1	< 2.1	< 2.1	< 1.3	--	< 2.1	< 2.1	< 2.1	< 2.1	< 1.3
Copper	**7440-50-8**	**200**	**NA**	--	< 2.7	--	< 2.2	< 2.7	< 2.7	< 2.7	--	2.5 J	< 2.2	< 2.2	< 2.7	< 2.7
Iron	**7439-89-6**	**300**	**NA**	--	< 43.0	--	105 J	519	293	454	--	851	323	238	< 52.2	< 43.0
Lead	**7439-92-1**	**25**	**NA**	--	< 4.7	--	< 6.9	< 6.9	< 6.9	< 4.7	--	< 6.9	< 6.9	< 6.9	< 6.9	< 4.7
Magnesium	**7439-95-4**	**35000**	**NA**	--	41,800	--	107,000	57,900	58,900	37,500	--	7,370	7,150	6,100	7,710	14,700
Manganese	**7439-96-5**	**300**	**NA**	--	< 0.83	--	3.7 J	13.7	10.4	29.3	--	764	364	335	7.5	2.7 J
Nickel	**7440-02-0**	**100**	**NA**	--	< 1.5	--	< 5.6	< 5.6	< 5.6	< 1.5	--	< 5.6	< 5.6	< 5.6	< 5.6	< 1.5
Potassium	**7440-09-7**	**NA**	**NA**	--	2,250	--	31,200	32,600	32,900	19,900	--	3,390	3,100	2,520	4,000	6,600
Selenium	**7782-49-2**	**10**	**NA**	--	< 8.4	--	< 9.4	< 10.7	10.9 J	< 8.4	--	< 9.4	< 9.4	< 9.4	< 10.7	< 8.4
Silver	**7440-22-4**	**50**	**NA**	--	< 2.1	--	< 1.6	< 2.2	< 2.2	< 2.1	--	< 1.6	< 1.6	< 1.6	< 2.2	< 2.1
Sodium	**7440-23-5**	**20000**	**NA**	--	9,230	--	513,000	445,000	453,000	341,000	--	99,800	101,000	82,800	100,000	62,800
Thallium	**7440-28-0**	**0.5**	**NA**	--	< 5.4	--	< 13.5	< 14.0	< 14.0	< 5.4	--	< 13.5	< 13.5	< 13.5	< 14.0	< 5.4
Vanadium	**7440-62-2**	**NA**	**86**	--	< 2.0	--	< 1.5	< 2.5	< 2.5	< 2.0	--	< 1.5	< 1.5	< 1.5	< 2.5	< 2.0
Zinc	**7440-66-6**	**2000**	**NA**	--	17.0 J	--	< 8.1	< 8.1	17.6 J	7.2 J	--	114	62	< 8.1	< 8.1	8.0 J
Mercury	**7439-97-6**	**0.7**	**NA**	--	< 0.070	--	< 0.070 J	< 0.056	< 0.056	< 0.060	--	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-9 NA 3/1/2000 ITMW-09-0-0-03012000-W REG	SWMW-1 1022020 4961226 1/17/2007 SWMW-1011707 REG	SWMW-1 1022020 4961232 1/17/2007 SWMW-101011707 REG	SWMW-1 1114224 5493863 10/8/2008 SWMW-1(10-8-08) REG	SWMW-1 1398230 7098411 6/18/2013 SWMW-1(061813) REG	SWMW-103 1123356 5549881 12/4/2008 SWMW-103G(12-4-08) REG	SWMW-103 1137957 5633603 3/26/2009 SWMW-103(3-26-09) REG	SWMW-103 1195720 5987991 5/21/2010 SWMW-103(5-21-10) REG	SWMW-103 1342893 6826950 10/16/2012 SWMW-103(101612) REG	SWMW-103 1398579 7100129 6/19/2013 SWMW-103(061913) REG	SWMW-103 1462188 7407280 3/25/2014 SWMW-103-032514 REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	5 J	2 J	2 J	2 J	4 J	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	3 J	2 J	2 J	2 J	3 J	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1-Dichloroethane	75-34-3	5	NA	< 5	< 1	< 1	< 1	< 1	5 J	1 J	1 J	1 J	2 J	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	< 10	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	< 5	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 10	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
2-Hexanone	591-78-6	50	NA	< 10	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 10	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
Acetone	67-64-1	50	NA	3 JB	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	--
Benzene	71-43-2	1	NA	< 5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	< 5	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Bromoform	75-25-2	50	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	60	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	5	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Chloroform	67-66-3	7	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	1 J	2 J	2 J	0.9 J	1 J	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	7	< 0.8	< 0.8	2 J	3 J	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Dibromochloromethane	124-48-1	50	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	2 J	< 0.5	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 5	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	5	NA	< 5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 5	2 J	2 J	2 J	2 J	25	2 J	2 J	5 J	8	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	< 10	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 15	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	< 5	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-9 NA 3/1/2000 ITMW-09-0-0-03012000-W REG	SWMW-1 1022020 4961226 1/17/2007 SWMW-1011707 REG	SWMW-1 1022020 4961232 1/17/2007 SWMW-101011707 REG	SWMW-1 1114224 5493863 10/8/2008 SWMW-1(10-8-08) REG	SWMW-1 1398230 7098411 6/18/2013 SWMW-1(061813) REG	SWMW-103 1123356 5549881 12/4/2008 SWMW-103G(12-4-08) REG	SWMW-103 1137957 5633603 3/26/2009 SWMW-103(3-26-09) REG	SWMW-103 1195720 5987991 5/21/2010 SWMW-103(5-21-10) REG	SWMW-103 1342893 6826950 10/16/2012 SWMW-103(101612) REG	SWMW-103 1398579 7100129 6/19/2013 SWMW-103(061913) REG	SWMW-103 1462188 7407280 3/25/2014 SWMW-103-032514 REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2,4-Dichlorophenol	120-83-2	5	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2,4-Dimethylphenol	105-67-9	50	NA	--	< 3	< 3	< 3	< 0.5	--	< 3	< 3	< 0.5	< 0.6	--
2,4-Dinitrophenol	51-28-5	10	NA	--	< 19	< 20	< 20	< 11	--	< 19	< 10	< 9	< 11	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 5	< 1	< 1	< 1	< 1	--	< 1	< 1	< 0.9	< 1	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2-Chloronaphthalene	91-58-7	10	NA	< 5	< 2	< 2	< 2	< 0.4	--	< 2	< 2	< 0.4	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 25	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 10	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--
3-Nitroaniline	99-09-2	5	NA	< 25	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 6	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
4-Chloroaniline	106-47-8	5	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 5	< 2	< 2	< 2	< 0.5	--	< 2	< 2	< 0.5	< 0.6	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	< 2	< 2	< 2	< 0.5	--	< 2	< 2	< 0.5	< 0.6	--
4-Nitroaniline	100-01-6	5	NA	< 25	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
4-Nitrophenol	100-02-7	1	NA	--	< 10	< 10	< 10	< 11	--	< 10	< 10	< 9	< 11	--
Acenaphthene	83-32-9	20	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Acenaphthylene	208-96-8	NA	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Anthracene	120-12-7	50	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 10	< 2	< 2	< 2	< 2	--	15	< 2	< 2	< 2	--
Butylbenzylphthalate	85-68-7	50	NA	< 10	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--
Carbazole	86-74-8	NA	NA	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
Chrysene	218-01-9	0.002	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Di-n-butylphthalate	84-74-2	50	NA	< 10	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--
Di-n-octylphthalate	117-84-0	50	NA	< 10	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Dibenzofuran	132-64-9	NA	7.9	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
Diethylphthalate	84-66-2	50	NA	< 10	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--
Dimethyl phthalate	131-11-3	50	NA	< 10	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--
Fluoranthene	206-44-0	50	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	0.1 J	< 0.1	--
Fluorene	86-73-7	50	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Hexachlorobenzene	118-74-1	0.04	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 6	--
Hexachloroethane	67-72-1	5	NA	< 5	< 1	< 1	< 1	< 1	--	< 1	< 1	< 0.9	< 1	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Isophorone	78-59-1	50	NA	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 5	< 2	< 2	< 2	< 0.5	--	< 2	< 2	< 0.5	< 0.6	--
Naphthalene	91-20-3	10	NA	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	ITMW-9 NA 3/1/2000 ITMW-09-0-0-03012000-W REG	SWMW-1 1022020 4961226 1/17/2007 SWMW-1011707 REG	SWMW-1 1022020 4961232 1/17/2007 SWMW-101011707 REG	SWMW-1 1114224 5493863 10/8/2008 SWMW-1(10-8-08) REG	SWMW-1 1398230 7098411 6/18/2013 SWMW-1(061813) REG	SWMW-103 1123356 5549881 12/4/2008 SWMW-103G(12-4-08) REG	SWMW-103 1137957 5633603 3/26/2009 SWMW-103(3-26-09) REG	SWMW-103 1195720 5987991 5/21/2010 SWMW-103(5-21-10) REG	SWMW-103 1342893 6826950 10/16/2012 SWMW-103(101612) REG	SWMW-103 1398579 7100129 6/19/2013 SWMW-103(061913) REG	SWMW-103 1462188 7407280 3/25/2014 SWMW-103-032514 REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 5	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	< 3	< 3	< 3	< 1	--	< 3	< 3	< 0.9	< 1	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	< 0.09	< 0.1	--
Phenol	**108-95-2**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	--	6	< 1	< 0.5	< 0.6	--
Pyrene	**129-00-0**	**50**	**NA**	< 5	< 1	< 1	< 1	< 0.1	--	< 1	< 1	0.1 J	< 0.1	--
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	--	1,460	1,730	464	4,120	--	258	< 80.2	1,360	111 J	--
Antimony	**7440-36-0**	**3**	**NA**	--	< 9.7	< 9.7	< 9.7	< 5.3	--	< 9.7	< 9.7	< 3.5	< 5.3	--
Arsenic	**7440-38-2**	**25**	**NA**	--	< 10	< 10	< 10.2	7.4 J	--	< 10.0	< 7.2	< 6.8	< 6.8	--
Barium	**7440-39-3**	**1000**	**NA**	--	27.1	31.2	25.6	74.9	--	61.6	69.9	67.2	58	--
Beryllium	**7440-41-7**	**3**	**NA**	--	< 0.94	< 0.94	< 0.90	< 0.67	--	< 0.90	< 1.4	< 0.67	< 0.67	--
Cadmium	**7440-43-9**	**5**	**NA**	--	< 0.91	< 0.91	< 2.0	< 0.76	--	< 2.0	< 2.0	0.48 J	< 0.76	--
Calcium	**7440-70-2**	**NA**	**NA**	--	24,100	24,900	35,800	80,400	--	126,000	141,000	117,000	115,000	--
Chromium	**7440-47-3**	**50**	**NA**	--	2.6 J	< 2.3	< 3.0	6.4 J	--	< 3.0	< 3.4	3.1 J	< 1.6	--
Cobalt	**7440-48-4**	**5**	**NA**	--	< 2.1	< 2.1	< 2.1	1.7 J	--	< 2.1	< 2.1	< 5 J	< 1.3	--
Copper	**7440-50-8**	**200**	**NA**	--	4.4 J	4.1 J	< 2.7	7.6 J	--	2.9 J	< 2.7	4.7 J	< 2.7	--
Iron	**7439-89-6**	**300**	**NA**	--	1,590	1,940	712	5,560	--	243	< 52.2	2,830	173 J	--
Lead	**7439-92-1**	**25**	**NA**	--	< 6.9	< 6.9	< 6.9	13.2 J	--	< 6.9	< 6.9	13.9 J	< 4.7	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	5,110	5,250	7,230	14,700	--	53,100	57,400	61,800	60,700	--
Manganese	**7439-96-5**	**300**	**NA**	--	103	155	21.9	315	--	9.5	1.9 J	54.4	5.4	6.4 J
Nickel	**7440-02-0**	**100**	**NA**	--	< 5.6	< 5.6	< 5.6	4.3 J	--	< 5.6	< 1.8	2.4 J	2.2 J	--
Potassium	**7440-09-7**	**NA**	**NA**	--	2,690	2,650	3,960	5,980	--	4,410	4,420	16,500	4,740	--
Selenium	**7782-49-2**	**10**	**NA**	--	< 9.4	< 9.4	< 10.7	< 8.4	--	< 10.7	< 8.9	< 7.5	< 8.4	--
Silver	**7440-22-4**	**50**	**NA**	--	< 1.6	< 1.6	< 2.2	< 2.1	--	< 2.2	< 2.3	< 1.2	< 2.1	--
Sodium	**7440-23-5**	**20000**	**NA**	--	74,600	74,200	94,700	70,900	--	318,000	214,000	157,000	135,000	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	< 13.5	16.9 J	< 14.0	< 5.4	--	< 14.0	< 14.0	< 30 J	< 5.4	--
Vanadium	**7440-62-2**	**NA**	**86**	--	2.8 J	2.8 J	< 2.5	8	--	< 2.5	< 2.5	2.5 J	< 2.0	--
Zinc	**7440-66-6**	**2000**	**NA**	--	< 21.9	< 22.0	21.3	39	--	9.5 J	< 8.1	104	8.7 J	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	< 0.056	< 0.056	< 0.056	0.13 J	--	< 0.056	< 0.056	0.24	< 0.070	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-103 1546899 7813900 3/19/2015 CVX-0044-08 REG	SWMW-103 1670992 8421613 6/10/2016 SWMW-103-W-55.00-160610 REG	SWMW-104 1123356 5549882 12/5/2008 SWMW-104G(12-5-08) REG	SWMW-104 1137775 5632471 3/25/2009 SWMW-104(3-25-09) REG	SWMW-104 1195721 5988010 5/21/2010 SWMW-104(5-21-10) REG	SWMW-104 1343539 6830357 10/18/2012 SWMW-104(101812) REG	SWMW-104 1398230 7098402 6/18/2013 SWMW-104(061813) REG	SWMW-105 1123903 5553423 12/9/2008 SWMW-105G(12-9-08) REG	SWMW-105 1137775 5632472 3/25/2009 SWMW-105(3-25-09) REG	SWMW-105 1195721 5988009 5/21/2010 SWMW-105(5-21-10) REG
Volatile Organic Compounds													
1,1 Dichloroethene	75-35-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds													
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-103 1546899 7813900 3/19/2015 CVX-0044-08 REG	SWMW-103 1670992 8421613 6/10/2016 SWMW-103-W-55.00-160610 REG	SWMW-104 1123356 5549882 12/5/2008 SWMW-104G(12-5-08) REG	SWMW-104 1137775 5632471 3/25/2009 SWMW-104(3-25-09) REG	SWMW-104 1195721 5988010 5/21/2010 SWMW-104(5-21-10) REG	SWMW-104 1343539 6830357 10/18/2012 SWMW-104(101812) REG	SWMW-104 1398230 7098402 6/18/2013 SWMW-104(061813) REG	SWMW-105 1123903 5553423 12/9/2008 SWMW-105G(12-9-08) REG	SWMW-105 1137775 5632472 3/25/2009 SWMW-105(3-25-09) REG	SWMW-105 1195721 5988009 5/21/2010 SWMW-105(5-21-10) REG
Volatile Organic Compounds													
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	< 3	< 3	< 0.5	< 0.5	--	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	< 22	< 10	< 9	< 10	--	< 20	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	< 1	< 1	< 0.9	< 1	--	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	< 2	< 2	< 0.4	< 0.4	--	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	< 2	< 2	< 2	< 2	--	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	< 5	< 5	< 5	< 5	--	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	--	< 11	< 10	< 9	< 10	--	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Anthracene	120-12-7	50	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	< 6	< 5 J	< 2	< 2	--	< 5 J	< 7
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	< 2	< 2	< 2	< 2	--	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
Chrysene	218-01-9	0.002	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	< 2	< 2	< 2	< 2	--	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	< 2	< 2	< 2	< 2	--	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
Diethylphthalate	84-66-2	50	NA	--	--	--	< 2	< 2	< 2	< 2	--	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	< 2	< 2	< 2	< 2	--	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Fluorene	86-73-7	50	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	< 5	< 5	< 5	< 5	--	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	< 1	< 1	< 0.9	< 1	--	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Isophorone	78-59-1	50	NA	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2
Naphthalene	91-20-3	10	NA	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-103 1546899 7813900 3/19/2015 CVX-0044-08 REG	SWMW-103 1670992 8421613 6/10/2016 SWMW-103-W-55.00-160610 REG	SWMW-104 1123356 5549882 12/5/2008 SWMW-104G(12-5-08) REG	SWMW-104 1137775 5632471 3/25/2009 SWMW-104(3-25-09) REG	SWMW-104 1195721 5988010 5/21/2010 SWMW-104(5-21-10) REG	SWMW-104 1343539 6830357 10/18/2012 SWMW-104(101812) REG	SWMW-104 1398230 7098402 6/18/2013 SWMW-104(061813) REG	SWMW-105 1123903 5553423 12/9/2008 SWMW-105G(12-9-08) REG	SWMW-105 1137775 5632472 3/25/2009 SWMW-105(3-25-09) REG	SWMW-105 1195721 5988009 5/21/2010 SWMW-105(5-21-10) REG
Volatile Organic Compounds													
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	< 3	< 3	< 0.9	< 1	--	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Phenol	**108-95-2**	**1**	**NA**	--	--	--	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	< 1	< 1	< 0.09	< 0.1	--	< 1	< 1
Polychlorinated Biphenyls†													
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Metals													
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	< 80.2	< 80.2	112 J	< 82.8	--	286	267 J
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	< 9.7	< 9.7	< 3.5	< 5.3	--	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	< 10.0	< 7.2	8.6 J	< 6.8	--	< 10.0	< 7.2
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	15.7	13.2	24.2	16.4	--	53.5	41.7
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	< 0.90	< 1.4	< 0.67	< 0.67	--	< 0.90	< 1.4
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	< 2.0	< 2.0	< 0.36	< 0.76	--	< 2.0	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	40,100	38,200	65,500	52,800	--	95,500	76,400
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	< 3.0	< 3.4	2.8 J	< 1.6	--	< 3.0	< 3.4
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	< 2.1	< 2.1	< 0.66	< 1.3	--	< 2.1	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	--	< 2.7	< 2.7	< 2.1	< 2.7	--	< 2.7	< 2.7
Iron	**7439-89-6**	**300**	**NA**	--	--	--	< 52.2	< 52.2	200	81.6 J	--	244	361 J
Lead	**7439-92-1**	**25**	**NA**	--	--	--	< 6.9	< 6.9	< 5.1	< 4.7	--	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	17,400	16,100	27,400	21,300	--	32,500	26,300
Manganese	**7439-96-5**	**300**	**NA**	41	31.5	--	< 0.84	< 0.84	3.7 J	1.5 J	--	8.7	12.8 J
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	< 5.6	< 1.8	< 1.1	< 1.5	--	< 5.6	< 1.8
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	3,350	3,440	4,600	4,040	--	6,220	5,340
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	< 10.7	< 8.9	< 7.5	< 8.4	--	< 10.7	< 8.9
Silver	**7440-22-4**	**50**	**NA**	--	--	--	< 2.2	< 2.3	< 1.2	< 2.1	--	< 2.2	< 2.3
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	52,500	43,800	37,400	36,600	--	344,000	266,000
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	< 14.0	< 14.0	< 5.7	< 5.4	--	< 14.0	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	< 2.5	< 2.5	< 1.3	< 2.0	--	< 2.5	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	< 8.1	12.6 J	2.1 J	< 2.0	--	< 8.1	8.9 J
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	< 0.056	< 0.056	< 0.070	< 0.070	--	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-105	SWMW-105	SWMW-107	SWMW-108	SWMW-108	SWMW-108	SWMW-108	SWMW-108	SWMW-109	SWMW-109
Sample Delivery Group (SDG)				1343539	1398230	1124672	1124672	1137775	1196041	1342893	1398579	1123903	1137776
Lab Sample ID				6830358	7098403	5557897	5557898	5632473	5989877	6826951	7100128	5553424	5632479
Sample Date				10/18/2012	6/18/2013	12/12/2008	12/12/2008	3/25/2009	5/25/2010	10/16/2012	6/19/2013	12/9/2008	3/25/2009
Field Sample ID				SWMW-105(101812)	SWMW-105(061813)	SWMW-107G(12-12-08)	SWMW-108G(12-12-08)	SWMW-108(3-25-09)	SWMW-108(5-25-10)	SWMW-108(101612)	SWMW-108(061913)	SWMW-109G(12-9-08)	SWMW-109(3-25-09)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code												
Volatile Organic Compounds													
1,1 Dichloroethene	75-35-4	5	NA	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	3 J	< 1	< 1	< 1	< 1	< 1	3 J	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	1 J	< 0.5	< 0.5	0.8 J	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1 J
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	16	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	0.9 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	10
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	31	2 J
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	7	2 J	< 1	< 1	< 1	< 1	< 1	< 1	23	2 J
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds													
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-105	SWMW-105	SWMW-107	SWMW-108	SWMW-108	SWMW-108	SWMW-108	SWMW-108	SWMW-109	SWMW-109
Sample Delivery Group (SDG)				1343539	1398230	1124672	1124672	1137775	1196041	1342893	1398579	1123903	1137776
Lab Sample ID				6830358	7098403	5557897	5557898	5632473	5989877	6826951	7100128	5553424	5632479
Sample Date				10/18/2012	6/18/2013	12/12/2008	12/12/2008	3/25/2009	5/25/2010	10/16/2012	6/19/2013	12/9/2008	3/25/2009
Field Sample ID				SWMW-105(101812)	SWMW-105(061813)	SWMW-107G(12-12-08)	SWMW-108G(12-12-08)	SWMW-108(3-25-09)	SWMW-108(5-25-10)	SWMW-108(101612)	SWMW-108(061913)	SWMW-109G(12-9-08)	SWMW-109(3-25-09)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code												
Volatile Organic Compounds													
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 0.5	--	--	< 3	< 3	< 0.5	< 0.5	--	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 11	--	--	< 19	< 10	< 9	< 10	--	< 20
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	--	--	< 0.9	< 1	< 0.9	< 1	--	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 0.4	--	--	< 2	< 2	< 0.4	< 0.4	--	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	0.2 J	--	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	--	--	< 2	< 2	< 2	< 2	--	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	--	--	< 5	< 5	< 5	< 5	--	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 0.5	--	--	< 2	< 2	< 0.5	< 0.5	--	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	< 0.5	--	--	< 2	< 2	< 0.5	< 0.5	--	< 2
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
4-Nitrophenol	100-02-7	1	NA	< 10	< 11	--	--	< 9	< 10	< 9	< 10	--	< 10
Acenaphthene	83-32-9	20	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Acenaphthylene	208-96-8	NA	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Anthracene	120-12-7	50	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	--	--	< 5 J	< 5 J	< 2	< 2	--	6
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	--	--	< 2	< 2	< 2	< 2	--	< 2
Carbazole	86-74-8	NA	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
Chrysene	218-01-9	0.002	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	--	--	< 2	< 2	< 2	< 2	--	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	--	--	< 2	< 2	< 2	< 2	--	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Dibenzofuran	132-64-9	NA	7.9	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
Diethylphthalate	84-66-2	50	NA	< 2	< 2	--	--	< 2	< 2	< 2	< 2	--	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	--	--	< 2	< 2	< 2	< 2	--	< 2
Fluoranthene	206-44-0	50	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Fluorene	86-73-7	50	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	--	--	< 5	< 5	< 5	< 5	--	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	--	--	< 0.9	< 1	< 0.9	< 1	--	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Isophorone	78-59-1	50	NA	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 0.5	--	--	< 2	< 2	< 0.5	< 0.5	--	< 2
Naphthalene	91-20-3	10	NA	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	0.5 J	--	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-105 1343539 6830358 10/18/2012 SWMW-105(101812) REG	SWMW-105 1398230 7098403 6/18/2013 SWMW-105(061813) REG	SWMW-107 1124672 5557897 12/12/2008 SWMW-107G(12-12-08) REG	SWMW-108 1124672 5557898 12/12/2008 SWMW-108G(12-12-08) REG	SWMW-108 1137775 5632473 3/25/2009 SWMW-108(3-25-09) REG	SWMW-108 1196041 5989877 5/25/2010 SWMW-108(5-25-10) REG	SWMW-108 1342893 6826951 10/16/2012 SWMW-108(101612) REG	SWMW-108 1398579 7100128 6/19/2013 SWMW-108(061913) REG	SWMW-109 1123903 5553424 12/9/2008 SWMW-109G(12-9-08) REG	SWMW-109 1137776 5632479 3/25/2009 SWMW-109(3-25-09) REG
Volatile Organic Compounds													
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 1	--	--	< 3	< 3	< 0.9	< 1	--	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	--	--	< 0.9	< 1	< 0.5	< 0.5	--	< 1
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	< 0.1	--	--	< 0.9	< 1	< 0.09	< 0.1	--	< 1
Polychlorinated Biphenyls†													
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Metals													
Aluminum	**7429-90-5**	**100**	**NA**	888	434	--	--	422	< 80.2	85.0 J	131 J	--	335
Antimony	**7440-36-0**	**3**	**NA**	< 3.5	< 5.3	--	--	< 9.7	< 9.7	< 3.5	< 5.3	--	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	8.4 J	< 6.8	--	--	< 10.0	< 7.2	< 6.8	< 6.8	--	< 10.0
Barium	**7440-39-3**	**1000**	**NA**	61	39.1	--	--	23.1	15.3	50.6	35.2	--	37.3
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.67	--	--	< 0.90	< 1.4	< 0.67	< 0.67	--	< 0.90
Cadmium	**7440-43-9**	**5**	**NA**	< 0.36	< 0.76	--	--	< 2.0	< 2.0	< 0.36	< 0.76	--	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	99,200	75,500	--	--	59,800	64,500	141,000	126,000	--	136,000
Chromium	**7440-47-3**	**50**	**NA**	4.6 J	7.3 J	--	--	3.3 J	< 3.4	1.3 J	1.9 J	--	20.8
Cobalt	**7440-48-4**	**5**	**NA**	1.2 J	< 1.3	--	--	< 2.1	< 2.1	< 5 J	< 1.3	--	< 2.1
Copper	**7440-50-8**	**200**	**NA**	2.3 J	< 2.7	--	--	< 2.7	< 2.7	< 2.1	< 2.7	--	4.4 J
Iron	**7439-89-6**	**300**	**NA**	1,310	523	--	--	372	< 52.2	53.3 J	109 J	--	650
Lead	**7439-92-1**	**25**	**NA**	< 5.1	< 4.7	--	--	< 6.9	< 6.9	< 5.1	< 4.7	--	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	37,100	24,800	--	--	20,200	23,400	52,100	45,500	--	28,800
Manganese	**7439-96-5**	**300**	**NA**	32.2	11.8	--	--	14.2	1.9 J	1.7 J	3.7 J	--	73.6
Nickel	**7440-02-0**	**100**	**NA**	< 1.1	2.6 J	--	--	< 5.6	< 1.8	< 1.1	< 1.5	--	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	7,390	5,840	--	--	1,900	2,490	3,060	2,330	--	15,200
Selenium	**7782-49-2**	**10**	**NA**	< 7.5	< 8.4	--	--	< 10.7	< 8.9	< 7.5	< 8.4	--	< 10.7
Silver	**7440-22-4**	**50**	**NA**	< 1.2	< 2.1	--	--	< 2.2	< 2.3	< 1.2	< 2.1	--	< 2.2
Sodium	**7440-23-5**	**20000**	**NA**	183,000	178,000	--	--	29,300	23,500	42,700	26,500	--	159,000
Thallium	**7440-28-0**	**0.5**	**NA**	< 30 J	< 5.4	--	--	< 14.0	< 14.0	< 30 J	< 5.4	--	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	1.6 J	< 2.0	--	--	< 2.5	< 2.5	< 1.3	< 2.0	--	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	4.1 J	6.4 J	--	--	< 8.1	< 8.1	3.9 J	6.6 J	--	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.070	--	--	< 0.056	< 0.056	< 0.070	< 0.070	--	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-109	SWMW-109	SWMW-109	SWMW-11	SWMW-11	SWMW-11	SWMW-110	SWMW-110	SWMW-110	SWMW-110	SWMW-110
Sample Delivery Group (SDG)				1195720	1343207	1399165	1021819	1114665	1399165	1124672	1137776	1195720	1195720	1343207
Lab Sample ID				5988004	6828405	7104479	4959996	5496356	7104473	5557891	5632476	5988006	5988008	6828408
Sample Date				5/21/2010	10/17/2012	6/21/2013	1/16/2007	10/10/2008	6/21/2013	12/10/2008	3/25/2009	5/21/2010	5/21/2010	10/17/2012
Field Sample ID				SWMW-109(5-21-10)	SWMW-109(101712)	SWMW-109(062113)	SWMW-11011607	SWMW-11(10-10-08)	SWMW-11(062113)	SWMW-110G(12-10-08)	SWMW-110(3-25-09)	SWMW-110(5-21-10)	SWMW-110(5-21-10)	SWMW-110(101712)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	2 J	2 J	< 1	2 J
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	6 J	< 6	< 6	6 J	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	9	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2 J	7	13	< 0.8	18
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	7	1 J	< 1	< 1	< 1	< 1	2 J	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	3 J	1 J	< 1	1 J
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-109 1195720 5988004 5/21/2010 SWMW-109(5-21-10) REG	SWMW-109 1343207 6828405 10/17/2012 SWMW-109(101712) REG	SWMW-109 1399165 7104479 6/21/2013 SWMW-109(062113) REG	SWMW-11 1021819 4959996 1/16/2007 SWMW-11011607 REG	SWMW-11 1114665 5496356 10/10/2008 SWMW-11(10-10-08) REG	SWMW-11 1399165 7104473 6/21/2013 SWMW-11(062113) REG	SWMW-110 1124672 5557891 12/10/2008 SWMW-110G(12-10-08) REG	SWMW-110 1137776 5632476 3/25/2009 SWMW-110(3-25-09) REG	SWMW-110 1195720 5988006 5/21/2010 SWMW-110(5-21-10) REG	SWMW-110 1195720 5988008 5/21/2010 SWMW-110(5-21-10) REG	SWMW-110 1343207 6828408 10/17/2012 SWMW-110(101712) REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 0.5	< 0.5	< 3	< 3	< 0.5	--	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 10	< 10	< 20	< 19	< 10	--	< 20	< 10	< 10	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4	--	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	--	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	--	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Acenaphthylene	208-96-8	NA	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Anthracene	120-12-7	50	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.1 J
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.2 J
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.1 J
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	19	< 5 J	< 2	--	6	< 2	< 5 J	13
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.1 J
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Dibenzofuran	132-64-9	NA	7.9	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.2 J
Fluorene	86-73-7	50	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1
Isophorone	78-59-1	50	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	--	< 2	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	< 0.1

Appendix B-2
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-109 1195720 5988004 5/21/2010 SWMW-109(5-21-10) REG	SWMW-109 1343207 6828405 10/17/2012 SWMW-109(101712) REG	SWMW-109 1399165 7104479 6/21/2013 SWMW-109(062113) REG	SWMW-11 1021819 4959996 1/16/2007 SWMW-11011607 REG	SWMW-11 1114665 5496356 10/10/2008 SWMW-11(10-10-08) REG	SWMW-11 1399165 7104473 6/21/2013 SWMW-11(062113) REG	SWMW-110 1124672 5557891 12/10/2008 SWMW-110G(12-10-08) REG	SWMW-110 1137776 5632476 3/25/2009 SWMW-110(3-25-09) REG	SWMW-110 1195720 5988006 5/21/2010 SWMW-110(5-21-10) REG	SWMW-110 1195720 5988008 5/21/2010 SWMW-110(5-21-10) REG	SWMW-110 1343207 6828408 10/17/2012 SWMW-110(101712) REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 1	< 1	< 3	< 3	< 1	--	< 3	< 3	< 3	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.1 J
Phenol	**108-95-2**	**1**	**NA**	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	< 1	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	< 1	< 1	< 1	0.1 J
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	< 80.2	168 J	145 J	731	302	976	--	357	< 80.2	190 J	628
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 3.5	< 5.3	< 9.7	< 9.7	< 5.3	--	< 9.7	< 9.7	< 9.7	< 3.5
Arsenic	**7440-38-2**	**25**	**NA**	< 7.2	< 6.8	6.8 J	< 10	< 10.2	6.9 J	--	< 10.0	< 7.2	< 7.2	< 6.8
Barium	**7440-39-3**	**1000**	**NA**	46.8	38.8	20.6	22.1	44.8	29.5	--	38.4	32.1	39.9	68
Beryllium	**7440-41-7**	**3**	**NA**	< 1.4	< 0.67	< 0.67	< 0.94	< 0.90	< 0.67	--	< 0.90	< 1.4	< 1.4	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	0.53 J	< 0.76	3.6 J	8.6	< 0.76	--	< 2.0	< 2.0	< 2.0	0.64 J
Calcium	**7440-70-2**	**NA**	**NA**	213,000	164,000	124,000	22,900	66,800	45,500	--	61,600	55,200	76,200	60,700
Chromium	**7440-47-3**	**50**	**NA**	< 3.4	3.2 J	< 1.6	3.1 J	< 3.0	4.5 J	--	< 3.0	< 3.4	< 3.4	4.7 J
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 0.66	< 1.3	< 2.1	< 2.1	< 1.3	--	< 2.1	< 2.1	< 2.1	4.8 J
Copper	**7440-50-8**	**200**	**NA**	< 2.7	< 2.1	< 2.7	8.7 J	< 2.7	< 2.7	--	< 2.7	< 2.7	< 2.7	8.1 J
Iron	**7439-89-6**	**300**	**NA**	< 52.2	296	179 J	1,060	499	759	--	400	57.0 J	193 J	1,780
Lead	**7439-92-1**	**25**	**NA**	< 6.9	5.4 J	< 4.7	8.9 J	< 6.9	< 4.7	--	< 6.9	< 6.9	< 6.9	7.3 J
Magnesium	**7439-95-4**	**35000**	**NA**	39,200	25,900	19,200	8,000	27,300	15,900	--	26,700	24,100	26,100	26,300
Manganese	**7439-96-5**	**300**	**NA**	51.6	17.2	4.5 J	27.1	31.3	19	--	124	30.5	7.2	3,610
Nickel	**7440-02-0**	**100**	**NA**	< 1.8	< 1.1	< 1.5	< 5.6	< 5.6	1.6 J	--	< 5.6	< 1.8	< 1.8	6.7 J
Potassium	**7440-09-7**	**NA**	**NA**	7,360	3,220	1,950	3,770	2,730	1,980	--	982	995	5,360	1,140
Selenium	**7782-49-2**	**10**	**NA**	< 8.9	< 7.5	9.8 J	< 9.4	< 10.7	< 8.4	--	< 10.7	< 8.9	< 8.9	< 7.5
Silver	**7440-22-4**	**50**	**NA**	< 2.3	< 1.2	< 2.1	< 1.6	< 2.2	< 2.1	--	< 2.2	< 2.3	< 2.3	< 1.2
Sodium	**7440-23-5**	**20000**	**NA**	137,000	118,000	60,200	115,000	323,000	110,000	--	29,000	26,600	263,000	23,300
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	8.2 J	< 5.4	< 67.5	< 14.0	< 5.4	--	< 14.0	< 14.0	< 14.0	6.9 J
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 1.3	< 2.0	< 1.5	< 2.5	2.1 J	--	< 2.5	< 2.5	< 2.5	3.5 J
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	4.5 J	3.2 J	114	< 8.1	18.3 J	--	< 8.1	< 8.1	< 8.1	696
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.070	< 0.060	< 0.056	< 0.056	< 0.060	--	< 0.056	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-110 1398940 7103162 6/20/2013 SWMW-110(062013) REG	SWMW-111 1129234 5583088 1/22/2009 SWMW-111-012209 REG	SWMW-111 1137957 5633604 3/26/2009 SWMW-111(3-26-09) REG	SWMW-111 1195720 5987992 5/21/2010 SWMW-111(5-21-10) REG	SWMW-111 1342893 6826952 10/16/2012 SWMW-111(101612) REG	SWMW-111 1398579 7100137 6/19/2013 SWMW-111(061913) REG	SWMW-111 1462188 7407281 3/25/2014 SWMW-111-032514 REG	SWMW-111 1462188 7407283 3/25/2014 SWMW-1111-032514 FD	SWMW-111 1480953 7494454 6/10/2014 SWMW-111-061014 REG	SWMW-111 1504322 7604428 9/17/2014 CVX-0031-07 REG	SWMW-111 1516585 7664712 11/5/2014 CVX-0035-08 REG	SWMW-111 1546899 7813901 3/19/2015 CVX-0044-09 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	3 J	6	2 J	< 0.8	2 J	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	2 J	3 J	3 J	1 J	< 1	1 J	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	--	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	20	8	15	8	< 0.8	10	17	16	11	5	6	13
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	1 J	0.9 J	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	66	94	56	1 J	78	65	69	34	16	43	65
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	1 J	1 J	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-110	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111	SWMW-111
Sample Delivery Group (SDG)				1398940	1129234	1137957	1195720	1342893	1398579	1462188	1462188	1480953	1504322	1516585	1546899
Lab Sample ID				7103162	5583088	5633604	5987992	6826952	7100137	7407281	7407283	7494454	7604428	7664712	7813901
Sample Date				6/20/2013	1/22/2009	3/26/2009	5/21/2010	10/16/2012	6/19/2013	3/25/2014	3/25/2014	6/10/2014	9/17/2014	11/5/2014	3/19/2015
Field Sample ID				SWMW-110(062013)	SWMW-111-012209	SWMW-111(3-26-09)	SWMW-111(5-21-10)	SWMW-111(101612)	SWMW-111(061913)	SWMW-111-032514	SWMW-1111-032514	SWMW-111-061014	CVX-0031-07	CVX-0035-08	CVX-0044-09
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	--	< 3	< 3	< 0.5	< 0.6	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 10	--	< 20	< 10	< 10	< 11	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	< 1	< 1	< 1	< 1	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	< 2	< 2	< 2	< 2	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	--	< 5	< 5	< 5	< 6	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	--	< 2	< 2	< 0.5	< 0.6	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	--	< 2	< 2	< 0.5	< 0.6	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	--	< 10	< 10	< 10	< 11	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 0.1	--	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	--	< 1	< 1	0.3 J	0.2 J	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	--	< 1	< 1	0.3 J	0.2 J	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	--	< 1	< 1	0.4 J	0.4 J	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	--	< 1	< 1	0.3 J	0.2 J	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	--	< 1	< 1	0.3 J	0.2 J	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	--	< 1	< 1	< 0.5	1	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	5 J	< 2	< 2	< 2	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 0.1	--	< 1	< 1	0.4 J	0.3 J	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	--	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	--	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 0.1	--	< 1	< 1	0.6	0.4 J	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	--	< 5	< 5	< 5	< 6	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	--	< 1	< 1	< 1	< 1	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	--	< 1	< 1	0.2 J	0.2 J	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	--	< 2	< 2	< 0.5	< 0.6	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-110 1398940 7103162 6/20/2013 SWMW-110(062013) REG	SWMW-111 1129234 5583088 1/22/2009 SWMW-111-012209 REG	SWMW-111 1137957 5633604 3/26/2009 SWMW-111(3-26-09) REG	SWMW-111 1195720 5987992 5/21/2010 SWMW-111(5-21-10) REG	SWMW-111 1342893 6826952 10/16/2012 SWMW-111(101612) REG	SWMW-111 1398579 7100137 6/19/2013 SWMW-111(061913) REG	SWMW-111 1462188 7407281 3/25/2014 SWMW-111-032514 REG	SWMW-111 1462188 7407283 3/25/2014 SWMW-1111-032514 FD	SWMW-111 1480953 7494454 6/10/2014 SWMW-111-061014 REG	SWMW-111 1504322 7604428 9/17/2014 CVX-0031-07 REG	SWMW-111 1516585 7664712 11/5/2014 CVX-0035-08 REG	SWMW-111 1546899 7813901 3/19/2015 CVX-0044-09 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	--	< 1	< 1	< 0.5	< 0.6	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	--	< 3	< 3	< 1	< 1	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	--	< 1	< 1	0.4 J	0.2 J	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.5	--	8	< 1	< 0.5	< 0.6	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	--	< 1	< 1	0.6	0.4 J	--	--	--	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	< 82.8	--	1,360	649	3,860	2,480	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 5.3	--	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	--	< 10.0	< 7.2	9.8 J	< 6.8	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	33.5	--	65	60.8	58.3	107	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	--	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.76	--	< 2.0	< 2.0	1.2 J	< 0.76	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	53,900	--	106,000	103,000	43,700	115,000	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 1.6	--	< 3.0	< 3.4	6.4 J	5.9 J	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 1.3	--	< 2.1	< 2.1	< 5 J	< 1.3	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	--	5.3 J	2.9 J	25	11.2	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	63.1 J	--	1,700	833	5,460	3,270	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 4.7	--	< 6.9	< 6.9	48	19.2	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	23,200	--	42,800	36,100	4,870	45,200	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	113	--	59.4	31.4	346	195	314	147	114	129	138	97.1
Nickel	**7440-02-0**	**100**	**NA**	< 1.5	--	< 5.6	2.1 J	5.8 J	5.0 J	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	924	--	3,740	3,600	2,790	3,200	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 8.4	--	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.1	--	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	21,100	--	72,100	88,900	7,670	69,600	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 5.4	--	< 14.0	< 14.0	< 30 J	< 5.4	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.0	--	< 2.5	< 2.5	10.5	5.5	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	3.1 J	--	29.2	11.5 J	80.9	40.2	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.060	--	< 0.056	< 0.056	1.7	0.52	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-111 1570520 7935716 6/18/2015 CVX-0050-02 REG	SWMW-111 1592327 8045004 9/11/2015 CVX-0061-07 REG	SWMW-111 1609458 8135155 11/13/2015 SWMW-111-W-40.00-151113 REG	SWMW-111 1670992 8421614 6/10/2016 SWMW-111-W-40.00-160610 REG	SWMW-112 1124672 5557893 12/11/2008 SWMW-112G(12-11-08) REG	SWMW-112 1128853 5580846 1/20/2009 SWMW-112-50-60 REG	SWMW-112 1128853 5580847 1/20/2009 SWMW-112-40-50 REG	SWMW-112 1128853 5580848 1/20/2009 SWMW-112-30-40 REG	SWMW-112 1137957 5633601 3/26/2009 SWMW-112(3-26-09) REG	SWMW-112 1195597 5987002 5/20/2010 SWMW-112(5-20-10) REG	SWMW-112 1342893 6826947 10/16/2012 SWMW-112(101612) REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	7	13	9	3 J	31	36	2 J
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	< 0.8	0.9 J	< 0.8	< 0.8	2 J	2 J	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	15	25	16	6	57	68	4 J
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--	--	--	3 J	3 J	0.5 J
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	6 J	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	--	22	7 J	9 J	9 J	< 6	< 6	400
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	2 J	3 J	4 J	3 J	4 J	4 J	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	0.9 J	2 J	3 J	1 J	3 J	3 J	< 0.8
Chloroethane	75-00-3	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	--	--	< 0.8	1 J	< 0.8	< 0.8	1 J	1 J	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	10	< 0.5	2	6	98	190	150	67	350	530	50
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	--	--	5	< 0.8	1 J	2 J	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	0.9 J	0.8 J	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	--	--	< 0.7	32	140	180	2 J	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	1 J	1 J	2 J	1 J	2 J	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	68	< 0.5	13	49	140	250	180	83	340	310	26
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 0.5	< 0.5	16	29	26	12	49	72	2 J
Xylene (total)	1330-20-7	5	NA	--	--	--	--	4 J	< 0.8	1 J	1 J	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-111 1570520 7935716 6/18/2015 CVX-0050-02 REG	SWMW-111 1592327 8045004 9/11/2015 CVX-0061-07 REG	SWMW-111 1609458 8135155 11/13/2015 SWMW-111-W-40.00-151113 REG	SWMW-111 1670992 8421614 6/10/2016 SWMW-111-W-40.00-160610 REG	SWMW-112 1124672 5557893 12/11/2008 SWMW-112G(12-11-08) REG	SWMW-112 1128853 5580846 1/20/2009 SWMW-112-50-60 REG	SWMW-112 1128853 5580847 1/20/2009 SWMW-112-40-50 REG	SWMW-112 1128853 5580848 1/20/2009 SWMW-112-30-40 REG	SWMW-112 1137957 5633601 3/26/2009 SWMW-112(3-26-09) REG	SWMW-112 1195597 5987002 5/20/2010 SWMW-112(5-20-10) REG	SWMW-112 1342893 6826947 10/16/2012 SWMW-112(101612) REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	< 19	< 10	< 9
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 9
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	15	16	2
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	15	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-111 1570520 7935716 6/18/2015 CVX-0050-02 REG	SWMW-111 1592327 8045004 9/11/2015 CVX-0061-07 REG	SWMW-111 1609458 8135155 11/13/2015 SWMW-111-W-40.00-151113 REG	SWMW-111 1670992 8421614 6/10/2016 SWMW-111-W-40.00-160610 REG	SWMW-112 1124672 5557893 12/11/2008 SWMW-112G(12-11-08) REG	SWMW-112 1128853 5580846 1/20/2009 SWMW-112-50-60 REG	SWMW-112 1128853 5580847 1/20/2009 SWMW-112-40-50 REG	SWMW-112 1128853 5580848 1/20/2009 SWMW-112-30-40 REG	SWMW-112 1137957 5633601 3/26/2009 SWMW-112(3-26-09) REG	SWMW-112 1195597 5987002 5/20/2010 SWMW-112(5-20-10) REG	SWMW-112 1342893 6826947 10/16/2012 SWMW-112(101612) REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	--	--	< 3	< 3	< 0.9
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	--	--	6	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 0.09
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	--	--	536	< 80.2	886
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	--	--	< 9.7	< 9.7	< 3.5
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	--	--	< 10.0	< 7.2	11.0 J
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	--	--	115	105	31.1
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	--	--	< 0.90	< 1.4	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	--	--	< 2.0	< 2.0	1.1 J
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	--	--	103,000	101,000	26,200
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	--	--	< 3.0	< 3.4	4.4 J
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	--	--	< 2.1	< 2.1	< 5 J
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	--	--	< 2.7	< 2.7	5.9 J
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	--	--	788	321	1,840
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	--	--	< 6.9	< 6.9	6.5 J
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	--	--	56,200	55,700	5,940
Manganese	**7439-96-5**	**300**	**NA**	36.4	16.3	10.4	20	--	--	--	--	229	173	114
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	--	--	< 5.6	< 1.8	2.9 J
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	--	--	15,100	14,200	2,650
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	--	--	< 10.7	< 8.9	< 7.5
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	--	--	< 2.2	< 2.3	< 1.2
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	--	--	134,000	114,000	21,600
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	--	--	< 14.0	< 14.0	< 30 J
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	--	--	< 2.5	< 2.5	2.6 J
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	--	--	< 8.1	< 8.1	78.8
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-112 1398234 7098436 6/18/2013 SWMW-112(061813) REG	SWMW-112 1462877 7410815 3/27/2014 SWMW-112-032714 REG	SWMW-112 1480247 7491524 6/6/2014 SWMW-112-060614 REG	SWMW-112 1504703 7606267 9/18/2014 CVX-0032-11 REG	SWMW-112 1517227 7668613 11/7/2014 CVX-0037-04 REG	SWMW-112 1546494 7811604 3/18/2015 CVX-0043-01 REG	SWMW-112 1570188 7933932 6/17/2015 CVX-0049-13 REG	SWMW-112 1592070 8043677 9/10/2015 CVX-0060-10 REG	SWMW-112 1609458 8135156 11/13/2015 SWMW-112-W-55.00-151113 REG	SWMW-112 1670992 8421611 6/10/2016 SWMW-112-W-55.00-160610 REG	SWMW-114 1125519 5562579 12/17/2008 SWMW-114G(12-17-08) REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	36	--	--	--	--	--	--	--	--	--	6
1,1,1-Trichloroethane	71-55-6	5	NA	1 J	--	--	--	--	--	--	--	--	--	20
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	60	--	--	--	--	--	--	--	--	--	21
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	2	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	--	--	--	--	--	--	--	--	--	< 3
2-Hexanone	591-78-6	50	NA	< 3	--	--	--	--	--	--	--	--	--	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	--	--	--	--	--	--	--	--	--	< 3
Acetone	67-64-1	50	NA	< 6	--	--	--	--	--	--	--	--	--	30
Benzene	71-43-2	1	NA	3 J	2	2	2	2	2	2	2	1	1 J	6
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Bromoform	75-25-2	50	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Carbon disulfide	75-15-0	60	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Chlorobenzene	108-90-7	5	NA	3 J	3	3	3	3	3	3	2	2	1	800
Chloroethane	75-00-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	16
Chloroform	67-66-3	7	NA	0.8 J	--	--	--	--	--	--	--	--	--	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	560	520	630	560	500	550	550	500	410	500	12
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	38
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	--	--	--	--	--	--	--	--	--	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	--	--	--	--	--	--	--	--	--	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	--	--	--	--	--	--	--	--	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Toluene	108-88-3	5	NA	< 0.7	--	--	--	--	--	--	--	--	--	4 J
trans-1,2-Dichloroethene	156-60-5	5	NA	2 J	--	--	--	--	--	--	--	--	--	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	--	--	--	--	--	--	--	--	--	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	270	280	290	240	230	250	290	250	120	180	410
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	23	13	12	10	7	12	12	9	4	6	2 J
Xylene (total)	1330-20-7	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	98
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

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Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 11	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	--	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	--	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 11	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	10	--	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.5	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 0.1	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-112 1398234 7098436 6/18/2013 SWMW-112(061813) REG	SWMW-112 1462877 7410815 3/27/2014 SWMW-112-032714 REG	SWMW-112 1480247 7491524 6/6/2014 SWMW-112-060614 REG	SWMW-112 1504703 7606267 9/18/2014 CVX-0032-11 REG	SWMW-112 1517227 7668613 11/7/2014 CVX-0037-04 REG	SWMW-112 1546494 7811604 3/18/2015 CVX-0043-01 REG	SWMW-112 1570188 7933932 6/17/2015 CVX-0049-13 REG	SWMW-112 1592070 8043677 9/10/2015 CVX-0060-10 REG	SWMW-112 1609458 8135156 11/13/2015 SWMW-112-W-55.00-151113 REG	SWMW-112 1670992 8421611 6/10/2016 SWMW-112-W-55.00-160610 REG	SWMW-114 1125519 5562579 12/17/2008 SWMW-114G(12-17-08) REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	--	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	--	--	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	--	--	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.5	--	--	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	184 J	--	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 5.3	--	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	--	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	112	--	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	--	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.76	--	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	110,000	--	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 1.6	--	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 1.3	--	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	--	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	282	--	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 4.7	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	55,200	--	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	194	314	192	210	189	221	220	189	168	124	--
Nickel	**7440-02-0**	**100**	**NA**	2.5 J	--	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	9,920	--	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 8.4	--	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.1	--	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	97,600	--	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 5.4	--	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.0	--	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	42.7	--	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	--	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-114 1128381 5578264 1/13/2009 SWMW-114(20-30)(1-13-09) REG	SWMW-114 1128381 5578265 1/13/2009 SWMW-114(30-40)(1-13-09) REG	SWMW-114 1128381 5578266 1/13/2009 SWMW-114(40-45)(1-13-09) REG	SWMW-114 1137775 5632464 3/24/2009 SWMW-114(3-24-09) REG	SWMW-114 1343207 6828415 10/17/2012 SWMW-114(101712) REG	SWMW-114 1395751 7086909 6/7/2013 SWMW-114(060713) REG	SWMW-114 1460835 7400675 3/19/2014 SWMW-114-031914 REG	SWMW-114 1460835 7400676 3/19/2014 SWMW-1114-031914 FD	SWMW-114 1479931 7489810 6/5/2014 SWMW-114-060514 REG	SWMW-114 1503937 7602494 9/16/2014 CVX-0030-03 REG
Volatile Organic Compounds													
1,1 Dichloroethene	75-35-4	5	NA	2 J	2 J	< 0.8	2 J	< 0.8	< 0.8	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	18	26	6	30	15	10	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	11	9	3 J	6	7	6	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	270	26	18	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	7	< 0.5	< 0.5	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	30	2	1	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	13 J	4 J	< 3	4 J	< 3	< 3	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 6	< 3	< 3	< 3	< 3	< 3	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 6	< 3	< 3	< 3	< 3	< 3	--	--	--	--
Acetone	67-64-1	50	NA	18 J	< 6	< 6	< 6	7 J	< 6	--	--	--	--
Benzene	71-43-2	1	NA	3 J	1 J	< 0.5	1 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromoform	75-25-2	50	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chlorobenzene	108-90-7	5	NA	260	76	18	290	26	24	12	12	16	10
Chloroethane	75-00-3	5	NA	< 2	3 J	< 1	1 J	< 1	< 1	--	--	--	--
Chloroform	67-66-3	7	NA	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	10	8	3 J	5 J	9	6	3 J	3 J	3	3
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethylbenzene	100-41-4	5	NA	21	2 J	< 0.8	22	< 0.8	< 0.8	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 4	< 2	< 2	< 2	< 2	< 2	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 20	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Toluene	108-88-3	5	NA	29	5 J	10	6	< 0.7	< 0.7	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 2	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	520	780	700	560	230	240	180	180	240	240
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	56	4 J	< 0.8	80	< 0.8	< 0.8	--	--	--	--
Semivolatile Organic Compounds													
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--

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Volatile Organic Compounds													
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	12	< 0.5	< 0.5	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	< 20	< 10	< 11	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	< 1	< 1	< 1	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	< 2	< 0.4	< 0.4	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	1,200	0.9	< 0.1	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	< 2	< 2	< 2	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	< 5	< 5	< 5	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	< 2	< 0.5	< 0.5	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	38	< 0.5	< 0.5	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	< 10	< 10	< 11	--	--	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	31	0.2 J	< 0.1	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	3 J	0.2 J	< 0.1	--	--	--	--
Anthracene	120-12-7	50	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	< 17	2 J	< 2	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	< 2	< 2	< 2	--	--	--	--
Carbazole	86-74-8	NA	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	< 2	< 2	< 2	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	< 2	< 2	< 2	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	17	< 0.5	< 0.5	--	--	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	< 2	< 2	< 2	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	< 2	< 2	< 2	--	--	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Fluorene	86-73-7	50	NA	--	--	--	12	0.2 J	< 0.1	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	< 5	< 5	< 5	--	--	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	< 1	< 1	< 1	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Isophorone	78-59-1	50	NA	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	< 2	< 0.5	< 0.5	--	--	--	--
Naphthalene	91-20-3	10	NA	--	--	--	73	0.2 J	0.1 J	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-114 1128381 5578264 1/13/2009 SWMW-114(20-30)(1-13-09) REG	SWMW-114 1128381 5578265 1/13/2009 SWMW-114(30-40)(1-13-09) REG	SWMW-114 1128381 5578266 1/13/2009 SWMW-114(40-45)(1-13-09) REG	SWMW-114 1137775 5632464 3/24/2009 SWMW-114(3-24-09) REG	SWMW-114 1343207 6828415 10/17/2012 SWMW-114(101712) REG	SWMW-114 1395751 7086909 6/7/2013 SWMW-114(060713) REG	SWMW-114 1460835 7400675 3/19/2014 SWMW-114-031914 REG	SWMW-114 1460835 7400676 3/19/2014 SWMW-1114-031914 FD	SWMW-114 1479931 7489810 6/5/2014 SWMW-114-060514 REG	SWMW-114 1503937 7602494 9/16/2014 CVX-0030-03 REG
Volatile Organic Compounds													
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	< 1	< 0.5	< 0.5	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	< 3	< 1	< 1	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	10	0.2 J	< 0.1	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	--	--	--	110	< 0.5	< 0.5	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	< 1	< 0.1	< 0.1	--	--	--	--
Polychlorinated Biphenyls†													
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Metals													
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	2,190	< 74.3	122 J	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	< 9.7	< 3.5	< 3.5	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	< 10.0	< 6.8	< 6.8	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	171	37.2	38.8	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	< 0.90	< 0.67	< 0.67	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	< 2.0	< 0.36	0.37 J	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	67,100	71,500	65,500	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	< 3.0	< 1.1	< 1.1	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	< 2.1	< 0.66	< 0.66	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	--	--	--	5.3 J	< 2.1	< 2.1	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	--	--	--	1,270	44.3 J	66.1 J	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	--	--	--	10.7 J	< 5.1	10.6 J	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	8,160	8,970	7,820	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	--	--	--	1,570	515	446	343	361	403	315
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	< 5.6	< 1.1	< 1.1	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	779	582	509	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	< 10.7	< 7.5	< 7.5	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	--	--	--	< 2.2	< 1.2	< 1.2	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	10,100	10,900	9,580	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	< 14.0	< 5.7	< 5.7	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	6.2	< 1.3	< 1.3	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	10.2 J	2.2 J	< 2.0	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	< 0.056	< 0.070	< 0.070	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	3 J	1 J	1 J	1 J
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	< 1	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	< 1	--	--	--	--	--	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	7	--	--	--	--	--	< 1	< 1	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	< 1	--	--	--	--	--	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	< 1	--	--	--	--	--	< 1	< 1	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	12	21	9	11	13	12	17	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	3	4	2	3	4	4	3	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	< 0.5	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	< 0.5	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	< 0.5	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	< 0.5	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	260	250	140	170	250	250	240	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	0.6 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	--	--	< 0.5	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

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Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	< 20	< 10	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	1 J	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	< 5 J	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	< 1	< 1	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-114 1516213 7662953 11/4/2014 CVX-0034-05 REG	SWMW-114 1548024 7819753 3/24/2015 CVX-0046-08 REG	SWMW-114 1569290 7929750 6/15/2015 CVX-0047-03 REG	SWMW-114 1593311 8049701 9/15/2015 CVX-0062-04 REG	SWMW-114 1608498 8129221 11/10/2015 SWMW-114-W-40.00-151110 REG	SWMW-114 1608498 8129222 11/10/2015 SWMW-114-WD-40.00-151110 FD	SWMW-114 1669977 8417053 6/8/2016 SWMW-114-W-40.00-160608 REG	SWMW-115 1125519 5562578 12/17/2008 SWMW-115G(12-17-08) REG	SWMW-115 1137775 5632467 3/25/2009 SWMW-115(3-25-09) REG	SWMW-115 1195374 5985326 5/19/2010 SWMW-115(5-19-10) REG	SWMW-115 1195374 5985327 5/19/2010 SWMW-1150(5-19-10) FD
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	--	--	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	--	--	18	< 1	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	--	--	481	652	807
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	--	--	< 9.7	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	--	--	< 10.0	< 7.2	< 7.2
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	--	--	49.3	50.7	51.5
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	--	--	< 0.90	< 1.4	< 1.4
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	--	--	2.0 J	< 2.0	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	--	--	69,900	93,300	93,100
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	--	--	< 3.0	< 3.4	< 3.4
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	--	--	< 2.1	< 2.1	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	--	--	6.2 J	3.7 J	5.9 J
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	--	--	459	694	953
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	--	--	< 6.9	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	--	--	7,920	10,400	10,400
Manganese	**7439-96-5**	**300**	**NA**	535	523	1,130	466	490	518	582	--	30.9	21.2	27
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	--	--	< 5.6	< 1.8	< 1.8
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	--	--	4,120	841	992
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	--	--	< 10.7	< 8.9	< 8.9
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	--	--	< 2.2	< 2.3	< 2.3
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	--	--	27,600	16,700	16,900
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	--	--	< 14.0	< 14.0	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	--	--	< 2.5	< 2.5	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	--	--	< 8.1	< 8.1	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-115	SWMW-115	SWMW-115	SWMW-116	SWMW-116	SWMW-116	SWMW-116	SWMW-116	SWMW-116	SWMW-116
Sample Delivery Group (SDG)				1341939	1341939	1397265	1128381	1128381	1128381	1137775	1195597	1343539	1397265
Lab Sample ID				6821819	6821820	7093600	5578267	5578268	5578269	5632462	5987005	6830356	7093589
Sample Date				10/11/2012	10/11/2012	6/13/2013	1/14/2009	1/14/2009	1/14/2009	3/24/2009	5/20/2010	10/18/2012	6/13/2013
Field Sample ID				SWMW-115(101112)	SWMW-1115(101112)	SWMW-115(061313)	SWMW-116(24-34)(1-14-09)	SWMW-116(40-50)(1-14-09)	SWMW-116(50-60)(1-14-09)	SWMW-116(3-24-09)	SWMW-116(5-20-10)	SWMW-116(101812)	SWMW-116(061313)
Sample Purpose				REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019										
Volatile Organic Compounds													
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	1 J	1 J	< 1	< 1	< 1	< 1	2 J	3 J	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 0.5	< 0.5	--	--	--	3 J	3 J	< 0.5	2
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	1 J	< 0.5	0.6 J
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	3 J	6 J	3 J	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	--	< 6	12 J	< 6	12 J	< 6	< 6	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	0.6 J	0.7 J	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	4 J	4 J	1 J	3 J	2 J	< 0.8	2 J
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	4 J	7	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	38	95	210	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	2 J	2 J	< 1	< 1	2 J	4 J	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	6	10	< 0.8	1 J	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds													
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-115 1341939 6821819 10/11/2012 SWMW-115(101112) REG	SWMW-115 1341939 6821820 10/11/2012 SWMW-1115(101112) FD	SWMW-115 1397265 7093600 6/13/2013 SWMW-115(061313) REG	SWMW-116 1128381 5578267 1/14/2009 SWMW-116(24-34)(1-14-09) REG	SWMW-116 1128381 5578268 1/14/2009 SWMW-116(40-50)(1-14-09) REG	SWMW-116 1128381 5578269 1/14/2009 SWMW-116(50-60)(1-14-09) REG	SWMW-116 1137775 5632462 3/24/2009 SWMW-116(3-24-09) REG	SWMW-116 1195597 5987005 5/20/2010 SWMW-116(5-20-10) REG	SWMW-116 1343539 6830356 10/18/2012 SWMW-116(101812) REG	SWMW-116 1397265 7093589 6/13/2013 SWMW-116(061313) REG
Volatile Organic Compounds													
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 3	< 3	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 9	< 10	--	--	--	< 21	< 10	< 10	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 0.9	< 1	--	--	--	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 0.4	< 0.4	--	--	--	< 2	< 2	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 2	< 2	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 2	< 2	< 0.5	< 0.5
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
4-Nitrophenol	100-02-7	1	NA	< 10	< 9	< 10	--	--	--	< 11	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Acenaphthylene	208-96-8	NA	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Anthracene	120-12-7	50	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	--	--	--	< 9	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
Chrysene	218-01-9	0.002	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Dibenzofuran	132-64-9	NA	7.9	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Fluorene	86-73-7	50	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 0.9	< 1	--	--	--	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Isophorone	78-59-1	50	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 0.5	< 0.5	--	--	--	< 2	< 2	< 0.5	< 0.5
Naphthalene	91-20-3	10	NA	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-115	SWMW-115	SWMW-115	SWMW-116	SWMW-116	SWMW-116	SWMW-116	SWMW-116	SWMW-116	SWMW-116
Sample Delivery Group (SDG)				1341939	1341939	1397265	1128381	1128381	1128381	1137775	1195597	1343539	1397265
Lab Sample ID				6821819	6821820	7093600	5578267	5578268	5578269	5632462	5987005	6830356	7093589
Sample Date				10/11/2012	10/11/2012	6/13/2013	1/14/2009	1/14/2009	1/14/2009	3/24/2009	5/20/2010	10/18/2012	6/13/2013
Field Sample ID				SWMW-115(101112)	SWMW-1115(101112)	SWMW-115(061313)	SWMW-116(24-34)(1-14-09)	SWMW-116(40-50)(1-14-09)	SWMW-116(50-60)(1-14-09)	SWMW-116(3-24-09)	SWMW-116(5-20-10)	SWMW-116(101812)	SWMW-116(061313)
Sample Purpose				REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019										
Volatile Organic Compounds													
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 0.9	< 1	--	--	--	< 3	< 3	< 1	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	< 1	< 1	< 0.5	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	< 0.09	< 0.1	--	--	--	< 1	< 1	< 0.1	< 0.1
Polychlorinated Biphenyls†													
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--
Metals													
Aluminum	**7429-90-5**	**100**	**NA**	90.7 J	143 J	< 82.8	--	--	--	214	< 80.2	572	< 82.8
Antimony	**7440-36-0**	**3**	**NA**	< 3.5	< 3.5	< 5.3	--	--	--	< 9.7	< 9.7	< 3.5	< 5.3
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	< 6.8	< 6.8	--	--	--	< 10.0	< 7.2	14.2 J	< 6.8
Barium	**7440-39-3**	**1000**	**NA**	41.8	43	8.7	--	--	--	671	275	43.7	97.6
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.67	< 0.67	--	--	--	< 0.90	< 1.4	< 0.67	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	< 0.36	< 0.36	< 0.76	--	--	--	< 2.0	< 2.0	< 0.36	< 0.76
Calcium	**7440-70-2**	**NA**	**NA**	71,000	71,800	17,800	--	--	--	289,000	148,000	53,000	89,200
Chromium	**7440-47-3**	**50**	**NA**	< 1.1	< 1.1	< 1.6	--	--	--	< 3.0	< 3.4	2.4 J	< 1.6
Cobalt	**7440-48-4**	**5**	**NA**	< 0.66	< 0.66	< 1.3	--	--	--	< 2.1	< 2.1	1.5 J	< 1.3
Copper	**7440-50-8**	**200**	**NA**	< 2.1	< 2.1	9.5 J	--	--	--	10.2	< 2.7	4.4 J	2.7 J
Iron	**7439-89-6**	**300**	**NA**	110 J	202	142 J	--	--	--	270	78.7 J	832	193 J
Lead	**7439-92-1**	**25**	**NA**	< 5.1	< 5.1	< 4.7	--	--	--	< 6.9	< 6.9	< 5.1	< 4.7
Magnesium	**7439-95-4**	**35000**	**NA**	7,710	7,750	1,650	--	--	--	32,800	18,000	8,190	11,700
Manganese	**7439-96-5**	**300**	**NA**	9.4	18.4	9.8	--	--	--	1,040	1,110	363	1,140
Nickel	**7440-02-0**	**100**	**NA**	< 1.1	< 1.1	< 1.5	--	--	--	< 5.6	< 1.8	< 1.1	< 1.5
Potassium	**7440-09-7**	**NA**	**NA**	883	931	1,630	--	--	--	3,550	1,900	4,650	2,850
Selenium	**7782-49-2**	**10**	**NA**	< 7.5	< 7.5	< 8.4	--	--	--	< 10.7	< 8.9	< 7.5	< 8.4
Silver	**7440-22-4**	**50**	**NA**	< 1.2	< 1.2	< 2.1	--	--	--	< 2.2	< 2.3	< 1.2	< 2.1
Sodium	**7440-23-5**	**20000**	**NA**	15,200	15,400	23,800	--	--	--	464,000	101,000	118,000	79,100
Thallium	**7440-28-0**	**0.5**	**NA**	< 5.7	< 5.7	< 5.4	--	--	--	< 14.0	< 14.0	< 30 J	< 5.4
Vanadium	**7440-62-2**	**NA**	**86**	1.3 J	1.4 J	< 2.0	--	--	--	< 2.5	< 2.5	4.8 J	5.9
Zinc	**7440-66-6**	**2000**	**NA**	4.7 J	7.2 J	5.3 J	--	--	--	< 8.1	8.7 J	53.7	13.4 J
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.070	< 0.070	--	--	--	< 0.056	< 0.056	0.10 J	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-117 1125519 5562581 12/18/2008 SWMW-117G(12-18-08) REG	SWMW-117 1137775 5632470 3/25/2009 SWMW-117(3-25-09) REG	SWMW-117 1195186 5984080 5/18/2010 SWMW-117(5-18-10) REG	SWMW-117 1195186 5984081 5/18/2010 SWMW-1170(5-18-10) FD	SWMW-117 1343207 6828414 10/17/2012 SWMW-117(101712) REG	SWMW-117 1398230 7098405 6/18/2013 SWMW-117(061813) REG	SWMW-118 1129234 5583086 1/21/2009 SWMW-118(60-70)GW REG	SWMW-118 1129234 5583087 1/21/2009 SWMW-118(65-75)GW REG	SWMW-118 1137775 5632458 3/24/2009 SWMW-118(3-24-09) REG	SWMW-118 1195373 5985316 5/19/2010 SWMW-118(5-19-10) REG
Volatile Organic Compounds													
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	8 J	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	0.5 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	3 J	12	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds													
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-117 1125519 5562581 12/18/2008 SWMW-117G(12-18-08) REG	SWMW-117 1137775 5632470 3/25/2009 SWMW-117(3-25-09) REG	SWMW-117 1195186 5984080 5/18/2010 SWMW-117(5-18-10) REG	SWMW-117 1195186 5984081 5/18/2010 SWMW-1170(5-18-10) FD	SWMW-117 1343207 6828414 10/17/2012 SWMW-117(101712) REG	SWMW-117 1398230 7098405 6/18/2013 SWMW-117(061813) REG	SWMW-118 1129234 5583086 1/21/2009 SWMW-118(60-70)GW REG	SWMW-118 1129234 5583087 1/21/2009 SWMW-118(65-75)GW REG	SWMW-118 1137775 5632458 3/24/2009 SWMW-118(3-24-09) REG	SWMW-118 1195373 5985316 5/19/2010 SWMW-118(5-19-10) REG
Volatile Organic Compounds													
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	--	< 3	< 3	< 3	< 0.5	< 0.5	--	--	< 3	< 3
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	--	< 19	< 10	< 10	< 10	< 10	--	--	< 20	< 10
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	--	< 1	< 1	< 1	< 1	< 1	--	--	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	--	< 2	< 2	< 2	< 0.4	< 0.4	--	--	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	--	< 2	< 2	< 2	< 2	< 2	--	--	< 2	< 2
3-Nitroaniline	**99-09-2**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	--	< 5	< 5	< 5	< 5	< 5	--	--	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
4-Chloroaniline	**106-47-8**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	< 2	< 2
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	< 2	< 2
4-Nitroaniline	**100-01-6**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
4-Nitrophenol	**100-02-7**	**1**	**NA**	--	< 10	< 10	< 10	< 10	< 10	--	--	< 10	< 10
Acenaphthene	**83-32-9**	**20**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Acenaphthylene	**208-96-8**	**NA**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Anthracene	**120-12-7**	**50**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	--	< 2	4 J	4 J	< 2	< 2	--	--	< 2	< 2
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	--	--	< 2	< 2
Carbazole	**86-74-8**	**NA**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
Chrysene	**218-01-9**	**0.002**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	--	--	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	--	--	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Dibenzofuran	**132-64-9**	**NA**	**7.9**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
Diethylphthalate	**84-66-2**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	--	--	< 2	< 2
Dimethyl phthalate	**131-11-3**	**50**	**NA**	--	< 2	< 2	< 2	< 2	< 2	--	--	< 2	< 2
Fluoranthene	**206-44-0**	**50**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Fluorene	**86-73-7**	**50**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	--	< 5	< 5	< 5	< 5	< 5	--	--	< 5	< 5
Hexachloroethane	**67-72-1**	**5**	**NA**	--	< 1	< 1	< 1	< 1	< 1	--	--	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Isophorone	**78-59-1**	**50**	**NA**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	< 2	< 2
Naphthalene	**91-20-3**	**10**	**NA**	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-117	SWMW-117	SWMW-117	SWMW-117	SWMW-117	SWMW-117	SWMW-118	SWMW-118	SWMW-118	SWMW-118
Sample Delivery Group (SDG)				1125519	1137775	1195186	1195186	1343207	1398230	1129234	1129234	1137775	1195373
Lab Sample ID				5562581	5632470	5984080	5984081	6828414	7098405	5583086	5583087	5632458	5985316
Sample Date				12/18/2008	3/25/2009	5/18/2010	5/18/2010	10/17/2012	6/18/2013	1/21/2009	1/21/2009	3/24/2009	5/19/2010
Field Sample ID				SWMW-117G(12-18-08)	SWMW-117(3-25-09)	SWMW-117(5-18-10)	SWMW-1170(5-18-10)	SWMW-117(101712)	SWMW-117(061813)	SWMW-118(60-70)GW	SWMW-118(65-75)GW	SWMW-118(3-24-09)	SWMW-118(5-19-10)
Sample Purpose				REG	REG	REG	FD	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019										
Volatile Organic Compounds													
Nitrobenzene	98-95-3	0.4	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
p-Chloro-m-cresol	59-50-7	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
Pentachlorophenol	87-86-5	1	NA	--	< 3	< 3	< 3	< 1	< 1	--	--	< 3	< 3
Phenanthrene	85-01-8	50	NA	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Phenol	108-95-2	1	NA	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	< 1	< 1
Pyrene	129-00-0	50	NA	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	< 1	< 1
Polychlorinated Biphenyls†													
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--
Metals													
Aluminum	7429-90-5	100	NA	--	310	493	463	162 J	122 J	--	--	1,010	369
Antimony	7440-36-0	3	NA	--	< 9.7	< 9.7	< 9.7	< 3.5	< 5.3	--	--	< 9.7	< 9.7
Arsenic	7440-38-2	25	NA	--	< 10.0	< 7.2	< 7.2	< 6.8	< 6.8	--	--	< 10.0	< 7.2
Barium	7440-39-3	1000	NA	--	159	130	124	164	181	--	--	96.1	110
Beryllium	7440-41-7	3	NA	--	< 0.90	< 1.4	< 1.4	< 0.67	< 0.67	--	--	< 0.90	< 1.4
Cadmium	7440-43-9	5	NA	--	< 2.0	< 2.0	< 2.0	< 0.36	< 0.76	--	--	< 2.0	< 2.0
Calcium	7440-70-2	NA	NA	--	60,500	60,600	59,400	55,400	60,400	--	--	84,500	104,000
Chromium	7440-47-3	50	NA	--	< 3.0	< 3.4	< 3.4	< 1.1	< 1.6	--	--	< 3.0	< 3.4
Cobalt	7440-48-4	5	NA	--	< 2.1	< 2.1	< 2.1	< 0.66	< 1.3	--	--	< 2.1	< 2.1
Copper	7440-50-8	200	NA	--	< 2.7	11.2	13.8	< 2.1	< 2.7	--	--	3.4 J	3.8 J
Iron	7439-89-6	300	NA	--	169 J	983	804	248	181 J	--	--	1,180	537
Lead	7439-92-1	25	NA	--	< 6.9	< 6.9	7.0 J	< 5.1	< 4.7	--	--	< 6.9	< 6.9
Magnesium	7439-95-4	35000	NA	--	11,300	12,300	12,100	11,800	11,900	--	--	27,600	37,900
Manganese	7439-96-5	300	NA	--	4.4 J	31.6	27.4	8.5	4.4 J	--	--	929	137
Nickel	7440-02-0	100	NA	--	< 5.6	< 1.8	< 1.8	< 1.1	< 1.5	--	--	< 5.6	< 1.8
Potassium	7440-09-7	NA	NA	--	1,410	1,130	1,120	899	828	--	--	3,280	2,900
Selenium	7782-49-2	10	NA	--	< 10.7	< 8.9	< 8.9	< 7.5	< 8.4	--	--	< 10.7	< 8.9
Silver	7440-22-4	50	NA	--	< 2.2	< 2.3	< 2.3	< 1.2	< 2.1	--	--	< 2.2	< 2.3
Sodium	7440-23-5	20000	NA	--	61,300	48,000	47,300	46,400	45,500	--	--	188,000	113,000
Thallium	7440-28-0	0.5	NA	--	< 14.0	< 14.0	< 14.0	6.1 J	< 5.4	--	--	< 14.0	< 14.0
Vanadium	7440-62-2	NA	86	--	< 2.5	< 2.5	< 2.5	< 1.3	< 2.0	--	--	< 2.5	< 2.5
Zinc	7440-66-6	2000	NA	--	< 8.1	9.3 J	8.8 J	3.3 J	2.1 J	--	--	9.2 J	11.8 J
Mercury	7439-97-6	0.7	NA	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-118	SWMW-118	SWMW-118	SWMW-119	SWMW-119	SWMW-119	SWMW-119	SWMW-12	SWMW-12	SWMW-12	SWMW-12
Sample Delivery Group (SDG)				1195719	1341939	1397510	1137775	1196041	1343207	1398940	1021535	1114665	1195720	1343207
Lab Sample ID				5987987	6821824	7095169	5632474	5989880	6828404	7103161	4958652	5496358	5987990	6828402
Sample Date				5/21/2010	10/11/2012	6/14/2013	3/25/2009	5/25/2010	10/17/2012	6/20/2013	1/12/2007	10/10/2008	5/21/2010	10/17/2012
Field Sample ID				SWMW-118(5-21-10)	SWMW-118(101112)	SWMW-118(061413)	SWMW-119(3-25-09)	SWMW-119(5-25-10)	SWMW-119(101712)	SWMW-119(062013)	SWMW-12011207	SWMW-12(10-10-08)	SWMW-12(5-21-10)	SWMW-12(101712)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code													
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	3
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	1 J	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	0.6 J
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	36	37	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	18	12	6	4 J	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	4 J	2 J	2 J	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	0.9 J	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	1 J	< 1	6	4 J	3 J	3 J	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	13	1 J	2 J	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-118 1195719 5987987 5/21/2010 SWMW-118(5-21-10) REG	SWMW-118 1341939 6821824 10/11/2012 SWMW-118(101112) REG	SWMW-118 1397510 7095169 6/14/2013 SWMW-118(061413) REG	SWMW-119 1137775 5632474 3/25/2009 SWMW-119(3-25-09) REG	SWMW-119 1196041 5989880 5/25/2010 SWMW-119(5-25-10) REG	SWMW-119 1343207 6828404 10/17/2012 SWMW-119(101712) REG	SWMW-119 1398940 7103161 6/20/2013 SWMW-119(062013) REG	SWMW-12 1021535 4958652 1/12/2007 SWMW-12011207 REG	SWMW-12 1114665 5496358 10/10/2008 SWMW-12(10-10-08) REG	SWMW-12 1195720 5987990 5/21/2010 SWMW-12(5-21-10) REG	SWMW-12 1343207 6828402 10/17/2012 SWMW-12(101712) REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 0.5	< 0.5	< 3	< 3	< 0.5	< 0.5	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 10	< 10	< 19	< 10	< 10	< 10	< 20	< 19	< 10	< 9
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	1 J	< 1	< 1	< 0.09
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 9
Acenaphthene	83-32-9	20	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Acenaphthylene	208-96-8	NA	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Anthracene	120-12-7	50	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 5 J	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	6
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Dibenzofuran	132-64-9	NA	7.9	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Fluorene	86-73-7	50	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Isophorone	78-59-1	50	NA	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	7	< 1	< 1	< 0.09

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-118 1195719 5987987 5/21/2010 SWMW-118(5-21-10) REG	SWMW-118 1341939 6821824 10/11/2012 SWMW-118(101112) REG	SWMW-118 1397510 7095169 6/14/2013 SWMW-118(061413) REG	SWMW-119 1137775 5632474 3/25/2009 SWMW-119(3-25-09) REG	SWMW-119 1196041 5989880 5/25/2010 SWMW-119(5-25-10) REG	SWMW-119 1343207 6828404 10/17/2012 SWMW-119(101712) REG	SWMW-119 1398940 7103161 6/20/2013 SWMW-119(062013) REG	SWMW-12 1021535 4958652 1/12/2007 SWMW-12011207 REG	SWMW-12 1114665 5496358 10/10/2008 SWMW-12(10-10-08) REG	SWMW-12 1195720 5987990 5/21/2010 SWMW-12(5-21-10) REG	SWMW-12 1343207 6828402 10/17/2012 SWMW-12(101712) REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 1	< 1	< 3	< 3	< 1	< 1	< 3	< 3	< 3	< 0.9
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Phenol	**108-95-2**	**1**	**NA**	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.09
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	< 80.2	317	670	651	108 J	689	197 J	< 80.2	< 80.2	< 80.2	177 J
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5	< 5.3	< 9.7	< 9.7	< 9.7	< 3.5
Arsenic	**7440-38-2**	**25**	**NA**	< 7.2	< 6.8	< 6.8	< 10.0	< 7.2	< 6.8	< 6.8	< 10	11.3 J	< 7.2	< 6.8
Barium	**7440-39-3**	**1000**	**NA**	90.9	117	115	40.1	34.7	45.2	40.7	174	121	152	89.9
Beryllium	**7440-41-7**	**3**	**NA**	< 1.4	< 0.67	< 0.67	< 0.90	< 1.4	< 0.67	< 0.67	< 0.94	< 0.90	< 1.4	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 0.36	< 0.36	< 2.0	< 2.0	< 0.36	< 0.76	< 0.91	< 2.0	< 2.0	0.50 J
Calcium	**7440-70-2**	**NA**	**NA**	54,900	102,000	103,000	94,200	88,500	98,900	89,800	111,000	102,000	107,000	101,000
Chromium	**7440-47-3**	**50**	**NA**	< 3.4	2.1 J	1.8 J	< 3.0	< 3.4	2.6 J	2.1 J	< 2.3	< 3.0	< 3.4	1.4 J
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 0.66	0.66 J	< 2.1	< 2.1	1.5 J	< 1.3	< 2.1	< 2.1	< 2.1	1.5 J
Copper	**7440-50-8**	**200**	**NA**	4.7 J	< 2.1	4.3 J	5.0 J	< 2.7	< 2.1	< 2.7	< 2.2	< 2.7	4.4 J	< 2.1
Iron	**7439-89-6**	**300**	**NA**	230	469	1,260	639	106 J	581	199 J	453	637	177 J	867
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 5.1	< 5.1	< 6.9	< 6.9	< 5.1	< 4.7	< 6.9	< 6.9	< 6.9	6.7 J
Magnesium	**7439-95-4**	**35000**	**NA**	9,120	38,200	39,300	52,700	50,100	56,200	51,600	35,500	35,200	37,800	36,200
Manganese	**7439-96-5**	**300**	**NA**	975	94.9	231	16.7	3.3 J	11.6	3.7 J	1,040	1,110	844	1,660
Nickel	**7440-02-0**	**100**	**NA**	< 1.8	< 1.1	1.4 J	< 5.6	< 1.8	< 1.1	< 1.5	< 5.6	< 5.6	< 1.8	1.5 J
Potassium	**7440-09-7**	**NA**	**NA**	7,170	2,880	2,830	2,480	2,680	2,560	3,980	4,950	4,140	6,580	4,570
Selenium	**7782-49-2**	**10**	**NA**	< 8.9	< 7.5	< 7.5	< 10.7	< 8.9	< 7.5	< 8.4	< 9.4	< 10.7	< 8.9	< 7.5
Silver	**7440-22-4**	**50**	**NA**	< 2.3	< 1.2	< 1.2	< 2.2	< 2.3	< 1.2	< 2.1	< 1.6	< 2.2	< 2.3	< 1.2
Sodium	**7440-23-5**	**20000**	**NA**	912,000	99,400	90,100	28,900	29,500	46,200	45,500	881,000	587,000	596,000	436,000
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 5.7	< 5.7	< 14.0	< 14.0	6.1 J	< 5.4	< 13.5	< 14.0	< 14.0	10.5 J
Vanadium	**7440-62-2**	**NA**	**86**	3.3 J	< 1.3	< 1.3	< 2.5	< 2.5	< 1.3	< 2.0	1.5 J	< 2.5	< 2.5	< 1.3
Zinc	**7440-66-6**	**2000**	**NA**	11.3 J	13.7 J	20.9	< 8.1	< 8.1	4.4 J	2.6 J	< 8.1	< 8.1	24.7	14.1 J
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070	< 0.060	< 0.056	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-12	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-123	SWMW-123	SWMW-123
Sample Delivery Group (SDG)				1398234	1130261	1137776	1137776	1195720	1343207	1343207	1398940	1137775	1195597	1343539
Lab Sample ID				7098438	5589385	5632477	5632478	5988005	6828406	6828407	7103164	5632469	5987007	6830355
Sample Date				6/18/2013	1/30/2009	3/25/2009	3/25/2009	5/21/2010	10/17/2012	10/17/2012	6/20/2013	3/25/2009	5/20/2010	10/18/2012
Field Sample ID				SWMW-12(061813)	SWMW-122G(1-30-09)	SWMW-122(3-25-09)	SWMW-1220(3-25-09)	SWMW-122(5-21-10)	SWMW-122(101712)	SWMW-1122(101712)	SWMW-122(062013)	SWMW-123(3-25-09)	SWMW-123(5-20-10)	SWMW-123(101812)
Sample Purpose				REG	REG	REG	FD	REG	REG	FD	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	4 J	4 J	2 J
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	24	21	11
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	3 J	4 J	5
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	2 J	2 J	3
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	8 J	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2 J	2 J	3 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	310	260	230
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	3 J	3 J	1 J
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	4 J	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
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Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-12	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-123	SWMW-123	SWMW-123
Sample Delivery Group (SDG)				1398234	1130261	1137776	1137776	1195720	1343207	1343207	1398940	1137775	1195597	1343539
Lab Sample ID				7098438	5589385	5632477	5632478	5988005	6828406	6828407	7103164	5632469	5987007	6830355
Sample Date				6/18/2013	1/30/2009	3/25/2009	3/25/2009	5/21/2010	10/17/2012	10/17/2012	6/20/2013	3/25/2009	5/20/2010	10/18/2012
Field Sample ID				SWMW-12(061813)	SWMW-122G(1-30-09)	SWMW-122(3-25-09)	SWMW-1220(3-25-09)	SWMW-122(5-21-10)	SWMW-122(101712)	SWMW-1122(101712)	SWMW-122(062013)	SWMW-123(3-25-09)	SWMW-123(5-20-10)	SWMW-123(101812)
Sample Purpose				REG	REG	REG	FD	REG	REG	FD	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	--	< 3	< 3	< 3	< 0.5	< 0.5	< 0.5	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	< 10	--	< 20	< 19	< 10	< 9	< 9	< 10	< 20	< 10	< 9
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	< 1	< 1	< 1	< 0.9	< 0.9	< 1	< 1	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	< 2	< 2	< 2	< 0.4	< 0.4	< 0.4	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	2 J	1 J	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	--	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	--	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	< 10	--	< 10	< 10	< 10	< 9	< 9	< 10	< 10	< 10	< 9
Acenaphthene	83-32-9	20	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Acenaphthylene	208-96-8	NA	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Anthracene	120-12-7	50	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	45	3 J	< 2	< 2	< 2	< 2	< 5 J	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Dibenzofuran	132-64-9	NA	7.9	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Fluorene	86-73-7	50	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	--	< 1	< 1	< 1	< 0.9	< 0.9	< 1	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Isophorone	78-59-1	50	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	--	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-12	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-122	SWMW-123	SWMW-123	SWMW-123
Sample Delivery Group (SDG)				1398234	1130261	1137776	1137776	1195720	1343207	1343207	1398940	1137775	1195597	1343539
Lab Sample ID				7098438	5589385	5632477	5632478	5988005	6828406	6828407	7103164	5632469	5987007	6830355
Sample Date				6/18/2013	1/30/2009	3/25/2009	3/25/2009	5/21/2010	10/17/2012	10/17/2012	6/20/2013	3/25/2009	5/20/2010	10/18/2012
Field Sample ID				SWMW-12(061813)	SWMW-122G(1-30-09)	SWMW-122(3-25-09)	SWMW-1220(3-25-09)	SWMW-122(5-21-10)	SWMW-122(101712)	SWMW-1122(101712)	SWMW-122(062013)	SWMW-123(3-25-09)	SWMW-123(5-20-10)	SWMW-123(101812)
Sample Purpose				REG	REG	REG	FD	REG	REG	FD	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
Nitrobenzene	98-95-3	0.4	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
p-Chloro-m-cresol	59-50-7	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 1	< 1	< 0.5
Pentachlorophenol	87-86-5	1	NA	< 1	--	< 3	< 3	< 3	< 0.9	< 0.9	< 1	< 3	< 3	< 0.9
Phenanthrene	85-01-8	50	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Phenol	108-95-2	1	NA	< 0.5	--	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	6	< 1	< 0.5
Pyrene	129-00-0	50	NA	< 0.1	--	< 1	< 1	< 1	< 0.09	< 0.09	< 0.1	< 1	< 1	< 0.09
Polychlorinated Biphenyls†														
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	7429-90-5	100	NA	96.8 J	--	155 J	593	< 80.2	748	596	119 J	191 J	5,960	< 74.3
Antimony	7440-36-0	3	NA	< 5.3	--	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	< 5.3	< 9.7	< 9.7	< 3.5
Arsenic	7440-38-2	25	NA	< 6.8	--	< 10.0	< 10.0	< 7.2	< 6.8	< 6.8	< 6.8	< 10.0	< 7.2	< 6.8
Barium	7440-39-3	1000	NA	78.5	--	27.2	29.3	25.5	36.5	33.7	29.4	288	347	272
Beryllium	7440-41-7	3	NA	< 0.67	--	< 0.90	< 0.90	< 1.4	< 0.67	< 0.67	< 0.67	< 0.90	< 1.4	< 0.67
Cadmium	7440-43-9	5	NA	< 0.76	--	< 2.0	< 2.0	< 2.0	0.42 J	0.53 J	< 0.76	< 2.0	< 2.0	< 0.36
Calcium	7440-70-2	NA	NA	96,800	--	41,800	49,600	44,100	55,000	54,600	45,500	155,000	155,000	122,000
Chromium	7440-47-3	50	NA	< 1.6	--	< 3.0	< 3.0	< 3.4	6.4 J	5.7 J	1.7 J	< 3.0	6.9 J	1.8 J
Cobalt	7440-48-4	5	NA	< 1.3	--	< 2.1	< 2.1	< 2.1	0.81 J	< 0.66	< 1.3	< 2.1	< 2.1	< 0.66
Copper	7440-50-8	200	NA	< 2.7	--	< 2.7	< 2.7	< 2.7	< 2.1	< 2.1	< 2.7	3.6 J	5.9 J	< 2.1
Iron	7439-89-6	300	NA	180 J	--	183 J	987	< 52.2	1,220	1,070	170 J	217	9,830	143 J
Lead	7439-92-1	25	NA	< 4.7	--	< 6.9	< 6.9	< 6.9	< 5.1	< 5.1	< 4.7	< 6.9	< 6.9	< 5.1
Magnesium	7439-95-4	35000	NA	31,600	--	22,300	26,600	22,700	29,100	28,400	22,900	21,000	23,500	18,400
Manganese	7439-96-5	300	NA	37	--	18.2	39.8	6.3	41.7	37.2	4.3 J	1,260	877	652
Nickel	7440-02-0	100	NA	< 1.5	--	< 5.6	< 5.6	< 1.8	4.2 J	3.4 J	< 1.5	< 5.6	< 1.8	< 1.1
Potassium	7440-09-7	NA	NA	4,620	--	3,050	3,270	1,350	2,400	2,080	1,380	6,130	5,120	2,480
Selenium	7782-49-2	10	NA	< 8.4	--	< 10.7	< 10.7	< 8.9	< 7.5	< 7.5	< 8.4	< 10.7	< 8.9	< 7.5
Silver	7440-22-4	50	NA	< 2.1	--	< 2.2	< 2.2	< 2.3	< 1.2	< 1.2	< 2.1	< 2.2	< 2.3	< 1.2
Sodium	7440-23-5	20000	NA	401,000	--	22,400	22,900	21,500	24,800	24,000	22,800	55,200	70,400	53,200
Thallium	7440-28-0	0.5	NA	< 5.4	--	< 14.0	< 14.0	< 14.0	7.6 J	7.0 J	< 5.4	< 14.0	< 14.0	< 5.7
Vanadium	7440-62-2	NA	86	< 2.0	--	< 2.5	< 2.5	< 2.5	< 1.3	1.5 J	< 2.0	< 2.5	9.1	< 1.3
Zinc	7440-66-6	2000	NA	30.5	--	< 8.1	< 8.1	< 8.1	8.5 J	8.4 J	< 2.0	< 8.1	22	< 2.0
Mercury	7439-97-6	0.7	NA	< 0.070	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	< 0.060	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-123 1397265 7093591 6/13/2013 SWMW-123(061313) REG	SWMW-123 1461101 7401982 3/20/2014 SWMW-123-032014 REG	SWMW-123 1479931 7489811 6/5/2014 SWMW-123-060514 REG	SWMW-123 1504322 7604426 9/17/2014 CVX-0031-05 REG	SWMW-123 1516213 7662954 11/4/2014 CVX-0034-06 REG	SWMW-123 1548024 7819751 3/24/2015 CVX-0046-06 FD	SWMW-123 1548024 7819757 3/24/2015 CVX-0046-09 REG	SWMW-123 1570188 7933926 6/17/2015 CVX-0049-07 REG	SWMW-123 1593311 8049705 9/15/2015 CVX-0062-05 REG	SWMW-123 1609458 8135157 11/13/2015 SWMW-123-W-50.00-151113 REG	SWMW-123 1669977 8417052 6/8/2016 SWMW-123-W-50.00-160608 REG	SWMW-124 1128381 5578262 1/13/2009 SWMW-124(10-12)(1-13-09) REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	3 J	--	--	--	--	--	--	--	--	--	--	2 J
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	16
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	12	--	--	--	--	--	--	--	--	--	--	33
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	< 1	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.6	--	--	--	--	--	--	< 1	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	5	--	--	--	--	--	--	2 J	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.6	--	--	--	--	--	--	< 1	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	2	--	--	--	--	--	--	1 J	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	--	--	--	--	--	--	--	--	--	--	7 J
2-Hexanone	591-78-6	50	NA	< 3	--	--	--	--	--	--	--	--	--	--	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	--	--	--	--	--	--	--	--	--	--	< 3
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	--	--	--	23
Benzene	71-43-2	1	NA	2 J	1 J	< 0.5	< 0.5	0.6 J	0.6 J	0.6 J	0.5 J	0.7 J	< 0.5	< 0.5	1 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Bromoform	75-25-2	50	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Carbon disulfide	75-15-0	60	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Chlorobenzene	108-90-7	5	NA	24	96	4	1 J	69	43	36	34	52	27	23	63
Chloroethane	75-00-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	10
Chloroform	67-66-3	7	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	1 J
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	20
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	--	--	--	--	--	--	< 0.5	--	--	--	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	< 0.5	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	1 J	--	--	--	--	--	--	--	--	--	--	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	--	--	--	--	--	--	--	--	--	--	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	< 0.5	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	--	--	--	--	--	--	--	--	--	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8
Toluene	108-88-3	5	NA	< 0.7	--	--	--	--	--	--	< 0.5	--	--	--	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	--	--	--	--	--	--	--	--	--	--	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	--	--	--	--	--	--	--	--	--	--	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2 J
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	--	--	--	--	--	--	< 0.5	--	--	--	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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OU-1A Bedrock Groundwater Analytical Results
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-123 1397265 7093591 6/13/2013 SWMW-123(061313) REG	SWMW-123 1461101 7401982 3/20/2014 SWMW-123-032014 REG	SWMW-123 1479931 7489811 6/5/2014 SWMW-123-060514 REG	SWMW-123 1504322 7604426 9/17/2014 CVX-0031-05 REG	SWMW-123 1516213 7662954 11/4/2014 CVX-0034-06 REG	SWMW-123 1548024 7819751 3/24/2015 CVX-0046-06 FD	SWMW-123 1548024 7819757 3/24/2015 CVX-0046-09 REG	SWMW-123 1570188 7933926 6/17/2015 CVX-0049-07 REG	SWMW-123 1593311 8049705 9/15/2015 CVX-0062-05 REG	SWMW-123 1609458 8135157 11/13/2015 SWMW-123-W-50.00-151113 REG	SWMW-123 1669977 8417052 6/8/2016 SWMW-123-W-50.00-160608 REG	SWMW-124 1128381 5578262 1/13/2009 SWMW-124(10-12)(1-13-09) REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 11	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 6	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 11	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.6	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 6	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.6	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-123	SWMW-124
Sample Delivery Group (SDG)				1397265	1461101	1479931	1504322	1516213	1548024	1548024	1570188	1593311	1609458	1669977	1128381
Lab Sample ID				7093591	7401982	7489811	7604426	7662954	7819751	7819757	7933926	8049705	8135157	8417052	5578262
Sample Date				6/13/2013	3/20/2014	6/5/2014	9/17/2014	11/4/2014	3/24/2015	3/24/2015	6/17/2015	9/15/2015	11/13/2015	6/8/2016	1/13/2009
Field Sample ID				SWMW-123(061313)	SWMW-123-032014	SWMW-123-060514	CVX-0031-05	CVX-0034-06	CVX-0046-06	CVX-0046-09	CVX-0049-07	CVX-0062-05	SWMW-123-W-50.00-151113	SWMW-123-W-50.00-160608	SWMW-124(10-12)(1-13-09)
Sample Purpose				REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds															
Nitrobenzene	98-95-3	0.4	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	59-50-7	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	1	NA	< 1	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Phenol	108-95-2	1	NA	< 0.6	--	--	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	50	NA	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	7429-90-5	100	NA	< 82.8	--	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	3	NA	< 5.3	--	--	--	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	25	NA	< 6.8	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	1000	NA	267	--	--	--	--	--	--	--	--	--	--	--
Beryllium	7440-41-7	3	NA	< 0.67	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440-43-9	5	NA	< 0.76	--	--	--	--	--	--	--	--	--	--	--
Calcium	7440-70-2	NA	NA	129,000	--	--	--	--	--	--	--	--	--	--	--
Chromium	7440-47-3	50	NA	< 1.6	--	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	5	NA	< 1.3	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	200	NA	< 2.7	--	--	--	--	--	--	--	--	--	--	--
Iron	7439-89-6	300	NA	166 J	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	25	NA	< 4.7	--	--	--	--	--	--	--	--	--	--	--
Magnesium	7439-95-4	35000	NA	16,200	--	--	--	--	--	--	--	--	--	--	--
Manganese	7439-96-5	300	NA	517	263	67.7	19.2	218	326	315	431	186	334	207	--
Nickel	7440-02-0	100	NA	< 1.5	--	--	--	--	--	--	--	--	--	--	--
Potassium	7440-09-7	NA	NA	1,890	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	10	NA	< 8.4	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	50	NA	< 2.1	--	--	--	--	--	--	--	--	--	--	--
Sodium	7440-23-5	20000	NA	48,000	--	--	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	0.5	NA	< 5.4	--	--	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	NA	86	< 2.0	--	--	--	--	--	--	--	--	--	--	--
Zinc	7440-66-6	2000	NA	2.6 J	--	--	--	--	--	--	--	--	--	--	--
Mercury	7439-97-6	0.7	NA	< 0.070	--	--	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-124 1137775 5632468 3/25/2009 SWMW-124(3-25-09) REG	SWMW-124 1195373 5985323 5/19/2010 SWMW-124(5-19-10) REG	SWMW-124 1341939 6821821 10/11/2012 SWMW-124(101112) REG	SWMW-124 1397265 7093587 6/13/2013 SWMW-124(061313) REG	SWMW-125 480-163807-1 480-163807-4 12/4/2019 SWMW-125-W-191204 REG	SWMW-125 1137775 5632463 3/24/2009 SWMW-125(3-24-09) REG	SWMW-125 1195374 5985334 5/19/2010 SWMW-125(5-19-10) REG	SWMW-125 1341939 6821809 10/11/2012 SWMW-125(101112) REG	SWMW-125 1395751 7086910 6/7/2013 SWMW-125(060713) REG	SWMW-125 1460835 7400671 3/19/2014 SWMW-125-031914 REG	SWMW-125 1479931 7489809 6/5/2014 SWMW-125-060514 REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	8 J	8 J	10	10	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	130	220	220	200	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	--	26	33	77	73	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 0.5	< 0.5	--	390	730	390	360	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	< 0.5	--	3 J	6	3	3	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 0.5	< 0.5	--	18	32	19	19	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	--	8 J	< 6	< 3	5 J	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	< 6	< 6	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	< 6	< 6	< 3	< 3	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	--	--	< 12	< 12	10 J	< 6	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	6 J	4 J	4 J	4 J	3 J	5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	290	210	250	270	210	300
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	5 J	7 J	15	11	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	33	84	120	85	60	88
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	4 J	2 J	4 J	4 J	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	< 4	< 4	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	< 20	< 20	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	--	18	33	22	18	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	< 2	< 2	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	< 2	< 2	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	1 J	< 1	--	420	480	270	250	260	300
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	--	< 2	2 J	6	4 J	3 J	5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	8 J	8 J	8	8	--	--
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
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Glenham, NY

Location ID				SWMW-124	SWMW-124	SWMW-124	SWMW-124	SWMW-125	SWMW-125	SWMW-125	SWMW-125	SWMW-125	SWMW-125	SWMW-125
Sample Delivery Group (SDG)				1137775	1195373	1341939	1397265	480-163807-1	1137775	1195374	1341939	1395751	1460835	1479931
Lab Sample ID				5632468	5985323	6821821	7093587	480-163807-4	5632463	5985334	6821809	7086910	7400671	7489809
Sample Date				3/25/2009	5/19/2010	10/11/2012	6/13/2013	12/4/2019	3/24/2009	5/19/2010	10/11/2012	6/7/2013	3/19/2014	6/5/2014
Field Sample ID				SWMW-124(3-25-09)	SWMW-124(5-19-10)	SWMW-124(101112)	SWMW-124(061313)	SWMW-125-W-191204	SWMW-125(3-24-09)	SWMW-125(5-19-10)	SWMW-125(101112)	SWMW-125(060713)	SWMW-125-031914	SWMW-125-060514
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	< 0.40	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	0.9 J	1	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 0.5	--	< 3	38	13	7	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 10	< 10	< 10	--	< 20	< 10	< 10	< 11	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 0.4	--	< 2	< 2	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	< 0.5	--	1 J	2 J	3	16	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.1	< 0.1	--	10	29	17	15	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	3 J	0.5 J	< 0.5	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 0.5	--	14	430	36	7	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10	< 11	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 0.1	< 0.1	--	1 J	1 J	1	1	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	0.2 J	< 0.1	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 5 J	6	< 2	< 2	--	< 6	6	12	3 J	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	3 J	< 2	< 2	--	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	< 0.5	--	< 1	1 J	1	1	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Fluorene	86-73-7	50	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	1 J	1	0.9	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2	< 0.5	< 0.5	--	--
Naphthalene	91-20-3	10	NA	< 1	< 1	< 0.1	< 0.1	--	3 J	7	4	4	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-124 1137775 5632468 3/25/2009 SWMW-124(3-25-09) REG	SWMW-124 1195373 5985323 5/19/2010 SWMW-124(5-19-10) REG	SWMW-124 1341939 6821821 10/11/2012 SWMW-124(101112) REG	SWMW-124 1397265 7093587 6/13/2013 SWMW-124(061313) REG	SWMW-125 480-163807-1 480-163807-4 12/4/2019 SWMW-125-W-191204 REG	SWMW-125 1137775 5632463 3/24/2009 SWMW-125(3-24-09) REG	SWMW-125 1195374 5985334 5/19/2010 SWMW-125(5-19-10) REG	SWMW-125 1341939 6821809 10/11/2012 SWMW-125(101112) REG	SWMW-125 1395751 7086910 6/7/2013 SWMW-125(060713) REG	SWMW-125 1460835 7400671 3/19/2014 SWMW-125-031914 REG	SWMW-125 1479931 7489809 6/5/2014 SWMW-125-060514 REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.5	< 0.5	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 1	< 1	--	< 3	< 3	< 1	< 1	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	0.8	0.6	--	--
Phenol	**108-95-2**	**1**	**NA**	50	< 1	< 0.5	< 0.5	--	31	1,200	10	3	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.1	< 0.1	--	--
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	231	340	181 J	< 82.8	--	850	101 J	1,030	119 J	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 5.3	--	< 9.7	< 9.7	< 3.5	< 3.5	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10.0	< 7.2	< 6.8	< 6.8	--	< 10.0	< 7.2	< 6.8	< 6.8	--	--
Barium	**7440-39-3**	**1000**	**NA**	44.8	26.7	17.5	16.7	--	19.9	22.3	56.7	24.4	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.90	< 1.4	< 0.67	< 0.67	--	< 0.90	< 1.4	< 0.67	< 0.67	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 2.0	< 0.36	< 0.76	--	< 2.0	< 2.0	< 0.36	< 0.36	--	--
Calcium	**7440-70-2**	**NA**	**NA**	83,600	112,000	89,500	84,400	--	38,500	35,800	89,000	41,800	--	--
Chromium	**7440-47-3**	**50**	**NA**	45.2	< 3.4	1.4 J	2.1 J	--	< 3.0	< 3.4	2.6 J	1.5 J	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 0.66	< 1.3	--	< 2.1	< 2.1	< 0.66	< 0.66	--	--
Copper	**7440-50-8**	**200**	**NA**	5.1 J	< 2.7	< 2.1	4.3 J	--	< 2.7	< 2.7	< 2.1	< 2.1	--	--
Iron	**7439-89-6**	**300**	**NA**	190 J	332	214	227	--	2,130	1,180	1,740	1,300	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 5.1	< 4.7	--	< 6.9	< 6.9	< 5.1	16	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	10,700	14,100	10,700	9,870	--	7,450	6,180	8,440	6,470	--	--
Manganese	**7439-96-5**	**300**	**NA**	5.1	8	5.5	13.6	--	4,450	2,880	3,600	2,900	4,910	4,610
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 1.8	< 1.1	< 1.5	--	< 5.6	< 1.8	< 1.1	< 1.1	--	--
Potassium	**7440-09-7**	**NA**	**NA**	43,900	1,230	1,440	879	--	786	10,300	4,140	19,100	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 8.4	--	< 10.7	< 8.9	< 7.5	< 7.5	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 2.1	--	< 2.2	< 2.3	< 1.2	< 1.2	--	--
Sodium	**7440-23-5**	**20000**	**NA**	50,400	26,100	19,100	17,300	--	6,800	14,700	11,700	25,600	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 14.0	< 5.7	< 5.4	--	< 14.0	< 14.0	< 5.7	< 5.7	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 2.5	< 1.3	< 2.0	--	3.1 J	< 2.5	4.0 J	2.2 J	--	--
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	28.5	13.7 J	8.6 J	--	< 8.1	< 8.1	4.9 J	< 2.0	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.070	--	< 0.056	< 0.056	< 0.070	< 0.070	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-125 1503937 7602498 9/16/2014 CVX-0030-04 REG	SWMW-125 1503937 7602499 9/16/2014 CVX-0030-05 FD	SWMW-125 1516213 7662955 11/4/2014 CVX-0034-07 REG	SWMW-125 1548024 7819752 3/24/2015 CVX-0046-07 FD	SWMW-125 1548024 7819758 3/24/2015 CVX-0046-10 REG	SWMW-125 1569290 7929754 6/15/2015 CVX-0047-04 REG	SWMW-125 1569290 7929757 6/15/2015 CVX-0047-07 FD	SWMW-125 1593311 8049706 9/15/2015 CVX-0062-06 REG	SWMW-125 1593311 8049715 9/15/2015 CVX-0062-15 FD	SWMW-125 1608498 8129217 11/10/2015 SWMW-125-W-29.00-151110 REG	SWMW-125 1669977 8417054 6/8/2016 SWMW-125-W-29.00-160608 REG	SWMW-126 1137957 5633599 3/26/2009 SWMW-126(3-26-09) REG	SWMW-126 1195597 5987001 5/20/2010 SWMW-126(5-20-10) REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	26	20
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	--	--	--	10	0.8 J
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	--	--	--	33	33
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	< 1	< 1	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	< 1	< 1	--	--	--	--	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	360	350	--	--	--	--	3 J	3 J
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	4 J	4 J	--	--	--	--	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	24	24	--	--	--	--	< 1	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	--	--	--	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 6	< 6
Benzene	71-43-2	1	NA	3	3	3	4	4	4	4	4	4	3	4	6	5 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Chlorobenzene	108-90-7	5	NA	260	220	290	310	300	330	320	320	270	300	400	4 J	4 J
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	--	--	--	2 J	1 J
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	110	96	100	110	110	75	75	100	110	93	94	290	260
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	6	6	--	--	--	--	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	5	5	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	--	--	--	3 J	2 J
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	3	3	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	--	--	--	11	10	--	--	--	--	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	--	--	--	2 J	2 J
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	270	230	260	250	250	270	280	270	240	270	280	460	410
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	6	5	7	7	7	5	5	6	7	7	7	57	40
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	8	8	--	--	--	--	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-125 1503937 7602498 9/16/2014 CVX-0030-04 REG	SWMW-125 1503937 7602499 9/16/2014 CVX-0030-05 FD	SWMW-125 1516213 7662955 11/4/2014 CVX-0034-07 REG	SWMW-125 1548024 7819752 3/24/2015 CVX-0046-07 FD	SWMW-125 1548024 7819758 3/24/2015 CVX-0046-10 REG	SWMW-125 1569290 7929754 6/15/2015 CVX-0047-04 REG	SWMW-125 1569290 7929757 6/15/2015 CVX-0047-07 FD	SWMW-125 1593311 8049706 9/15/2015 CVX-0062-06 REG	SWMW-125 1593311 8049715 9/15/2015 CVX-0062-15 FD	SWMW-125 1608498 8129217 11/10/2015 SWMW-125-W-29.00-151110 REG	SWMW-125 1669977 8417054 6/8/2016 SWMW-125-W-29.00-160608 REG	SWMW-126 1137957 5633599 3/26/2009 SWMW-126(3-26-09) REG	SWMW-126 1195597 5987001 5/20/2010 SWMW-126(5-20-10) REG
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	--	--	--	< 19	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	--	--	--	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	--	--	--	16	14
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	2 J
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	--	--	--	< 2	< 2
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1

Appendix B-2
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Chevron Environmental Management Company
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-125 1503937 7602498 9/16/2014 CVX-0030-04 REG	SWMW-125 1503937 7602499 9/16/2014 CVX-0030-05 FD	SWMW-125 1516213 7662955 11/4/2014 CVX-0034-07 REG	SWMW-125 1548024 7819752 3/24/2015 CVX-0046-07 FD	SWMW-125 1548024 7819758 3/24/2015 CVX-0046-10 REG	SWMW-125 1569290 7929754 6/15/2015 CVX-0047-04 REG	SWMW-125 1569290 7929757 6/15/2015 CVX-0047-07 FD	SWMW-125 1593311 8049706 9/15/2015 CVX-0062-06 REG	SWMW-125 1593311 8049715 9/15/2015 CVX-0062-15 FD	SWMW-125 1608498 8129217 11/10/2015 SWMW-125-W-29.00-151110 REG	SWMW-125 1669977 8417054 6/8/2016 SWMW-125-W-29.00-160608 REG	SWMW-126 1137957 5633599 3/26/2009 SWMW-126(3-26-09) REG	SWMW-126 1195597 5987001 5/20/2010 SWMW-126(5-20-10) REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	--	1 J	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 1	< 1
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	--	971	356
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 10.0	< 7.2
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	--	--	--	--	--	118	111
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 0.90	< 1.4
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 2.0	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--	98,100	99,300
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	--	3.1 J	< 3.4
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 2.1	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	--	--	--	--	--	4.1 J	< 2.7
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	--	--	--	--	--	1,310	575
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	--	--	--	--	--	49,000	51,700
Manganese	**7439-96-5**	**300**	**NA**	4,430	4,240	5,350	13,200	12,200	9,620	9,900	8,960	8,640	8,000	6,420	211	168
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 5.6	< 1.8
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--	7,450	6,630
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 10.7	< 8.9
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 2.2	< 2.3
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	--	--	--	--	--	98,800	101,000
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 14.0	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	--	--	--	--	--	< 2.5	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	--	--	--	--	--	32.1	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	--	--	--	--	--	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-126 1342893 6826946 10/16/2012 SWMW-126(101612) REG	SWMW-126 1398940 7103165 6/20/2013 SWMW-126(062013) REG	SWMW-126 1462877 7410813 3/27/2014 SWMW-126-032714 REG	SWMW-126 1480247 7491529 6/6/2014 SWMW-126-060614 REG	SWMW-126 1504703 7606265 9/18/2014 CVX-0032-09 REG	SWMW-126 1517227 7668618 11/7/2014 CVX-0037-06 REG	SWMW-126 1546494 7811609 3/18/2015 CVX-0043-03 REG	SWMW-126 1570188 7933937 6/17/2015 CVX-0049-15 REG	SWMW-126 1570188 7933938 6/17/2015 CVX-0049-16 FD	SWMW-126 1592070 8043670 9/10/2015 CVX-0060-06 REG	SWMW-126 1609238 8133665 11/12/2015 SWMW-126-W-40.00-151112 REG	SWMW-126 1670544 8419278 6/9/2016 SWMW-126-W-40.00-160609 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	16	15	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	23	25	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	3	3	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	17 J	< 6	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	4 J	3 J	3	3	3	3	2	2	2	2	2	2
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	5 J	5 J	3	5	3	3	2	2	2	2	2	2
Chloroethane	75-00-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	270	270	210	280	210	200	180	190	200	160	130	150
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	2 J	2 J	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	3 J	4 J	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	330	300	300	250	230	260	260	290	250	250	230	280
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	13	10	4	12	8	7	6	6	7	4	5	8
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-126 1342893 6826946 10/16/2012 SWMW-126(101612) REG	SWMW-126 1398940 7103165 6/20/2013 SWMW-126(062013) REG	SWMW-126 1462877 7410813 3/27/2014 SWMW-126-032714 REG	SWMW-126 1480247 7491529 6/6/2014 SWMW-126-060614 REG	SWMW-126 1504703 7606265 9/18/2014 CVX-0032-09 REG	SWMW-126 1517227 7668618 11/7/2014 CVX-0037-06 REG	SWMW-126 1546494 7811609 3/18/2015 CVX-0043-03 REG	SWMW-126 1570188 7933937 6/17/2015 CVX-0049-15 REG	SWMW-126 1570188 7933938 6/17/2015 CVX-0049-16 FD	SWMW-126 1592070 8043670 9/10/2015 CVX-0060-06 REG	SWMW-126 1609238 8133665 11/12/2015 SWMW-126-W-40.00-151112 REG	SWMW-126 1670544 8419278 6/9/2016 SWMW-126-W-40.00-160609 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 9	< 10	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 0.9	< 1	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	--	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 9	< 10	--	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	11	12	--	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 0.9	< 1	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-126 1342893 6826946 10/16/2012 SWMW-126(101612) REG	SWMW-126 1398940 7103165 6/20/2013 SWMW-126(062013) REG	SWMW-126 1462877 7410813 3/27/2014 SWMW-126-032714 REG	SWMW-126 1480247 7491529 6/6/2014 SWMW-126-060614 REG	SWMW-126 1504703 7606265 9/18/2014 CVX-0032-09 REG	SWMW-126 1517227 7668618 11/7/2014 CVX-0037-06 REG	SWMW-126 1546494 7811609 3/18/2015 CVX-0043-03 REG	SWMW-126 1570188 7933937 6/17/2015 CVX-0049-15 REG	SWMW-126 1570188 7933938 6/17/2015 CVX-0049-16 FD	SWMW-126 1592070 8043670 9/10/2015 CVX-0060-06 REG	SWMW-126 1609238 8133665 11/12/2015 SWMW-126-W-40.00-151112 REG	SWMW-126 1670544 8419278 6/9/2016 SWMW-126-W-40.00-160609 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 0.9	< 1	--	--	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	222	444	--	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 3.5	< 5.3	--	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	< 6.8	--	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	104	95.8	--	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.67	--	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.36	< 0.76	--	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	88,000	86,200	--	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	2.8 J	3.1 J	--	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 5 J	< 1.3	--	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.1	< 2.7	--	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	410	772	--	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 5.1	< 4.7	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	45,000	44,400	--	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	136	133	201	169	137	135	212	186	172	142	238	143
Nickel	**7440-02-0**	**100**	**NA**	1.8 J	2.6 J	--	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	5,350	5,250	--	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 7.5	< 8.4	--	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 1.2	< 2.1	--	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	87,000	88,700	--	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 30 J	< 5.4	--	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 1.3	< 2.0	--	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	4.6 J	11.9 J	--	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.060	--	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-13 1021535 4958651 1/12/2007 SWMW-13011207 REG	SWMW-13 1115036 5498313 10/14/2008 SWMW-13(10-14-08) REG	SWMW-13 1196041 5989879 5/25/2010 SWMW-13(5-25-10) REG	SWMW-13 1398230 7098401 6/18/2013 SWMW-13(061813) REG	SWMW-13 1462188 7407277 3/25/2014 SWMW-13-032514 REG	SWMW-13 1546899 7813902 3/19/2015 CVX-0044-10 REG	SWMW-13 1670992 8421619 6/10/2016 SWMW-13-W-46.00-160610 REG	SWMW-135 1397265 7093599 6/13/2013 SWMW-135(061313) REG	SWMW-136 1397270 7093621 6/13/2013 SWMW-136(061313) REG	SWMW-138 1398230 7098409 6/18/2013 SWMW-138(061813) REG	SWMW-14 1021819 4959987 1/16/2007 SWMW-14011607 REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	4 J	6	5	3 J	--	--	--	< 0.8	< 0.8	< 0.8	20
1,1,1-Trichloroethane	71-55-6	5	NA	4 J	5	3 J	1 J	--	--	--	< 0.8	< 0.8	< 0.8	9
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	2 J	1 J	1 J	< 1	--	--	--	< 1	< 1	< 1	13
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	--	--	--	55	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	--	--	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	--	--	--	92	--	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	2 J
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	3 J	< 0.8	< 0.8	2 J	4 J	2	< 0.5	< 0.8	< 0.8	< 0.8	1 J
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	4 J
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	27	3 J	4 J	13	19	14	1	< 1	< 1	< 1	25
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-13 1021535 4958651 1/12/2007 SWMW-13011207 REG	SWMW-13 1115036 5498313 10/14/2008 SWMW-13(10-14-08) REG	SWMW-13 1196041 5989879 5/25/2010 SWMW-13(5-25-10) REG	SWMW-13 1398230 7098401 6/18/2013 SWMW-13(061813) REG	SWMW-13 1462188 7407277 3/25/2014 SWMW-13-032514 REG	SWMW-13 1546899 7813902 3/19/2015 CVX-0044-10 REG	SWMW-13 1670992 8421619 6/10/2016 SWMW-13-W-46.00-160610 REG	SWMW-135 1397265 7093599 6/13/2013 SWMW-135(061313) REG	SWMW-136 1397270 7093621 6/13/2013 SWMW-136(061313) REG	SWMW-138 1398230 7098409 6/18/2013 SWMW-138(061813) REG	SWMW-14 1021819 4959987 1/16/2007 SWMW-14011607 REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 3	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 20	< 10	< 10	--	--	--	< 10	< 10	< 10	< 20
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 2	< 0.4	--	--	--	< 0.4	< 0.4	< 0.4	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 2	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 2	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 2
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	--	--	--	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Anthracene	120-12-7	50	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	23
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Fluorene	86-73-7	50	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	--	--	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	--	--	--	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Isophorone	78-59-1	50	NA	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 2	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 2
Naphthalene	91-20-3	10	NA	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-13 1021535 4958651 1/12/2007 SWMW-13011207 REG	SWMW-13 1115036 5498313 10/14/2008 SWMW-13(10-14-08) REG	SWMW-13 1196041 5989879 5/25/2010 SWMW-13(5-25-10) REG	SWMW-13 1398230 7098401 6/18/2013 SWMW-13(061813) REG	SWMW-13 1462188 7407277 3/25/2014 SWMW-13-032514 REG	SWMW-13 1546899 7813902 3/19/2015 CVX-0044-10 REG	SWMW-13 1670992 8421619 6/10/2016 SWMW-13-W-46.00-160610 REG	SWMW-135 1397265 7093599 6/13/2013 SWMW-135(061313) REG	SWMW-136 1397270 7093621 6/13/2013 SWMW-136(061313) REG	SWMW-138 1398230 7098409 6/18/2013 SWMW-138(061813) REG	SWMW-14 1021819 4959987 1/16/2007 SWMW-14011607 REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 3	< 1	--	--	--	< 1	< 1	< 1	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 1	< 0.5	--	--	--	< 0.5	< 0.5	< 0.5	< 1
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 1	< 0.1	--	--	--	< 0.1	< 0.1	< 0.1	< 1
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	710	553	353	216	--	--	--	499	528	799	581
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 9.7	< 5.3	--	--	--	< 5.3	< 5.3	< 5.3	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	< 10	< 10.2	< 7.2	< 6.8	--	--	--	< 6.8	< 6.8	< 6.8	< 10
Barium	**7440-39-3**	**1000**	**NA**	104	44.8	44.5	87.8	--	--	--	14.9	35.1	24.6	48
Beryllium	**7440-41-7**	**3**	**NA**	< 0.94	< 0.90	< 1.4	< 0.67	--	--	--	< 0.67	< 0.67	< 0.67	< 0.94
Cadmium	**7440-43-9**	**5**	**NA**	< 0.91	< 2.0	< 2.0	< 0.76	--	--	--	< 0.76	< 0.76	< 0.76	< 0.91
Calcium	**7440-70-2**	**NA**	**NA**	184,000	85,400	89,500	165,000	--	--	--	26,000	40,800	33,200	64,400
Chromium	**7440-47-3**	**50**	**NA**	< 2.3	< 3.0	< 3.4	2.4 J	--	--	--	< 1.6	1.8 J	< 1.6	10.9 J
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 2.1	< 1.3	--	--	--	2.1 J	< 1.3	< 1.3	< 2.1
Copper	**7440-50-8**	**200**	**NA**	< 2.2	< 2.7	< 2.7	< 2.7	--	--	--	< 2.7	< 2.7	3.7 J	2.7 J
Iron	**7439-89-6**	**300**	**NA**	925	625	291	177 J	--	--	--	789	1,340	806	674
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 6.9	< 4.7	--	--	--	< 4.7	< 4.7	< 4.7	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	79,700	38,600	38,700	64,100	--	--	--	5,880	4,620	11,700	43,300
Manganese	**7439-96-5**	**300**	**NA**	69.9	17.8	9.4	3.6 J	36.2	36.9	11.3	1,440	34.7	38.1	10.9
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 5.6	< 1.8	2.2 J	--	--	--	2.4 J	< 1.5	< 1.5	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	9,600	6,150	6,540	8,550	--	--	--	2,420	4,840	2,510	5,660
Selenium	**7782-49-2**	**10**	**NA**	< 9.4	< 10.7	< 8.9	< 8.4	--	--	--	< 8.4	< 8.4	< 8.4	< 9.4
Silver	**7440-22-4**	**50**	**NA**	< 1.6	< 2.2	< 2.3	< 2.1	--	--	--	< 2.1	< 2.1	< 2.1	< 1.6
Sodium	**7440-23-5**	**20000**	**NA**	263,000	69,300	72,200	207,000	--	--	--	8,750	9,420	5,620	35,200
Thallium	**7440-28-0**	**0.5**	**NA**	< 13.5	< 14.0	< 14.0	< 5.4	--	--	--	< 5.4	< 5.4	< 5.4	< 13.5
Vanadium	**7440-62-2**	**NA**	**86**	2.7 J	< 2.5	< 2.5	< 2.0	--	--	--	< 2.0	6.2	< 2.0	< 1.5
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	12.2 J	< 8.1	2.0 J	--	--	--	5.6 J	2.4 J	4.5 J	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.056	< 0.070	--	--	--	< 0.070	< 0.070	< 0.070	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-14 1115029 5498252 10/14/2008 SWMW-14(10-14-08) REG	SWMW-14 1195597 5987003 5/20/2010 SWMW-14(5-20-10) REG	SWMW-14 1342893 6826948 10/16/2012 SWMW-14(101612) REG	SWMW-14 1398940 7103157 6/20/2013 SWMW-14(062013) REG	SWMW-14 1462877 7410816 3/27/2014 SWMW-14-032714 REG	SWMW-14 1480247 7491520 6/6/2014 SWMW-14-060614 REG	SWMW-14 1504703 7606270 9/18/2014 CVX-0032-14 REG	SWMW-14 1517227 7668610 11/7/2014 CVX-0037-01 REG	SWMW-14 1547125 7815461 3/20/2015 CVX-0045-04 REG	SWMW-14 1570188 7933929 6/17/2015 CVX-0049-10 REG	SWMW-14 1592327 8044998 9/11/2015 CVX-0061-01 REG	SWMW-14 1608899 8131662 11/11/2015 SWMW-14-W-26.00-151111 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	5 J	4 J	< 0.8	3 J	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	2 J	1 J	< 0.8	1 J	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	3 J	3 J	< 1	2 J	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	7 J	< 6	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	1 J	< 0.8	2 J	< 0.5	2	2	1	2	1	1	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	16	17	< 1	18	17	22	16	14	18	14	12	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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OU-1A Bedrock Groundwater Analytical Results
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-14 1115029 5498252 10/14/2008 SWMW-14(10-14-08) REG	SWMW-14 1195597 5987003 5/20/2010 SWMW-14(5-20-10) REG	SWMW-14 1342893 6826948 10/16/2012 SWMW-14(101612) REG	SWMW-14 1398940 7103157 6/20/2013 SWMW-14(062013) REG	SWMW-14 1462877 7410816 3/27/2014 SWMW-14-032714 REG	SWMW-14 1480247 7491520 6/6/2014 SWMW-14-060614 REG	SWMW-14 1504703 7606270 9/18/2014 CVX-0032-14 REG	SWMW-14 1517227 7668610 11/7/2014 CVX-0037-01 REG	SWMW-14 1547125 7815461 3/20/2015 CVX-0045-04 REG	SWMW-14 1570188 7933929 6/17/2015 CVX-0049-10 REG	SWMW-14 1592327 8044998 9/11/2015 CVX-0061-01 REG	SWMW-14 1608899 8131662 11/11/2015 SWMW-14-W-26.00-151111 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 19	< 10	< 10	< 11	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 0.9	< 1	< 1	< 1	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 6	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 0.6	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 0.6	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 9	< 10	< 10	< 11	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.9	< 1	0.2 J	< 0.1	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.9	< 1	0.2 J	< 0.1	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.9	< 1	0.3 J	< 0.1	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.9	< 1	0.2 J	< 0.1	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.9	< 1	0.2 J	< 0.1	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	4 J	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 0.9	< 1	0.3 J	< 0.1	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 0.9	< 1	0.5 J	< 0.1	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 6	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 0.9	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.9	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 0.6	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-14 1115029 5498252 10/14/2008 SWMW-14(10-14-08) REG	SWMW-14 1195597 5987003 5/20/2010 SWMW-14(5-20-10) REG	SWMW-14 1342893 6826948 10/16/2012 SWMW-14(101612) REG	SWMW-14 1398940 7103157 6/20/2013 SWMW-14(062013) REG	SWMW-14 1462877 7410816 3/27/2014 SWMW-14-032714 REG	SWMW-14 1480247 7491520 6/6/2014 SWMW-14-060614 REG	SWMW-14 1504703 7606270 9/18/2014 CVX-0032-14 REG	SWMW-14 1517227 7668610 11/7/2014 CVX-0037-01 REG	SWMW-14 1547125 7815461 3/20/2015 CVX-0045-04 REG	SWMW-14 1570188 7933929 6/17/2015 CVX-0049-10 REG	SWMW-14 1592327 8044998 9/11/2015 CVX-0061-01 REG	SWMW-14 1608899 8131662 11/11/2015 SWMW-14-W-26.00-151111 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 1	< 1	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.9	< 1	0.2 J	< 0.1	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.9	< 1	< 0.5	< 0.6	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 0.9	< 1	0.3 J	< 0.1	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	746	349	9,700	649	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10.2	< 7.2	13.7 J	< 6.8	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	54.8	55.7	139	50.2	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.90	< 1.4	0.86 J	< 0.67	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 2.0	1.5 J	< 0.76	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	114,000	140,000	33,700	98,200	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	3.2 J	< 3.4	10.4 J	4.4 J	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 5 J	< 1.3	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	2.8 J	30.1	< 2.7	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	1,180	816	13,200	714	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	83	< 4.7	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	64,400	68,400	8,710	44,700	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	29.3	11.8	284	13	23	6.7 J	13.6	98.3	39.9	11	365	21.4
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 1.8	9.7 J	< 1.5	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	4,320	5,310	3,030	3,740	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	98,900	129,000	7,760	95,200	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 14.0	< 30 J	< 5.4	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 2.5	16.4	< 2.0	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	12.3 J	9.5 J	290	25.8	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	2.5	< 0.060	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-14 1670992 8421612 6/10/2016 SWMW-14-W-26.00-160610 REG	SWMW-140 480-163807-1 480-163807-5 12/4/2019 SWMW-140-W-191204 REG	SWMW-140 1398230 7098408 6/18/2013 SWMW-140(061813) REG	SWMW-16 1021328 4957582 1/11/2007 SWMW16011107 REG	SWMW-16 1115036 5498312 10/14/2008 SWMW-16(10-14-08) REG	SWMW-16 1399165 7104471 6/21/2013 SWMW-16(062113) REG	SWMW-16 1399165 7104472 6/21/2013 SWMW-116(062113) FD	SWMW-17 1021328 4957584 1/11/2007 SWMW17011107 REG	SWMW-17 1115029 5498268 10/14/2008 SWMW-17(10-14-08) REG	SWMW-17 1398579 7100138 6/19/2013 SWMW-17(061913) REG	SWMW-2 1022233 4962181 1/18/2007 SWMW-2011807 REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	7
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	21
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	18
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	6
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	43
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	5 J
2-Hexanone	591-78-6	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	8 J
Benzene	71-43-2	1	NA	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	2 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.5	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	330
Chloroethane	75-00-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	37
Chloroform	67-66-3	7	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	3 J
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	1	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	7
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	0.9 J
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	15	--	< 1	< 1	1 J	< 1	< 1	< 1	< 1	< 1	2 J
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	4 J
Xylene (total)	1330-20-7	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-14 1670992 8421612 6/10/2016 SWMW-14-W-26.00-160610 REG	SWMW-140 480-163807-1 480-163807-5 12/4/2019 SWMW-140-W-191204 REG	SWMW-140 1398230 7098408 6/18/2013 SWMW-140(061813) REG	SWMW-16 1021328 4957582 1/11/2007 SWMW16011107 REG	SWMW-16 1115036 5498312 10/14/2008 SWMW-16(10-14-08) REG	SWMW-16 1399165 7104471 6/21/2013 SWMW-16(062113) REG	SWMW-16 1399165 7104472 6/21/2013 SWMW-116(062113) FD	SWMW-17 1021328 4957584 1/11/2007 SWMW17011107 REG	SWMW-17 1115029 5498268 10/14/2008 SWMW-17(10-14-08) REG	SWMW-17 1398579 7100138 6/19/2013 SWMW-17(061913) REG	SWMW-2 1022233 4962181 1/18/2007 SWMW-2011807 REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	< 0.40	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	< 0.5	< 3	< 3	< 0.5	< 0.5	< 3	< 3	< 0.5	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	< 10	< 21	< 19	< 10	< 10	< 21	< 20	< 11	< 20
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	< 0.4	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	1 J
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	4 J
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	< 10	< 10	< 9	< 10	< 10	< 10	< 10	< 11	< 10
Acenaphthene	83-32-9	20	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	1 J
Acenaphthylene	208-96-8	NA	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Anthracene	120-12-7	50	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	< 2	2 J	< 2	< 2	< 2	11	< 2	< 2	3 J
Butylbenzylphthalate	85-68-7	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
Chrysene	218-01-9	0.002	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	2 J
Diethylphthalate	84-66-2	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Fluorene	86-73-7	50	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	2 J
Hexachlorobenzene	118-74-1	0.04	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Isophorone	78-59-1	50	NA	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 2
Naphthalene	91-20-3	10	NA	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	6

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-14 1670992 8421612 6/10/2016 SWMW-14-W-26.00-160610 REG	SWMW-140 480-163807-1 480-163807-5 12/4/2019 SWMW-140-W-191204 REG	SWMW-140 1398230 7098408 6/18/2013 SWMW-140(061813) REG	SWMW-16 1021328 4957582 1/11/2007 SWMW16011107 REG	SWMW-16 1115036 5498312 10/14/2008 SWMW-16(10-14-08) REG	SWMW-16 1399165 7104471 6/21/2013 SWMW-16(062113) REG	SWMW-16 1399165 7104472 6/21/2013 SWMW-116(062113) FD	SWMW-17 1021328 4957584 1/11/2007 SWMW17011107 REG	SWMW-17 1115029 5498268 10/14/2008 SWMW-17(10-14-08) REG	SWMW-17 1398579 7100138 6/19/2013 SWMW-17(061913) REG	SWMW-2 1022233 4962181 1/18/2007 SWMW-2011807 REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	< 1	< 3	< 3	< 1	< 1	< 3	< 3	< 1	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	1 J
Phenol	**108-95-2**	**1**	**NA**	--	--	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 1	< 1	< 0.5	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	< 0.1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	--	--	< 82.8	716	< 80.2	492	293	28,200	4,220	2,320	336
Antimony	**7440-36-0**	**3**	**NA**	--	--	< 5.3	< 9.7	< 9.7	< 5.3	< 5.3	< 9.7	< 9.7	< 5.3	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	--	--	< 6.8	< 10	< 10.2	< 6.8	< 6.8	15.6 J	< 10.2	< 6.8	< 10
Barium	**7440-39-3**	**1000**	**NA**	--	--	191	60.8	36.4	34.4	33.4	172	38.7	26.8	51.6
Beryllium	**7440-41-7**	**3**	**NA**	--	--	< 0.67	< 0.94	< 0.90	< 0.67	< 0.67	2.9 J	< 0.90	< 0.67	< 0.94
Cadmium	**7440-43-9**	**5**	**NA**	--	--	< 0.76	< 0.91	< 2.0	< 0.76	< 0.76	< 0.91	< 2.0	< 0.76	< 0.91
Calcium	**7440-70-2**	**NA**	**NA**	--	--	156,000	134,000	122,000	146,000	144,000	120,000	89,200	62,900	54,200
Chromium	**7440-47-3**	**50**	**NA**	--	--	< 1.6	3.5 J	< 3.0	< 1.6	< 1.6	28.9	3.3 J	4.9 J	< 2.3
Cobalt	**7440-48-4**	**5**	**NA**	--	--	< 1.3	< 2.1	< 2.1	< 1.3	< 1.3	18.5	< 2.1	< 1.3	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	< 2.7	2.2 J	< 2.7	< 2.7	< 2.7	46.3	4.7 J	< 2.7	< 2.2
Iron	**7439-89-6**	**300**	**NA**	--	--	117 J	534	< 52.2	220	88.7 J	50,700	7,670	2,920	1,610
Lead	**7439-92-1**	**25**	**NA**	--	--	< 4.7	< 6.9	< 6.9	< 4.7	< 4.7	26.4	< 6.9	< 4.7	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	17,600	68,400	61,200	73,800	72,700	62,400	42,900	26,500	10,500
Manganese	**7439-96-5**	**300**	**NA**	959	--	5.9	19.9	1.4 J	3.0 J	1.5 J	1,120	195	49	2,980
Nickel	**7440-02-0**	**100**	**NA**	--	--	< 1.5	< 5.6	< 5.6	1.7 J	2.0 J	42.9	6.7 J	4.0 J	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	--	--	2,130	8,100	7,370	6,870	6,740	9,600	4,390	3,320	2,210
Selenium	**7782-49-2**	**10**	**NA**	--	--	< 8.4	< 9.4	< 10.7	< 8.4	< 8.4	< 9.4	< 10.7	< 8.4	< 9.4
Silver	**7440-22-4**	**50**	**NA**	--	--	< 2.1	< 1.6	< 2.2	< 2.1	< 2.1	< 1.6	< 2.2	< 2.1	< 1.6
Sodium	**7440-23-5**	**20000**	**NA**	--	--	53,200	91,300	103,000	37,200	36,700	40,000	27,200	20,400	136,000
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	< 5.4	< 13.5	< 14.0	< 5.4	< 5.4	< 13.5	< 14.0	< 5.4	< 13.5
Vanadium	**7440-62-2**	**NA**	**86**	--	--	< 2.0	< 1.5	< 2.5	< 2.0	< 2.0	41.2	5.5	3.5 J	< 1.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	< 2.0	< 8.1	< 8.1	4.5 J	3.3 J	146	26.1	11.4 J	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	< 0.070	< 0.056	< 0.056	< 0.060	< 0.060	< 0.056	< 0.056	< 0.070	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2
Sample Delivery Group (SDG)				1113255	1195373	1341939	1397265	1460835	1480247	1503937	1516213	1548024	1569290	1593311	1608498	1669977
Lab Sample ID				5487987	5985324	6821818	7093581	7400681	7491530	7602500	7662946	7819759	7929755	8049707	8129226	8417059
Sample Date				10/2/2008	5/19/2010	10/11/2012	6/13/2013	3/19/2014	6/6/2014	9/16/2014	11/4/2014	3/24/2015	6/15/2015	9/15/2015	11/10/2015	6/8/2016
Field Sample ID				SWMW-2(10-2-08)	SWMW-02(5-19-10)	SWMW-2(101112)	SWMW-2(061313)	SWMW-2-031914	SWMW-2-060614	CVX-0030-06	CVX-0034-01	CVX-0046-11	CVX-0047-05	CVX-0062-07	SWMW-2-W-13.00-151110	SWMW-2-W-13.00-160608
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code															
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	7	3 J	0.9 J	1 J	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	26	14	14	11	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	11	8	5	2	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	1 J	1 J	1	0.6 J	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	12	10	8	5	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	5 J	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	1 J	0.9 J	< 0.5	< 0.5	0.9 J	1	1	0.6 J	0.7 J	0.9 J	< 0.5	< 0.5	0.5 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	110	100	56	19	150	130	56	93	92	120	42	9	78
Chloroethane	75-00-3	5	NA	16	12	11	4 J	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	8	3 J	3 J	3 J	3 J	2	3	4	3	6	6	4	5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	3 J	< 1	2 J	1 J	< 1	< 0.5	1	2	1	2	2	1	2
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	4 J	2 J	< 1	1 J	< 1	3	5	3	1	4	3	2	3
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2	SWMW-2
Sample Delivery Group (SDG)				1113255	1195373	1341939	1397265	1460835	1480247	1503937	1516213	1548024	1569290	1593311	1608498	1669977
Lab Sample ID				5487987	5985324	6821818	7093581	7400681	7491530	7602500	7662946	7819759	7929755	8049707	8129226	8417059
Sample Date				10/2/2008	5/19/2010	10/11/2012	6/13/2013	3/19/2014	6/6/2014	9/16/2014	11/4/2014	3/24/2015	6/15/2015	9/15/2015	11/10/2015	6/8/2016
Field Sample ID				SWMW-2(10-2-08)	SWMW-02(5-19-10)	SWMW-2(101112)	SWMW-2(061313)	SWMW-2-031914	SWMW-2-060614	CVX-0030-06	CVX-0034-01	CVX-0046-11	CVX-0047-05	CVX-0062-07	SWMW-2-W-13.00-151110	SWMW-2-W-13.00-160608
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code															
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 19	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	0.2 J	0.1 J	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	5	< 2	< 2	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	0.1 J	0.1 J	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 1	< 1	0.2 J	0.1 J	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 1	< 1	0.2 J	< 0.1	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-2 1113255 5487987 10/2/2008 SWMW-2(10-2-08) REG	SWMW-2 1195373 5985324 5/19/2010 SWMW-02(5-19-10) REG	SWMW-2 1341939 6821818 10/11/2012 SWMW-2(101112) REG	SWMW-2 1397265 7093581 6/13/2013 SWMW-2(061313) REG	SWMW-2 1460835 7400681 3/19/2014 SWMW-2-031914 REG	SWMW-2 1480247 7491530 6/6/2014 SWMW-2-060614 REG	SWMW-2 1503937 7602500 9/16/2014 CVX-0030-06 REG	SWMW-2 1516213 7662946 11/4/2014 CVX-0034-01 REG	SWMW-2 1548024 7819759 3/24/2015 CVX-0046-11 REG	SWMW-2 1569290 7929755 6/15/2015 CVX-0047-05 REG	SWMW-2 1593311 8049707 9/15/2015 CVX-0062-07 REG	SWMW-2 1608498 8129226 11/10/2015 SWMW-2-W-13.00-151110 REG	SWMW-2 1669977 8417059 6/8/2016 SWMW-2-W-13.00-160608 REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 1	< 1	--	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	0.2 J	0.1 J	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	105 J	200	< 74.3	5,900	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	46.7	133	66.1	84.9	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 2.0	< 0.36	< 0.76	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	61,600	84,400	63,800	48,600	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 3.0	< 3.4	< 1.1	3.4 J	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 0.66	1.7 J	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	< 2.7	< 2.1	6.4 J	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	1,640	3,120	1,080	7,250	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 5.1	9.3 J	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	9,720	15,500	10,100	9,140	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	1,560	2,650	1,940	1,170	2,670	2,060	1,390	1,430	4,220	2,650	1,730	1,840	1,740
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 1.8	< 1.1	3.3 J	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	2,270	4,090	3,080	3,370	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	104,000	437,000	137,000	246,000	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 14.0	< 5.7	< 5.4	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 2.5	< 1.3	4.5 J	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	< 8.1	2.7 J	19.4 J	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-26	SWMW-26	SWMW-26	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-3	SWMW-3	SWMW-3
Sample Delivery Group (SDG)				1022020	1114224	1398230	1021819	1114664	1195719	1341939	1397510	1570188	1022233	1022233	1113054
Lab Sample ID				4961229	5493869	7098406	4959997	5496353	5987988	6821826	7095176	7933927	4962182	4962183	5487059
Sample Date				1/17/2007	10/8/2008	6/18/2013	1/16/2007	10/10/2008	5/21/2010	10/11/2012	6/14/2013	6/17/2015	1/18/2007	1/18/2007	9/30/2008
Field Sample ID				SWMW-26011707	SWMW-26(10-8-08)	SWMW-26(061813)	SWMW-27011607	SWMW-27(10-10-08)	SWMW-27(5-21-10)	SWMW-27(101112)	SWMW-27(061413)	CVX-0049-08	SWMW-3011807	SWMW-103011807	SWMW-3(9-30-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	3 J	2 J	2 J	1 J	< 0.8	--	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	12	8	9	6	< 1	--	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	< 1	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.9
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 0.5	28	23	26	13	< 0.5	17	< 1	< 1	< 0.9
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	2 J	2 J	< 1	--	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.9
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 0.5	12	8	10	4	< 0.5	6	< 1	< 1	< 0.9
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	--	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	18	10	13	6	< 0.5	6	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	2 J	< 1	2 J	< 1	< 1	--	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	2 J	< 0.8	51	32	46	24	< 0.8	27	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	42	5	37	7	< 0.8	--	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	8	8	8	5	< 0.8	6	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	0.7 J	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	0.9 J	0.9 J	0.9 J	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	0.5 J	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	22	11	20	10	< 0.8	--	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	2 J	1 J	2 J	0.9 J	< 0.7	0.8 J	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	10	8	9	8	< 1	7	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	4 J	2 J	2 J	2 J	< 1	2	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	7	5 J	5 J	< 0.8	< 0.8	1	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-26	SWMW-26	SWMW-26	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-3	SWMW-3	SWMW-3
Sample Delivery Group (SDG)				1022020	1114224	1398230	1021819	1114664	1195719	1341939	1397510	1570188	1022233	1022233	1113054
Lab Sample ID				4961229	5493869	7098406	4959997	5496353	5987988	6821826	7095176	7933927	4962182	4962183	5487059
Sample Date				1/17/2007	10/8/2008	6/18/2013	1/16/2007	10/10/2008	5/21/2010	10/11/2012	6/14/2013	6/17/2015	1/18/2007	1/18/2007	9/30/2008
Field Sample ID				SWMW-26011707	SWMW-26(10-8-08)	SWMW-26(061813)	SWMW-27011607	SWMW-27(10-10-08)	SWMW-27(5-21-10)	SWMW-27(101112)	SWMW-27(061413)	CVX-0049-08	SWMW-3011807	SWMW-103011807	SWMW-3(9-30-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 3	< 3	< 3	< 0.5	< 0.5	--	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 20	< 10	< 20	< 21	< 10	< 10	< 10	--	< 20	< 20	< 19
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	--	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.9
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 10	< 10	< 9
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 0.1	3 J	1 J	3 J	0.5 J	< 0.1	--	< 1	< 1	< 0.9
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.9
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.9
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.2 J	--	< 1	< 1	< 0.9
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.3 J	--	< 1	< 1	< 0.9
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.3 J	--	< 1	< 1	< 0.9
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.3 J	--	< 1	< 1	< 0.9
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.2 J	--	< 1	< 1	< 0.9
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	7	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.2 J	--	< 1	< 1	< 0.9
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.9
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 1	0.1 J	< 1	< 1	< 1	< 0.1	0.4 J	--	< 1	< 1	< 0.9
Fluorene	86-73-7	50	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.9
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	--	< 1	< 1	< 0.9
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.2 J	--	< 1	< 1	< 0.9
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2	< 2
Naphthalene	91-20-3	10	NA	< 1	< 1	< 0.1	15	5 J	12	1	< 0.1	--	< 1	< 1	< 0.9

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-26	SWMW-26	SWMW-26	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-27	SWMW-3	SWMW-3	SWMW-3
Sample Delivery Group (SDG)				1022020	1114224	1398230	1021819	1114664	1195719	1341939	1397510	1570188	1022233	1022233	1113054
Lab Sample ID				4961229	5493869	7098406	4959997	5496353	5987988	6821826	7095176	7933927	4962182	4962183	5487059
Sample Date				1/17/2007	10/8/2008	6/18/2013	1/16/2007	10/10/2008	5/21/2010	10/11/2012	6/14/2013	6/17/2015	1/18/2007	1/18/2007	9/30/2008
Field Sample ID				SWMW-26011707	SWMW-26(10-8-08)	SWMW-26(061813)	SWMW-27011607	SWMW-27(10-10-08)	SWMW-27(5-21-10)	SWMW-27(101112)	SWMW-27(061413)	CVX-0049-08	SWMW-3011807	SWMW-103011807	SWMW-3(9-30-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
Nitrobenzene	98-95-3	0.4	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
p-Chloro-m-cresol	59-50-7	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
Pentachlorophenol	87-86-5	1	NA	< 3	< 3	< 1	< 3	< 3	< 3	< 1	< 1	--	< 3	< 3	< 3
Phenanthrene	85-01-8	50	NA	< 1	< 1	< 0.1	1 J	< 1	< 1	< 0.1	0.2 J	--	< 1	< 1	< 0.9
Phenol	108-95-2	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	< 1	< 1	< 0.9
Pyrene	129-00-0	50	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.5 J	--	< 1	< 1	< 0.9
Polychlorinated Biphenyls†															
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	7429-90-5	100	NA	< 80.2	< 80.2	< 82.8	137 J	< 80.2	< 80.2	217	10,100	--	20,400	966	4,740
Antimony	7440-36-0	3	NA	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--	< 9.7	< 9.7	< 9.7
Arsenic	7440-38-2	25	NA	< 10	< 10.2	< 6.8	< 10	< 10.2	< 7.2	< 6.8	12.0 J	--	18.3 J	< 10	< 10.2
Barium	7440-39-3	1000	NA	19.5	20	48.8	317	422	503	477	141	--	174	20.5	50
Beryllium	7440-41-7	3	NA	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 1.4	< 0.67	0.88 J	--	1.9 J	< 0.94	< 0.90
Cadmium	7440-43-9	5	NA	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36	--	< 0.91	< 0.91	< 2.0
Calcium	7440-70-2	NA	NA	29,000	36,700	82,300	93,800	87,500	92,800	81,000	9,660	--	33,100	29,000	28,900
Chromium	7440-47-3	50	NA	< 2.3	< 3.0	2.3 J	7.3 J	< 3.0	< 3.4	2.0 J	11.5 J	--	22.1	< 2.3	5.0 J
Cobalt	7440-48-4	5	NA	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 2.1	< 0.66	2.6 J	--	11.7	< 2.1	2.3 J
Copper	7440-50-8	200	NA	< 2.2	< 2.7	< 2.7	2.5 J	< 2.7	< 2.7	< 2.1	8.4 J	--	40.3	< 2.2	8.0 J
Iron	7439-89-6	300	NA	< 52.2	< 52.2	404	109 J	62.7 J	122 J	106 J	23,000	--	32,200	1,370	6,840
Lead	7439-92-1	25	NA	< 6.9	< 6.9	< 4.7	< 6.9	< 6.9	< 6.9	< 5.1	14.8 J	--	26.3	< 6.9	8.6 J
Magnesium	7439-95-4	35000	NA	5,860	7,530	13,900	22,600	26,200	29,900	26,000	4,550	--	12,100	6,760	7,820
Manganese	7439-96-5	300	NA	0.55 J	7.6	5.3	2.9 J	3.9 J	5.4	3.9 J	2,900	65.8	1,090	422	347
Nickel	7440-02-0	100	NA	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 1.8	< 1.1	5.2 J	--	16.5	< 5.6	< 5.6
Potassium	7440-09-7	NA	NA	2,550	3,740	5,150	3,500	1,880	2,050	1,680	2,170	--	4,220	1,090	2,060
Selenium	7782-49-2	10	NA	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--	< 9.4	< 9.4	< 10.7
Silver	7440-22-4	50	NA	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--	< 1.6	< 1.6	< 2.2
Sodium	7440-23-5	20000	NA	77,800	83,000	63,600	22,100	20,600	38,100	28,900	9,530	--	5,850	4,780	4,580
Thallium	7440-28-0	0.5	NA	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--	< 13.5	< 13.5	< 14.0
Vanadium	7440-62-2	NA	86	< 1.5	< 2.5	< 2.0	< 1.5	< 2.5	< 2.5	< 1.3	14	--	27.3	1.6 J	6.1
Zinc	7440-66-6	2000	NA	< 12.6 J	< 8.1	10.7 J	< 8.1	< 8.1	< 8.1	2.3 J	233	--	92.3	10.4 J	23.5
Mercury	7439-97-6	0.7	NA	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	0.21	--	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-3	SWMW-39	SWMW-39	SWMW-39	SWMW-39	SWMW-4	SWMW-4	SWMW-4	SWMW-4	SWMW-41	SWMW-41	SWMW-41
Sample Delivery Group (SDG)				1397270	1014758	1021328	1115036	1398940	1022020	1113255	1397265	1397265	480-163807-1	1021819	1115029
Lab Sample ID				7093620	4919104	4957583	5498311	7103151	4961240	5487991	7093595	7093596	480-163807-1	4959989	5498253
Sample Date				6/13/2013	11/14/2006	1/11/2007	10/14/2008	6/20/2013	1/17/2007	10/2/2008	6/13/2013	6/13/2013	12/5/2019	1/16/2007	10/14/2008
Field Sample ID				SWMW-3(061313)	SWMW-39	SWMW39011107	SWMW-39(10-14-08)	SWMW-39(062013)	SWMW-4011707	SWMW-4(10-2-08)	SWMW-4(061313)	SWMW-104(061313)	SWMW-41-W-191205	SWMW-41011607	SWMW-41(10-14-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	680	330
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	29,000	8,300
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	150 J	78 J
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 1	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	5	3 J
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
1,2-Dichloroethene	540-59-0	5	NA	--	< 0.8	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 1	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 1	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 150	< 60
2-Hexanone	591-78-6	50	NA	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 150	< 60
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 150	< 60
Acetone	67-64-1	50	NA	--	--	< 6	< 6	< 6	< 6	< 6	--	--	--	< 300	< 120
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	90 J	31 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Carbon disulfide	75-15-0	60	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	55 J	28 J
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	260	200
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 25	< 10
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 100	< 40
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	< 500	< 200
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	43 J	19 J
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	79 J	17 J
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 50	< 20
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	340	270
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	< 2	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	74 J	49 J
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 40	< 16
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-3	SWMW-39	SWMW-39	SWMW-39	SWMW-39	SWMW-4	SWMW-4	SWMW-4	SWMW-4	SWMW-41	SWMW-41	SWMW-41
Sample Delivery Group (SDG)				1397270	1014758	1021328	1115036	1398940	1022020	1113255	1397265	1397265	480-163807-1	1021819	1115029
Lab Sample ID				7093620	4919104	4957583	5498311	7103151	4961240	5487991	7093595	7093596	480-163807-1	4959989	5498253
Sample Date				6/13/2013	11/14/2006	1/11/2007	10/14/2008	6/20/2013	1/17/2007	10/2/2008	6/13/2013	6/13/2013	12/5/2019	1/16/2007	10/14/2008
Field Sample ID				SWMW-3(061313)	SWMW-39	SWMW39011107	SWMW-39(10-14-08)	SWMW-39(062013)	SWMW-4011707	SWMW-4(10-2-08)	SWMW-4(061313)	SWMW-104(061313)	SWMW-41-W-191205	SWMW-41011607	SWMW-41(10-14-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	5.6	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	--	< 3	< 3	< 0.6	< 3	< 3	< 0.5	< 0.5	--	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 10	--	< 21	< 19	< 11	< 21	< 19	< 10	< 10	--	< 20	< 19
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 0.9	< 1	< 1	--	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	--	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 0.4	--	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	3 J	2 J
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	--	< 5	< 5	< 6	< 5	< 5	< 5	< 5	--	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
4-Chloroaniline	106-47-8	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	--	< 2	< 2	< 0.6	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	--	< 2	< 2	< 0.6	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
4-Nitrophenol	100-02-7	1	NA	< 10	--	< 10	< 10	< 11	< 10	< 9	< 10	< 10	--	< 10	< 9
Acenaphthene	83-32-9	20	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Acenaphthylene	208-96-8	NA	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Anthracene	120-12-7	50	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	21	14
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	19	4 J
Butylbenzylphthalate	85-68-7	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2
Carbazole	86-74-8	NA	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
Chrysene	218-01-9	0.002	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Di-n-butylphthalate	84-74-2	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Dibenzofuran	132-64-9	NA	7.9	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
Diethylphthalate	84-66-2	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Fluorene	86-73-7	50	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	--	< 5	< 5	< 6	< 5	< 5	< 5	< 5	--	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	--	< 1	< 1	< 1	< 1	< 0.9	< 1	< 1	--	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Isophorone	78-59-1	50	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	--	< 2	< 2	< 0.6	< 2	< 2	< 0.5	< 0.5	--	< 2	< 2
Naphthalene	91-20-3	10	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	3 J	1 J

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-3	SWMW-39	SWMW-39	SWMW-39	SWMW-39	SWMW-4	SWMW-4	SWMW-4	SWMW-4	SWMW-41	SWMW-41	SWMW-41
Sample Delivery Group (SDG)				1397270	1014758	1021328	1115036	1398940	1022020	1113255	1397265	1397265	480-163807-1	1021819	1115029
Lab Sample ID				7093620	4919104	4957583	5498311	7103151	4961240	5487991	7093595	7093596	480-163807-1	4959989	5498253
Sample Date				6/13/2013	11/14/2006	1/11/2007	10/14/2008	6/20/2013	1/17/2007	10/2/2008	6/13/2013	6/13/2013	12/5/2019	1/16/2007	10/14/2008
Field Sample ID				SWMW-3(061313)	SWMW-39	SWMW39011107	SWMW-39(10-14-08)	SWMW-39(062013)	SWMW-4011707	SWMW-4(10-2-08)	SWMW-4(061313)	SWMW-104(061313)	SWMW-41-W-191205	SWMW-41011607	SWMW-41(10-14-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
Nitrobenzene	98-95-3	0.4	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
p-Chloro-m-cresol	59-50-7	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
Pentachlorophenol	87-86-5	1	NA	< 1	--	< 3	< 3	< 1	< 3	< 3	< 1	< 1	--	< 3	< 3
Phenanthrene	85-01-8	50	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Phenol	108-95-2	1	NA	< 0.5	--	< 1	< 1	< 0.6	< 1	< 0.9	< 0.5	< 0.5	--	< 1	< 0.9
Pyrene	129-00-0	50	NA	< 0.1	--	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 0.1	--	< 1	< 0.9
Polychlorinated Biphenyls†															
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	7429-90-5	100	NA	1,170	--	2,320	2,150	325	3,340	1,350	2,030	4,220	--	523	164 J
Antimony	7440-36-0	3	NA	< 5.3	--	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 5.3	< 5.3	--	< 9.7	< 9.7
Arsenic	7440-38-2	25	NA	< 6.8	--	< 10	< 10.2	< 6.8	< 10	< 10.2	< 6.8	< 6.8	--	< 10	< 10.2
Barium	7440-39-3	1000	NA	14	--	91.9	69.7	47.8	16.7	11.4	11.2	19.2	--	92.7	91.6
Beryllium	7440-41-7	3	NA	< 0.67	--	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	< 0.67	--	< 0.94	< 0.90
Cadmium	7440-43-9	5	NA	< 0.76	--	< 0.91	< 2.0	1.7 J	< 0.91	< 2.0	< 0.76	< 0.76	--	< 0.91	< 2.0
Calcium	7440-70-2	NA	NA	27,500	--	149,000	108,000	81,000	19,100	30,000	18,300	18,500	--	98,400	108,000
Chromium	7440-47-3	50	NA	< 1.6	--	4.5 J	< 3.0	1.9 J	3.0 J	< 3.0	< 1.6	3.9 J	--	< 2.3	< 3.0
Cobalt	7440-48-4	5	NA	< 1.3	--	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 1.3	< 1.3	--	< 2.1	< 2.1
Copper	7440-50-8	200	NA	< 2.7	--	3.5 J	3.4 J	< 2.7	2.7 J	< 2.7	< 2.7	< 2.7	--	3.0 J	< 2.7
Iron	7439-89-6	300	NA	1,360	--	3,210	4,660	636	4,900	2,140	2,980	6,460	--	694	582
Lead	7439-92-1	25	NA	6.5 J	--	< 6.9	< 6.9	< 4.7	< 6.9	< 6.9	< 4.7	< 4.7	--	< 6.9	< 6.9
Magnesium	7439-95-4	35000	NA	6,260	--	42,900	31,800	23,700	3,560	5,640	3,630	4,080	--	50,200	50,900
Manganese	7439-96-5	300	NA	39.8	--	690	706	271	148	56.1	57.8	126	--	255	249
Nickel	7440-02-0	100	NA	< 1.5	--	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 1.5	< 1.5	--	< 5.6	< 5.6
Potassium	7440-09-7	NA	NA	1,000	--	2,940	2,280	1,490	1,880	1,840	1,140	1,580	--	8,540	8,490
Selenium	7782-49-2	10	NA	< 8.4	--	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 8.4	< 8.4	--	< 9.4	< 10.7
Silver	7440-22-4	50	NA	< 2.1	--	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.1	< 2.1	--	< 1.6	< 2.2
Sodium	7440-23-5	20000	NA	4,580	--	81,300	71,600	58,700	12,800	21,900	11,500	11,500	--	60,400	85,000
Thallium	7440-28-0	0.5	NA	< 5.4	--	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 5.4	< 5.4	--	< 67.5	< 14.0
Vanadium	7440-62-2	NA	86	< 2.0	--	3.1 J	3.1 J	< 2.0	5.6	< 2.5	2.5 J	6.3	--	< 1.5	< 2.5
Zinc	7440-66-6	2000	NA	6.3 J	--	< 8.1	22.5	16.9 J	< 24.8	19.1 J	7.4 J	12.6 J	--	8.6 J	12.7 J
Mercury	7439-97-6	0.7	NA	< 0.070	--	< 0.056	< 0.056	< 0.060	< 0.056	< 0.056	< 0.070	< 0.070	--	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41
Sample Delivery Group (SDG)				1195599	1195599	1342893	1398940	1462877	1480247	1480247	1504703	1517227	1547125	1570188	1592070	1608899
Lab Sample ID				5987027	5987028	6826949	7103154	7410817	7491521	7491522	7606269	7668611	7815465	7933930	8043672	8131661
Sample Date				5/20/2010	5/20/2010	10/16/2012	6/20/2013	3/27/2014	6/6/2014	6/6/2014	9/18/2014	11/7/2014	3/20/2015	6/17/2015	9/10/2015	11/11/2015
Field Sample ID				SWMW-41(5-20-10)	SWMW-141(5-20-10)	SWMW-41(101612)	SWMW-41(062013)	SWMW-41-032714	SWMW-41-060614	SWMW-141-060614	CVX-0032-13	CVX-0037-02	CVX-0045-08	CVX-0049-11	CVX-0060-08	SWMW-41-W-25.00-151111
Sample Purpose				REG	FD	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	440	440	300	470	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	9,000	8,900	1,100	7,000	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 16	< 16	< 0.8	< 8	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	91 J	90 J	76	76	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	6	6	3	4	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 60	< 60	< 3	< 30	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 60	< 60	< 3	< 30	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 60	< 60	< 3	< 30	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 120	< 120	< 6	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	40 J	39 J	9	23 J	25	27	27	14	18	14	12	19	22
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 16	< 16	3 J	< 8	2	4 J	< 5	2	< 3	2	2	3 J	1
Chloroethane	75-00-3	5	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	33 J	34 J	24	24 J	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	360	360	310	370	270	380	370	270	230	290	260	220	210
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 16	< 16	< 0.8	< 8	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 16	< 16	< 0.8	< 8	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 16	< 16	< 0.8	< 8	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 10	< 10	8	7 J	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 40	< 40	< 2	< 20	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 16	< 16	< 0.8	< 8	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 200	< 200	< 10	< 100	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	19 J	19 J	7	< 8	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	21 J	22 J	2 J	13 J	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 16	< 16	2 J	< 8	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 20	< 20	< 1	< 10	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	230	220	250	210	220	210	210	190	180	200	230	160	180
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	60 J	58 J	46	36 J	31	30	32	20	20	19	25	14	19
Xylene (total)	1330-20-7	5	NA	< 16	< 16	< 0.8	8 J	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41	SWMW-41
Sample Delivery Group (SDG)				1195599	1195599	1342893	1398940	1462877	1480247	1480247	1504703	1517227	1547125	1570188	1592070	1608899
Lab Sample ID				5987027	5987028	6826949	7103154	7410817	7491521	7491522	7606269	7668611	7815465	7933930	8043672	8131661
Sample Date				5/20/2010	5/20/2010	10/16/2012	6/20/2013	3/27/2014	6/6/2014	6/6/2014	9/18/2014	11/7/2014	3/20/2015	6/17/2015	9/10/2015	11/11/2015
Field Sample ID				SWMW-41(5-20-10)	SWMW-141(5-20-10)	SWMW-41(101612)	SWMW-41(062013)	SWMW-41-032714	SWMW-41-060614	SWMW-141-060614	CVX-0032-13	CVX-0037-02	CVX-0045-08	CVX-0049-11	CVX-0060-08	SWMW-41-W-25.00-151111
Sample Purpose				REG	FD	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 10	< 9	< 11	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	2 J	2 J	0.1 J	1	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 9	< 11	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	17	16	11	14	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	1 J	1 J	< 0.5 J	0.6	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-41 1195599 5987027 5/20/2010 SWMW-41(5-20-10) REG	SWMW-41 1195599 5987028 5/20/2010 SWMW-141(5-20-10) FD	SWMW-41 1342893 6826949 10/16/2012 SWMW-41(101612) REG	SWMW-41 1398940 7103154 6/20/2013 SWMW-41(062013) REG	SWMW-41 1462877 7410817 3/27/2014 SWMW-41-032714 REG	SWMW-41 1480247 7491521 6/6/2014 SWMW-41-060614 REG	SWMW-41 1480247 7491522 6/6/2014 SWMW-141-060614 FD	SWMW-41 1504703 7606269 9/18/2014 CVX-0032-13 REG	SWMW-41 1517227 7668611 11/7/2014 CVX-0037-02 REG	SWMW-41 1547125 7815465 3/20/2015 CVX-0045-08 REG	SWMW-41 1570188 7933930 6/17/2015 CVX-0049-11 REG	SWMW-41 1592070 8043672 9/10/2015 CVX-0060-08 REG	SWMW-41 1608899 8131661 11/11/2015 SWMW-41-W-25.00-151111 REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 0.9	< 1	--	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	< 80.2	< 80.2	216	353	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 7.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	86.3	85.4	91.8	99.3	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 1.4	< 1.4	< 0.67	< 0.67	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 2.0	0.44 J	< 0.76	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	104,000	104,000	104,000	108,000	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 3.4	< 3.4	1.6 J	< 1.6	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 5 J	< 1.3	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	< 2.7	< 2.1	< 2.7	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	331	332	719	563	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 5.1	< 4.7	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	50,300	50,600	49,800	51,400	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	241	251	209	240	294	239	230	239	218	288	224	224	209
Nickel	**7440-02-0**	**100**	**NA**	< 1.8	< 1.8	1.1 J	2.0 J	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	7,600	7,720	7,840	8,120	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 8.9	< 8.9	< 7.5	< 8.4	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.3	< 2.3	< 1.2	< 2.1	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	71,300	71,000	79,500	82,400	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 14.0	< 30 J	< 5.4	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 2.5	< 1.3	< 2.0	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	< 8.1	4.9 J	8.0 J	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.060	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-41 1670992 8421610 6/10/2016 SWMW-41-W-25.00-160610 REG	SWMW-42 1022233 4962184 1/18/2007 SWMW-42011807 REG	SWMW-42 1113054 5487058 9/30/2008 SWMW-42(9-30-08) REG	SWMW-42 1397270 7093622 6/13/2013 SWMW-42(061313) REG	SWMW-43 1021819 4959990 1/16/2007 SWMW-43011607 REG	SWMW-43 1114665 5496357 10/10/2008 SWMW-43(10-10-08) REG	SWMW-43 1398234 7098437 6/18/2013 SWMW-43(061813) REG	SWMW-44 1022020 4961230 1/17/2007 SWMW-44011707 REG	SWMW-44 1114224 5493860 10/8/2008 SWMW-44(10-8-08) REG	SWMW-44 1114224 5493861 10/8/2008 SWMW-144(10-8-08) FD	SWMW-44 1195186 5984077 5/18/2010 SWMW-44(5-18-10) REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	7	5	6	3 J
1,1,1-Trichloroethane	71-55-6	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	53	53	53	31
1,2-Dichloroethane	107-06-2	0.6	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	4 J	3 J	3 J	3 J
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	21	23	23	15
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	< 3	< 3	< 3	< 3	< 3	< 3	7 J	10 J	10	10 J
2-Hexanone	591-78-6	50	NA	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	< 6	< 6	--	< 6	< 6	< 6	15 J	19 J	21	19 J
Benzene	71-43-2	1	NA	14	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	3 J	2 J	2 J	2 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	1	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	490	370	360	380
Chloroethane	75-00-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	230	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	41	110	110	38
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2 J	1 J	1 J	1 J
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	1 J	1 J	1 J	0.9 J
trans-1,2-Dichloroethene	156-60-5	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	4 J	4 J	5 J
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	190	< 1	< 1	< 1	< 1	< 1	< 1	280	160	160	97
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	16	< 1	< 1	< 1	< 1	< 1	< 1	9	33	33	23
Xylene (total)	1330-20-7	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	3 J	2 J	2 J	2 J
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-41	SWMW-42	SWMW-42	SWMW-42	SWMW-43	SWMW-43	SWMW-43	SWMW-44	SWMW-44	SWMW-44	SWMW-44
Sample Delivery Group (SDG)				1670992	1022233	1113054	1397270	1021819	1114665	1398234	1022020	1114224	1114224	1195186
Lab Sample ID				8421610	4962184	5487058	7093622	4959990	5496357	7098437	4961230	5493860	5493861	5984077
Sample Date				6/10/2016	1/18/2007	9/30/2008	6/13/2013	1/16/2007	10/10/2008	6/18/2013	1/17/2007	10/8/2008	10/8/2008	5/18/2010
Field Sample ID				SWMW-41-W-25.00-160610	SWMW-42011807	SWMW-42(9-30-08)	SWMW-42(061313)	SWMW-43011607	SWMW-43(10-10-08)	SWMW-43(061813)	SWMW-44011707	SWMW-44(10-8-08)	SWMW-144(10-8-08)	SWMW-44(5-18-10)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	FD	REG
Parameter Name	Parameter Code													
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 3	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	< 20	< 19	< 10	< 20	< 19	< 11	< 20	< 20	< 20	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	2 J	2 J	1 J
2-Methyl-Naphthalene	91-57-6	NA	36	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	2 J	< 1	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	--	< 10	< 9	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	1 J	< 0.9	0.2 J	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Anthracene	120-12-7	50	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 8	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
Chrysene	218-01-9	0.002	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	1 J	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
Diethylphthalate	84-66-2	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	0.2 J	< 1	< 1	< 1	< 1
Fluorene	86-73-7	50	NA	--	3 J	1 J	0.6	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Isophorone	78-59-1	50	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2
Naphthalene	91-20-3	10	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	3 J	2 J	2 J	< 1

Appendix B-2
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Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-41	SWMW-42	SWMW-42	SWMW-42	SWMW-43	SWMW-43	SWMW-43	SWMW-44	SWMW-44	SWMW-44	SWMW-44
Sample Delivery Group (SDG)				1670992	1022233	1113054	1397270	1021819	1114665	1398234	1022020	1114224	1114224	1195186
Lab Sample ID				8421610	4962184	5487058	7093622	4959990	5496357	7098437	4961230	5493860	5493861	5984077
Sample Date				6/10/2016	1/18/2007	9/30/2008	6/13/2013	1/16/2007	10/10/2008	6/18/2013	1/17/2007	10/8/2008	10/8/2008	5/18/2010
Field Sample ID				SWMW-41-W-25.00-160610	SWMW-42011807	SWMW-42(9-30-08)	SWMW-42(061313)	SWMW-43011607	SWMW-43(10-10-08)	SWMW-43(061813)	SWMW-44011707	SWMW-44(10-8-08)	SWMW-144(10-8-08)	SWMW-44(5-18-10)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	FD	REG
Parameter Name	Parameter Code													
Volatile Organic Compounds														
Nitrobenzene	98-95-3	0.4	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
p-Chloro-m-cresol	59-50-7	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1
Pentachlorophenol	87-86-5	1	NA	--	< 3	< 3	< 1	< 3	< 3	< 1	< 3	< 3	< 3	< 3
Phenanthrene	85-01-8	50	NA	--	1 J	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1
Phenol	108-95-2	1	NA	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	11	< 1	< 1	< 1
Pyrene	129-00-0	50	NA	--	< 1	< 0.9	< 0.1	< 1	< 1	0.2 J	< 1	< 1	< 1	< 1
Polychlorinated Biphenyls†														
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	7429-90-5	100	NA	--	345	< 80.2	166 J	< 80.2	< 80.2	101 J	197 J	< 80.2	< 80.2	< 80.2
Antimony	7440-36-0	3	NA	--	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 9.7	< 9.7
Arsenic	7440-38-2	25	NA	--	< 10	< 10.2	< 6.8	< 10	< 10.2	< 6.8	< 10	< 10.2	< 10.2	< 7.2
Barium	7440-39-3	1000	NA	--	7.2	9.2	7.6	96.2	53.5	65.4	24.9	51.4	51.3	70.4
Beryllium	7440-41-7	3	NA	--	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 0.90	< 1.4
Cadmium	7440-43-9	5	NA	--	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 0.76	1.1 J	< 2.0	< 2.0	< 2.0
Calcium	7440-70-2	NA	NA	--	31,200	28,500	26,800	102,000	73,400	80,200	38,400	58,600	59,400	70,300
Chromium	7440-47-3	50	NA	--	< 2.3	< 3.0	< 1.6	< 2.3	< 3.0	2.9 J	< 2.3	< 3.0	< 3.0	< 3.4
Cobalt	7440-48-4	5	NA	--	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 2.1	< 2.1
Copper	7440-50-8	200	NA	--	< 2.2	< 2.7	< 2.7	< 2.2	< 2.7	< 2.7	< 2.2	< 2.7	< 2.7	< 2.7
Iron	7439-89-6	300	NA	--	2,610	3,190	4,090	54.7 J	61.3 J	92.2 J	465	1,330	1,510	3,040
Lead	7439-92-1	25	NA	--	< 6.9	< 6.9	5.1 J	< 6.9	< 6.9	< 4.7	< 6.9	< 6.9	< 6.9	< 6.9
Magnesium	7439-95-4	35000	NA	--	5,720	5,390	5,480	43,300	29,300	31,100	6,210	10,400	10,400	11,200
Manganese	7439-96-5	300	NA	233	4,020	2,210	2,090	33.5	5.9	8.5	322	876	867	1,210
Nickel	7440-02-0	100	NA	--	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 5.6	< 1.8
Potassium	7440-09-7	NA	NA	--	605	647	615	8,250	5,780	5,990	3,510	4,360	4,420	3,340
Selenium	7782-49-2	10	NA	--	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 10.7	< 8.9
Silver	7440-22-4	50	NA	--	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.2	< 2.3
Sodium	7440-23-5	20000	NA	--	4,880	4,530	4,540	434,000	323,000	367,000	120,000	125,000	126,000	183,000
Thallium	7440-28-0	0.5	NA	--	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 14.0	< 14.0
Vanadium	7440-62-2	NA	86	--	< 1.5	< 2.5	< 2.0	< 1.5	< 2.5	< 2.0	< 1.5	< 2.5	< 2.5	< 2.5
Zinc	7440-66-6	2000	NA	--	< 8.1	< 8.1	4.8 J	< 8.1	< 8.1	199	< 15.8 J	13.9 J	< 8.1	< 8.1
Mercury	7439-97-6	0.7	NA	--	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.070	0.056 J	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-44 1343539 6830360 10/18/2012 SWMW-44(101812) REG	SWMW-44 1398230 7098413 6/18/2013 SWMW-44(061813) REG	SWMW-44 1462188 7407272 3/25/2014 SWMW-44-032514 REG	SWMW-44 1479164 7486615 6/3/2014 SWMW-44-060314 REG	SWMW-44 1504322 7604425 9/17/2014 CVX-0031-04 REG	SWMW-44 1516585 7664709 11/5/2014 CVX-0035-05 REG	SWMW-44 1547125 7815462 3/20/2015 CVX-0045-05 FD	SWMW-44 1547125 7815469 3/20/2015 CVX-0045-09 REG	SWMW-44 1570188 7933924 6/17/2015 CVX-0049-05 REG	SWMW-44 1592070 8043667 9/10/2015 CVX-0060-03 REG	SWMW-44 1592070 8043668 9/10/2015 CVX-0060-04 FD	SWMW-44 1608899 8131659 11/11/2015 SWMW-44-W-15.00-151111 REG	SWMW-44 1669538 8415285 6/7/2016 SWMW-44-W-15.00 REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	2 J	3 J	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	< 1	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	< 1	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	23	35	--	--	--	--	--	--	47	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	2	3	--	--	--	--	--	--	3 J	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	9	13	--	--	--	--	--	--	16	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	4 J	5 J	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	--	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	2 J	1 J	1 J	2	1	1	1	1	1 J	0.8 J	0.9 J	1	0.9 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	240	220	170	250	240	270	200	200	220	170	200	220	200
Chloroethane	75-00-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	27	29	36	39	24	35	48	48	25	20	24	35	31
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	0.8 J	0.8 J	--	--	--	--	--	--	< 0.5	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	< 0.5	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	< 0.5	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	2 J	2 J	--	--	--	--	--	--	0.7 J	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	0.8 J	1 J	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	68	120	190	170	79	170	260	260	120	64	80	140	150
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	13	10	13	15	7	11	15	13	9	5	6	10	9
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	< 0.5	--	--	--	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-44 1343539 6830360 10/18/2012 SWMW-44(101812) REG	SWMW-44 1398230 7098413 6/18/2013 SWMW-44(061813) REG	SWMW-44 1462188 7407272 3/25/2014 SWMW-44-032514 REG	SWMW-44 1479164 7486615 6/3/2014 SWMW-44-060314 REG	SWMW-44 1504322 7604425 9/17/2014 CVX-0031-04 REG	SWMW-44 1516585 7664709 11/5/2014 CVX-0035-05 REG	SWMW-44 1547125 7815462 3/20/2015 CVX-0045-05 FD	SWMW-44 1547125 7815469 3/20/2015 CVX-0045-09 REG	SWMW-44 1570188 7933924 6/17/2015 CVX-0049-05 REG	SWMW-44 1592070 8043667 9/10/2015 CVX-0060-03 REG	SWMW-44 1592070 8043668 9/10/2015 CVX-0060-04 FD	SWMW-44 1608899 8131659 11/11/2015 SWMW-44-W-15.00-151111 REG	SWMW-44 1669538 8415285 6/7/2016 SWMW-44-W-15.00 REG
Volatile Organic Compounds																
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	< 10	< 11	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 5	< 5	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 10	< 11	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	**83-32-9**	**20**	**NA**	0.2 J	0.3 J	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 0.1	0.1 J	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**50**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**NA**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Chrysene	**218-01-9**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	**84-66-2**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**50**	**NA**	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Fluorene	**86-73-7**	**50**	**NA**	0.4 J	0.5 J	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 5	< 5	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	**67-72-1**	**5**	**NA**	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Isophorone	**78-59-1**	**50**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	**91-20-3**	**10**	**NA**	0.5	< 0.1	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-44 1343539 6830360 10/18/2012 SWMW-44(101812) REG	SWMW-44 1398230 7098413 6/18/2013 SWMW-44(061813) REG	SWMW-44 1462188 7407272 3/25/2014 SWMW-44-032514 REG	SWMW-44 1479164 7486615 6/3/2014 SWMW-44-060314 REG	SWMW-44 1504322 7604425 9/17/2014 CVX-0031-04 REG	SWMW-44 1516585 7664709 11/5/2014 CVX-0035-05 REG	SWMW-44 1547125 7815462 3/20/2015 CVX-0045-05 FD	SWMW-44 1547125 7815469 3/20/2015 CVX-0045-09 REG	SWMW-44 1570188 7933924 6/17/2015 CVX-0049-05 REG	SWMW-44 1592070 8043667 9/10/2015 CVX-0060-03 REG	SWMW-44 1592070 8043668 9/10/2015 CVX-0060-04 FD	SWMW-44 1608899 8131659 11/11/2015 SWMW-44-W-15.00-151111 REG	SWMW-44 1669538 8415285 6/7/2016 SWMW-44-W-15.00 REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 1	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	0.1 J	< 0.1	--	--	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	175 J	< 82.8	--	--	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 3.5	< 5.3	--	--	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	7.5 J	< 6.8	--	--	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	93.4	74.8	--	--	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.67	--	--	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.36	< 0.76	--	--	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	101,000	88,300	--	--	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	2.6 J	< 1.6	--	--	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	0.87 J	< 1.3	--	--	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.1	< 2.7	--	--	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	2,780	1,370	--	--	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	9.7 J	< 4.7	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	15,200	13,000	--	--	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	1,530	1,140	1,870	957	788	951	1,350	1,400	669	605	643	795	710
Nickel	**7440-02-0**	**100**	**NA**	1.2 J	< 1.5	--	--	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	4,150	3,400	--	--	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 7.5	< 8.4	--	--	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 1.2	< 2.1	--	--	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	107,000	136,000	--	--	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 30 J	< 5.4	--	--	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 1.3	< 2.0	--	--	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	29.8	11.3 J	--	--	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.070	--	--	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-45 1022020 4961237 1/17/2007 SWMW-45011707 REG	SWMW-45 1113255 5487992 10/2/2008 SWMW-45(10-2-08) REG	SWMW-45 1195597 5987006 5/20/2010 SWMW-45(5-20-10) REG	SWMW-45 1343539 6830365 10/18/2012 SWMW-45(101812) REG	SWMW-45 1397270 7093619 6/13/2013 SWMW-45(061313) REG	SWMW-45 1461101 7401978 3/20/2014 SWMW-45-032014 REG	SWMW-45 1479931 7489814 6/5/2014 SWMW-45-060514 REG	SWMW-45 1503937 7602502 9/16/2014 CVX-0030-08 REG	SWMW-45 1516213 7662951 11/4/2014 CVX-0034-03 REG	SWMW-45 1548024 7819760 3/24/2015 CVX-0046-12 REG	SWMW-45 1570206 7934023 6/16/2015 CVX-0048-01 REG	SWMW-45 1570520 7935727 6/18/2015 CVX-0050-13 REG	SWMW-45 1593311 8049709 9/15/2015 CVX-0062-09 REG
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	< 1	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	< 1	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	1 J	1	< 0.5	--	--	--	--	--	--	--	< 1	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	1 J	2 J	1	< 0.5	--	--	--	--	--	--	--	1 J	--
1,4-Dichlorobenzene	106-46-7	3	NA	31	9	8	8	1	--	--	--	--	--	--	--	6	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	17 J	23	< 6	< 6	9 J	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	1 J	< 0.5	< 0.5	< 0.5	< 0.5	0.5 J	< 0.5	--	< 0.5	< 0.5	
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	150	76	57	120	21	19	53	70	82	39	--	75	60	
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	< 0.5	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 0.5	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	< 0.5	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--	--	< 0.5	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	< 0.5	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45	SWMW-45
Sample Delivery Group (SDG)				1022020	1113255	1195597	1343539	1397270	1461101	1479931	1503937	1516213	1548024	1570206	1570520	1593311
Lab Sample ID				4961237	5487992	5987006	6830365	7093619	7401978	7489814	7602502	7662951	7819760	7934023	7935727	8049709
Sample Date				1/17/2007	10/2/2008	5/20/2010	10/18/2012	6/13/2013	3/20/2014	6/5/2014	9/16/2014	11/4/2014	3/24/2015	6/16/2015	6/18/2015	9/15/2015
Field Sample ID				SWMW-45011707	SWMW-45(10-2-08)	SWMW-45(5-20-10)	SWMW-45(101812)	SWMW-45(061313)	SWMW-45-032014	SWMW-45-060514	CVX-0030-08	CVX-0034-03	CVX-0046-12	CVX-0048-01	CVX-0050-13	CVX-0062-09
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code															
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 22	< 19	< 10	< 9	< 10	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	3 J	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	3 J	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	12	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 1	0.9 J	< 0.5	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	2 J	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	1 J	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 11	< 10	< 10	< 9	< 10	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 1	2	0.2 J	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 1	1	0.1 J	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 1	0.4 J	0.2 J	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 1	0.4 J	0.2 J	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 1	0.2 J	0.3 J	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 1	< 0.09	0.2 J	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	360	< 34	23	90	31	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 1	0.5	0.3 J	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	2 J	14	< 2	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	1 J	2	< 0.5	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 1	2	0.5 J	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	4 J	< 1	1 J	4	0.6	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 1	0.1 J	0.1 J	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	7	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 1	1 J	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-45 1022020 4961237 1/17/2007 SWMW-45011707 REG	SWMW-45 1113255 5487992 10/2/2008 SWMW-45(10-2-08) REG	SWMW-45 1195597 5987006 5/20/2010 SWMW-45(5-20-10) REG	SWMW-45 1343539 6830365 10/18/2012 SWMW-45(101812) REG	SWMW-45 1397270 7093619 6/13/2013 SWMW-45(061313) REG	SWMW-45 1461101 7401978 3/20/2014 SWMW-45-032014 REG	SWMW-45 1479931 7489814 6/5/2014 SWMW-45-060514 REG	SWMW-45 1503937 7602502 9/16/2014 CVX-0030-08 REG	SWMW-45 1516213 7662951 11/4/2014 CVX-0034-03 REG	SWMW-45 1548024 7819760 3/24/2015 CVX-0046-12 REG	SWMW-45 1570206 7934023 6/16/2015 CVX-0048-01 REG	SWMW-45 1570520 7935727 6/18/2015 CVX-0050-13 REG	SWMW-45 1593311 8049709 9/15/2015 CVX-0062-09 REG
Volatile Organic Compounds																	
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 3	< 0.9	< 1	--	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	4 J	< 1	< 1	2	0.3 J	--	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 1	2	0.5 J	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†																	
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																	
Aluminum	**7429-90-5**	**100**	**NA**	131 J	145 J	119 J	3,630	1,960	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10	< 10.2	< 7.2	10.9 J	< 6.8	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	24.3	35.6	111	105	22.2	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.94	< 0.90	< 1.4	1.0 J	< 0.67	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.91	3.9 J	< 2.0	< 0.36	0.95 J	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	27,700	32,600	93,900	60,100	18,600	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 2.3	< 3.0	< 3.4	5.3 J	4.2 J	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 2.1	2.1 J	< 1.3	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.2	< 2.7	< 2.7	3.3 J	7.5 J	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	2,520	1,340	3,660	11,200	8,560	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 6.9	8.8 J	25.3	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	7,990	8,170	23,700	16,000	5,400	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	2,150	1,840	4,920	3,470	199	1,380	1,420	1,920	2,530	5,480	6,160	--	6,170
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 5.6	< 1.8	< 1.1	3.5 J	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	3,830	4,290	7,250	6,980	985	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 9.4	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 1.6	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	145,000	193,000	483,000	388,000	4,960	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 13.5	< 14.0	< 14.0	< 30 J	< 5.4	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 1.5	< 2.5	< 2.5	7.7	5.9	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	< 14.0 J	< 8.1	< 8.1	17.9 J	544	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-45	SWMW-45	SWMW-46	SWMW-46	SWMW-46	SWMW-47	SWMW-47	SWMW-47	SWMW-49	SWMW-49	SWMW-49
Sample Delivery Group (SDG)				1608899	1669538	1022233	1113054	1397265	1022233	1113255	1397265	1022435	1113054	1113054
Lab Sample ID				8131654	8415289	4962188	5487057	7093585	4962189	5487988	7093583	4963407	5487046	5487047
Sample Date				11/11/2015	6/7/2016	1/18/2007	9/30/2008	6/13/2013	1/18/2007	10/2/2008	6/13/2013	1/19/2007	9/30/2008	9/30/2008
Field Sample ID				SWMW-45-W-17.00-151111	SWMW-45-W-17.00	SWMW-46011807	SWMW-46(9-30-08)	SWMW-46(061313)	SWMW-47011807	SWMW-47(10-2-08)	SWMW-47(061313)	SWMW-49011907	SWMW-49(9-30-08)	SWMW-149(9-30-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	FD
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	< 6	< 6	--	< 6	< 6	--	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	0.7 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	12	100	< 0.8	< 0.8	< 0.8	< 0.8	2 J	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-45	SWMW-45	SWMW-46	SWMW-46	SWMW-46	SWMW-47	SWMW-47	SWMW-47	SWMW-49	SWMW-49	SWMW-49
Sample Delivery Group (SDG)				1608899	1669538	1022233	1113054	1397265	1022233	1113255	1397265	1022435	1113054	1113054
Lab Sample ID				8131654	8415289	4962188	5487057	7093585	4962189	5487988	7093583	4963407	5487046	5487047
Sample Date				11/11/2015	6/7/2016	1/18/2007	9/30/2008	6/13/2013	1/18/2007	10/2/2008	6/13/2013	1/19/2007	9/30/2008	9/30/2008
Field Sample ID				SWMW-45-W-17.00-151111	SWMW-45-W-17.00	SWMW-46011807	SWMW-46(9-30-08)	SWMW-46(061313)	SWMW-47011807	SWMW-47(10-2-08)	SWMW-47(061313)	SWMW-49011907	SWMW-49(9-30-08)	SWMW-149(9-30-08)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	FD
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019											
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2,4-Dichlorophenol	120-83-2	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2,4-Dimethylphenol	105-67-9	50	NA	--	--	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 2	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	--	--	< 21	< 19	< 10	< 20	< 19	< 10	< 10	< 19	< 19
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	< 1	< 0.9	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2-Chloronaphthalene	91-58-7	10	NA	--	--	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 1	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 3	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
4-Chloroaniline	106-47-8	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 1	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 1	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
4-Nitrophenol	100-02-7	1	NA	--	--	< 10	< 9	< 10	< 10	< 10	< 10	< 5	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Acenaphthylene	208-96-8	NA	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Anthracene	120-12-7	50	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	< 2	< 2	< 2	2 J	< 2	< 2	< 1	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
Chrysene	218-01-9	0.002	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Di-n-butylphthalate	84-74-2	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Dibenzofuran	132-64-9	NA	7.9	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
Diethylphthalate	84-66-2	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 1	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Fluorene	86-73-7	50	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	0.1 J	< 0.5	< 1	< 1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 3	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	< 1	< 0.9	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Isophorone	78-59-1	50	NA	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 1	< 2	< 2
Naphthalene	91-20-3	10	NA	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-45 1608899 8131654 11/11/2015 SWMW-45-W-17.00-151111 REG	SWMW-45 1669538 8415289 6/7/2016 SWMW-45-W-17.00 REG	SWMW-46 1022233 4962188 1/18/2007 SWMW-46011807 REG	SWMW-46 1113054 5487057 9/30/2008 SWMW-46(9-30-08) REG	SWMW-46 1397265 7093585 6/13/2013 SWMW-46(061313) REG	SWMW-47 1022233 4962189 1/18/2007 SWMW-47011807 REG	SWMW-47 1113255 5487988 10/2/2008 SWMW-47(10-2-08) REG	SWMW-47 1397265 7093583 6/13/2013 SWMW-47(061313) REG	SWMW-49 1022435 4963407 1/19/2007 SWMW-49011907 REG	SWMW-49 1113054 5487046 9/30/2008 SWMW-49(9-30-08) REG	SWMW-49 1113054 5487047 9/30/2008 SWMW-149(9-30-08) FD
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	< 3	< 3	< 1	< 3	< 3	< 1	< 2	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Phenol	**108-95-2**	**1**	**NA**	--	--	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1
Pyrene	**129-00-0**	**50**	**NA**	--	--	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 0.5	< 1	< 1
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	--	--	22,500	195 J	530	3,010	84.1 J	399	403	1,410	441
Antimony	**7440-36-0**	**3**	**NA**	--	--	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	--	--	< 10	< 10.2	< 6.8	< 10	< 10.2	< 6.8	< 10	< 10.2	< 10.2
Barium	**7440-39-3**	**1000**	**NA**	--	--	91.3	2.9 J	4.2 J	26.5	18.8	38.9	13.3	18.1	13
Beryllium	**7440-41-7**	**3**	**NA**	--	--	< 4.7	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 0.90
Cadmium	**7440-43-9**	**5**	**NA**	--	--	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	--	--	16,200	13,700	12,700	23,800	29,700	22,900	29,100	26,700	26,700
Chromium	**7440-47-3**	**50**	**NA**	--	--	20.6	< 3.0	< 1.6	4.7 J	< 3.0	< 1.6	< 2.3	< 3.0	< 3.0
Cobalt	**7440-48-4**	**5**	**NA**	--	--	7.4	< 2.1	< 1.3	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 2.1
Copper	**7440-50-8**	**200**	**NA**	--	--	13	< 2.7	< 2.7	< 2.2	< 2.7	< 2.7	< 2.2	< 2.7	< 2.7
Iron	**7439-89-6**	**300**	**NA**	--	--	31,200	134 J	584	4,550	2,060	5,620	627	1,710	561
Lead	**7439-92-1**	**25**	**NA**	--	--	< 6.9	< 6.9	< 4.7	< 6.9	< 6.9	< 4.7	< 6.9	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	9,020	3,380	3,180	5,760	6,420	4,880	6,550	5,320	5,140
Manganese	**7439-96-5**	**300**	**NA**	726	5,100	902	16.5	21.1	1,020	1,310	1,240	8.3	28.9	19
Nickel	**7440-02-0**	**100**	**NA**	--	--	12.8	< 5.6	< 1.5	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	--	--	3,960	669	756	2,400	1,770	1,380	568	924	685
Selenium	**7782-49-2**	**10**	**NA**	--	--	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 10.7
Silver	**7440-22-4**	**50**	**NA**	--	--	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.2
Sodium	**7440-23-5**	**20000**	**NA**	--	--	4,810	4,170	3,570	35,000	53,100	46,500	3,310	3,770	3,740
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	--	--	28.8	< 2.5	< 2.0	3.1 J	< 2.5	< 2.0	< 1.5	< 2.5	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	--	--	61.7	< 8.1	3.9 J	19.7 J	15.2 J	14.9 J	< 8.1	< 8.1	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	0.086 J	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-49 1395751 7086907 6/7/2013 SWMW-49(060713) REG	SWMW-5 1022435 4963402 1/19/2007 SWMW-5011907 REG	SWMW-5 1022435 4963403 1/19/2007 SWMW-105011907 FD	SWMW-5 1113255 5487989 10/2/2008 SWMW-5(10-2-08) REG	SWMW-5 1397265 7093582 6/13/2013 SWMW-5(061313) REG	SWMW-51 1022233 4962190 1/18/2007 SWMW-51011807 REG	SWMW-51 1022233 4962191 1/18/2007 SWMW-151011807 FD	SWMW-51 1113054 5487055 9/30/2008 SWMW-51(9-30-08) REG	SWMW-51 1395751 7086908 6/7/2013 SWMW-51(060713) REG	SWMW-51 1395751 7086915 6/7/2013 SWMW-151(060713) FD	SWMW-52 1022233 4962192 1/18/2007 SWMW-52011807 REG	SWMW-52 1113054 5487056 9/30/2008 SWMW-52(9-30-08) REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	--	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	< 0.8	1 J	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-49 1395751 7086907 6/7/2013 SWMW-49(060713) REG	SWMW-5 1022435 4963402 1/19/2007 SWMW-5011907 REG	SWMW-5 1022435 4963403 1/19/2007 SWMW-105011907 FD	SWMW-5 1113255 5487989 10/2/2008 SWMW-5(10-2-08) REG	SWMW-5 1397265 7093582 6/13/2013 SWMW-5(061313) REG	SWMW-51 1022233 4962190 1/18/2007 SWMW-51011807 REG	SWMW-51 1022233 4962191 1/18/2007 SWMW-151011807 FD	SWMW-51 1113054 5487055 9/30/2008 SWMW-51(9-30-08) REG	SWMW-51 1395751 7086908 6/7/2013 SWMW-51(060713) REG	SWMW-51 1395751 7086915 6/7/2013 SWMW-151(060713) FD	SWMW-52 1022233 4962192 1/18/2007 SWMW-52011807 REG	SWMW-52 1113054 5487056 9/30/2008 SWMW-52(9-30-08) REG
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 3	< 3	< 3	--	< 3	< 3	< 3	< 0.5	< 0.5	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 21	< 21	< 19	--	< 20	< 22	< 19	< 10	< 10	< 21	< 19
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.9
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 2	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	< 2	< 2	< 2	--	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 9	--	< 10	< 11	< 9	< 10	< 10	< 10	< 9
Acenaphthene	83-32-9	20	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Acenaphthylene	208-96-8	NA	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Anthracene	120-12-7	50	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	2 J	< 5 J	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
Chrysene	218-01-9	0.002	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Dibenzofuran	132-64-9	NA	7.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Fluorene	86-73-7	50	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.9
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Isophorone	78-59-1	50	NA	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2
Naphthalene	91-20-3	10	NA	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-49 1395751 7086907 6/7/2013 SWMW-49(060713) REG	SWMW-5 1022435 4963402 1/19/2007 SWMW-5011907 REG	SWMW-5 1022435 4963403 1/19/2007 SWMW-105011907 FD	SWMW-5 1113255 5487989 10/2/2008 SWMW-5(10-2-08) REG	SWMW-5 1397265 7093582 6/13/2013 SWMW-5(061313) REG	SWMW-51 1022233 4962190 1/18/2007 SWMW-51011807 REG	SWMW-51 1022233 4962191 1/18/2007 SWMW-151011807 FD	SWMW-51 1113054 5487055 9/30/2008 SWMW-51(9-30-08) REG	SWMW-51 1395751 7086908 6/7/2013 SWMW-51(060713) REG	SWMW-51 1395751 7086915 6/7/2013 SWMW-151(060713) FD	SWMW-52 1022233 4962192 1/18/2007 SWMW-52011807 REG	SWMW-52 1113054 5487056 9/30/2008 SWMW-52(9-30-08) REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 1	< 1	< 0.9	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 3	< 3	< 3	--	< 3	< 3	< 3	< 1	< 1	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 1	< 1	< 0.9	--	< 1	< 1	< 0.9	< 0.5	< 0.5	< 1	< 0.9
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	< 1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.9	< 0.1	< 0.1	< 1	< 0.9
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	1,770	639	1,950	467	6,120	2,060	454	216	< 74.3	< 74.3	5,950	5,110
Antimony	**7440-36-0**	**3**	**NA**	< 3.5	< 9.7	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	< 10	< 10	< 10.2	< 6.8	< 10	< 10	< 10.2	< 6.8	< 6.8	< 10	< 10.2
Barium	**7440-39-3**	**1000**	**NA**	20.8	14	21.5	6.8	35.7	27.2	16.1	18.4	11.3	11.5	36.5	29.3
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.94	< 0.94	< 0.90	< 0.67	< 0.94	< 0.94	< 0.90	< 0.67	< 0.67	< 0.94	1.0 J
Cadmium	**7440-43-9**	**5**	**NA**	0.72 J	< 0.91	< 0.91	< 2.0	< 0.76	< 0.91	< 0.91	< 2.0	0.38 J	0.39 J	< 0.91	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	32,400	111,000	115,000	88,800	97,900	40,000	40,000	41,100	42,500	43,900	12,700	14,800
Chromium	**7440-47-3**	**50**	**NA**	1.6 J	< 2.3	4.2 J	< 3.0	6.1 J	2.3 J	< 2.3	< 3.0	< 1.1	< 1.1	8.3 J	6.4 J
Cobalt	**7440-48-4**	**5**	**NA**	< 0.66	< 2.1	< 2.1	< 2.1	3.0 J	< 2.1	< 2.1	< 2.1	< 0.66	< 0.66	3.1 J	< 2.1
Copper	**7440-50-8**	**200**	**NA**	< 2.1	< 2.2	2.5 J	< 2.7	5.6 J	2.3 J	< 2.2	< 2.7	< 2.1	< 2.1	< 2.2	3.0 J
Iron	**7439-89-6**	**300**	**NA**	2,600	1,140	3,660	868	12,900	3,240	626	1,760	173 J	119 J	9,650	6,800
Lead	**7439-92-1**	**25**	**NA**	12.2 J	< 6.9	< 6.9	< 6.9	< 4.7	< 6.9	< 6.9	< 6.9	10.4 J	11.1 J	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	7,050	25,600	26,900	17,900	21,000	7,380	7,130	7,090	6,890	7,120	5,170	4,930
Manganese	**7439-96-5**	**300**	**NA**	24.6	1,320	1,580	974	4,330	748	731	1,980	130	331	362	196
Nickel	**7440-02-0**	**100**	**NA**	< 1.1	< 5.6	< 5.6	< 5.6	1.7 J	< 5.6	< 5.6	< 5.6	< 1.1	< 1.1	< 5.6	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	914	2,790	3,340	2,380	3,520	1,570	1,260	1,290	1,500	1,510	1,740	1,560
Selenium	**7782-49-2**	**10**	**NA**	< 7.5	< 9.4	< 9.4	< 10.7	< 8.4	< 9.4	< 9.4	< 10.7	< 7.5	< 7.5	< 9.4	< 10.7
Silver	**7440-22-4**	**50**	**NA**	< 1.2	< 1.6	< 1.6	< 2.2	< 2.1	< 1.6	< 1.6	< 2.2	< 1.2	< 1.2	< 1.6	< 2.2
Sodium	**7440-23-5**	**20000**	**NA**	3,080	25,100	25,100	29,700	46,000	5,460	5,370	7,080	6,730	7,780	4,720	4,600
Thallium	**7440-28-0**	**0.5**	**NA**	< 5.7	< 13.5	< 13.5	< 14.0	< 5.4	< 13.5	< 13.5	< 14.0	< 5.7	< 5.7	< 13.5	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	2.7 J	< 1.5	2.8 J	< 2.5	9.5	2.5 J	< 1.5	< 2.5	< 1.3	< 1.3	7.6	5.5
Zinc	**7440-66-6**	**2000**	**NA**	5.6 J	13.2 J	16.2 J	15.3 J	34.9	11.8 J	< 8.1	8.6 J	3.9 J	2.1 J	20.5	18.4 J
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-52	SWMW-54	SWMW-54	SWMW-54	SWMW-54	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55
Sample Delivery Group (SDG)				1397265	1022020	1113255	1113255	1397270	1022020	1113255	1195599	1343539	1397265	1461101	1479931
Lab Sample ID				7093586	4961238	5487993	5488004	7093618	4961239	5488005	5987026	6830364	7093597	7401979	7489813
Sample Date				6/13/2013	1/17/2007	10/2/2008	10/2/2008	6/13/2013	1/17/2007	10/2/2008	5/20/2010	10/18/2012	6/13/2013	3/20/2014	6/5/2014
Field Sample ID				SWMW-52(061313)	SWMW-54011707	SWMW-54(10-2-08)	SWMW-154(10-2-08)	SWMW-54(061313)	SWMW-55011707	SWMW-55(10-2-08)	SWMW-55(5-20-10)	SWMW-55(101812)	SWMW-55(061313)	SWMW-55-032014	SWMW-55-060514
Sample Purpose				REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 1	< 1	< 1	< 0.5	2 J	3 J	2 J	1	< 0.5	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	0.6 J	< 0.5	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 1	< 1	< 1	< 0.5	5 J	13	6	5	2	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 6	< 15	< 3	< 3	< 3	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 6	< 15	< 3	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 6	< 15	< 3	< 3	< 3	--	--
Acetone	67-64-1	50	NA	--	< 6	< 6	< 6	--	< 12	< 30	< 6	< 6	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	1 J	< 3	1 J	2 J	0.7 J	0.5 J	3
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2,000	3,100	1,300	700	640	460	1,800
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	< 0.8	< 1
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 3	< 0.5	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 4	< 10	< 2	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 20	< 50	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 1	< 4	< 0.7	< 0.7	< 0.7	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	1 J	4 J	4 J	3 J	< 2	< 5	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 2	< 5	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 4	< 0.8	< 0.8	< 0.8	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-52	SWMW-54	SWMW-54	SWMW-54	SWMW-54	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55
Sample Delivery Group (SDG)				1397265	1022020	1113255	1113255	1397270	1022020	1113255	1195599	1343539	1397265	1461101	1479931
Lab Sample ID				7093586	4961238	5487993	5488004	7093618	4961239	5488005	5987026	6830364	7093597	7401979	7489813
Sample Date				6/13/2013	1/17/2007	10/2/2008	10/2/2008	6/13/2013	1/17/2007	10/2/2008	5/20/2010	10/18/2012	6/13/2013	3/20/2014	6/5/2014
Field Sample ID				SWMW-52(061313)	SWMW-54011707	SWMW-54(10-2-08)	SWMW-154(10-2-08)	SWMW-54(061313)	SWMW-55011707	SWMW-55(10-2-08)	SWMW-55(5-20-10)	SWMW-55(101812)	SWMW-55(061313)	SWMW-55-032014	SWMW-55-060514
Sample Purpose				REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 0.5	< 3	< 3	< 3	< 0.5	< 3	< 3	< 3	< 0.5	< 0.5	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 10	< 20	< 19	< 19	< 10	< 21	< 20	< 9	< 9	< 10	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.9	< 0.9	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 0.4	< 2	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	17	10	10	3	2	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 0.1	< 1	< 1	< 1	< 0.1	2 J	3 J	2 J	0.2 J	< 0.1	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Nitroaniline	100-01-6	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 9	< 9	< 10	--	--
Acenaphthene	83-32-9	20	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	0.2 J	< 0.1	--	--
Acenaphthylene	208-96-8	NA	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Anthracene	120-12-7	50	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	2 J	4 J	< 5 J	< 5 J	< 2	< 2	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
Chrysene	218-01-9	0.002	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Dibenzofuran	132-64-9	NA	7.9	< 0.5	< 1	< 1	< 1	< 0.5	< 1	1 J	< 0.9	< 0.5	< 0.5	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Fluorene	86-73-7	50	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	0.4 J	0.1 J	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.9	< 0.9	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Isophorone	78-59-1	50	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--
Naphthalene	91-20-3	10	NA	< 0.1	< 1	< 1	< 1	< 0.1	13	10	2 J	1	0.4 J	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID		NY_TOGS	USEPA Tapwater RSL 2019	SWMW-52	SWMW-54	SWMW-54	SWMW-54	SWMW-54	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55
Sample Delivery Group (SDG)				1397265	1022020	1113255	1113255	1397270	1022020	1113255	1195599	1343539	1397265	1461101	1479931
Lab Sample ID				7093586	4961238	5487993	5488004	7093618	4961239	5488005	5987026	6830364	7093597	7401979	7489813
Sample Date				6/13/2013	1/17/2007	10/2/2008	10/2/2008	6/13/2013	1/17/2007	10/2/2008	5/20/2010	10/18/2012	6/13/2013	3/20/2014	6/5/2014
Field Sample ID				SWMW-52(061313)	SWMW-54011707	SWMW-54(10-2-08)	SWMW-154(10-2-08)	SWMW-54(061313)	SWMW-55011707	SWMW-55(10-2-08)	SWMW-55(5-20-10)	SWMW-55(101812)	SWMW-55(061313)	SWMW-55-032014	SWMW-55-060514
Sample Purpose				REG	REG	REG	FD	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code														
Volatile Organic Compounds															
Nitrobenzene	98-95-3	0.4	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
p-Chloro-m-cresol	59-50-7	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
Pentachlorophenol	87-86-5	1	NA	< 1	< 3	< 3	< 3	< 1	< 3	< 3	< 3	< 0.9	< 1	--	--
Phenanthrene	85-01-8	50	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Phenol	108-95-2	1	NA	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.9	< 0.5	< 0.5	--	--
Pyrene	129-00-0	50	NA	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.9	< 0.09	< 0.1	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	7429-90-5	100	NA	1,130	1,180	318	397	251	391	282	384	2,360	205	--	--
Antimony	7440-36-0	3	NA	< 5.3	< 9.7	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 9.7	4.3 J	< 5.3	--	--
Arsenic	7440-38-2	25	NA	< 6.8	< 10	< 10.2	< 10.2	< 6.8	< 10	< 10.2	< 7.2	36	41.8	--	--
Barium	7440-39-3	1000	NA	4.4 J	24.2	30.2	30.3	48.3	43	40.1	49.3	28.1	11.7	--	--
Beryllium	7440-41-7	3	NA	< 0.67	< 0.94	< 0.90	< 0.90	< 0.67	< 0.94	< 0.90	< 1.4	0.91 J	< 0.67	--	--
Cadmium	7440-43-9	5	NA	< 0.76	< 0.91	< 2.0	< 2.0	< 0.76	< 0.91	< 2.0	< 2.0	< 0.36	< 0.76	--	--
Calcium	7440-70-2	NA	NA	9,800	31,000	45,800	45,800	69,900	36,000	41,500	80,100	48,100	37,700	--	--
Chromium	7440-47-3	50	NA	< 1.6	< 2.3	< 3.0	< 3.0	< 1.6	< 2.3	< 3.0	< 3.4	5.3 J	< 1.6	--	--
Cobalt	7440-48-4	5	NA	< 1.3	< 2.1	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 2.1	1.0 J	< 1.3	--	--
Copper	7440-50-8	200	NA	< 2.7	4.9 J	< 2.7	< 2.7	< 2.7	3.4 J	< 2.7	< 2.7	4.5 J	< 2.7	--	--
Iron	7439-89-6	300	NA	1,000	1,340	385	522	664	3,870	6,840	7,390	3,830	715	--	--
Lead	7439-92-1	25	NA	< 4.7	18.4	7.9 J	11.5 J	7.1 J	< 6.9	< 6.9	< 6.9	< 5.1	< 4.7	--	--
Magnesium	7439-95-4	35000	NA	3,050	6,460	8,080	7,900	14,300	8,770	10,600	19,900	10,000	6,830	--	--
Manganese	7439-96-5	300	NA	35.8	50.8	18.7	26.9	8.7	4,890	6,240	7,910	4,290	1,690	2,990	3,580
Nickel	7440-02-0	100	NA	< 1.5	< 5.6	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 1.8	< 1.1	< 1.5	--	--
Potassium	7440-09-7	NA	NA	517	2,520	2,860	3,010	3,950	2,690	2,640	3,150	3,510	2,880	--	--
Selenium	7782-49-2	10	NA	< 8.4	< 9.4	< 10.7	< 10.7	< 8.4	< 9.4	< 10.7	< 8.9	< 7.5	9.6 J	--	--
Silver	7440-22-4	50	NA	< 2.1	< 1.6	< 2.2	< 2.2	< 2.1	1.9 J	< 2.2	< 2.3	< 1.2	< 2.1	--	--
Sodium	7440-23-5	20000	NA	4,700	83,800	150,000	151,000	216,000	93,400	91,200	434,000	144,000	142,000	--	--
Thallium	7440-28-0	0.5	NA	< 5.4	14.2 J	< 14.0	< 14.0	< 5.4	< 13.5	< 14.0	< 14.0	< 30 J	< 5.4	--	--
Vanadium	7440-62-2	NA	86	< 2.0	3.6 J	< 2.5	< 2.5	< 2.0	< 1.5	< 2.5	< 2.5	2.8 J	< 2.0	--	--
Zinc	7440-66-6	2000	NA	6.4 J	< 46.6	< 8.1	10.1 J	9.1 J	< 16.4 J	< 8.1	161	7.9 J	3.0 J	--	--
Mercury	7439-97-6	0.7	NA	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-56	SWMW-56	SWMW-56	SWMW-56	SWMW-56
Sample Delivery Group (SDG)				1503937	1516213	1548024	1570206	1570520	1593311	1608899	1669538	1021535	1115029	1195720	1342893	1398940
Lab Sample ID				7602503	7662952	7819762	7934024	7935728	8049710	8131655	8415291	4958657	5498262	5988001	6826961	7103166
Sample Date				9/16/2014	11/4/2014	3/24/2015	6/16/2015	6/18/2015	9/15/2015	11/11/2015	6/7/2016	1/12/2007	10/14/2008	5/21/2010	10/16/2012	6/20/2013
Field Sample ID				CVX-0030-09	CVX-0034-04	CVX-0046-14	CVX-0048-02	CVX-0050-14	CVX-0062-10	SWMW-55-W-10.00-151111	SWMW-55-W-10.00	SWMW-56011207	SWMW-56(10-14-08)	SWMW-56(5-21-10)	SWMW-56(101612)	SWMW-56(062013)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	44	15	12	10	9
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	65	17	11	8	8
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	< 5	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	< 5	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	< 5	--	--	--	1 J	< 0.9	< 0.9	< 0.5	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	< 5	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	6 J	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	< 3	< 6	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	< 3	< 6	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	< 3	< 6	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	18 J	< 12	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	2	1	--	3 J	14	< 0.5	3	14	4 J	2 J	1 J	1 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	290	1,300	860	--	2,000	1,400	< 0.5	570	1 J	2 J	1 J	0.8 J	< 0.8
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	< 0.5	--	< 3	< 0.5	< 0.5	< 0.5	320	270	260	170	160
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	--	--	< 3	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	< 3	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	< 0.5	< 1	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	< 2	< 4	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	< 3	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	< 10	< 20	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	--	--	< 3	--	--	--	< 0.7	< 1	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	46	91	87	63	56
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	< 1	< 2	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	< 0.5	--	< 3	< 0.5	< 0.5	< 0.5	1,200	560	380	310	270
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	< 0.5	--	< 3	< 0.5	< 0.5	< 0.5	81	23	7	4 J	4 J
Xylene (total)	1330-20-7	5	NA	--	--	--	--	< 3	--	--	--	< 0.8	< 2	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-56	SWMW-56	SWMW-56	SWMW-56	SWMW-56
Sample Delivery Group (SDG)				1503937	1516213	1548024	1570206	1570520	1593311	1608899	1669538	1021535	1115029	1195720	1342893	1398940
Lab Sample ID				7602503	7662952	7819762	7934024	7935728	8049710	8131655	8415291	4958657	5498262	5988001	6826961	7103166
Sample Date				9/16/2014	11/4/2014	3/24/2015	6/16/2015	6/18/2015	9/15/2015	11/11/2015	6/7/2016	1/12/2007	10/14/2008	5/21/2010	10/16/2012	6/20/2013
Field Sample ID				CVX-0030-09	CVX-0034-04	CVX-0046-14	CVX-0048-02	CVX-0050-14	CVX-0062-10	SWMW-55-W-10.00-151111	SWMW-55-W-10.00	SWMW-56011207	SWMW-56(10-14-08)	SWMW-56(5-21-10)	SWMW-56(101612)	SWMW-56(062013)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	< 20	< 19	< 9	< 9	< 11
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.9	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	< 10	< 9	< 9	< 9	< 11
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	160	61	32	27	24
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	23	2 J	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	0.1 J	< 0.1
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.9	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID				SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-55	SWMW-56	SWMW-56	SWMW-56	SWMW-56	SWMW-56
Sample Delivery Group (SDG)				1503937	1516213	1548024	1570206	1570520	1593311	1608899	1669538	1021535	1115029	1195720	1342893	1398940
Lab Sample ID				7602503	7662952	7819762	7934024	7935728	8049710	8131655	8415291	4958657	5498262	5988001	6826961	7103166
Sample Date				9/16/2014	11/4/2014	3/24/2015	6/16/2015	6/18/2015	9/15/2015	11/11/2015	6/7/2016	1/12/2007	10/14/2008	5/21/2010	10/16/2012	6/20/2013
Field Sample ID				CVX-0030-09	CVX-0034-04	CVX-0046-14	CVX-0048-02	CVX-0050-14	CVX-0062-10	SWMW-55-W-10.00-151111	SWMW-55-W-10.00	SWMW-56011207	SWMW-56(10-14-08)	SWMW-56(5-21-10)	SWMW-56(101612)	SWMW-56(062013)
Sample Purpose				REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																
Nitrobenzene	98-95-3	0.4	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
p-Chloro-m-cresol	59-50-7	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
Pentachlorophenol	87-86-5	1	NA	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0.9	< 1
Phenanthrene	85-01-8	50	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Phenol	108-95-2	1	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.5	< 0.5
Pyrene	129-00-0	50	NA	--	--	--	--	--	--	--	--	< 1	< 0.9	< 0.9	< 0.09	< 0.1
Polychlorinated Biphenyls†																
Aroclor 1016	12674-11-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	11104-28-2	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	11141-16-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	53469-21-9	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	12672-29-6	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	11097-69-1	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	11096-82-5	0.09	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	7429-90-5	100	NA	--	--	--	--	--	--	--	--	361	93.4 J	110 J	208	< 82.8
Antimony	7440-36-0	3	NA	--	--	--	--	--	--	--	--	< 9.7	< 9.7	< 9.7	< 3.5	< 5.3
Arsenic	7440-38-2	25	NA	--	--	--	--	--	--	--	--	< 10	< 10.2	< 7.2	< 6.8	< 6.8
Barium	7440-39-3	1000	NA	--	--	--	--	--	--	--	--	50.9	50.3	69.8	80.6	82
Beryllium	7440-41-7	3	NA	--	--	--	--	--	--	--	--	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67
Cadmium	7440-43-9	5	NA	--	--	--	--	--	--	--	--	< 0.91	< 2.0	< 2.0	< 0.36	< 0.76
Calcium	7440-70-2	NA	NA	--	--	--	--	--	--	--	--	72,300	63,700	86,400	96,900	98,800
Chromium	7440-47-3	50	NA	--	--	--	--	--	--	--	--	22.2	< 3.0	< 3.4	< 1.1	< 1.6
Cobalt	7440-48-4	5	NA	--	--	--	--	--	--	--	--	< 2.1	< 2.1	< 2.1	< 5 J	< 1.3
Copper	7440-50-8	200	NA	--	--	--	--	--	--	--	--	< 2.2	< 2.7	< 2.7	< 2.1	< 2.7
Iron	7439-89-6	300	NA	--	--	--	--	--	--	--	--	409	269	110 J	271	65.8 J
Lead	7439-92-1	25	NA	--	--	--	--	--	--	--	--	< 6.9	< 6.9	< 6.9	< 5.1	< 4.7
Magnesium	7439-95-4	35000	NA	--	--	--	--	--	--	--	--	56,500	62,200	47,700	45,600	47,000
Manganese	7439-96-5	300	NA	4,160	3,500	2,470	3,170	--	4,670	520	3,530	31.6	42.9	79.2	107	117
Nickel	7440-02-0	100	NA	--	--	--	--	--	--	--	--	< 5.6	< 5.6	< 1.8	< 1.1	< 1.5
Potassium	7440-09-7	NA	NA	--	--	--	--	--	--	--	--	12,000	4,930	1,630	1,420	1,170
Selenium	7782-49-2	10	NA	--	--	--	--	--	--	--	--	< 9.4	< 10.7	< 8.9	< 7.5	< 8.4
Silver	7440-22-4	50	NA	--	--	--	--	--	--	--	--	< 1.6	< 2.2	< 2.3	< 1.2	< 2.1
Sodium	7440-23-5	20000	NA	--	--	--	--	--	--	--	--	34,000	28,600	28,200	32,500	37,000
Thallium	7440-28-0	0.5	NA	--	--	--	--	--	--	--	--	< 13.5	< 14.0	< 14.0	< 30 J	< 5.4
Vanadium	7440-62-2	NA	86	--	--	--	--	--	--	--	--	2.0 J	< 2.5	< 2.5	< 1.3	< 2.0
Zinc	7440-66-6	2000	NA	--	--	--	--	--	--	--	--	< 8.1	< 8.1	< 8.1	9.3 J	2.7 J
Mercury	7439-97-6	0.7	NA	--	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.060

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-56 1463182 7412716 3/28/2014 SWMW-56-032814 REG	SWMW-56 1480953 7494460 6/10/2014 SWMW-56-061014 REG	SWMW-56 1504703 7606256 9/18/2014 CVX-0032-03 REG	SWMW-56 1516918 7666472 11/6/2014 CVX-0036-02 REG	SWMW-56 1546899 7813895 3/19/2015 CVX-0044-03 REG	SWMW-56 1546899 7813898 3/19/2015 CVX-0044-06 FD	SWMW-56 1570520 7935721 6/18/2015 CVX-0050-07 REG	SWMW-56 1592327 8045000 9/11/2015 CVX-0061-03 REG	SWMW-56 1609458 8135152 11/13/2015 SWMW-56-W-35.00-151113 REG	SWMW-56 1670544 8419272 6/9/2016 SWMW-56-W-35.00-160609 REG	SWMW-57 1022234 4962202 1/18/2007 SWMW-57011807 REG	SWMW-57 1114221 5493847 10/8/2008 SWMW-57(10-8-08) REG	SWMW-57 1398234 7098433 6/18/2013 SWMW-57(061813) REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 6	< 6	< 6
Benzene	71-43-2	1	NA	1	1	1	1	1	1	1	1 J	1	1	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	0.7 J	0.8 J	0.9 J	0.7 J	1 J	0.6 J	0.8 J	0.7 J	0.6 J	0.9 J	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	130	130	140	170	160	160	140	150	160	160	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	--	--	--	--	0.6 J	< 0.5	0.6 J
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	280	300	290	290	310	310	250	300	300	300	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	4	4	3	4	3	3	3	2	3	2	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-56 1463182 7412716 3/28/2014 SWMW-56-032814 REG	SWMW-56 1480953 7494460 6/10/2014 SWMW-56-061014 REG	SWMW-56 1504703 7606256 9/18/2014 CVX-0032-03 REG	SWMW-56 1516918 7666472 11/6/2014 CVX-0036-02 REG	SWMW-56 1546899 7813895 3/19/2015 CVX-0044-03 REG	SWMW-56 1546899 7813898 3/19/2015 CVX-0044-06 FD	SWMW-56 1570520 7935721 6/18/2015 CVX-0050-07 REG	SWMW-56 1592327 8045000 9/11/2015 CVX-0061-03 REG	SWMW-56 1609458 8135152 11/13/2015 SWMW-56-W-35.00-151113 REG	SWMW-56 1670544 8419272 6/9/2016 SWMW-56-W-35.00-160609 REG	SWMW-57 1022234 4962202 1/18/2007 SWMW-57011807 REG	SWMW-57 1114221 5493847 10/8/2008 SWMW-57(10-8-08) REG	SWMW-57 1398234 7098433 6/18/2013 SWMW-57(061813) REG
Volatile Organic Compounds																
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	--	--	--	--	< 20	< 20	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 5 J	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	--	--	--	--	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	--	--	--	--	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1

Appendix B-2
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-56 1463182 7412716 3/28/2014 SWMW-56-032814 REG	SWMW-56 1480953 7494460 6/10/2014 SWMW-56-061014 REG	SWMW-56 1504703 7606256 9/18/2014 CVX-0032-03 REG	SWMW-56 1516918 7666472 11/6/2014 CVX-0036-02 REG	SWMW-56 1546899 7813895 3/19/2015 CVX-0044-03 REG	SWMW-56 1546899 7813898 3/19/2015 CVX-0044-06 FD	SWMW-56 1570520 7935721 6/18/2015 CVX-0050-07 REG	SWMW-56 1592327 8045000 9/11/2015 CVX-0061-03 REG	SWMW-56 1609458 8135152 11/13/2015 SWMW-56-W-35.00-151113 REG	SWMW-56 1670544 8419272 6/9/2016 SWMW-56-W-35.00-160609 REG	SWMW-57 1022234 4962202 1/18/2007 SWMW-57011807 REG	SWMW-57 1114221 5493847 10/8/2008 SWMW-57(10-8-08) REG	SWMW-57 1398234 7098433 6/18/2013 SWMW-57(061813) REG
Volatile Organic Compounds																
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	< 3	< 3	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 1	< 1	< 0.1
Polychlorinated Biphenyls†																
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	297	101 J	466
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	< 9.7	15.6 J	< 5.3
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	< 10	< 10.2	< 6.8
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	--	--	--	--	76.2	24.3	84.3
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.94	< 0.90	< 0.67
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.91	< 2.0	< 0.76
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	129,000	70,100	120,000
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 2.3	< 3.0	< 1.6
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 2.1	< 2.1	< 1.3
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	--	--	--	--	< 2.2	< 2.7	< 2.7
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	--	--	--	--	459	288	762
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	< 6.9	< 6.9	< 4.7
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	--	--	--	--	17,700	9,890	17,200
Manganese	**7439-96-5**	**300**	**NA**	193	95.8	75.2	88.7	96.8	729	127	68.1	131	74.6	1,720	626	1,160
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	< 5.6	< 5.6	< 1.5
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	1,710	4,360	1,460
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	< 9.4	< 10.7	< 8.4
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 1.6	< 2.2	< 2.1
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	--	--	--	--	41,600	39,100	37,200
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 13.5	< 14.0	< 5.4
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	--	--	--	--	1.5 J	< 2.5	2.8 J
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	--	--	--	--	8.2 J	< 8.1	13.1 J
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-59 1022435 4963411 1/19/2007 SWMW-59011907 REG	SWMW-59 1113255 5487990 10/2/2008 SWMW-59(10-2-08) REG	SWMW-59 1397265 7093580 6/13/2013 SWMW-59(061313) REG	SWMW-6 1022435 4963404 1/19/2007 SWMW-6011907 REG	SWMW-6 1114221 5493846 10/8/2008 SWMW-6(10-8-08) REG	SWMW-6 1398234 7098434 6/18/2013 SWMW-6(061813) REG	SWMW-64 1021819 4959992 1/16/2007 SWMW-64011607 REG	SWMW-64 1114664 5496351 10/10/2008 SWMW-64(10-10-08) REG	SWMW-64 1397510 7095174 6/14/2013 SWMW-64(061413) REG	SWMW-66 1021328 4957588 1/11/2007 SWMW66011107 REG	SWMW-66 1115029 5498267 10/14/2008 SWMW-66(10-14-08) REG	SWMW-66 1195720 5988003 5/21/2010 SWMW-66(5-21-10) REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2 J	2 J	< 0.8	35	23	23
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	3 J	1 J	0.9 J
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	3 J	2 J	< 1	29	13	18
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	12	14	5
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	< 6	< 6	--	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	7	5 J	3 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	12	24	8
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1 J	< 1	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	1 J	< 0.8	1,000	470	760
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.8 J	< 0.8	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	1 J	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2 J	2 J	2 J
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	3 J	3 J	< 1	660	320	370
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	130	100	73
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-59 1022435 4963411 1/19/2007 SWMW-59011907 REG	SWMW-59 1113255 5487990 10/2/2008 SWMW-59(10-2-08) REG	SWMW-59 1397265 7093580 6/13/2013 SWMW-59(061313) REG	SWMW-6 1022435 4963404 1/19/2007 SWMW-6011907 REG	SWMW-6 1114221 5493846 10/8/2008 SWMW-6(10-8-08) REG	SWMW-6 1398234 7098434 6/18/2013 SWMW-6(061813) REG	SWMW-64 1021819 4959992 1/16/2007 SWMW-64011607 REG	SWMW-64 1114664 5496351 10/10/2008 SWMW-64(10-10-08) REG	SWMW-64 1397510 7095174 6/14/2013 SWMW-64(061413) REG	SWMW-66 1021328 4957588 1/11/2007 SWMW66011107 REG	SWMW-66 1115029 5498267 10/14/2008 SWMW-66(10-14-08) REG	SWMW-66 1195720 5988003 5/21/2010 SWMW-66(5-21-10) REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 19	< 10	< 20	< 19	< 10	< 20	< 19	< 10	< 21	< 19	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 0.9	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 10	< 10	< 9	< 10	< 10	< 10	< 10	< 10	< 9	< 10
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
bis(2-Chloroethyl) ether	111-44-4	1	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	2 J	1 J	1 J
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	2 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	7
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Fluorene	86-73-7	50	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 0.9	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2
Naphthalene	91-20-3	10	NA	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1

Appendix B-2
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-59 1022435 4963411 1/19/2007 SWMW-59011907 REG	SWMW-59 1113255 5487990 10/2/2008 SWMW-59(10-2-08) REG	SWMW-59 1397265 7093580 6/13/2013 SWMW-59(061313) REG	SWMW-6 1022435 4963404 1/19/2007 SWMW-6011907 REG	SWMW-6 1114221 5493846 10/8/2008 SWMW-6(10-8-08) REG	SWMW-6 1398234 7098434 6/18/2013 SWMW-6(061813) REG	SWMW-64 1021819 4959992 1/16/2007 SWMW-64011607 REG	SWMW-64 1114664 5496351 10/10/2008 SWMW-64(10-10-08) REG	SWMW-64 1397510 7095174 6/14/2013 SWMW-64(061413) REG	SWMW-66 1021328 4957588 1/11/2007 SWMW66011107 REG	SWMW-66 1115029 5498267 10/14/2008 SWMW-66(10-14-08) REG	SWMW-66 1195720 5988003 5/21/2010 SWMW-66(5-21-10) REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 1	< 3	< 3	< 1	< 3	< 3	< 1	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 0.5	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 0.9	< 1
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 0.1	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 0.9	< 1
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	71,500	10,200	8,300	123 J	1,050	875	2,100	< 80.2	146 J	1,700	179 J	84.0 J
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	30.4	< 10.2	< 6.8	< 10	< 10.2	< 6.8	< 10	< 10.2	< 6.8	< 10	< 10.2	< 7.2
Barium	**7440-39-3**	**1000**	**NA**	479	77.5	175	6.2	16.1	12.8	83.2	72.5	28.5	75.7	64.6	83.5
Beryllium	**7440-41-7**	**3**	**NA**	7.8	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	< 0.94	< 0.90	< 1.4
Cadmium	**7440-43-9**	**5**	**NA**	1.3 J	< 2.0	< 0.76	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 0.36	< 0.91	< 2.0	< 2.0
Calcium	**7440-70-2**	**NA**	**NA**	67,600	38,500	34,300	22,400	41,700	18,000	116,000	150,000	61,500	198,000	174,000	209,000
Chromium	**7440-47-3**	**50**	**NA**	65.2	10.3 J	8.5 J	< 2.3	< 3.0	< 1.6	7.3 J	< 3.0	3.3 J	< 2.3	< 3.0	< 3.4
Cobalt	**7440-48-4**	**5**	**NA**	25.5	3.6 J	4.5 J	< 2.1	< 2.1	< 1.3	< 2.1	< 2.1	< 0.66	< 2.1	< 2.1	< 2.1
Copper	**7440-50-8**	**200**	**NA**	160	27.6	18.5	< 2.2	< 2.7	< 2.7	4.6 J	< 2.7	2.9 J	2.6 J	< 2.7	< 2.7
Iron	**7439-89-6**	**300**	**NA**	80,700	10,700	8,540	198 J	1,560	1,210	2,560	106 J	184 J	1,650	398	73.2 J
Lead	**7439-92-1**	**25**	**NA**	844	142	79.6	< 6.9	< 6.9	< 4.7	7.5 J	< 6.9	< 5.1	< 6.9	< 6.9	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	22,800	7,990	7,350	3,470	6,930	3,050	52,400	68,500	13,200	76,000	67,300	78,700
Manganese	**7439-96-5**	**300**	**NA**	3,410	3,250	14,800	53.3	27.8	21.6	99.7	8.4	11.3	176	201	185
Nickel	**7440-02-0**	**100**	**NA**	48.9	8.1 J	6.3 J	< 5.6	< 5.6	< 1.5	< 5.6	< 5.6	< 1.1	< 5.6	< 5.6	2.5 J
Potassium	**7440-09-7**	**NA**	**NA**	6,690	3,120	2,430	1,030	1,570	952	4,250	2,330	4,350	2,110	1,890	2,380
Selenium	**7782-49-2**	**10**	**NA**	< 9.4	< 10.7	11.8 J	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 8.9
Silver	**7440-22-4**	**50**	**NA**	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 1.2	< 1.6	< 2.2	< 2.3
Sodium	**7440-23-5**	**20000**	**NA**	65,200	64,600	59,200	20,900	30,800	23,900	40,500	59,500	15,600	82,400	100,000	261,000
Thallium	**7440-28-0**	**0.5**	**NA**	< 13.5	< 14.0	7.2 J	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 14.0
Vanadium	**7440-62-2**	**NA**	**86**	84.4	13.5	12	< 1.5	< 2.5	< 2.0	2.4 J	< 2.5	< 1.3	3.1 J	< 2.5	< 2.5
Zinc	**7440-66-6**	**2000**	**NA**	338	126	52.9	< 8.1	10.4 J	3.5 J	39.1	13.2 J	184	< 8.1	11.5 J	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	0.084 J	< 0.056	0.17 J	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-66 1342893 6826964 10/16/2012 SWMW-66(101612) REG	SWMW-66 1398940 7103163 6/20/2013 SWMW-66(062013) REG	SWMW-66 1462877 7410804 3/27/2014 SWMW-66-032714 REG	SWMW-66 1480953 7494459 6/10/2014 SWMW-66-061014 REG	SWMW-66 1504703 7606258 9/18/2014 CVX-0032-05 REG	SWMW-66 1516918 7666474 11/6/2014 CVX-0036-04 REG	SWMW-66 1546899 7813897 3/19/2015 CVX-0044-05 REG	SWMW-66 1570520 7935723 6/18/2015 CVX-0050-09 REG	SWMW-66 1592327 8045006 9/11/2015 CVX-0061-09 REG	SWMW-66 1609458 8135153 11/13/2015 SWMW-66-W-43.00-151113 REG	SWMW-66 1670544 8419274 6/9/2016 SWMW-66-W-43.00-160609 REG	SWMW-68 1021819 4959985 1/16/2007 SWMW-68011607 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	25	24	--	--	--	--	--	--	--	--	--	9
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	0.9 J	--	--	--	--	--	--	--	--	--	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	20	21	--	--	--	--	--	--	--	--	--	6
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	3	3	--	--	--	--	--	--	--	--	--	< 1
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3
2-Hexanone	591-78-6	50	NA	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	--	--	--	--	--	--	--	--	--	< 3
Acetone	67-64-1	50	NA	< 6	< 6	--	--	--	--	--	--	--	--	--	< 6
Benzene	71-43-2	1	NA	3 J	2 J	1	2	1	0.8 J	< 0.5	0.6 J	0.8 J	0.7 J	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Bromoform	75-25-2	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Carbon disulfide	75-15-0	60	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	1 J
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Chlorobenzene	108-90-7	5	NA	4 J	3 J	2	2	2	1 J	0.6 J	0.8 J	0.9 J	0.8 J	< 0.5	< 0.8
Chloroethane	75-00-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	780	950	620	800	560	440	330	440	400	370	300	61
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	1 J
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	--	--	--	--	--	--	--	--	--	< 10
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Toluene	108-88-3	5	NA	< 0.7	< 0.7	--	--	--	--	--	--	--	--	--	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	2 J	2 J	--	--	--	--	--	--	--	--	--	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	300	320	280	250	270	250	180	230	240	210	200	430
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	78	62	46	54	29	11	6	12	14	10	5	3 J
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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Volatile Organic Compounds															
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 3
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	< 10	< 10	--	--	--	--	--	--	--	--	--	< 19
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 0.4	< 0.4	--	--	--	--	--	--	--	--	--	< 2
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 5	< 5	--	--	--	--	--	--	--	--	--	< 5
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 2
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 2
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 10	< 10	--	--	--	--	--	--	--	--	--	< 10
Acenaphthene	**83-32-9**	**20**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Anthracene	**120-12-7**	**50**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	2	2	--	--	--	--	--	--	--	--	--	3 J
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Carbazole	**86-74-8**	**NA**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Chrysene	**218-01-9**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Diethylphthalate	**84-66-2**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 2	< 2	--	--	--	--	--	--	--	--	--	< 2
Fluoranthene	**206-44-0**	**50**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Fluorene	**86-73-7**	**50**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 5	< 5	--	--	--	--	--	--	--	--	--	< 5
Hexachloroethane	**67-72-1**	**5**	**NA**	< 1	< 1	--	--	--	--	--	--	--	--	--	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Isophorone	**78-59-1**	**50**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 2
Naphthalene	**91-20-3**	**10**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1

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Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 1	--	--	--	--	--	--	--	--	--	< 3
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--	< 1
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	< 0.1	--	--	--	--	--	--	--	--	--	< 1
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	597	235	--	--	--	--	--	--	--	--	--	352
Antimony	**7440-36-0**	**3**	**NA**	4.0 J	< 5.3	--	--	--	--	--	--	--	--	--	< 9.7
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	< 6.8	--	--	--	--	--	--	--	--	--	< 10
Barium	**7440-39-3**	**1000**	**NA**	84.1	70.9	--	--	--	--	--	--	--	--	--	40.6
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.67	--	--	--	--	--	--	--	--	--	< 0.94
Cadmium	**7440-43-9**	**5**	**NA**	< 0.36	< 0.76	--	--	--	--	--	--	--	--	--	< 0.91
Calcium	**7440-70-2**	**NA**	**NA**	189,000	179,000	--	--	--	--	--	--	--	--	--	89,400
Chromium	**7440-47-3**	**50**	**NA**	1.6 J	< 1.6	--	--	--	--	--	--	--	--	--	< 2.3
Cobalt	**7440-48-4**	**5**	**NA**	< 0.66	< 1.3	--	--	--	--	--	--	--	--	--	< 2.1
Copper	**7440-50-8**	**200**	**NA**	< 2.1	< 2.7	--	--	--	--	--	--	--	--	--	2.7 J
Iron	**7439-89-6**	**300**	**NA**	845	369	--	--	--	--	--	--	--	--	--	346
Lead	**7439-92-1**	**25**	**NA**	< 5.1	< 4.7	--	--	--	--	--	--	--	--	--	< 6.9
Magnesium	**7439-95-4**	**35000**	**NA**	69,000	66,000	--	--	--	--	--	--	--	--	--	34,900
Manganese	**7439-96-5**	**300**	**NA**	210	105	358	70.2	168	82.9	26.3	166	242	130	47.2	10.7
Nickel	**7440-02-0**	**100**	**NA**	< 1.1	< 1.5	--	--	--	--	--	--	--	--	--	< 5.6
Potassium	**7440-09-7**	**NA**	**NA**	2,090	1,830	--	--	--	--	--	--	--	--	--	1,780
Selenium	**7782-49-2**	**10**	**NA**	< 7.5	< 8.4	--	--	--	--	--	--	--	--	--	< 9.4
Silver	**7440-22-4**	**50**	**NA**	< 1.2	< 2.1	--	--	--	--	--	--	--	--	--	< 1.6
Sodium	**7440-23-5**	**20000**	**NA**	124,000	103,000	--	--	--	--	--	--	--	--	--	40,000
Thallium	**7440-28-0**	**0.5**	**NA**	< 30 J	< 5.4	--	--	--	--	--	--	--	--	--	< 67.5
Vanadium	**7440-62-2**	**NA**	**86**	< 1.3	< 2.0	--	--	--	--	--	--	--	--	--	< 1.5
Zinc	**7440-66-6**	**2000**	**NA**	7.7 J	15.6 J	--	--	--	--	--	--	--	--	--	< 8.1
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.060	--	--	--	--	--	--	--	--	--	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-68 1115029 5498255 10/14/2008 SWMW-68(10-14-08) REG	SWMW-68 1195720 5987997 5/21/2010 SWMW-68(5-21-10) REG	SWMW-68 1342893 6826954 10/16/2012 SWMW-68(101612) REG	SWMW-68 1398940 7103159 6/20/2013 SWMW-68(062013) REG	SWMW-68 1462188 7407279 3/25/2014 SWMW-68-032514 REG	SWMW-68 1480953 7494456 6/10/2014 SWMW-68-061014 REG	SWMW-68 1504703 7606262 9/18/2014 CVX-0032-06 REG	SWMW-68 1516918 7666479 11/6/2014 CVX-0036-06 REG	SWMW-68 1546899 7813904 3/19/2015 CVX-0044-12 REG	SWMW-68 1570520 7935725 6/18/2015 CVX-0050-11 REG	SWMW-68 1592327 8045003 9/11/2015 CVX-0061-06 REG	SWMW-68 1609458 8135154 11/13/2015 SWMW-68-W-31.00-151113 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	8	7	7	5	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	5	4 J	5 J	4 J	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	--	--	--	--	--	--	--	--
Benzene	71-43-2	1	NA	1 J	0.9 J	0.6 J	0.6 J	0.5 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	69	99	82	80	56	65	82	76	63	49	66	69
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	0.5 J	< 0.5	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	410	480	590	590	340	370	390	390	300	350	340	350
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	4 J	4 J	2 J	1 J	3 J	3	2	1	1 J	3	0.9 J	2
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-68 1115029 5498255 10/14/2008 SWMW-68(10-14-08) REG	SWMW-68 1195720 5987997 5/21/2010 SWMW-68(5-21-10) REG	SWMW-68 1342893 6826954 10/16/2012 SWMW-68(101612) REG	SWMW-68 1398940 7103159 6/20/2013 SWMW-68(062013) REG	SWMW-68 1462188 7407279 3/25/2014 SWMW-68-032514 REG	SWMW-68 1480953 7494456 6/10/2014 SWMW-68-061014 REG	SWMW-68 1504703 7606262 9/18/2014 CVX-0032-06 REG	SWMW-68 1516918 7666479 11/6/2014 CVX-0036-06 REG	SWMW-68 1546899 7813904 3/19/2015 CVX-0044-12 REG	SWMW-68 1570520 7935725 6/18/2015 CVX-0050-11 REG	SWMW-68 1592327 8045003 9/11/2015 CVX-0061-06 REG	SWMW-68 1609458 8135154 11/13/2015 SWMW-68-W-31.00-151113 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	< 20	< 10	< 9	< 10	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	< 10	< 10	< 9	< 10	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	3 J	3 J	1	1	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	< 1	< 1	< 0.9	< 1	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--

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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-68 1115029 5498255 10/14/2008 SWMW-68(10-14-08) REG	SWMW-68 1195720 5987997 5/21/2010 SWMW-68(5-21-10) REG	SWMW-68 1342893 6826954 10/16/2012 SWMW-68(101612) REG	SWMW-68 1398940 7103159 6/20/2013 SWMW-68(062013) REG	SWMW-68 1462188 7407279 3/25/2014 SWMW-68-032514 REG	SWMW-68 1480953 7494456 6/10/2014 SWMW-68-061014 REG	SWMW-68 1504703 7606262 9/18/2014 CVX-0032-06 REG	SWMW-68 1516918 7666479 11/6/2014 CVX-0036-06 REG	SWMW-68 1546899 7813904 3/19/2015 CVX-0044-12 REG	SWMW-68 1570520 7935725 6/18/2015 CVX-0050-11 REG	SWMW-68 1592327 8045003 9/11/2015 CVX-0061-06 REG	SWMW-68 1609458 8135154 11/13/2015 SWMW-68-W-31.00-151113 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 3	< 3	< 0.9	< 1	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 1	< 1	< 0.09	< 0.1	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	734	171 J	705	254	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 5.3	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	46.9	50.1	69.6	42.6	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 2.0	< 2.0	< 0.36	< 0.76	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	89,300	91,700	102,000	103,000	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 3.0	< 3.4	1.8 J	< 1.6	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 2.1	< 2.1	< 5 J	< 1.3	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	< 2.7	< 2.1	< 2.7	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	965	162 J	871	181 J	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 6.9	< 6.9	< 5.1	< 4.7	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	35,800	39,600	38,400	40,100	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	165	40.4	702	31.4	95.6	189	791	69.2	69.7	255	49.6	159
Nickel	**7440-02-0**	**100**	**NA**	< 5.6	< 1.8	< 1.1	< 1.5	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	1,830	1,700	1,660	1,650	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 8.4	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 2.1	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	36,100	32,200	35,300	34,200	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 14.0	< 14.0	< 30 J	< 5.4	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.5	< 2.5	< 1.3	< 2.0	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	< 8.1	< 8.1	4.9 J	< 2.0	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.060	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-68 1670544 8419269 6/9/2016 SWMW-68-W-31.00-160609 REG	SWMW-7 1022020 4961233 1/17/2007 SWMW-7011707 REG	SWMW-7 1114221 5493845 10/8/2008 SWMW-7(10-8-08) REG	SWMW-7 1398234 7098435 6/18/2013 SWMW-7(061813) REG	SWMW-70 1021328 4957590 1/11/2007 SWMW70011107 REG	SWMW-70 1115029 5498263 10/14/2008 SWMW-70(10-14-08) REG	SWMW-70 1398940 7103160 6/20/2013 SWMW-70(062013) REG	SWMW-9 1022435 4963405 1/19/2007 SWMW-9011907 REG	SWMW-9 1114221 5493850 10/8/2008 SWMW-9(10-8-08) REG	SWMW-9 1195186 5984073 5/18/2010 SWMW-09(5-18-10) REG	SWMW-9 1343539 6830362 10/18/2012 SWMW-9(101812) REG
Volatile Organic Compounds														
1,1 Dichloroethene	75-35-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	1	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1-Dichloroethane	75-34-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2-Dichloroethane	107-06-2	0.6	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	3	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	3	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	3 J	3 J	< 1	0.5 J
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	9 J	< 3	< 3
2-Hexanone	591-78-6	50	NA	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	NA	6300	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	50	NA	--	< 6	< 6	< 6	< 6	< 6	< 6	8 J	27	< 6	< 6
Benzene	71-43-2	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	60	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	5	NA	--	< 1	< 1	< 1	1 J	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	5	NA	< 0.5	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	9	11	< 0.8	2 J
Chloroethane	75-00-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	7	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	5	NA	42	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	124-48-1	50	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	NA	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	< 10	15 J	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	5	NA	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	340	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds														
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-68 1670544 8419269 6/9/2016 SWMW-68-W-31.00-160609 REG	SWMW-7 1022020 4961233 1/17/2007 SWMW-7011707 REG	SWMW-7 1114221 5493845 10/8/2008 SWMW-7(10-8-08) REG	SWMW-7 1398234 7098435 6/18/2013 SWMW-7(061813) REG	SWMW-70 1021328 4957590 1/11/2007 SWMW70011107 REG	SWMW-70 1115029 5498263 10/14/2008 SWMW-70(10-14-08) REG	SWMW-70 1398940 7103160 6/20/2013 SWMW-70(062013) REG	SWMW-9 1022435 4963405 1/19/2007 SWMW-9011907 REG	SWMW-9 1114221 5493850 10/8/2008 SWMW-9(10-8-08) REG	SWMW-9 1195186 5984073 5/18/2010 SWMW-09(5-18-10) REG	SWMW-9 1343539 6830362 10/18/2012 SWMW-9(101812) REG
Volatile Organic Compounds														
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	1	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	50	NA	--	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	10	NA	--	< 23	< 19	< 11	< 22	< 19	< 10	< 20	< 20	< 10	< 10
2,4-Dinitrotoluene	121-14-2	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	10	NA	--	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	NA	36	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	< 6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	NA	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	1	NA	--	< 11	< 10	< 11	< 11	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	20	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Acenaphthylene	208-96-8	NA	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Anthracene	120-12-7	50	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(a)anthracene	56-55-3	0.002	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(a)pyrene	50-32-8	NA	0.025	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	< 2	< 6	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbazole	86-74-8	NA	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Chrysene	218-01-9	0.002	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Di-n-butylphthalate	84-74-2	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Dibenzofuran	132-64-9	NA	7.9	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	50	NA	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Fluoranthene	206-44-0	50	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Fluorene	86-73-7	50	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Hexachlorobenzene	118-74-1	0.04	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Hexachlorobutadiene	87-68-3	0.5	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Hexachlorocyclopentadiene	77-47-4	5	NA	--	< 6	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Hexachloroethane	67-72-1	5	NA	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Isophorone	78-59-1	50	NA	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5
Naphthalene	91-20-3	10	NA	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-68 1670544 8419269 6/9/2016 SWMW-68-W-31.00-160609 REG	SWMW-7 1022020 4961233 1/17/2007 SWMW-7011707 REG	SWMW-7 1114221 5493845 10/8/2008 SWMW-7(10-8-08) REG	SWMW-7 1398234 7098435 6/18/2013 SWMW-7(061813) REG	SWMW-70 1021328 4957590 1/11/2007 SWMW70011107 REG	SWMW-70 1115029 5498263 10/14/2008 SWMW-70(10-14-08) REG	SWMW-70 1398940 7103160 6/20/2013 SWMW-70(062013) REG	SWMW-9 1022435 4963405 1/19/2007 SWMW-9011907 REG	SWMW-9 1114221 5493850 10/8/2008 SWMW-9(10-8-08) REG	SWMW-9 1195186 5984073 5/18/2010 SWMW-09(5-18-10) REG	SWMW-9 1343539 6830362 10/18/2012 SWMW-9(101812) REG
Volatile Organic Compounds														
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	< 3	< 3	< 1	< 3	< 3	< 1	< 3	< 3	< 3	< 1
Phenanthrene	**85-01-8**	**50**	**NA**	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Phenol	**108-95-2**	**1**	**NA**	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**50**	**NA**	--	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Polychlorinated Biphenyls†														
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Metals														
Aluminum	**7429-90-5**	**100**	**NA**	--	937	86.4 J	970	62,900	3,380	875	84.0 J	112 J	340	12,300
Antimony	**7440-36-0**	**3**	**NA**	--	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 5.3	< 9.7	< 9.7	< 9.7	< 3.5
Arsenic	**7440-38-2**	**25**	**NA**	--	26.4	< 10.2	13.7 J	17.3 J	< 10.2	< 6.8	< 10	< 10.2	< 7.2	11.0 J
Barium	**7440-39-3**	**1000**	**NA**	--	16.5	13.6	24.9	407	70.7	42.2	75.2	44.4	327	331
Beryllium	**7440-41-7**	**3**	**NA**	--	< 0.94	< 0.90	< 0.67	3.1 J	< 0.90	< 0.67	< 0.94	< 0.90	< 1.4	1.2 J
Cadmium	**7440-43-9**	**5**	**NA**	--	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 0.76	< 0.91	< 2.0	< 2.0	< 0.36
Calcium	**7440-70-2**	**NA**	**NA**	--	33,500	24,500	39,400	209,000	76,800	62,900	93,500	68,200	136,000	121,000
Chromium	**7440-47-3**	**50**	**NA**	--	< 2.3	< 3.0	< 1.6	99.7	3.8 J	2.1 J	< 2.3	< 3.0	< 3.4	20.2
Cobalt	**7440-48-4**	**5**	**NA**	--	< 2.1	< 2.1	< 1.3	25.9	< 2.1	< 1.3	< 2.1	< 2.1	< 2.1	3.7 J
Copper	**7440-50-8**	**200**	**NA**	--	2.8 J	< 2.7	< 2.7	77.2	3.2 J	< 2.7	< 2.2	< 2.7	< 2.7	13.4
Iron	**7439-89-6**	**300**	**NA**	--	671	57.5 J	776	73,100	4,990	801	469	310	692	14,100
Lead	**7439-92-1**	**25**	**NA**	--	< 6.9	< 6.9	< 4.7	43.3	< 6.9	< 4.7	< 6.9	< 6.9	< 6.9	14.0 J
Magnesium	**7439-95-4**	**35000**	**NA**	--	6,330	5,160	8,560	125,000	39,300	24,800	15,800	12,300	18,400	18,100
Manganese	**7439-96-5**	**300**	**NA**	12	296	210	17.2	1,730	115	17	4,880	4,000	105	2,980
Nickel	**7440-02-0**	**100**	**NA**	--	< 5.6	< 5.6	< 1.5	65	< 5.6	< 1.5	< 5.6	< 5.6	6.9 J	8.8 J
Potassium	**7440-09-7**	**NA**	**NA**	--	1,850	1,860	1,810	14,800	1,920	4,100	2,750	3,740	3,440	5,130
Selenium	**7782-49-2**	**10**	**NA**	--	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 8.4	< 9.4	< 10.7	< 8.9	< 7.5
Silver	**7440-22-4**	**50**	**NA**	--	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.1	< 1.6	< 2.2	< 2.3	< 1.2
Sodium	**7440-23-5**	**20000**	**NA**	--	54,800	84,500	56,100	34,500	40,200	35,300	155,000	152,000	134,000	156,000
Thallium	**7440-28-0**	**0.5**	**NA**	--	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 5.4	< 13.5	< 14.0	< 14.0	< 5.7
Vanadium	**7440-62-2**	**NA**	**86**	--	2.9 J	< 2.5	2.7 J	84.3	4.4 J	< 2.0	< 1.5	< 2.5	< 2.5	20.8
Zinc	**7440-66-6**	**2000**	**NA**	--	< 17.6 J	40.3	5.4 J	206	24.7	9.4 J	11.5 J	17.5 J	12.2 J	36.6
Mercury	**7439-97-6**	**0.7**	**NA**	--	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.060	< 0.056	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-9 1398230 7098400 6/18/2013 SWMW-109(061813) FD	SWMW-9 1398234 7098430 6/18/2013 SWMW-9(061813) REG	Unknown Well 1 1022233 4962193 1/18/2007 UNKNOWN#1011807 REG	Unknown Well 1 1113054 5487054 9/30/2008 UNKNOWN#1(9-30-08) REG	Unknown Well 1 1195374 5985328 5/19/2010 UNK-1(5-19-10) REG	Unknown Well 1 1341939 6821811 10/11/2012 UNK-1(101112) REG	Unknown Well 1 1395751 7086902 6/7/2013 UNK-1(060713) REG	Unknown Well 1 1460835 7400678 3/19/2014 UNK-1-031914 REG	Unknown Well 1 1479522 7487857 6/4/2014 UNK-01-060414 REG	Unknown Well 1 1503937 7602492 9/16/2014 CVX-0030-01 REG	Unknown Well 1 1516213 7662956 11/4/2014 CVX-0034-08 REG	Unknown Well 1 1548024 7819763 3/24/2015 CVX-0046-15 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	< 0.8	< 0.8	21	4 J	6	< 0.8	2 J	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	< 1	< 1	35	14	30	4 J	8	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	< 0.5	< 0.5	39	28	27	9	13	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	< 0.5	< 0.5	4 J	3 J	2 J	2	2	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	< 0.5	< 0.5	39	26	23	23	21	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--
Acetone	67-64-1	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	1 J	0.6 J	< 0.5	0.6 J	< 0.5	3 J	< 0.5	< 0.5	< 0.5	0.8 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Bromoform	75-25-2	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	2 J	2 J	290	190	95	160	69	820	140	160	150	230
Chloroethane	75-00-3	5	NA	< 1	< 1	22	16	39	20	17	--	--	--	--	--
Chloroform	67-66-3	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	0.6 J	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	< 0.8	< 0.8	45	5	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
Toluene	108-88-3	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	0.5 J	0.7 J
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	< 0.8	< 0.8	7	3 J	0.9 J	< 0.8	< 0.8	--	--	--	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-9 1398230 7098400 6/18/2013 SWMW-109(061813) FD	SWMW-9 1398234 7098430 6/18/2013 SWMW-9(061813) REG	Unknown Well 1 1022233 4962193 1/18/2007 UNKNOWN#1011807 REG	Unknown Well 1 1113054 5487054 9/30/2008 UNKNOWN#1(9-30-08) REG	Unknown Well 1 1195374 5985328 5/19/2010 UNK-1(5-19-10) REG	Unknown Well 1 1341939 6821811 10/11/2012 UNK-1(101112) REG	Unknown Well 1 1395751 7086902 6/7/2013 UNK-1(060713) REG	Unknown Well 1 1460835 7400678 3/19/2014 UNK-1-031914 REG	Unknown Well 1 1479522 7487857 6/4/2014 UNK-01-060414 REG	Unknown Well 1 1503937 7602492 9/16/2014 CVX-0030-01 REG	Unknown Well 1 1516213 7662956 11/4/2014 CVX-0034-08 REG	Unknown Well 1 1548024 7819763 3/24/2015 CVX-0046-15 REG
Volatile Organic Compounds																
1,4-Dioxane	**123-91-1**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	**88-06-2**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
2,4-Dichlorophenol	**120-83-2**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
2,4-Dimethylphenol	**105-67-9**	**50**	**NA**	< 0.5	< 0.5	< 3	< 3	< 3	< 0.5	--	--	--	--	--	--	--
2,4-Dinitrophenol	**51-28-5**	**10**	**NA**	< 10	< 10	< 21	< 19	< 10	< 9	--	--	--	--	--	--	--
2,4-Dinitrotoluene	**121-14-2**	**5**	**NA**	< 1	< 1	< 1	< 0.9	< 1	< 0.9	< 1	--	--	--	--	--	--
2,6-Dinitrotoluene	**606-20-2**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
2-Chloronaphthalene	**91-58-7**	**10**	**NA**	< 0.4	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**1**	**NA**	< 0.5	< 0.5	2 J	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
2-Methyl-Naphthalene	**91-57-6**	**NA**	**36**	< 0.1	< 0.1	< 1	1 J	< 1	0.9	< 0.1	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	**95-48-7**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	**91-94-1**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
3-Nitroaniline	**99-09-2**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**1**	**NA**	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--
4-Bromophenylphenylether	**101-55-3**	**NA**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
4-Chloroaniline	**106-47-8**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**NA**	**NA**	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	**106-44-5**	**1**	**NA**	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	--	--	--	--	--	--	--
4-Nitroaniline	**100-01-6**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
4-Nitrophenol	**100-02-7**	**1**	**NA**	< 10	< 10	< 10	< 9	< 10	< 9	--	--	--	--	--	--	--
Acenaphthene	**83-32-9**	**20**	**NA**	< 0.1	< 0.1	1 J	2 J	< 1	1	0.9	--	--	--	--	--	--
Acenaphthylene	**208-96-8**	**NA**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	0.3 J	< 0.1	--	--	--	--	--	--
Anthracene	**120-12-7**	**50**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	0.2 J	0.2 J	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**0.002**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Benzo(a)pyrene	**50-32-8**	**NA**	**0.025**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Benzo(b)fluoranthene	**205-99-2**	**0.002**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Benzo(g,h,i)perylene	**191-24-2**	**NA**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Benzo(k)fluoranthene	**207-08-9**	**0.002**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	**111-91-1**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
bis(2-Chloroethyl) ether	**111-44-4**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	**108-60-1**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	**117-81-7**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Butylbenzylphthalate	**85-68-7**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Carbazole	**86-74-8**	**NA**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
Chrysene	**218-01-9**	**0.002**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Di-n-butylphthalate	**84-74-2**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Di-n-octylphthalate	**117-84-0**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Dibenz(a,h)anthracene	**53-70-3**	**NA**	**0.025**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Dibenzofuran	**132-64-9**	**NA**	**7.9**	< 0.5	< 0.5	1 J	2 J	1 J	1	1 J	--	--	--	--	--	--
Diethylphthalate	**84-66-2**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Dimethyl phthalate	**131-11-3**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**50**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Fluorene	**86-73-7**	**50**	**NA**	< 0.1	< 0.1	2 J	3 J	1 J	2	2	--	--	--	--	--	--
Hexachlorobenzene	**118-74-1**	**0.04**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Hexachlorobutadiene	**87-68-3**	**0.5**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**5**	**NA**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--
Hexachloroethane	**67-72-1**	**5**	**NA**	< 1	< 1	< 1	< 0.9	< 1	< 0.9	< 1	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**0.002**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Isophorone	**78-59-1**	**50**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	**621-64-7**	**NA**	**0.011**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**50**	**NA**	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--
Naphthalene	**91-20-3**	**10**	**NA**	< 0.1	< 0.1	9	5	2 J	2	1	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-9 1398230 7098400 6/18/2013 SWMW-109(061813) FD	SWMW-9 1398234 7098430 6/18/2013 SWMW-9(061813) REG	Unknown Well 1 1022233 4962193 1/18/2007 UNKNOWN#1011807 REG	Unknown Well 1 1113054 5487054 9/30/2008 UNKNOWN#1(9-30-08) REG	Unknown Well 1 1195374 5985328 5/19/2010 UNK-1(5-19-10) REG	Unknown Well 1 1341939 6821811 10/11/2012 UNK-1(101112) REG	Unknown Well 1 1395751 7086902 6/7/2013 UNK-1(060713) REG	Unknown Well 1 1460835 7400678 3/19/2014 UNK-1-031914 REG	Unknown Well 1 1479522 7487857 6/4/2014 UNK-01-060414 REG	Unknown Well 1 1503937 7602492 9/16/2014 CVX-0030-01 REG	Unknown Well 1 1516213 7662956 11/4/2014 CVX-0034-08 REG	Unknown Well 1 1548024 7819763 3/24/2015 CVX-0046-15 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	< 1	< 1	< 3	< 3	< 3	< 0.9	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	< 0.1	< 0.1	2 J	2 J	1 J	2	1	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	< 0.5	< 0.5	< 1	< 0.9	< 1	< 0.5	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	< 0.1	< 0.1	< 1	< 0.9	< 1	< 0.09	< 0.1	--	--	--	--	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	< 82.8	87.0 J	234	1,280	363	582	78.9 J	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	< 5.3	< 5.3	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	< 6.8	< 6.8	< 10	< 10.2	< 7.2	< 6.8	< 6.8	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	173	179	19.2	37.9	19.9	28.3	21.1	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	< 0.67	< 0.67	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	< 0.76	< 0.76	< 0.91	< 2.0	< 2.0	< 0.36	0.49 J	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	110,000	112,000	35,200	38,200	31,600	36,900	35,700	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	< 1.6	< 1.6	< 2.3	< 3.0	< 3.4	2.0 J	< 1.1	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	< 1.3	< 1.3	< 2.1	< 2.1	< 2.1	< 0.66	< 0.66	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	< 2.7	< 2.7	< 2.2	11.3	< 2.7	2.6 J	< 2.1	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	108 J	133 J	11,200	16,800	8,800	15,600	13,500	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	< 4.7	< 4.7	< 6.9	< 6.9	< 6.9	7.6 J	13.8 J	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	15,100	15,500	6,750	7,330	5,960	6,720	6,580	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	221	228	4,060	4,310	3,380	3,550	3,060	6,160	3,160	6,270	5,470	7,640
Nickel	**7440-02-0**	**100**	**NA**	< 1.5	< 1.5	< 5.6	< 5.6	< 1.8	< 1.1	< 1.1	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	2,540	2,550	1,120	1,400	1,080	1,430	1,140	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	< 8.4	< 8.4	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	< 2.1	< 2.1	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	136,000	140,000	4,560	5,100	5,140	5,470	6,220	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	< 5.4	< 5.4	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	< 2.0	< 2.0	< 1.5	3.2 J	< 2.5	4.4 J	2.1 J	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	21.2	39.3	9.0 J	87.3	18.6 J	15.2 J	6.9 J	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	< 0.070	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 1 1570206 7934025 6/16/2015 CVX-0048-03 REG	Unknown Well 1 1570520 7935729 6/18/2015 CVX-0050-15 REG	Unknown Well 1 1593311 8049712 9/15/2015 CVX-0062-12 REG	Unknown Well 1 1608498 8129225 11/10/2015 UNK-1-W-0.00-151110 REG	Unknown Well 1 1669977 8417058 6/8/2016 UNK-1-W-0.00-160608 REG	Unknown Well 2 1022233 4962194 1/18/2007 UNKNOWN#2011807 REG	Unknown Well 2 1113054 5487053 9/30/2008 UNKNOWN#2(9-30-08) REG	Unknown Well 2 1195374 5985329 5/19/2010 UNK-2(5-19-10) REG	Unknown Well 2 1341939 6821812 10/11/2012 UNK-2(101112) REG	Unknown Well 2 1395751 7086903 6/7/2013 UNK-2(060713) REG	Unknown Well 2 1460835 7400679 3/19/2014 UNK-2-031914 REG	Unknown Well 2 1479522 7487856 6/4/2014 UNK-02-060414 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	1 J	< 1	2 J	< 1	< 1	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	14	11	71	1	8	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	2 J	< 0.9	2 J	< 0.5	1	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	12	8	15	3	14	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--
Acetone	67-64-1	50	NA	--	--	--	--	--	< 6	< 6	< 6	< 6	< 6	--	--
Benzene	71-43-2	1	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	0.7 J	< 0.5	< 0.5	< 0.5	< 0.5	0.8 J	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Chlorobenzene	108-90-7	5	NA	--	73	47	120	78	260	92	90	83	140	150	38
Chloroethane	75-00-3	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	--	< 0.5	< 0.5	0.6 J	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	2 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Toluene	108-88-3	5	NA	--	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	--	0.6 J	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	--	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	1 J	< 0.8	< 0.8	< 0.8	< 0.8	--	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 1 1570206 7934025 6/16/2015 CVX-0048-03 REG	Unknown Well 1 1570520 7935729 6/18/2015 CVX-0050-15 REG	Unknown Well 1 1593311 8049712 9/15/2015 CVX-0062-12 REG	Unknown Well 1 1608498 8129225 11/10/2015 UNK-1-W-0.00-151110 REG	Unknown Well 1 1669977 8417058 6/8/2016 UNK-1-W-0.00-160608 REG	Unknown Well 2 1022233 4962194 1/18/2007 UNKNOWN#2011807 REG	Unknown Well 2 1113054 5487053 9/30/2008 UNKNOWN#2(9-30-08) REG	Unknown Well 2 1195374 5985329 5/19/2010 UNK-2(5-19-10) REG	Unknown Well 2 1341939 6821812 10/11/2012 UNK-2(101112) REG	Unknown Well 2 1395751 7086903 6/7/2013 UNK-2(060713) REG	Unknown Well 2 1460835 7400679 3/19/2014 UNK-2-031914 REG	Unknown Well 2 1479522 7487856 6/4/2014 UNK-02-060414 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 0.5	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	< 21	< 19	< 10	< 10	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 1	< 1	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	< 5	< 5	< 5	< 5	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.5	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	< 11	< 9	< 10	< 10	--	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	1 J	< 0.9	1 J	0.4 J	2	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	0.3 J	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	< 2	< 2	5	< 2	< 2	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	1	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	1 J	< 0.9	2 J	0.4 J	3	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 1	< 1	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	5 J	< 0.9	< 1	0.2 J	1	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 1 1570206 7934025 6/16/2015 CVX-0048-03 REG	Unknown Well 1 1570520 7935729 6/18/2015 CVX-0050-15 REG	Unknown Well 1 1593311 8049712 9/15/2015 CVX-0062-12 REG	Unknown Well 1 1608498 8129225 11/10/2015 UNK-1-W-0.00-151110 REG	Unknown Well 1 1669977 8417058 6/8/2016 UNK-1-W-0.00-160608 REG	Unknown Well 2 1022233 4962194 1/18/2007 UNKNOWN#2011807 REG	Unknown Well 2 1113054 5487053 9/30/2008 UNKNOWN#2(9-30-08) REG	Unknown Well 2 1195374 5985329 5/19/2010 UNK-2(5-19-10) REG	Unknown Well 2 1341939 6821812 10/11/2012 UNK-2(101112) REG	Unknown Well 2 1395751 7086903 6/7/2013 UNK-2(060713) REG	Unknown Well 2 1460835 7400679 3/19/2014 UNK-2-031914 REG	Unknown Well 2 1479522 7487856 6/4/2014 UNK-02-060414 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	< 3	< 3	< 3	< 1	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	0.2 J	--	--
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	< 1	< 0.9	< 1	< 0.5	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	126 J	2,610	2,940	5,930	1,170	--	--
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--	--
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	< 10	< 10.2	11.9 J	16.2 J	< 6.8	--	--
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	17	40.8	39.9	62.5	40.2	--	--
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	< 0.94	< 0.90	< 1.4	0.68 J	< 0.67	--	--
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	< 0.91	< 2.0	< 2.0	0.74 J	0.51 J	--	--
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	32,700	30,900	29,700	35,700	38,700	--	--
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	< 2.3	3.6 J	7.1 J	9.9 J	3.0 J	--	--
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	< 2.1	< 2.1	< 2.1	2.1 J	< 0.66	--	--
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	< 2.2	5.8 J	13	12	2.9 J	--	--
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	8,340	10,700	28,100	30,100	18,600	--	--
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	< 6.9	< 6.9	12.8 J	18.3	15	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	6,730	6,540	6,460	8,060	7,600	--	--
Manganese	**7439-96-5**	**300**	**NA**	3,800	--	6,710	7,700	2,970	2,900	2,160	2,260	2,800	2,530	2,990	1,930
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	< 5.6	< 5.6	4.6 J	1.9 J	< 1.1	--	--
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	1,280	1,750	1,660	2,700	1,860	--	--
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--	--
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--	--
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	5,490	5,560	5,660	21,700	39,000	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--	--
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	< 1.5	5.4	12.3	14.2	3.6 J	--	--
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	9.0 J	175	384	201	39.9	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 2 1516213 7662957 11/4/2014 CVX-0034-09 REG	Unknown Well 2 1548024 7819764 3/24/2015 CVX-0046-16 REG	Unknown Well 2 1570206 7934026 6/16/2015 CVX-0048-04 REG	Unknown Well 2 1570520 7935730 6/18/2015 CVX-0050-16 REG	Unknown Well 2 1608498 8129224 11/10/2015 UNK-2-W-0.00-151110 REG	Unknown Well 2 1669977 8417057 6/8/2016 UNK-2-W-0.00-160608 REG	Unknown Well 3 1022233 4962195 1/18/2007 UNKNOWN#3011807 REG	Unknown Well 3 1113054 5487052 9/30/2008 UNKNOWN#3(9-30-08) REG	Unknown Well 3 1195374 5985330 5/19/2010 UNK-3(5-19-10) REG	Unknown Well 3 1341939 6821813 10/11/2012 UNK-3(101112) REG	Unknown Well 3 1395751 7086904 6/7/2013 UNK-3(060713) REG	Unknown Well 3 1460835 7400680 3/19/2014 UNK-3-031914 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--	1 J	< 1	1 J	0.5 J	0.6 J	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--	4 J	3 J	5 J	2	3	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	--
Acetone	67-64-1	50	NA	--	--	--	--	--	--	< 6	< 6	< 6	< 6	< 6	--
Benzene	71-43-2	1	NA	< 0.5	1	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6 J
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	5	NA	22	830	--	69	< 0.5	19	28	19	41	10	12	55
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	0.9 J
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	5	NA	--	--	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 2 1516213 7662957 11/4/2014 CVX-0034-09 REG	Unknown Well 2 1548024 7819764 3/24/2015 CVX-0046-16 REG	Unknown Well 2 1570206 7934026 6/16/2015 CVX-0048-04 REG	Unknown Well 2 1570520 7935730 6/18/2015 CVX-0050-16 REG	Unknown Well 2 1608498 8129224 11/10/2015 UNK-2-W-0.00-151110 REG	Unknown Well 2 1669977 8417057 6/8/2016 UNK-2-W-0.00-160608 REG	Unknown Well 3 1022233 4962195 1/18/2007 UNKNOWN#3011807 REG	Unknown Well 3 1113054 5487052 9/30/2008 UNKNOWN#3(9-30-08) REG	Unknown Well 3 1195374 5985330 5/19/2010 UNK-3(5-19-10) REG	Unknown Well 3 1341939 6821813 10/11/2012 UNK-3(101112) REG	Unknown Well 3 1395751 7086904 6/7/2013 UNK-3(060713) REG	Unknown Well 3 1460835 7400680 3/19/2014 UNK-3-031914 REG
Volatile Organic Compounds															
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--	< 3	< 3	< 3	< 0.5	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--	< 20	< 19	< 10	< 10	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--	< 5	< 5	< 5	< 5	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--	< 10	< 10	< 10	< 10	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--	< 1	< 1	1 J	0.6	0.7	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	0.1 J	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	0.7 J	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	--	1 J	< 1	2 J	0.8	1	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--	< 1	< 1	< 1	0.3 J	0.3 J	--

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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 2 1516213 7662957 11/4/2014 CVX-0034-09 REG	Unknown Well 2 1548024 7819764 3/24/2015 CVX-0046-16 REG	Unknown Well 2 1570206 7934026 6/16/2015 CVX-0048-04 REG	Unknown Well 2 1570520 7935730 6/18/2015 CVX-0050-16 REG	Unknown Well 2 1608498 8129224 11/10/2015 UNK-2-W-0.00-151110 REG	Unknown Well 2 1669977 8417057 6/8/2016 UNK-2-W-0.00-160608 REG	Unknown Well 3 1022233 4962195 1/18/2007 UNKNOWN#3011807 REG	Unknown Well 3 1113054 5487052 9/30/2008 UNKNOWN#3(9-30-08) REG	Unknown Well 3 1195374 5985330 5/19/2010 UNK-3(5-19-10) REG	Unknown Well 3 1341939 6821813 10/11/2012 UNK-3(101112) REG	Unknown Well 3 1395751 7086904 6/7/2013 UNK-3(060713) REG	Unknown Well 3 1460835 7400680 3/19/2014 UNK-3-031914 REG
Volatile Organic Compounds															
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--	< 3	< 3	< 3	< 1	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	0.1 J	--
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--	--
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--
Polychlorinated Biphenyls†															
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Metals															
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--	225	< 80.2	483	368	85.5 J	--
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--	< 10	< 10.2	< 7.2	< 6.8	< 6.8	--
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--	8	13.2	18.9	40.5	53.6	--
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--	< 0.91	< 2.0	< 2.0	< 0.36	0.65 J	--
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--	27,300	29,500	26,600	40,300	45,500	--
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--	< 2.3	< 3.0	< 3.4	1.3 J	< 1.1	--
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--	< 2.1	< 2.1	< 2.1	< 0.66	< 0.66	--
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--	< 2.2	< 2.7	< 2.7	2.2 J	< 2.1	--
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--	5,670	6,930	13,800	17,600	15,800	--
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--	< 6.9	< 6.9	< 6.9	10.3 J	9.3 J	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--	5,470	5,690	5,340	7,390	8,440	--
Manganese	**7439-96-5**	**300**	**NA**	--	--	2,240	--	--	1,690	1,790	2,230	2,700	2,990	2,890	2,280
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--	< 5.6	< 5.6	< 1.8	< 1.1	< 1.1	--
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--	1,140	1,320	1,100	2,060	2,350	--
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--	7,030	6,480	6,060	44,900	96,200	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--	< 1.5	< 2.5	< 2.5	2.2 J	< 1.3	--
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--	24.2	30.6	96.6	67.4	14.2 J	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 3 1479522 7487855 6/4/2014 UNK-03-060414 REG	Unknown Well 3 1548024 7819765 3/24/2015 CVX-0046-17 REG	Unknown Well 3 1570206 7934027 6/16/2015 CVX-0048-05 REG	Unknown Well 3 1570520 7935731 6/18/2015 CVX-0050-17 REG	Unknown Well 3 1593311 8049713 9/15/2015 CVX-0062-13 REG	Unknown Well 3 1669977 8417056 6/8/2016 UNK-3-W-0.00-160608 REG
Volatile Organic Compounds									
1,1 Dichloroethene	75-35-4	5	NA	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	5	NA	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	5	NA	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	1	NA	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5	NA	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	NA	7	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	5	NA	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	NA	0.00033	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	NA	0.0075	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	3	NA	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.6	NA	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	5	NA	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	1	NA	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	3	NA	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	3	NA	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	50	NA	--	--	--	--	--	--
2-Hexanone	591-78-6	50	NA	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	NA	6300	--	--	--	--	--	--
Acetone	67-64-1	50	NA	--	--	--	--	--	--
Benzene	71-43-2	1	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	NA	83	--	--	--	--	--	--
Bromodichloromethane	75-27-4	50	NA	--	--	--	--	--	--
Bromoform	75-25-2	50	NA	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	5	NA	--	--	--	--	--	--
Carbon disulfide	75-15-0	60	NA	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	5	NA	--	--	--	--	--	--
Chlorobenzene	108-90-7	5	NA	4	20	--	9	9	13
Chloroethane	75-00-3	5	NA	--	--	--	--	--	--
Chloroform	67-66-3	7	NA	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	5	NA	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	5	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	0.4	NA	--	--	--	--	--	--
Dibromochloromethane	124-48-1	50	NA	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	NA	200	--	--	--	--	--	--
Diisopropyl ether	108-20-3	NA	1500	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	NA	NA	--	--	--	--	--	--
Ethylbenzene	100-41-4	5	NA	--	--	--	--	--	--
Isopropylbenzene	98-82-8	NA	450	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	NA	NA	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	10	NA	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	5	NA	--	--	--	--	--	--
o-Xylene	95-47-6	NA	190	--	--	--	--	--	--
Styrene	100-42-5	5	NA	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	NA	NA	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	NA	NA	--	--	--	--	--	--
Tetrachloroethene	127-18-4	5	NA	--	--	--	--	--	--
Toluene	108-88-3	5	NA	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	5	NA	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	0.4	NA	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	5	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	5	NA	--	--	--	--	--	--
Vinyl chloride (Chloroethene)	75-01-4	2	NA	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	5	NA	--	--	--	--	--	--
Semivolatile Organic Compounds									
1,2,4,5-Tetrachlorobenzene	95-94-3	NA	1.7	--	--	--	--	--	--

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 3 1479522 7487855 6/4/2014 UNK-03-060414 REG	Unknown Well 3 1548024 7819765 3/24/2015 CVX-0046-17 REG	Unknown Well 3 1570206 7934027 6/16/2015 CVX-0048-05 REG	Unknown Well 3 1570520 7935731 6/18/2015 CVX-0050-17 REG	Unknown Well 3 1593311 8049713 9/15/2015 CVX-0062-13 REG	Unknown Well 3 1669977 8417056 6/8/2016 UNK-3-W-0.00-160608 REG
Volatile Organic Compounds									
1,4-Dioxane	123-91-1	NA	0.46	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1	NA	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	1	NA	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	5	NA	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	50	NA	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	10	NA	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	5	NA	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	5	NA	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	10	NA	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	1	NA	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	NA	36	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	1	NA	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	5	NA	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	1	NA	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	5	NA	--	--	--	--	--	--
3-Nitroaniline	99-09-2	5	NA	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	1	NA	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	NA	NA	--	--	--	--	--	--
4-Chloroaniline	106-47-8	5	NA	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	NA	NA	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	1	NA	--	--	--	--	--	--
4-Nitroaniline	100-01-6	5	NA	--	--	--	--	--	--
4-Nitrophenol	100-02-7	1	NA	--	--	--	--	--	--
Acenaphthene	83-32-9	20	NA	--	--	--	--	--	--
Acenaphthylene	208-96-8	NA	NA	--	--	--	--	--	--
Anthracene	120-12-7	50	NA	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	0.002	NA	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	NA	0.025	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	0.002	NA	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	NA	NA	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	0.002	NA	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	5	NA	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	1	NA	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	5	NA	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	5	NA	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	50	NA	--	--	--	--	--	--
Carbazole	86-74-8	NA	NA	--	--	--	--	--	--
Chrysene	218-01-9	0.002	NA	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	50	NA	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	50	NA	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	NA	0.025	--	--	--	--	--	--
Dibenzofuran	132-64-9	NA	7.9	--	--	--	--	--	--
Diethylphthalate	84-66-2	50	NA	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	50	NA	--	--	--	--	--	--
Fluoranthene	206-44-0	50	NA	--	--	--	--	--	--
Fluorene	86-73-7	50	NA	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.04	NA	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	0.5	NA	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	5	NA	--	--	--	--	--	--
Hexachloroethane	67-72-1	5	NA	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	193-39-5	0.002	NA	--	--	--	--	--	--
Isophorone	78-59-1	50	NA	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	621-64-7	NA	0.011	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	50	NA	--	--	--	--	--	--
Naphthalene	91-20-3	10	NA	--	--	--	--	--	--

Appendix B-2
OU-1A Bedrock Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	NY_TOGS	USEPA Tapwater RSL 2019	Unknown Well 3 1479522 7487855 6/4/2014 UNK-03-060414 REG	Unknown Well 3 1548024 7819765 3/24/2015 CVX-0046-17 REG	Unknown Well 3 1570206 7934027 6/16/2015 CVX-0048-05 REG	Unknown Well 3 1570520 7935731 6/18/2015 CVX-0050-17 REG	Unknown Well 3 1593311 8049713 9/15/2015 CVX-0062-13 REG	Unknown Well 3 1669977 8417056 6/8/2016 UNK-3-W-0.00-160608 REG
Volatile Organic Compounds									
Nitrobenzene	**98-95-3**	**0.4**	**NA**	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**1**	**NA**	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**1**	**NA**	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**50**	**NA**	--	--	--	--	--	--
Phenol	**108-95-2**	**1**	**NA**	--	--	--	--	--	--
Pyrene	**129-00-0**	**50**	**NA**	--	--	--	--	--	--
Polychlorinated Biphenyls†									
Aroclor 1016	**12674-11-2**	**0.09**	**NA**	--	--	--	--	--	--
Aroclor 1221	**11104-28-2**	**0.09**	**NA**	--	--	--	--	--	--
Aroclor 1232	**11141-16-5**	**0.09**	**NA**	--	--	--	--	--	--
Aroclor 1242	**53469-21-9**	**0.09**	**NA**	--	--	--	--	--	--
Aroclor 1248	**12672-29-6**	**0.09**	**NA**	--	--	--	--	--	--
Aroclor 1254	**11097-69-1**	**0.09**	**NA**	--	--	--	--	--	--
Aroclor 1260	**11096-82-5**	**0.09**	**NA**	--	--	--	--	--	--
Metals									
Aluminum	**7429-90-5**	**100**	**NA**	--	--	--	--	--	--
Antimony	**7440-36-0**	**3**	**NA**	--	--	--	--	--	--
Arsenic	**7440-38-2**	**25**	**NA**	--	--	--	--	--	--
Barium	**7440-39-3**	**1000**	**NA**	--	--	--	--	--	--
Beryllium	**7440-41-7**	**3**	**NA**	--	--	--	--	--	--
Cadmium	**7440-43-9**	**5**	**NA**	--	--	--	--	--	--
Calcium	**7440-70-2**	**NA**	**NA**	--	--	--	--	--	--
Chromium	**7440-47-3**	**50**	**NA**	--	--	--	--	--	--
Cobalt	**7440-48-4**	**5**	**NA**	--	--	--	--	--	--
Copper	**7440-50-8**	**200**	**NA**	--	--	--	--	--	--
Iron	**7439-89-6**	**300**	**NA**	--	--	--	--	--	--
Lead	**7439-92-1**	**25**	**NA**	--	--	--	--	--	--
Magnesium	**7439-95-4**	**35000**	**NA**	--	--	--	--	--	--
Manganese	**7439-96-5**	**300**	**NA**	1,860	4,190	1,950	--	3,700	2,270
Nickel	**7440-02-0**	**100**	**NA**	--	--	--	--	--	--
Potassium	**7440-09-7**	**NA**	**NA**	--	--	--	--	--	--
Selenium	**7782-49-2**	**10**	**NA**	--	--	--	--	--	--
Silver	**7440-22-4**	**50**	**NA**	--	--	--	--	--	--
Sodium	**7440-23-5**	**20000**	**NA**	--	--	--	--	--	--
Thallium	**7440-28-0**	**0.5**	**NA**	--	--	--	--	--	--
Vanadium	**7440-62-2**	**NA**	**86**	--	--	--	--	--	--
Zinc	**7440-66-6**	**2000**	**NA**	--	--	--	--	--	--
Mercury	**7439-97-6**	**0.7**	**NA**	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
†: Criteria listed for individual PCBs are those identified for Total PCBs.
--: Not analyzed for
NA: Standard not Applicable

APPENDIX B-3

OU-1C Overburden Analytical Results

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-101 1137775 5632453 3/24/2009 SWMW-101(3-24-09) REG	SWMW-101 1196041 5989890 5/25/2010 SWMW-101(5-25-10) REG	SWMW-101 1343539 6830366 10/18/2012 SWMW-101(101812) REG	SWMW-101 1395579 7085952 6/6/2013 SWMW-101 (060613) REG	SWMW-102 1137775 5632452 3/24/2009 SWMW-102(3-24-09) REG	SWMW-102 1196041 5989891 5/25/2010 SWMW-102(5-25-10) REG	SWMW-102 1343541 6830371 10/18/2012 SWMW-102(101812) REG	SWMW-102 1395579 7085945 6/6/2013 SWMW-102 (060613) REG	SWMW-120 1396587 7090577 6/11/2013 SWMW-120(061113) REG	SWMW-121 1128853 5580849 1/20/2009 SWMW-121-012009 REG	SWMW-121 1137775 5632454 3/24/2009 SWMW-121(3-24-09) REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-101 1137775 5632453 3/24/2009 SWMW-101(3-24-09) REG	SWMW-101 1196041 5989890 5/25/2010 SWMW-101(5-25-10) REG	SWMW-101 1343539 6830366 10/18/2012 SWMW-101(101812) REG	SWMW-101 1395579 7085952 6/6/2013 SWMW-101 (060613) REG	SWMW-102 1137775 5632452 3/24/2009 SWMW-102(3-24-09) REG	SWMW-102 1196041 5989891 5/25/2010 SWMW-102(5-25-10) REG	SWMW-102 1343541 6830371 10/18/2012 SWMW-102(101812) REG	SWMW-102 1395579 7085945 6/6/2013 SWMW-102 (060613) REG	SWMW-120 1396587 7090577 6/11/2013 SWMW-120(061113) REG	SWMW-121 1128853 5580849 1/20/2009 SWMW-121-012009 REG	SWMW-121 1137775 5632454 3/24/2009 SWMW-121(3-24-09) REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 0.5	< 0.5	< 3	< 3	< 0.5	< 0.5	< 0.5	--	< 3
2,4-Dinitrophenol	51-28-5	N	10	NA	< 19	< 10	< 9	< 10	< 20	< 10	< 9	< 11	< 11	--	< 20
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.9	< 1	< 1	--	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4	< 0.4	< 0.4	--	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 1	< 0.09	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 0.5	--	< 2
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 0.5	--	< 2
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 10	< 9	< 10	< 10	< 10	< 9	< 11	< 11	--	< 10
Acenaphthene	83-32-9	N	20	NA	< 1	< 1	0.2 J	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 1	0.1 J	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.1 J	< 0.1	< 0.1	--	< 1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.1 J	< 0.1	< 0.1	--	< 1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.2 J	< 0.1	< 0.1	--	< 1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.1 J	< 0.1	< 0.1	--	< 1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 2	< 2	< 2	< 2	< 12	< 2	< 2	< 2	< 2	--	< 7
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
Chrysene	218-01-9	N	0.002	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.1 J	< 0.1	< 0.1	--	< 1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 1	< 0.09	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.1 J	< 0.1	< 0.1	--	< 1
Fluorene	86-73-7	N	50	NA	< 1	< 1	0.9	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 1	< 0.09	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5

Appendix B-3
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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-101 1137775 5632453 3/24/2009 SWMW-101(3-24-09) REG	SWMW-101 1196041 5989890 5/25/2010 SWMW-101(5-25-10) REG	SWMW-101 1343539 6830366 10/18/2012 SWMW-101(101812) REG	SWMW-101 1395579 7085952 6/6/2013 SWMW-101 (060613) REG	SWMW-102 1137775 5632452 3/24/2009 SWMW-102(3-24-09) REG	SWMW-102 1196041 5989891 5/25/2010 SWMW-102(5-25-10) REG	SWMW-102 1343541 6830371 10/18/2012 SWMW-102(101812) REG	SWMW-102 1395579 7085945 6/6/2013 SWMW-102 (060613) REG	SWMW-120 1396587 7090577 6/11/2013 SWMW-120(061113) REG	SWMW-121 1128853 5580849 1/20/2009 SWMW-121-012009 REG	SWMW-121 1137775 5632454 3/24/2009 SWMW-121(3-24-09) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 0.9	< 1	< 1	< 1	< 0.9	< 1	< 1	--	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 1	< 0.09	< 0.1	< 1	< 1	0.1 J	< 0.1	< 0.1	--	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 0.5	--	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 1	< 0.09	0.2 J	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	--	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 0.9	< 1	< 3	< 3	< 0.9	< 1	< 1	--	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 1	1	< 0.1	< 1	< 1	< 0.09	< 0.1	< 0.1	--	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	0.6 J	--	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 1	0.1 J	< 0.1	< 1	< 1	0.2 J	< 0.1	< 0.1	--	< 1
Metals															
Aluminum	**7429-90-5**	**N**	**100**	**NA**	3,180	1,730	3,100	269	691	1,720	30,200	272	6,730	--	1,220
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5	< 3.5	< 3.5	--	< 9.7
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10.0	< 7.2	10.1 J	< 6.8	< 10.0	< 7.2	29.4	< 6.8	< 6.8	--	< 10.0
Barium	**7440-39-3**	**N**	**1000**	**NA**	51.1	51.2	67.3	40.3	42.4	53.4	179	39.3	56.1	--	38.7
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.90	< 1.4	< 0.67	< 0.67	< 0.90	< 1.4	1.7 J	< 0.67	< 0.67	--	< 0.90
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 2.0	< 2.0	< 0.36	< 0.36	< 2.0	< 2.0	0.47 J	< 0.36	< 0.36	--	< 2.0
Calcium	**7440-70-2**	**N**	**NA**	**NA**	85,700	93,400	43,700	91,600	89,300	135,000	46,900	111,000	15,600	--	43,100
Chromium	**7440-47-3**	**N**	**50**	**NA**	4.7 J	164	788	38.7	< 3.0	38.3	968	7.8 J	8.5 J	--	< 3.0
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	3.1 J	5.4	1.7 J	< 2.1	< 2.1	33.6	< 0.66	4.4 J	--	< 2.1
Copper	**7440-50-8**	**N**	**200**	**NA**	5.2 J	16.7	83.9	3.1 J	3.3 J	3.9 J	121	< 2.1	11.1	--	< 2.7
Iron	**7439-89-6**	**N**	**300**	**NA**	3,960	4,100	9,290	733	746	2,690	62,500	352	13,600	--	1,030
Lead	**7439-92-1**	**N**	**25**	**NA**	< 6.9	< 6.9	7.9 J	< 5.1	< 6.9	< 6.9	51.3	< 5.1	10.6 J	--	< 6.9
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	24,900	25,900	12,600	25,900	24,400	36,500	19,900	29,400	5,540	--	14,900
Manganese	**7439-96-5**	**N**	**300**	**NA**	207	879	845	274	37.8	141	3,740	18.2	232	--	34.6
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	153	189	144	< 5.6	13.7	173	6.2 J	11.1	--	< 5.6
Potassium	**7440-09-7**	**N**	**NA**	**NA**	1,910	1,910	1,740	1,500	1,130	1,840	5,470	1,250	18,200	--	1,240
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 7.5	< 10.7	< 8.9	< 7.5	< 7.5	< 7.5	--	< 10.7
Silver	**7440-22-4**	**N**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 1.2	< 2.2	< 2.3	< 1.2	< 1.2	< 1.2	--	< 2.2
Sodium	**7440-23-5**	**N**	**20000**	**NA**	296,000	322,000	210,000	195,000	338,000	365,000	180,000	201,000	45,000	--	13,200
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 14.0	< 14.0	< 5.7	< 5.7	< 14.0	< 14.0	< 5.7	< 5.7	< 5.7	--	< 14.0
Vanadium	**7440-62-2**	**N**	**NA**	**86**	3.5 J	< 2.5	5.5	< 1.3	< 2.5	< 2.5	45	< 1.3	8.7	--	< 2.5
Zinc	**7440-66-6**	**N**	**2000**	**NA**	11.6 J	26.5	14.5 J	28.4	< 8.1	10.4 J	147	6.0 J	26.3	--	< 8.1
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070	< 0.070	< 0.070	--	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-121 1137775 5632455 3/24/2009 SWMW-1210(3-24-09) FD	SWMW-121 1196041 5989889 5/25/2010 SWMW-121(5-25-10) REG	SWMW-121 1342157 6822993 10/12/2012 SWMW-121(101212) REG	SWMW-121 1396587 7090580 6/11/2013 SWMW-121(061113) REG	SWMW-127 1137776 5632480 3/25/2009 SWMW-127(3-25-09) REG	SWMW-127 1196041 5989883 5/25/2010 SWMW-127(5-25-10) REG	SWMW-127 1343541 6830372 10/18/2012 SWMW-127(101812) REG	SWMW-127 1396587 7090573 6/11/2013 SWMW-127(061113) REG	SWMW-128 1137775 5632456 3/24/2009 SWMW-128(3-24-09) REG	SWMW-128 1196041 5989882 5/25/2010 SWMW-128(5-25-10) REG	SWMW-128 1343541 6830373 10/18/2012 SWMW-128(101812) REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	42	< 6	< 6
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--

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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-121 1137775 5632455 3/24/2009 SWMW-1210(3-24-09) FD	SWMW-121 1196041 5989889 5/25/2010 SWMW-121(5-25-10) REG	SWMW-121 1342157 6822993 10/12/2012 SWMW-121(101212) REG	SWMW-121 1396587 7090580 6/11/2013 SWMW-121(061113) REG	SWMW-127 1137776 5632480 3/25/2009 SWMW-127(3-25-09) REG	SWMW-127 1196041 5989883 5/25/2010 SWMW-127(5-25-10) REG	SWMW-127 1343541 6830372 10/18/2012 SWMW-127(101812) REG	SWMW-127 1396587 7090573 6/11/2013 SWMW-127(061113) REG	SWMW-128 1137775 5632456 3/24/2009 SWMW-128(3-24-09) REG	SWMW-128 1196041 5989882 5/25/2010 SWMW-128(5-25-10) REG	SWMW-128 1343541 6830373 10/18/2012 SWMW-128(101812) REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 0.5	< 0.5	< 3	< 3	< 0.5	< 0.5	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	N	10	NA	< 21	< 10	< 10	< 10	< 19	< 10	< 10	< 10	< 19	< 10	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	N	1	NA	< 11	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	0.1 J	< 0.1	< 1	< 1	< 0.1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 5 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 7	< 5 J	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
Chrysene	218-01-9	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Fluorene	86-73-7	N	50	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-121 1137775 5632455 3/24/2009 SWMW-1210(3-24-09) FD	SWMW-121 1196041 5989889 5/25/2010 SWMW-121(5-25-10) REG	SWMW-121 1342157 6822993 10/12/2012 SWMW-121(101212) REG	SWMW-121 1396587 7090580 6/11/2013 SWMW-121(061113) REG	SWMW-127 1137776 5632480 3/25/2009 SWMW-127(3-25-09) REG	SWMW-127 1196041 5989883 5/25/2010 SWMW-127(5-25-10) REG	SWMW-127 1343541 6830372 10/18/2012 SWMW-127(101812) REG	SWMW-127 1396587 7090573 6/11/2013 SWMW-127(061113) REG	SWMW-128 1137775 5632456 3/24/2009 SWMW-128(3-24-09) REG	SWMW-128 1196041 5989882 5/25/2010 SWMW-128(5-25-10) REG	SWMW-128 1343541 6830373 10/18/2012 SWMW-128(101812) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 1	< 1	< 3	< 3	< 1	< 1	< 3	< 3	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	0.1 J
Metals															
Aluminum	**7429-90-5**	**N**	**100**	**NA**	1,570	226	520	360	8,590	3,480	1,770	1,490	2,830	4,820	25,200
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10.0	< 7.2	< 6.8	< 6.8	< 10.0	< 7.2	< 6.8	< 6.8	< 10.0	< 7.2	18.2 J
Barium	**7440-39-3**	**N**	**1000**	**NA**	41.5	26	31.8	25.7	181	88.4	34.2	41.4	53.1	66.2	176
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.90	< 1.4	< 0.67	< 0.67	< 0.90	< 1.4	< 0.67	< 0.67	< 0.90	< 1.4	1.1 J
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 2.0	< 2.0	< 5 J	< 0.36	< 2.0	< 2.0	< 0.36	< 0.36	< 2.0	< 2.0	0.67 J
Calcium	**7440-70-2**	**N**	**NA**	**NA**	43,700	44,000	42,600	43,000	63,600	85,700	27,200	66,400	78,600	77,600	60,100
Chromium	**7440-47-3**	**N**	**50**	**NA**	< 3.0	< 3.4	2.2 J	< 1.1	9.3 J	< 3.4	3.1 J	2.5 J	3.4 J	6.8 J	34.7
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	< 2.1	< 0.66	< 0.66	6	< 2.1	1.5 J	0.82 J	2.5 J	3.8 J	19.6
Copper	**7440-50-8**	**N**	**200**	**NA**	< 2.7	< 2.7	< 2.1	2.2 J	25.6	4.6 J	2.4 J	4.4 J	6.7 J	12	65.5
Iron	**7439-89-6**	**N**	**300**	**NA**	1,210	258	627	491	12,600	2,910	2,280	2,290	3,720	6,800	44,900
Lead	**7439-92-1**	**N**	**25**	**NA**	< 6.9	< 6.9	< 5.1	< 5.1	12.5 J	< 6.9	< 5.1	< 5.1	< 6.9	< 6.9	26.3
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	15,300	14,900	15,200	15,100	20,100	23,300	6,720	16,500	21,500	20,200	25,000
Manganese	**7439-96-5**	**N**	**300**	**NA**	36.4	26.4	92.4	43.4	2,990	926	322	380	713	1,750	1,930
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	< 1.8	1.2 J	< 1.1	12.6	2.8 J	1.1 J	2.1 J	6.2 J	6.2 J	37.6
Potassium	**7440-09-7**	**N**	**NA**	**NA**	1,300	1,070	1,080	1,060	3,380	1,620	1,440	1,270	2,320	1,820	4,780
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 10.7	< 8.9	< 7.5	< 7.5	< 10.7	< 8.9	< 7.5	< 7.5	< 10.7	< 8.9	< 7.5
Silver	**7440-22-4**	**N**	**50**	**NA**	< 2.2	< 2.3	< 1.2	< 1.2	< 2.2	< 2.3	< 1.2	< 1.2	< 2.2	< 2.3	< 1.2
Sodium	**7440-23-5**	**N**	**20000**	**NA**	13,500	12,100	11,700	12,000	151,000	224,000	81,500	117,000	109,000	39,600	105,000
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 14.0	< 14.0	< 30 J	< 5.7	< 14.0	< 14.0	< 5.7	< 5.7	< 14.0	< 14.0	< 5.7
Vanadium	**7440-62-2**	**N**	**NA**	**86**	< 2.5	< 2.5	< 1.3	< 1.3	12.4	< 2.5	3.3 J	1.8 J	3.5 J	5.6	34.2
Zinc	**7440-66-6**	**N**	**2000**	**NA**	< 8.1	< 8.1	10.5 J	4.9 J	87.9	16.5 J	8.3 J	8.6 J	17.3 J	33.8	137
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-128 1396587 7090574 6/11/2013 SWMW-128(061113) REG	SWMW-129 1137775 5632457 3/24/2009 SWMW-129(3-24-09) REG	SWMW-129 1196041 5989887 5/25/2010 SWMW-129(5-25-10) REG	SWMW-129 1343541 6830374 10/18/2012 SWMW-129(101812) REG	SWMW-129 1396587 7090575 6/11/2013 SWMW-129(061113) REG	SWMW-133 1314500 6681087 6/6/2012 SWMW-133(B)(6-6-12) REG	SWMW-133 1314500 6681088 6/6/2012 SWMW-1133(B)(6-6-12) FD	SWMW-133 1396587 7090579 6/11/2013 SWMW-133(061113) REG	SWMW-134 1314500 6681089 6/6/2012 SWMW-134(B)(6-6-12) REG	SWMW-134 1396587 7090578 6/11/2013 SWMW-134(061113) REG	SWMW-18 1021137 4956584 1/10/2007 SWMW18011007 REG
Volatile Organic Compounds															
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--

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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-128 1396587 7090574 6/11/2013 SWMW-128(061113) REG	SWMW-129 1137775 5632457 3/24/2009 SWMW-129(3-24-09) REG	SWMW-129 1196041 5989887 5/25/2010 SWMW-129(5-25-10) REG	SWMW-129 1343541 6830374 10/18/2012 SWMW-129(101812) REG	SWMW-129 1396587 7090575 6/11/2013 SWMW-129(061113) REG	SWMW-133 1314500 6681087 6/6/2012 SWMW-133(B)(6-6-12) REG	SWMW-133 1314500 6681088 6/6/2012 SWMW-1133(B)(6-6-12) FD	SWMW-133 1396587 7090579 6/11/2013 SWMW-133(061113) REG	SWMW-134 1314500 6681089 6/6/2012 SWMW-134(B)(6-6-12) REG	SWMW-134 1396587 7090578 6/11/2013 SWMW-134(061113) REG	SWMW-18 1021137 4956584 1/10/2007 SWMW18011007 REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds															
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2,4-Dichlorophenol	120-83-2	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2,4-Dimethylphenol	105-67-9	N	50	NA	< 0.5	< 3	< 3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 3
2,4-Dinitrophenol	51-28-5	N	10	NA	< 10	< 21	< 9	< 9	< 10	< 10	< 10	< 11	< 10	< 11	< 20
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 0.9	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2-Chloronaphthalene	91-58-7	N	10	NA	< 0.4	< 2	< 2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
4-Chloroaniline	106-47-8	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 0.5	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 0.5	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2
4-Nitroaniline	100-01-6	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 10	< 9	< 9	< 10	< 10	< 10	< 11	< 10	< 11	< 10
Acenaphthene	83-32-9	N	20	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Acenaphthylene	208-96-8	N	NA	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 2	< 8	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Chrysene	218-01-9	N	0.002	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Dibenzofuran	132-64-9	N	NA	7.9	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Fluorene	86-73-7	N	50	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-128 1396587 7090574 6/11/2013 SWMW-128(061113) REG	SWMW-129 1137775 5632457 3/24/2009 SWMW-129(3-24-09) REG	SWMW-129 1196041 5989887 5/25/2010 SWMW-129(5-25-10) REG	SWMW-129 1343541 6830374 10/18/2012 SWMW-129(101812) REG	SWMW-129 1396587 7090575 6/11/2013 SWMW-129(061113) REG	SWMW-133 1314500 6681087 6/6/2012 SWMW-133(B)(6-6-12) REG	SWMW-133 1314500 6681088 6/6/2012 SWMW-1133(B)(6-6-12) FD	SWMW-133 1396587 7090579 6/11/2013 SWMW-133(061113) REG	SWMW-134 1314500 6681089 6/6/2012 SWMW-134(B)(6-6-12) REG	SWMW-134 1396587 7090578 6/11/2013 SWMW-134(061113) REG	SWMW-18 1021137 4956584 1/10/2007 SWMW18011007 REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 0.9	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0.5	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 1	< 3	< 3	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 0.1	< 1	< 0.9	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 0.5	< 1	< 0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 0.1	< 1	< 0.9	0.1 J	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Metals															
Aluminum	**7429-90-5**	**N**	**100**	**NA**	244	4,370	785	2,690	367	901	978	273	592	106 J	1,360
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 3.5	< 9.7	< 9.7	< 3.5	< 3.5	< 5.8	< 5.8	< 3.5	< 5.8	< 3.5	< 9.7
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 6.8	< 10.0	< 7.2	< 6.8	< 6.8	< 5.1	< 5.1	< 6.8	< 5.1	< 6.8	< 10
Barium	**7440-39-3**	**N**	**1000**	**NA**	30.5	55.9	43.6	30.6	24.3	42.3	41.2	39.7	30.5	24.8	37.9
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.67	< 0.90	< 1.4	< 0.67	< 0.67	< 0.24	< 0.24	< 0.67	< 0.24	< 0.67	< 0.94
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.36	< 2.0	< 2.0	0.43 J	< 0.36	< 0.27	< 0.27	< 0.36	< 0.27	0.59 J	< 0.91
Calcium	**7440-70-2**	**N**	**NA**	**NA**	77,000	50,600	63,700	31,100	38,800	27,500	28,000	76,800	67,500	59,800	93,100
Chromium	**7440-47-3**	**N**	**50**	**NA**	1.4 J	4.4 J	< 3.4	3.2 J	< 1.1	169	172	1.4 J	1.7 J	2.3 J	< 2.3
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 0.66	6.1	< 2.1	3.5 J	0.75 J	< 0.62	< 0.62	< 0.66	< 0.62	< 0.66	< 2.1
Copper	**7440-50-8**	**N**	**200**	**NA**	2.6 J	10.5	< 2.7	5.8 J	< 2.1	3.2 J	4.2 J	< 2.1	1.9 J	2.3 J	< 2.2
Iron	**7439-89-6**	**N**	**300**	**NA**	329	6,300	1,430	4,960	639	1,080	1,130	255	501	93.0 J	2,180
Lead	**7439-92-1**	**N**	**25**	**NA**	< 5.1	< 6.9	< 6.9	< 5.1	< 5.1	< 15 J	< 15 J	< 5.1	< 15 J	< 5.1	< 6.9
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	23,200	12,600	16,000	8,350	9,630	26,100	26,100	37,800	26,500	24,600	26,700
Manganese	**7439-96-5**	**N**	**300**	**NA**	13.5	1,660	762	774	489	95.7	101	171	14.1	5.7	103
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 1.1	7.1 J	2.5 J	5.4 J	1.8 J	2.8 J	2.6 J	4.5 J	< 0.95	< 1.1	< 5.6
Potassium	**7440-09-7**	**N**	**NA**	**NA**	714	13,600	13,500	11,000	11,000	49,600	50,700	2,610	1,160	4,170	1,550
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 7.5	< 10.7	< 8.9	< 7.5	< 7.5	< 6.9	< 6.9	< 7.5	< 6.9	< 7.5	< 9.4
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.2	< 2.2	< 2.3	< 1.2	< 1.2	< 0.91	< 0.91	< 1.2	< 0.91	< 1.2	< 1.6
Sodium	**7440-23-5**	**N**	**20000**	**NA**	89,900	65,300	117,000	34,400	88,800	82,900	83,800	41,300	62,700	61,600	159,000
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 5.7	< 14.0	< 14.0	< 5.7	< 5.7	< 4.2	< 4.2	< 5.7	< 4.2	< 5.7	< 13.5
Vanadium	**7440-62-2**	**N**	**NA**	**86**	< 1.3	6.8	< 2.5	4.5 J	< 1.3	2.3 J	2.0 J	< 1.3	1.1 J	< 1.3	3.2 J
Zinc	**7440-66-6**	**N**	**2000**	**NA**	4.8 J	23	13.3 J	15.0 J	2.7 J	8.2 J	8.2 J	< 2.0	3.2 J	5.6 J	< 8.1
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.070	< 0.056	< 0.056	< 0.070	< 0.070	< 0.026	< 0.026	< 0.070	< 0.026	< 0.070	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-18	SWMW-18	SWMW-19	SWMW-19	SWMW-19	SWMW-20	SWMW-21	SWMW-21	SWMW-21	SWMW-21	SWMW-21	SWMW-21	SWMW-21
Sample Delivery Group (SDG)					1115578	1395576	1021137	1115578	1395579	1395579	1021137	1115578	1395579	1463182	1479522	1504922	1517915
Lab Sample ID					5501152	7085926	4956585	5501156	7085950	7085946	4956575	5501160	7085949	7412722	7487860	7607786	7671550
Sample Date					10/15/2008	6/6/2013	1/10/2007	10/15/2008	6/6/2013	6/6/2013	1/10/2007	10/15/2008	6/6/2013	3/28/2014	6/4/2014	9/19/2014	11/11/2014
Field Sample ID					SWMW-18(10-15-08)	SWMW-18 (060613)	SWMW19011007	SWMW-19(10-15-08)	SWMW-19 (060613)	SWMW-20 (060613)	SWMW21011007	SWMW-21(10-15-08)	SWMW-21 (060613)	SWMW-21-032814	SWMW-21-060414	CVX-0033-03	CVX-0038-01
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	7	7	5	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	10 J	14 J	4 J	--	--	--	--
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	13 J	< 3	--	--	--	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 6	< 3	--	--	--	--
Acetone	67-64-1	N	50	NA	< 6	< 6	< 6	< 6	< 6	< 6	64	71	10 J	--	--	--	--
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6 J	550	370	240	260	400	250	270
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	< 3	< 1	0.6 J	< 0.5
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 2	< 0.8	< 3	1 J	1	0.9 J
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	230	580	< 0.8	--	--	--	--
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6	5	9 J	5	--	--	--	--
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 4	< 2	--	--	--	--
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 20	< 10	--	--	--	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	45	55	10	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 2	< 0.8	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 3	< 1	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-18 1115578 5501152 10/15/2008 SWMW-18(10-15-08) REG	SWMW-18 1395576 7085926 6/6/2013 SWMW-18 (060613) REG	SWMW-19 1021137 4956585 1/10/2007 SWMW19011007 REG	SWMW-19 1115578 5501156 10/15/2008 SWMW-19(10-15-08) REG	SWMW-19 1395579 7085950 6/6/2013 SWMW-19 (060613) REG	SWMW-20 1395579 7085946 6/6/2013 SWMW-20 (060613) REG	SWMW-21 1021137 4956575 1/10/2007 SWMW21011007 REG	SWMW-21 1115578 5501160 10/15/2008 SWMW-21(10-15-08) REG	SWMW-21 1395579 7085949 6/6/2013 SWMW-21 (060613) REG	SWMW-21 1463182 7412722 3/28/2014 SWMW-21-032814 REG	SWMW-21 1479522 7487860 6/4/2014 SWMW-21-060414 REG	SWMW-21 1504922 7607786 9/19/2014 CVX-0033-03 REG	SWMW-21 1517915 7671550 11/11/2014 CVX-0038-01 REG
Vinyl chloride (Chloroethene)	**75-01-4**	**N**	**2**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 3	< 1	< 0.5	< 0.5
Xylene (total)	**1330-20-7**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	700	1,500	490	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**N**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**N**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	**58-90-2**	**N**	**NA**	**240**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
2,4,6-Trichlorophenol	**88-06-2**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
2,4-Dichlorophenol	**120-83-2**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
2,4-Dimethylphenol	**105-67-9**	**N**	**50**	**NA**	< 3	< 0.5	< 3	< 3	< 0.5	< 0.5	14	23	7	--	--	--	--
2,4-Dinitrophenol	**51-28-5**	**N**	**10**	**NA**	< 20	< 10	< 20	< 20	< 10	< 10	< 21	< 20	< 10	--	--	--	--
2,4-Dinitrotoluene	**121-14-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--
2,6-Dinitrotoluene	**606-20-2**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
2-Chloronaphthalene	**91-58-7**	**N**	**10**	**NA**	< 2	< 0.4	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 0.4	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
2-Methyl-Naphthalene	**91-57-6**	**N**	**NA**	**36**	< 1	< 0.1	< 1	< 1	< 0.1	0.1 J	110	140	89	--	--	--	--
2-Methylphenol (o-Cresol)	**95-48-7**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	2 J	2 J	1	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
3,3'-Dichlorobenzidine	**91-94-1**	**N**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--
3-Nitroaniline	**99-09-2**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**N**	**1**	**NA**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	--
4-Bromophenylphenylether	**101-55-3**	**N**	**NA**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
4-Chloroaniline	**106-47-8**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**N**	**NA**	**NA**	< 2	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 0.5	--	--	--	--
4-Methylphenol (p-Cresol)	**106-44-5**	**N**	**1**	**NA**	< 2	< 0.5	< 2	< 2	< 0.5	< 0.5	< 2	< 2	2	--	--	--	--
4-Nitroaniline	**100-01-6**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
4-Nitrophenol	**100-02-7**	**N**	**1**	**NA**	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Acenaphthene	**83-32-9**	**N**	**20**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.6	5	3 J	2	--	--	--	--
Acenaphthylene	**208-96-8**	**N**	**NA**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	--	--	--
Acetophenone	**98-86-2**	**N**	**NA**	**1900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**N**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	1	2 J	< 1	1	--	--	--	--
Atrazine	**1912-24-9**	**N**	**NA**	**0.3**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	**100-52-7**	**N**	**NA**	**19**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**N**	**0.002**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.4 J	< 1	< 1	0.3 J	--	--	--	--
Benzo(a)pyrene	**50-32-8**	**N**	**NA**	**0.025**	< 1	< 0.1	< 1	< 1	< 0.1	0.4 J	< 1	< 1	0.1 J	--	--	--	--
Benzo(b)fluoranthene	**205-99-2**	**N**	**0.002**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.2 J	< 1	< 1	0.1 J	--	--	--	--
Benzo(g,h,i)perylene	**191-24-2**	**N**	**NA**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.5	< 1	< 1	0.2 J	--	--	--	--
Benzo(k)fluoranthene	**207-08-9**	**N**	**0.002**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	--	--	--
bis(2-Chloroethoxy)methane	**111-91-1**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
bis(2-Chloroethyl) ether	**111-44-4**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
bis(2-chloroisopropyl) ether	**108-60-1**	**N**	**5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
bis(2-Ethylhexyl)phthalate	**117-81-7**	**N**	**5**	**NA**	< 2	< 2	< 2	< 2	< 2	5 J	< 2	< 2	< 2	--	--	--	--
Butylbenzylphthalate	**85-68-7**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Caprolactam	**105-60-2**	**N**	**NA**	**9900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**N**	**NA**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	1 J	2 J	2	--	--	--	--
Chrysene	**218-01-9**	**N**	**0.002**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.8	< 1	< 1	0.5 J	--	--	--	--
Di-n-butylphthalate	**84-74-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Di-n-octylphthalate	**117-84-0**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dibenz(a,h)anthracene	**53-70-3**	**N**	**NA**	**0.025**	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	--	--	--
Dibenzofuran	**132-64-9**	**N**	**NA**	**7.9**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	4 J	6	5	--	--	--	--
Diethylphthalate	**84-66-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dimethyl phthalate	**131-11-3**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Diphenyl (Biphenyl, Phenyl benzene)	**92-52-4**	**N**	**NA**	**0.83**	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**N**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.5	< 1	< 1	0.5 J	--	--	--	--
Fluorene	**86-73-7**	**N**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	1	7	7	7	--	--	--	--
Hexachlorobenzene	**118-74-1**	**N**	**0.04**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 0.1	--	--	--	--
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**N**	**5**	**NA**	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-18 1115578 5501152 10/15/2008 SWMW-18(10-15-08) REG	SWMW-18 1395576 7085926 6/6/2013 SWMW-18 (060613) REG	SWMW-19 1021137 4956585 1/10/2007 SWMW19011007 REG	SWMW-19 1115578 5501156 10/15/2008 SWMW-19(10-15-08) REG	SWMW-19 1395579 7085950 6/6/2013 SWMW-19 (060613) REG	SWMW-20 1395579 7085946 6/6/2013 SWMW-20 (060613) REG	SWMW-21 1021137 4956575 1/10/2007 SWMW21011007 REG	SWMW-21 1115578 5501160 10/15/2008 SWMW-21(10-15-08) REG	SWMW-21 1395579 7085949 6/6/2013 SWMW-21 (060613) REG	SWMW-21 1463182 7412722 3/28/2014 SWMW-21-032814 REG	SWMW-21 1479522 7487860 6/4/2014 SWMW-21-060414 REG	SWMW-21 1504922 7607786 9/19/2014 CVX-0033-03 REG	SWMW-21 1517915 7671550 11/11/2014 CVX-0038-01 REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.2 J	< 1	< 1	< 0.1	--	--	--	--
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 0.5	< 2	< 2	< 0.5	< 0.5	4 J	< 2	< 0.5	--	--	--	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 0.1	< 1	< 1	0.3 J	0.3 J	200	260	150	--	--	--	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 0.5	--	--	--	--
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 1	< 3	< 3	< 1	< 1	< 3	< 3	< 1	--	--	--	--
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	0.2 J	11	8	9	--	--	--	--
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	36	15	4	--	--	--	--
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 0.1	< 1	< 1	< 0.1	4	2 J	2 J	2	--	--	--	--
Metals																	
Aluminum	**7429-90-5**	**N**	**100**	**NA**	2,870	4,010	628	5,540	1,230	< 74.3	918	< 80.2	25,300	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	33	< 3.5	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10.0	< 6.8	< 10	20.0 J	< 6.8	15.1 J	16.6 J	72	136	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	48	44.9	53.1	169	45.9	63.8	54.3	47.1	130	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.90	< 0.67	< 0.94	1.3 J	< 0.67	< 0.67	< 0.94	< 0.90	1.0 J	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 2.0	< 0.36	< 0.91	< 2.0	< 0.36	< 0.36	< 0.91	< 2.0	1.2 J	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	87,300	78,800	79,900	95,600	71,900	74,800	93,400	81,600	99,300	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	< 3.0	5.2 J	< 2.3	5.4 J	3.4 J	2.4 J	2.8 J	< 3.0	32.5	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	6	2.7 J	< 2.1	13.2	1.6 J	0.71 J	8	4.9 J	21.1	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	11.2	7.9 J	< 2.2	11	< 2.1	< 2.1	2.3 J	< 2.7	68.4	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	4,070	6,360	1,570	16,700	1,550	11,700	3,360	13,900	66,200	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	20.3	13.0 J	< 6.9	56.8	5.6 J	< 5.1	7.7 J	19.4	122	--	--	--	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	25,900	23,200	22,000	26,800	17,100	19,800	21,100	17,100	29,200	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	184	1,230	2,320	12,300	2,820	2,120	15,200	15,000	13,300	10,400	12,700	12,200	12,100
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	6.1 J	< 5.6	< 5.6	1.8 J	1.3 J	14.1	< 5.6	43.3	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	1,870	1,550	1,060	2,460	967	972	1,110	628	4,020	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 10.7	< 7.5	< 9.4	< 10.7	< 7.5	< 7.5	< 9.4	< 10.7	12.3 J	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	8.1	< 1.2	< 1.6	2.2 J	< 1.2	< 1.2	< 1.6	< 2.2	1.8 J	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	158,000	123,000	106,000	117,000	56,800	156,000	68,400	66,600	28,600	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 14.0	< 5.7	< 13.5	< 14.0	< 5.7	< 5.7	< 13.5	< 14.0	7.4 J	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	4.1 J	6.3	1.6 J	6.8	1.4 J	< 1.3	< 1.5	< 2.5	31.9	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	27.4	21.2	9.7 J	55.1	21.2	4.7 J	9.6 J	11.7 J	133	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.070	< 0.056	0.3	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-21 1546097 7809282 3/17/2015 CVX-0042-02 REG	SWMW-21 1570520 7935718 6/18/2015 CVX-0050-04 REG	SWMW-21 1593502 8050512 9/16/2015 CVX-0063-01 REG	SWMW-21 1609238 8133672 11/12/2015 SWMW-21-W-3.00-151112 REG	SWMW-21 1671684 8424625 6/13/2016 SWMW-21-W-3.00-160613 REG	SWMW-22 1021138 4956596 1/10/2007 SWMW22011007 REG	SWMW-22 1115579 5501182 10/16/2008 SWMW-22(10-16-08) REG	SWMW-22 1395576 7085918 6/6/2013 SWMW-22 (060613) REG	SWMW-29 1021138 4956599 1/10/2007 SWMW29011007 REG	SWMW-29 1115579 5501172 10/16/2008 SWMW-29(10-16-08) REG	SWMW-29 1115579 5501173 10/16/2008 SWMW-129(10-16-08) FD	SWMW-29 1395579 7085947 6/6/2013 SWMW-29 (060613) REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	--	--	--	--	--	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Benzene	71-43-2	N	1	NA	200	450	250	350	260	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 1	1	< 1	1	0.8 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 1	1	< 1	1	0.7 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	--	--	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	--	--	--	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 0.5	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-21 1546097 7809282 3/17/2015 CVX-0042-02 REG	SWMW-21 1570520 7935718 6/18/2015 CVX-0050-04 REG	SWMW-21 1593502 8050512 9/16/2015 CVX-0063-01 REG	SWMW-21 1609238 8133672 11/12/2015 SWMW-21-W-3.00-151112 REG	SWMW-21 1671684 8424625 6/13/2016 SWMW-21-W-3.00-160613 REG	SWMW-22 1021138 4956596 1/10/2007 SWMW22011007 REG	SWMW-22 1115579 5501182 10/16/2008 SWMW-22(10-16-08) REG	SWMW-22 1395576 7085918 6/6/2013 SWMW-22 (060613) REG	SWMW-29 1021138 4956599 1/10/2007 SWMW29011007 REG	SWMW-29 1115579 5501172 10/16/2008 SWMW-29(10-16-08) REG	SWMW-29 1115579 5501173 10/16/2008 SWMW-129(10-16-08) FD	SWMW-29 1395579 7085947 6/6/2013 SWMW-29 (060613) REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 0.5	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2,4,6-Trichlorophenol	88-06-2	N	1	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2,4-Dichlorophenol	120-83-2	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2,4-Dimethylphenol	105-67-9	N	50	NA	--	--	--	--	--	< 3	< 3	< 0.5	< 3	< 3	< 3	< 0.5
2,4-Dinitrophenol	51-28-5	N	10	NA	--	--	--	--	--	< 20	< 20	< 11	< 20	< 20	< 20	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Chloronaphthalene	91-58-7	N	10	NA	--	--	--	--	--	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Methyl-Naphthalene	91-57-6	N	NA	36	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4-Chloroaniline	106-47-8	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	--	--	--	--	--	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	--	--	--	--	--	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5
4-Nitroaniline	100-01-6	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
4-Nitrophenol	100-02-7	N	1	NA	--	--	--	--	--	< 10	< 10	< 11	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Acenaphthylene	208-96-8	N	NA	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(a)pyrene	50-32-8	N	NA	0.025	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Chrysene	218-01-9	N	0.002	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Di-n-butylphthalate	84-74-2	N	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Dibenzofuran	132-64-9	N	NA	7.9	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Diethylphthalate	84-66-2	N	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Fluorene	86-73-7	N	50	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Hexachlorobenzene	118-74-1	N	0.04	NA	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-21 1546097 7809282 3/17/2015 CVX-0042-02 REG	SWMW-21 1570520 7935718 6/18/2015 CVX-0050-04 REG	SWMW-21 1593502 8050512 9/16/2015 CVX-0063-01 REG	SWMW-21 1609238 8133672 11/12/2015 SWMW-21-W-3.00-151112 REG	SWMW-21 1671684 8424625 6/13/2016 SWMW-21-W-3.00-160613 REG	SWMW-22 1021138 4956596 1/10/2007 SWMW22011007 REG	SWMW-22 1115579 5501182 10/16/2008 SWMW-22(10-16-08) REG	SWMW-22 1395576 7085918 6/6/2013 SWMW-22 (060613) REG	SWMW-29 1021138 4956599 1/10/2007 SWMW29011007 REG	SWMW-29 1115579 5501172 10/16/2008 SWMW-29(10-16-08) REG	SWMW-29 1115579 5501173 10/16/2008 SWMW-129(10-16-08) FD	SWMW-29 1395579 7085947 6/6/2013 SWMW-29 (060613) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	--	--	--	--	--	< 3	< 3	< 1	< 3	< 3	< 3	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Phenol	**108-95-2**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	--	--	--	--	--	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1
Metals																
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	--	--	18,100	< 80.2	< 74.3	28,600	4,800	14,300	739
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	--	--	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 9.7	< 3.5
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	--	--	55	< 20	< 6.8	129	78.3	120	51
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	--	--	110	18.5	17.6	213	88.6	189	24.8
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	--	--	< 0.94	< 0.90	< 0.67	1.5 J	< 0.90	1.2 J	< 0.67
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	--	--	< 0.91	< 2.0	< 0.36	< 0.91	< 2.0	< 2.0	< 0.36
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	--	--	32,300	55,000	82,000	74,600	75,500	82,300	66,700
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	--	--	18.8	< 3.0	< 1.1	31	3.7 J	13.7 J	5.2 J
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	--	--	12.4	< 2.1	< 0.66	22	< 5.2	< 13.8	< 0.66
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	--	--	33.3	< 2.7	< 2.1	52	< 11.8	30.6	< 2.1
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	--	--	24,900	< 52.2	55.2 J	44,800	5,640	18,200	970
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	--	--	--	38.2	< 6.9	< 5.1	26.6	8.6 J	18.5	< 5.1
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	--	--	14,900	16,800	23,700	32,900	26,900	31,500	23,600
Manganese	**7439-96-5**	**N**	**300**	**NA**	7,810	11,800	13,100	15,200	6,330	886	20.6	3.0 J	2,060	477	1,130	38.1
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	--	--	22.5	< 5.6	< 1.1	39.5	< 5.6	16	9.1 J
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	--	--	3,980	2,480	1,730	5,440	1,420	2,790	949
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	--	--	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 10.7	< 7.5
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	--	--	< 1.6	< 2.2	< 1.2	< 1.6	< 2.2	< 2.2	< 1.2
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	--	--	128,000	151,000	160,000	126,000	211,000	216,000	110,000
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	--	--	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 14.0	< 5.7
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	--	--	19.3	< 2.5	< 1.3	31.3	4.1 J	14.2	< 1.3
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	--	--	80.2	< 8.1	< 2.0	132	43.9	67.8	8.3 J
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	--	--	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-30 1021137 4956589 1/10/2007 SWMW30011007 REG	SWMW-30 1115578 5501161 10/15/2008 SWMW-30(10-15-08) REG	SWMW-30 1196055 5989960 5/25/2010 SWMW-30(5-25-10) REG	SWMW-30 1343541 6830376 10/18/2012 SWMW-30(101812) REG	SWMW-30 1395579 7085956 6/6/2013 SWMW-30 (060613) REG	SWMW-30 1463182 7412720 3/28/2014 SWMW-30-032814 REG	SWMW-30 1479522 7487861 6/4/2014 SWMW-30-060414 REG	SWMW-30 1504922 7607787 9/19/2014 CVX-0033-04 REG	SWMW-30 1517915 7671551 11/11/2014 CVX-0038-02 REG	SWMW-30 1546097 7809283 3/17/2015 CVX-0042-03 REG	SWMW-30 1570520 7935719 6/18/2015 CVX-0050-05 REG	SWMW-30 1593502 8050513 9/16/2015 CVX-0063-02 REG	SWMW-30 1609238 8133673 11/12/2015 SWMW-30-W-3.00-151112 REG
Volatile Organic Compounds																		
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	N	50	NA	< 6	17 J	25	< 6	< 6	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	N	1	NA	< 0.5	40	14	< 0.5	9	9	5	20	18	8	8	15	7	
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	N	5	NA	< 0.8	2 J	2 J	< 0.8	< 0.8	0.9 J	0.9 J	2	2	0.9 J	0.9 J	1	0.6 J	
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	0.8 J	87	61	3 J	20	--	--	--	--	--	--	--	--	--
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--	--
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	6	4 J	< 0.8	1 J	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	N	5	NA	< 0.7	3 J	2 J	< 0.7	< 0.7	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	--	--	--	--	--	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-30 1021137 4956589 1/10/2007 SWMW30011007 REG	SWMW-30 1115578 5501161 10/15/2008 SWMW-30(10-15-08) REG	SWMW-30 1196055 5989960 5/25/2010 SWMW-30(5-25-10) REG	SWMW-30 1343541 6830376 10/18/2012 SWMW-30(101812) REG	SWMW-30 1395579 7085956 6/6/2013 SWMW-30 (060613) REG	SWMW-30 1463182 7412720 3/28/2014 SWMW-30-032814 REG	SWMW-30 1479522 7487861 6/4/2014 SWMW-30-060414 REG	SWMW-30 1504922 7607787 9/19/2014 CVX-0033-04 REG	SWMW-30 1517915 7671551 11/11/2014 CVX-0038-02 REG	SWMW-30 1546097 7809283 3/17/2015 CVX-0042-03 REG	SWMW-30 1570520 7935719 6/18/2015 CVX-0050-05 REG	SWMW-30 1593502 8050513 9/16/2015 CVX-0063-02 REG	SWMW-30 1609238 8133673 11/12/2015 SWMW-30-W-3.00-151112 REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	N	5	NA	< 0.8	6	4 J	< 0.8	1 J	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	51-28-5	N	10	NA	< 21	< 19	< 11	< 10	< 10	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 0.9	< 1	< 1	< 1	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 0.9	< 1	0.5 J	0.5	--	--	--	--	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 9	< 11	< 10	< 10	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	N	20	NA	< 1	< 0.9	< 1	1	1	--	--	--	--	--	--	--	--
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 0.9	< 1	< 0.1	0.5 J	--	--	--	--	--	--	--	--
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 0.9	< 1	0.2 J	0.2 J	--	--	--	--	--	--	--	--
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 0.9	< 1	< 0.1	0.1 J	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 0.9	< 1	< 0.1	0.1 J	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 0.9	< 1	< 0.1	0.1 J	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 0.9	< 1	< 0.1	0.1 J	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	2 J	< 2	2 J	< 2	< 2	--	--	--	--	--	--	--	--
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Chrysene	218-01-9	N	0.002	NA	< 1	< 0.9	< 1	< 0.1	0.2 J	--	--	--	--	--	--	--	--
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	--	--	--	--	--	--	--	--
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	1 J	< 0.9	< 1	< 0.1	0.1 J	--	--	--	--	--	--	--	--
Fluorene	86-73-7	N	50	NA	< 1	4 J	2 J	3	3	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	--	--	--	--	--	--	--	--

Appendix B-3
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-30 1021137 4956589 1/10/2007 SWMW30011007 REG	SWMW-30 1115578 5501161 10/15/2008 SWMW-30(10-15-08) REG	SWMW-30 1196055 5989960 5/25/2010 SWMW-30(5-25-10) REG	SWMW-30 1343541 6830376 10/18/2012 SWMW-30(101812) REG	SWMW-30 1395579 7085956 6/6/2013 SWMW-30 (060613) REG	SWMW-30 1463182 7412720 3/28/2014 SWMW-30-032814 REG	SWMW-30 1479522 7487861 6/4/2014 SWMW-30-060414 REG	SWMW-30 1504922 7607787 9/19/2014 CVX-0033-04 REG	SWMW-30 1517915 7671551 11/11/2014 CVX-0038-02 REG	SWMW-30 1546097 7809283 3/17/2015 CVX-0042-03 REG	SWMW-30 1570520 7935719 6/18/2015 CVX-0050-05 REG	SWMW-30 1593502 8050513 9/16/2015 CVX-0063-02 REG	SWMW-30 1609238 8133673 11/12/2015 SWMW-30-W-3.00-151112 REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 0.9	< 1	< 1	< 1	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 0.9	< 1	< 0.1	< 0.1	--	--	--	--	--	--	--	--
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 0.9	< 1	< 0.1	0.7	--	--	--	--	--	--	--	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 0.9	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 3	< 1	< 1	--	--	--	--	--	--	--	--
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	1 J	< 1	0.4 J	0.6	--	--	--	--	--	--	--	--
Phenol	**108-95-2**	**N**	**1**	**NA**	3 J	3 J	< 1	< 0.5	< 0.5	--	--	--	--	--	--	--	--
Pyrene	**129-00-0**	**N**	**50**	**NA**	2 J	< 0.9	< 1	0.2 J	0.4 J	--	--	--	--	--	--	--	--
Metals																	
Aluminum	**7429-90-5**	**N**	**100**	**NA**	634	278	237	524	5,630	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	13.2 J	133	84	92.6	108	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	61.6	155	169	73.4	157	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	72,500	91,700	93,000	61,200	87,200	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	< 2.3	< 3.0	< 3.4	1.3 J	8.8 J	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	< 2.1	< 2.1	< 0.66	1.9 J	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	3.8 J	< 2.7	< 2.7	< 2.1	13.3	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	1,130	15,700	16,500	9,990	18,700	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	< 6.9	13.3 J	< 6.9	< 5.1	10 J	--	--	--	--	--	--	--	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	12,700	28,800	28,300	14,400	21,800	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	244	3,220	3,280	2,160	2,380	2,610	2,530	2,910	3,150	2,420	3,120	3,090	3,120
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	< 5.6	< 1.8	< 1.1	5.2 J	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	2,800	2,580	2,410	1,440	2,530	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	25,000	147,000	187,000	46,000	105,000	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	1.7 J	< 2.5	< 2.5	< 1.3	6.2	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	12.0 J	< 8.1	< 8.1	4.1 J	27.7	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-30 1609238 8133678 11/12/2015 SWMW-30-WD-3.00-151112 FD	SWMW-30 1671684 8424618 6/13/2016 SWMW-30-WD-3.00-160613 FD	SWMW-30 1671684 8424619 6/13/2016 SWMW-30-W-3.00-160613 REG	SWMW-31 1021137 4956586 1/10/2007 SWMW31011007 REG	SWMW-31 1115578 5501155 10/15/2008 SWMW-31(10-15-08) REG	SWMW-31 1196055 5989961 5/25/2010 SWMW-31(5-25-10) REG	SWMW-31 1343541 6830377 10/18/2012 SWMW-31(101812) REG	SWMW-31 1395576 7085924 6/6/2013 SWMW-31 (060613) REG	SWMW-31 1463182 7412721 3/28/2014 SWMW-31-032814 REG	SWMW-31 1479522 7487862 6/4/2014 SWMW-31-060414 REG	SWMW-31 1504922 7607788 9/19/2014 CVX-0033-05 REG	SWMW-31 1517915 7671552 11/11/2014 CVX-0038-03 REG
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	N	5	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,1-Trichloroethane	71-55-6	N	5	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,1,2-Trichloroethane	79-00-5	N	1	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
2-Hexanone	591-78-6	N	50	NA	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	--	< 3	< 3	< 3	< 3	< 3	--	--	--	--
Acetone	67-64-1	N	50	NA	--	--	--	16 J	15 J	17 J	11 J	< 6	--	--	--	--
Benzene	71-43-2	N	1	NA	10	5	5	8	10	8	28	11	4	24	15	29
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromoform	75-25-2	N	50	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon disulfide	75-15-0	N	60	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Carbon Tetrachloride	56-23-5	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chlorobenzene	108-90-7	N	5	NA	0.8 J	1	1	4 J	5 J	2 J	3 J	2 J	1 J	3	1	4
Chloroethane	75-00-3	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Chloroform	67-66-3	N	7	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Ethylbenzene	100-41-4	N	5	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	--	--	--	110	69	20	14	12	--	--	--	--
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	7	5	2 J	2 J	1 J	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Tetrachloroethene	127-18-4	N	5	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
Toluene	108-88-3	N	5	NA	--	--	--	0.8 J	1 J	1 J	2 J	0.8 J	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--

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Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-30 1609238 8133678 11/12/2015 SWMW-30-WD-3.00-151112 FD	SWMW-30 1671684 8424618 6/13/2016 SWMW-30-WD-3.00-160613 FD	SWMW-30 1671684 8424619 6/13/2016 SWMW-30-W-3.00-160613 REG	SWMW-31 1021137 4956586 1/10/2007 SWMW31011007 REG	SWMW-31 1115578 5501155 10/15/2008 SWMW-31(10-15-08) REG	SWMW-31 1196055 5989961 5/25/2010 SWMW-31(5-25-10) REG	SWMW-31 1343541 6830377 10/18/2012 SWMW-31(101812) REG	SWMW-31 1395576 7085924 6/6/2013 SWMW-31 (060613) REG	SWMW-31 1463182 7412721 3/28/2014 SWMW-31-032814 REG	SWMW-31 1479522 7487862 6/4/2014 SWMW-31-060414 REG	SWMW-31 1504922 7607788 9/19/2014 CVX-0033-05 REG	SWMW-31 1517915 7671552 11/11/2014 CVX-0038-03 REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	N	5	NA	--	--	--	2 J	3 J	3 J	2 J	0.9 J	--	--	--	--
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	N	1	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2,4-Dichlorophenol	120-83-2	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2,4-Dimethylphenol	105-67-9	N	50	NA	--	--	--	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--	--
2,4-Dinitrophenol	51-28-5	N	10	NA	--	--	--	< 20	< 19	< 10	< 10	< 10	--	--	--	--
2,4-Dinitrotoluene	121-14-2	N	5	NA	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
2,6-Dinitrotoluene	606-20-2	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Chloronaphthalene	91-58-7	N	10	NA	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4	--	--	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Methyl-Naphthalene	91-57-6	N	NA	36	--	--	--	9	16	1 J	5	9	--	--	--	--
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
3-Nitroaniline	99-09-2	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--	--	--
4-Bromophenylphenylether	101-55-3	N	NA	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4-Chloroaniline	106-47-8	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
4-Nitroaniline	100-01-6	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
4-Nitrophenol	100-02-7	N	1	NA	--	--	--	< 10	< 10	< 10	< 10	< 10	--	--	--	--
Acenaphthene	83-32-9	N	20	NA	--	--	--	2 J	3 J	3 J	2	2	--	--	--	--
Acenaphthylene	208-96-8	N	NA	NA	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	--	--	--	< 1	< 1	< 1	0.6	0.4 J	--	--	--	--
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(a)pyrene	50-32-8	N	NA	0.025	--	--	--	< 1	< 1	< 1	0.2 J	< 0.1	--	--	--	--
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	--	--	--	< 1	< 1	< 1	0.1 J	< 0.1	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	--	--	--	< 2	< 2	7	< 2	< 2	--	--	--	--
Butylbenzylphthalate	85-68-7	N	50	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Chrysene	218-01-9	N	0.002	NA	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Di-n-butylphthalate	84-74-2	N	50	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Di-n-octylphthalate	117-84-0	N	50	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Dibenzofuran	132-64-9	N	NA	7.9	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Diethylphthalate	84-66-2	N	50	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Dimethyl phthalate	131-11-3	N	50	NA	--	--	--	< 2	< 2	< 2	< 2	< 2	--	--	--	--
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	--	--	--	< 1	< 1	< 1	0.2 J	0.1 J	--	--	--	--
Fluorene	86-73-7	N	50	NA	--	--	--	3 J	5 J	4 J	3	3	--	--	--	--
Hexachlorobenzene	118-74-1	N	0.04	NA	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	--	--	--	< 5	< 5	< 5	< 5	< 5	--	--	--	--

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Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	--	--	--	< 1	< 1	< 1	< 1	< 1	--	--	--	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	--	--	--	--
Isophorone	**78-59-1**	**N**	**50**	**NA**	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	< 1	< 1	1 J	< 0.1	0.4 J	--	--	--	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--	--
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	--	--	--	< 3	< 3	< 3	< 1	< 1	--	--	--	--
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	--	--	--	1 J	1 J	1 J	0.3 J	0.4 J	--	--	--	--
Phenol	**108-95-2**	**N**	**1**	**NA**	--	--	--	< 1	1 J	< 1	< 0.5	< 0.5	--	--	--	--
Pyrene	**129-00-0**	**N**	**50**	**NA**	--	--	--	< 1	< 1	< 1	0.5	0.3 J	--	--	--	--
Metals																
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	204	379	4,940	1,850	2,470	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	< 9.7	10.4 J	< 9.7	< 3.5	< 3.5	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	41.3	55.1	41.6	50.6	48.9	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	191	244	254	154	170	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	93,800	103,000	94,000	64,800	74,200	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	< 2.3	< 3.0	8.0 J	2.9 J	3.4 J	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	< 2.1	< 2.1	2.2 J	1.6 J	0.89 J	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	< 2.2	< 2.7	11.6	2.6 J	6.1 J	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	14,200	17,300	25,700	17,000	22,500	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	--	< 6.9	13.6 J	22.2	8.2 J	12.9 J	--	--	--	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	25,800	27,100	20,600	14,000	17,000	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	3,000	3,040	2,930	2,740	3,530	4,710	3,570	3,350	3,190	3,330	4,270	3,760
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	< 5.6	< 5.6	5.8 J	1.2 J	1.2 J	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	1,250	2,380	2,500	2,040	1,850	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	219,000	206,000	182,000	124,000	137,000	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	< 1.5	< 2.5	8	3.4 J	3.0 J	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	< 8.1	12.2 J	43.1	13.5 J	17.7 J	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-31	SWMW-31	SWMW-31	SWMW-31	SWMW-31	SWMW-32	SWMW-32	SWMW-32	SWMW-32	SWMW-32	SWMW-33	SWMW-33	SWMW-33
Sample Delivery Group (SDG)					1546097	1570520	1593502	1609238	1671684	1021137	1115579	1196055	1343541	1395579	1021137	1115579	1196055
Lab Sample ID					7809284	7935720	8050514	8133674	8424620	4956591	5501168	5989962	6830378	7085957	4956577	5501169	5989959
Sample Date					3/17/2015	6/18/2015	9/16/2015	11/12/2015	6/13/2016	1/10/2007	10/15/2008	5/25/2010	10/18/2012	6/6/2013	1/10/2007	10/15/2008	5/25/2010
Field Sample ID					CVX-0042-04	CVX-0050-06	CVX-0063-03	SWMW-31-W-3.00-151112	SWMW-31-W-3.00-160613	SWMW32011007	SWMW-32(10-15-08)	SWMW-32(5-25-10)	SWMW-32(101812)	SWMW-32 (060613)	SWMW33011007	SWMW-33(10-15-08)	SWMW-33(5-25-10)
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019													
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	--	--	--	8 J	< 3	< 3	< 3	< 3	4 J	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	--	--	--	--	--	33	15 J	13 J	< 6	< 6	40	< 6	10 J
Benzene	71-43-2	N	1	NA	12	13	25	21	21	5	13	0.9 J	1 J	< 0.5	0.8 J	2 J	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	1	3	3	2	3	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	--	--	--	--	--	67	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	--	--	--	--	--	8	110	53	21	20	0.9 J	2 J	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	--	--	< 0.8	6	2 J	< 0.8	1 J	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	--	--	--	--	--	0.9 J	1 J	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-31 1546097 7809284 3/17/2015 CVX-0042-04 REG	SWMW-31 1570520 7935720 6/18/2015 CVX-0050-06 REG	SWMW-31 1593502 8050514 9/16/2015 CVX-0063-03 REG	SWMW-31 1609238 8133674 11/12/2015 SWMW-31-W-3.00-151112 REG	SWMW-31 1671684 8424620 6/13/2016 SWMW-31-W-3.00-160613 REG	SWMW-32 1021137 4956591 1/10/2007 SWMW32011007 REG	SWMW-32 1115579 5501168 10/15/2008 SWMW-32(10-15-08) REG	SWMW-32 1196055 5989962 5/25/2010 SWMW-32(5-25-10) REG	SWMW-32 1343541 6830378 10/18/2012 SWMW-32(101812) REG	SWMW-32 1395579 7085957 6/6/2013 SWMW-32 (060613) REG	SWMW-33 1021137 4956577 1/10/2007 SWMW33011007 REG	SWMW-33 1115579 5501169 10/15/2008 SWMW-33(10-15-08) REG	SWMW-33 1196055 5989959 5/25/2010 SWMW-33(5-25-10) REG
Vinyl chloride (Chloroethene)	**75-01-4**	**N**	**2**	**NA**	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	**1330-20-7**	**N**	**5**	**NA**	--	--	--	--	--	17	2 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**N**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**N**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	**58-90-2**	**N**	**NA**	**240**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2,4,6-Trichlorophenol	**88-06-2**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2,4-Dichlorophenol	**120-83-2**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2,4-Dimethylphenol	**105-67-9**	**N**	**50**	**NA**	--	--	--	--	--	< 3	< 3	< 3	< 0.5	< 0.5	< 3	< 3	< 3
2,4-Dinitrophenol	**51-28-5**	**N**	**10**	**NA**	--	--	--	--	--	< 21	< 19	< 10	< 10	< 10	< 21	< 19	< 10
2,4-Dinitrotoluene	**121-14-2**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2-Chloronaphthalene	**91-58-7**	**N**	**10**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2-Methyl-Naphthalene	**91-57-6**	**N**	**NA**	**36**	--	--	--	--	--	20	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
2-Methylphenol (o-Cresol)	**95-48-7**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
3,3'-Dichlorobenzidine	**91-94-1**	**N**	**5**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	**99-09-2**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**N**	**1**	**NA**	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**N**	**NA**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4-Chloroaniline	**106-47-8**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	**7005-72-3**	**N**	**NA**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	**106-44-5**	**N**	**1**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	4 J	< 2	< 2
4-Nitroaniline	**100-01-6**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4-Nitrophenol	**100-02-7**	**N**	**1**	**NA**	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 11	< 10	< 10
Acenaphthene	**83-32-9**	**N**	**20**	**NA**	--	--	--	--	--	< 1	1 J	< 1	0.3 J	0.2 J	< 1	< 1	< 1
Acenaphthylene	**208-96-8**	**N**	**NA**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Acetophenone	**98-86-2**	**N**	**NA**	**1900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**N**	**50**	**NA**	--	--	--	--	--	1 J	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Atrazine	**1912-24-9**	**N**	**NA**	**0.3**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	**100-52-7**	**N**	**NA**	**19**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**N**	**0.002**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(a)pyrene	**50-32-8**	**N**	**NA**	**0.025**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(b)fluoranthene	**205-99-2**	**N**	**0.002**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(g,h,i)perylene	**191-24-2**	**N**	**NA**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(k)fluoranthene	**207-08-9**	**N**	**0.002**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-Chloroethyl) ether	**111-44-4**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	**108-60-1**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**N**	**5**	**NA**	--	--	--	--	--	2 J	< 2	< 2	< 2	< 2	2 J	< 2	< 2
Butylbenzylphthalate	**85-68-7**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	**105-60-2**	**N**	**NA**	**9900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**N**	**NA**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
Chrysene	**218-01-9**	**N**	**0.002**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Di-n-butylphthalate	**84-74-2**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**N**	**NA**	**0.025**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Dibenzofuran	**132-64-9**	**N**	**NA**	**7.9**	--	--	--	--	--	3 J	1 J	< 1	< 0.5	< 0.5	2 J	1 J	< 1
Diethylphthalate	**84-66-2**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	**131-11-3**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	**92-52-4**	**N**	**NA**	**0.83**	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**N**	**50**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Fluorene	**86-73-7**	**N**	**50**	**NA**	--	--	--	--	--	5 J	3 J	2 J	0.7	0.5 J	3 J	2 J	2 J
Hexachlorobenzene	**118-74-1**	**N**	**0.04**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**N**	**5**	**NA**	--	--	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-31 1546097 7809284 3/17/2015 CVX-0042-04 REG	SWMW-31 1570520 7935720 6/18/2015 CVX-0050-06 REG	SWMW-31 1593502 8050514 9/16/2015 CVX-0063-03 REG	SWMW-31 1609238 8133674 11/12/2015 SWMW-31-W-3.00-151112 REG	SWMW-31 1671684 8424620 6/13/2016 SWMW-31-W-3.00-160613 REG	SWMW-32 1021137 4956591 1/10/2007 SWMW32011007 REG	SWMW-32 1115579 5501168 10/15/2008 SWMW-32(10-15-08) REG	SWMW-32 1196055 5989962 5/25/2010 SWMW-32(5-25-10) REG	SWMW-32 1343541 6830378 10/18/2012 SWMW-32(101812) REG	SWMW-32 1395579 7085957 6/6/2013 SWMW-32 (060613) REG	SWMW-33 1021137 4956577 1/10/2007 SWMW33011007 REG	SWMW-33 1115579 5501169 10/15/2008 SWMW-33(10-15-08) REG	SWMW-33 1196055 5989959 5/25/2010 SWMW-33(5-25-10) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	--	--	--	--	--	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	< 1	< 1	< 1	0.3 J	0.2 J	< 1	< 1	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	--	--	--	--	--	< 3	< 3	< 3	< 1	< 1	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	--	--	--	--	--	8	2 J	< 1	0.1 J	0.1 J	< 1	< 1	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	--	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	--	--	--	--	--	3 J	1 J	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Metals																	
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	--	--	955	649	674	6,700	647	376	262	901
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	--	--	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 9.7
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	--	--	58.1	88.1	30.9	46.4	33	< 10	< 22.3	< 7.2
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	--	--	170	106	98.2	97.2	63.8	90.9	183	121
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	--	--	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	< 0.94	< 0.90	< 1.4
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	--	--	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36	< 0.91	< 2.0	< 2.0
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	--	--	104,000	106,000	87,800	83,300	85,100	66,200	90,500	70,800
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	--	--	2.4 J	< 3.0	< 3.4	8.3 J	9.1 J	< 2.3	< 3.0	< 3.4
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	--	--	2.8 J	< 2.1	< 2.1	4.5 J	< 0.66	< 2.1	< 2.1	< 2.1
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	--	--	2.9 J	< 10 J	< 2.7	20.8	< 2.1	< 2.2	< 10 J	< 2.7
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	--	--	12,900	6,160	4,470	12,200	5,320	7,710	19,200	9,050
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	--	--	--	12.8 J	< 6.9	< 6.9	15.6	< 5.1	< 6.9	< 6.9	< 6.9
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	--	--	25,700	38,500	31,900	33,900	25,700	17,000	20,200	15,700
Manganese	**7439-96-5**	**N**	**300**	**NA**	4,680	3,860	2,850	5,180	2,990	7,440	3,990	3,120	3,420	3,110	10,600	7,120	4,850
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	--	--	< 5.6	< 5.6	2.4 J	9.0 J	30.2	< 5.6	< 5.6	2.2 J
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	--	--	3,300	2,060	2,000	2,560	1,550	2,840	4,140	2,730
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	--	--	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	< 9.4	< 10.7	< 8.9
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	--	--	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	< 1.6	< 2.2	< 2.3
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	--	--	43,900	165,000	205,000	180,000	123,000	85,700	224,000	158,000
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	--	--	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	< 13.5	< 14.0	< 14.0
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	--	--	1.7 J	< 2.5	< 2.5	10	< 1.3	< 1.5	< 2.5	< 2.5
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	--	--	11.1 J	10.2 J	8.8 J	33.3	246	< 8.1	12.0 J	< 8.1
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
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Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-33	SWMW-33	SWMW-34	SWMW-34	SWMW-34	SWMW-35	SWMW-35	SWMW-35	SWMW-36	SWMW-36	SWMW-36	SWMW-36
Sample Delivery Group (SDG)					1343541	1395579	1021137	1115579	1395576	1021138	1115579	1395579	1021138	1115579	1395576	1395576
Lab Sample ID			NY_TOGS	USEPA Tapwater RSL 2019	6830375	7085951	4956574	5501179	7085910	4956593	5501175	7085948	4956594	5501170	7085914	7085915
Sample Date					10/18/2012	6/6/2013	1/10/2007	10/16/2008	6/6/2013	1/10/2007	10/16/2008	6/6/2013	1/10/2007	10/16/2008	6/6/2013	6/6/2013
Field Sample ID					SWMW-33(101812)	SWMW-33 (060613)	SWMW34011007	SWMW-34(10-16-08)	SWMW-34 (060613)	SWMW35011007	SWMW-35(10-16-08)	SWMW-35 (060613)	SWMW36011007	SWMW-36(10-16-08)	SWMW-36 (060613)	SWMW-136 (060613)
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	FD
Parameter Name	Parameter Code	Filtered														
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	< 6	< 6	14 J	< 6	< 6	< 6	< 6	< 6	< 11 J	< 6	< 6	< 6
Benzene	71-43-2	N	1	NA	0.6 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	1 J	0.7 J	0.6 J	< 0.5	< 0.5	1 J	4 J	< 0.5	< 0.5	0.8 J	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--

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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-33 1343541 6830375 10/18/2012 SWMW-33(101812) REG	SWMW-33 1395579 7085951 6/6/2013 SWMW-33 (060613) REG	SWMW-34 1021137 4956574 1/10/2007 SWMW34011007 REG	SWMW-34 1115579 5501179 10/16/2008 SWMW-34(10-16-08) REG	SWMW-34 1395576 7085910 6/6/2013 SWMW-34 (060613) REG	SWMW-35 1021138 4956593 1/10/2007 SWMW35011007 REG	SWMW-35 1115579 5501175 10/16/2008 SWMW-35(10-16-08) REG	SWMW-35 1395579 7085948 6/6/2013 SWMW-35 (060613) REG	SWMW-36 1021138 4956594 1/10/2007 SWMW36011007 REG	SWMW-36 1115579 5501170 10/16/2008 SWMW-36(10-16-08) REG	SWMW-36 1395576 7085914 6/6/2013 SWMW-36 (060613) REG	SWMW-36 1395576 7085915 6/6/2013 SWMW-136 (060613) FD
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	N	5	NA	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	N	50	NA	< 0.5	--	< 3	< 3	--	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	N	10	NA	< 10	--	< 19	< 19	--	< 21	< 20	< 10	< 20	< 19	< 10	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	0.6 J	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	N	10	NA	< 0.4	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	--	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
4-Chloroaniline	106-47-8	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 0.5	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 0.5	--	< 2	< 2	--	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 0.5
4-Nitroaniline	100-01-6	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
4-Nitrophenol	100-02-7	N	1	NA	< 10	--	< 9	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Acenaphthylene	208-96-8	N	NA	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 2	< 2	6	2 J	< 2	< 2	3 J	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
Chrysene	218-01-9	N	0.002	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Dibenzofuran	132-64-9	N	NA	7.9	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Fluorene	86-73-7	N	50	NA	0.1 J	0.3 J	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-33 1343541 6830375 10/18/2012 SWMW-33(101812) REG	SWMW-33 1395579 7085951 6/6/2013 SWMW-33 (060613) REG	SWMW-34 1021137 4956574 1/10/2007 SWMW34011007 REG	SWMW-34 1115579 5501179 10/16/2008 SWMW-34(10-16-08) REG	SWMW-34 1395576 7085910 6/6/2013 SWMW-34 (060613) REG	SWMW-35 1021138 4956593 1/10/2007 SWMW35011007 REG	SWMW-35 1115579 5501175 10/16/2008 SWMW-35(10-16-08) REG	SWMW-35 1395579 7085948 6/6/2013 SWMW-35 (060613) REG	SWMW-36 1021138 4956594 1/10/2007 SWMW36011007 REG	SWMW-36 1115579 5501170 10/16/2008 SWMW-36(10-16-08) REG	SWMW-36 1395576 7085914 6/6/2013 SWMW-36 (060613) REG	SWMW-36 1395576 7085915 6/6/2013 SWMW-136 (060613) FD
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0.5	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0.1	0.2 J	< 0.9	< 1	< 0.1	< 1	< 1	0.2 J	< 1	< 1	< 0.1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0.5	< 0.5	< 0.9	< 1	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 1	--	< 3	< 3	--	< 3	< 3	< 1	< 3	< 3	< 1	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 0.5	--	< 0.9	< 1	--	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.9	< 1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 0.1
Metals																
Aluminum	**7429-90-5**	**N**	**100**	**NA**	256	217	275	226	89.5 J	4,900	10,800	1,050	244	242	1,300	199 J
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 3.5	< 3.5
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 6.8	8.4 J	< 10	< 20 J	< 6.8	26.9	< 52.0	9.4 J	< 10	< 20 J	< 6.8	< 6.8
Barium	**7440-39-3**	**N**	**1000**	**NA**	65.6	71.9	72.5	168	52.9	50.2	335	72.6	18.5	45.9	26.8	11.8
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.67	< 0.67	< 0.94	< 0.90	< 0.67	< 0.94	1.2 J	< 0.67	< 0.94	< 0.90	< 0.67	< 0.67
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.36	< 0.36	< 0.91	< 2.0	< 0.36	< 0.91	< 2.0	< 0.36	< 0.91	6.7	< 0.36	< 0.36
Calcium	**7440-70-2**	**N**	**NA**	**NA**	79,600	60,100	50,400	94,100	48,600	52,200	95,000	51,300	32,900	90,200	50,500	50,400
Chromium	**7440-47-3**	**N**	**50**	**NA**	3.2 J	5.9 J	< 2.3	< 3.0	< 1.1	5.7 J	11.6 J	2.9 J	< 2.3	< 3.0	1.7 J	< 1.1
Cobalt	**7440-48-4**	**N**	**5**	**NA**	9.9	3.6 J	< 2.1	< 2.1	1.1 J	3.1 J	21.9	1.1 J	< 2.1	< 2.1	1.6 J	< 0.66
Copper	**7440-50-8**	**N**	**200**	**NA**	< 2.1	< 2.1	< 2.2	< 2.7	< 2.1	12.2	92.9	< 2.1	< 2.2	< 10 J	3.9 J	< 2.1
Iron	**7439-89-6**	**N**	**300**	**NA**	16,200	10,100	1,780	10,900	3,100	7,760	33,000	1,870	353	732	2,940	518
Lead	**7439-92-1**	**N**	**25**	**NA**	< 5.1	< 5.1	< 6.9	< 6.9	< 5.1	< 6.9	48.8	< 5.1	< 6.9	< 6.9	5.1 J	< 5.1
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	17,200	13,600	13,900	24,800	13,100	16,400	32,100	14,200	8,380	27,500	12,600	12,100
Manganese	**7439-96-5**	**N**	**300**	**NA**	17,900	8,920	2,020	2,050	4,040	1,390	6,980	2,720	193	5,560	659	95.2
Nickel	**7440-02-0**	**N**	**100**	**NA**	3.6 J	10.9	< 5.6	< 5.6	< 1.1	6.8 J	18.8	1.9 J	< 5.6	< 5.6	1.6 J	< 1.1
Potassium	**7440-09-7**	**N**	**NA**	**NA**	3,030	2,160	2,130	2,980	1,710	3,060	3,410	2,470	2,450	6,070	2,870	2,590
Selenium	**7782-49-2**	**N**	**10**	**NA**	7.7 J	< 7.5	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 7.5	< 7.5
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.2	1.3 J	< 1.6	< 2.2	< 1.2	< 1.6	2.3 J	< 1.2	< 1.6	< 2.2	< 1.2	< 1.2
Sodium	**7440-23-5**	**N**	**20000**	**NA**	113,000	91,900	139,000	274,000	95,800	129,000	177,000	98,600	45,200	125,000	33,000	32,800
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	8.5 J	< 5.7	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 5.7	< 5.7
Vanadium	**7440-62-2**	**N**	**NA**	**86**	1.6 J	< 1.3	< 1.5	< 2.5	< 1.3	6.3	16.4	1.5 J	< 1.5	< 2.5	1.5 J	< 1.3
Zinc	**7440-66-6**	**N**	**2000**	**NA**	9.1 J	67.7	< 8.1	24.2	< 2.0	20	74.5	8.3 J	< 8.1	16.8 J	7.3 J	< 2.0
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.070	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-37	SWMW-37	SWMW-37	SWMW-38	SWMW-38	SWMW-38	SWMW-50	SWMW-50	SWMW-50	SWMW-50	SWMW-50	SWMW-50
Sample Delivery Group (SDG)					1021138	1115579	1395576	1021137	1115579	1395579	1021137	1021137	1115579	1196055	1343541	1395576
Lab Sample ID			NY_TOGS	USEPA Tapwater RSL 2019	4956598	5501174	7085921	4956578	5501181	7085955	4956579	4956580	5501167	5989958	6830381	7085923
Sample Date					1/10/2007	10/16/2008	6/6/2013	1/10/2007	10/16/2008	6/6/2013	1/10/2007	1/10/2007	10/15/2008	5/25/2010	10/18/2012	6/6/2013
Field Sample ID					SWMW37011007	SWMW-37(10-16-08)	SWMW-37 (060613)	SWMW38011007	SWMW-38(10-16-08)	SWMW-38 (060613)	SWMW50011007	SWMW150011007	SWMW-50(10-15-08)	SWMW-50(5-25-10)	SWMW-50(101812)	SWMW-50 (060613)
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered														
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	1 J	1 J	1 J	0.8 J
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	3 J	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	< 6	< 6	< 6	11 J	< 6	< 6	11 J	11 J	< 6	11 J	< 6	< 6
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	8	7	10	3 J	1 J	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	1 J	1 J	< 0.8
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	2 J	2 J	2 J	3 J	1 J	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-37 1021138 4956598 1/10/2007 SWMW37011007 REG	SWMW-37 1115579 5501174 10/16/2008 SWMW-37(10-16-08) REG	SWMW-37 1395576 7085921 6/6/2013 SWMW-37 (060613) REG	SWMW-38 1021137 4956578 1/10/2007 SWMW38011007 REG	SWMW-38 1115579 5501181 10/16/2008 SWMW-38(10-16-08) REG	SWMW-38 1395579 7085955 6/6/2013 SWMW-38 (060613) REG	SWMW-50 1021137 4956579 1/10/2007 SWMW50011007 REG	SWMW-50 1021137 4956580 1/10/2007 SWMW150011007 FD	SWMW-50 1115579 5501167 10/15/2008 SWMW-50(10-15-08) REG	SWMW-50 1196055 5989958 5/25/2010 SWMW-50(5-25-10) REG	SWMW-50 1343541 6830381 10/18/2012 SWMW-50(101812) REG	SWMW-50 1395576 7085923 6/6/2013 SWMW-50 (060613) REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	3 J	3 J	2 J	4 J	< 0.8	< 0.8
Semivolatile Organic Compounds																
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 3	< 3	< 3	< 3	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	N	10	NA	< 20	< 19	< 11	< 21	< 20	< 10	< 23	< 21	< 21	< 10	< 11	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 2	< 2	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	0.4 J	0.4 J
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 9	< 11	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 11	< 10
Acenaphthene	83-32-9	N	20	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	0.4 J
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 0.9	< 0.1	1 J	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	0.1 J
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	3 J	< 2	< 2	5	13	< 2	< 2	< 2	< 2	5	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Chrysene	218-01-9	N	0.002	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	1 J	2 J	2 J	1	1
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 1	< 0.9	< 0.1	3 J	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Fluorene	86-73-7	N	50	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	2 J	2 J	2 J	2	2
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	< 5

Appendix B-3
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-37 1021138 4956598 1/10/2007 SWMW37011007 REG	SWMW-37 1115579 5501174 10/16/2008 SWMW-37(10-16-08) REG	SWMW-37 1395576 7085921 6/6/2013 SWMW-37 (060613) REG	SWMW-38 1021137 4956578 1/10/2007 SWMW38011007 REG	SWMW-38 1115579 5501181 10/16/2008 SWMW-38(10-16-08) REG	SWMW-38 1395579 7085955 6/6/2013 SWMW-38 (060613) REG	SWMW-50 1021137 4956579 1/10/2007 SWMW50011007 REG	SWMW-50 1021137 4956580 1/10/2007 SWMW150011007 FD	SWMW-50 1115579 5501167 10/15/2008 SWMW-50(10-15-08) REG	SWMW-50 1196055 5989958 5/25/2010 SWMW-50(5-25-10) REG	SWMW-50 1343541 6830381 10/18/2012 SWMW-50(101812) REG	SWMW-50 1395576 7085923 6/6/2013 SWMW-50 (060613) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 0.9	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 1	< 3	< 3	< 1	< 3	< 3	< 3	< 3	< 1	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 0.9	< 0.1	9	< 1	< 0.1	1 J	1 J	< 1	2 J	1	0.7
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 0.9	< 0.5	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 0.9	< 0.1	2 J	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1
Metals																
Aluminum	**7429-90-5**	**N**	**100**	**NA**	4,200	17,200	3,550	< 80.2	< 80.2	< 74.3	7,790	4,390	< 80.2	< 80.2	15,900	< 74.3
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10	< 25.8	< 6.8	11.7 J	< 22.1	9.5 J	132	122	120	143	143	79.5
Barium	**7440-39-3**	**N**	**1000**	**NA**	37.5	117	38.1	61.9	105	64.5	253	125	83.6	221	155	85.7
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.94	0.98 J	< 0.67	< 0.94	< 0.90	< 0.67	1.5 J	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.91	4.0 J	< 0.36	< 0.91	< 2.0	< 0.36	< 0.91	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36
Calcium	**7440-70-2**	**N**	**NA**	**NA**	40,700	83,300	71,500	39,500	64,600	63,400	115,000	70,700	47,600	118,000	62,400	108,000
Chromium	**7440-47-3**	**N**	**50**	**NA**	4.8 J	21.8	3.6 J	< 2.3	< 3.0	1.5 J	8.4 J	4.9 J	< 3.0	< 3.4	19.6	< 1.1
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	14	1.9 J	< 2.1	< 2.1	< 0.66	12.9	4.0 J	< 2.1	< 2.1	11.6	< 0.66
Copper	**7440-50-8**	**N**	**200**	**NA**	6.0 J	36.6	5.5 J	< 2.2	< 10 J	< 2.1	44	13.6	< 10 J	< 2.7	41.7	< 2.1
Iron	**7439-89-6**	**N**	**300**	**NA**	4,310	26,000	4,570	4,240	4,040	377	33,000	21,500	8,680	29,500	35,200	10,900
Lead	**7439-92-1**	**N**	**25**	**NA**	< 6.9	11.9 J	8.2 J	< 6.9	< 6.9	< 5.1	36.1	11.2 J	< 6.9	< 6.9	22.8	6.5 J
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	13,700	33,100	25,000	9,550	15,600	13,600	32,800	17,400	7,900	20,000	17,700	17,200
Manganese	**7439-96-5**	**N**	**300**	**NA**	731	3,200	218	939	799	145	4,680	2,800	1,960	4,380	2,350	2,360
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	26.6	3.2 J	< 5.6	< 5.6	1.4 J	14.7	8.3 J	< 5.6	< 1.8	22.6	< 1.1
Potassium	**7440-09-7**	**N**	**NA**	**NA**	1,930	3,800	1,210	2,100	3,420	2,370	2,740	2,610	2,480	3,310	4,200	1,790
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 7.5	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.6	2.6 J	< 1.2	< 1.6	< 2.2	< 1.2	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2
Sodium	**7440-23-5**	**N**	**20000**	**NA**	72,400	160,000	124,000	108,000	143,000	75,600	67,100	68,600	93,100	170,000	97,500	66,400
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 5.7	< 13.5	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7
Vanadium	**7440-62-2**	**N**	**NA**	**86**	5.8	22.5	4.4 J	< 1.5	< 2.5	< 1.3	11.3	5.8	< 2.5	< 2.5	20.3	< 1.3
Zinc	**7440-66-6**	**N**	**2000**	**NA**	20.0 J	99.7	19.3 J	< 8.1	11.0 J	58.7	67.9	30.9	< 8.1	< 8.1	80	3.2 J
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-53	SWMW-53	SWMW-53	SWMW-60	SWMW-60	SWMW-60	SWMW-60	SWMW-60	SWMW-60	SWMW-61	SWMW-61	SWMW-61
Sample Delivery Group (SDG)					1021137	1115579	1395576	1021137	1115578	1196055	1196055	1343541	1395576	1021138	1115578	1196041
Lab Sample ID					4956570	5501180	7085919	4956581	5501162	5989951	5989952	6830382	7085916	4956592	5501163	5989894
Sample Date					1/10/2007	10/16/2008	6/6/2013	1/10/2007	10/15/2008	5/25/2010	5/25/2010	10/18/2012	6/6/2013	1/10/2007	10/15/2008	5/25/2010
Field Sample ID					SWMW53011007	SWMW-53(10-16-08)	SWMW-53 (060613)	SWMW60011007	SWMW-60(10-15-08)	SWMW-60(5-25-10)	SWMW-160(5-25-10)	SWMW-60(101812)	SWMW-60 (060613)	SWMW61011007	SWMW-61(10-15-08)	SWMW-61(5-25-10)
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 0.5	< 1	5 J	5 J	4 J	< 0.5	3	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	0.7 J	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	10	9 J	6 J	7 J	3 J	< 3	< 3	< 3	< 3
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	12	< 3	< 3	< 3
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Acetone	67-64-1	N	50	NA	23	< 6	< 6	110	53	51	64	9 J	8 J	20	< 6	< 6
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	9	9	3 J	4 J	< 0.5	0.5 J	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	1 J	< 0.8	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	270	230	14	110	< 0.8	0.9 J	2 J	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	0.6 J	< 0.5	< 0.5	2 J	1 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	0.9 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	6	6	2 J	3 J	< 0.7	1 J	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-53 1021137 4956570 1/10/2007 SWMW53011007 REG	SWMW-53 1115579 5501180 10/16/2008 SWMW-53(10-16-08) REG	SWMW-53 1395576 7085919 6/6/2013 SWMW-53 (060613) REG	SWMW-60 1021137 4956581 1/10/2007 SWMW60011007 REG	SWMW-60 1115578 5501162 10/15/2008 SWMW-60(10-15-08) REG	SWMW-60 1196055 5989951 5/25/2010 SWMW-60(5-25-10) REG	SWMW-60 1196055 5989952 5/25/2010 SWMW-160(5-25-10) REG	SWMW-60 1343541 6830382 10/18/2012 SWMW-60(101812) REG	SWMW-60 1395576 7085916 6/6/2013 SWMW-60 (060613) REG	SWMW-61 1021138 4956592 1/10/2007 SWMW61011007 REG	SWMW-61 1115578 5501163 10/15/2008 SWMW-61(10-15-08) REG	SWMW-61 1196041 5989894 5/25/2010 SWMW-61(5-25-10) REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	210	44	18	24	< 0.8	7	8	2 J	< 0.8
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 0.5	< 3	< 3	< 3	< 3	< 0.5	--	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	N	10	NA	< 20	< 20	< 10	< 21	< 21	< 10	< 10	< 10	--	< 22	< 21	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 0.4	< 2	< 2	< 2	< 2	< 0.4	< 0.4	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 1	< 0.1	170	110	160	150	< 0.1	95	8	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 6	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	2	--	< 2	< 2	< 2
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 10	< 10	< 10	< 11	< 10	< 10	< 10	--	< 11	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 1	< 1	< 0.1	< 1	1 J	1 J	< 1	< 0.1	1	1 J	< 1	< 1
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 1	< 0.1	1 J	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	0.2 J	< 1	< 1	< 1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	3 J	< 2	< 2	3 J	< 2	2 J	4 J	5	< 2	14	< 5 J	< 5
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
Chrysene	218-01-9	N	0.002	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 1	< 0.5	4 J	4 J	4 J	4 J	0.7 J	4	4 J	< 1	< 1
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	0.3 J	< 0.1	< 1	< 1	< 1
Fluorene	86-73-7	N	50	NA	3 J	< 1	< 0.1	6	6	6	7	1	6	6	< 1	< 1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-53 1021137 4956570 1/10/2007 SWMW53011007 REG	SWMW-53 1115579 5501180 10/16/2008 SWMW-53(10-16-08) REG	SWMW-53 1395576 7085919 6/6/2013 SWMW-53 (060613) REG	SWMW-60 1021137 4956581 1/10/2007 SWMW60011007 REG	SWMW-60 1115578 5501162 10/15/2008 SWMW-60(10-15-08) REG	SWMW-60 1196055 5989951 5/25/2010 SWMW-60(5-25-10) REG	SWMW-60 1196055 5989952 5/25/2010 SWMW-160(5-25-10) REG	SWMW-60 1343541 6830382 10/18/2012 SWMW-60(101812) REG	SWMW-60 1395576 7085916 6/6/2013 SWMW-60 (060613) REG	SWMW-61 1021138 4956592 1/10/2007 SWMW61011007 REG	SWMW-61 1115578 5501163 10/15/2008 SWMW-61(10-15-08) REG	SWMW-61 1196041 5989894 5/25/2010 SWMW-61(5-25-10) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 1	< 1	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 0.5	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 2	< 2	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 1	< 0.1	110	68	71	66	< 0.1	3	< 1	< 1	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 1	< 3	< 3	< 3	< 3	< 1	--	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 1	< 0.1	7	4 J	4 J	5	< 0.1	4	6	< 1	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 0.5	--	< 1	< 1	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 1	< 1	< 1	< 1	0.6	< 0.1	< 1	< 1	< 1
Metals																
Aluminum	**7429-90-5**	**N**	**100**	**NA**	111 J	2,350	653	101 J	< 80.2	< 80.2	< 80.2	465	< 74.3	4,470	< 80.2	126 J
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	< 9.7
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10	< 20 J	< 6.8	63.5	67.6	92.2	71.5	33.8	75.8	30.6	23	70.5
Barium	**7440-39-3**	**N**	**1000**	**NA**	91.8	186	58.1	67.1	102	232	259	24.9	94.7	44.6	27.1	87.7
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.94	1.1 J	< 0.67	< 0.94	< 0.90	< 1.4	< 1.4	< 0.67	< 0.67	< 0.94	< 0.90	< 1.4
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.91	< 2.0	< 0.36	< 0.91	< 2.0	< 2.0	< 2.0	< 0.36	< 0.36	< 0.91	< 2.0	5.8
Calcium	**7440-70-2**	**N**	**NA**	**NA**	53,200	89,800	54,000	55,000	51,700	112,000	117,000	52,700	55,300	32,100	46,700	112,000
Chromium	**7440-47-3**	**N**	**50**	**NA**	< 2.3	< 3.0	1.4 J	< 2.3	< 3.0	< 3.4	< 3.4	1.1 J	< 1.1	5.2 J	< 3.0	< 3.4
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	< 5 J	0.98 J	< 2.1	< 2.1	< 2.1	< 2.1	< 0.66	< 0.66	2.3 J	< 2.1	< 2.1
Copper	**7440-50-8**	**N**	**200**	**NA**	< 2.2	< 10 J	< 2.1	< 2.2	< 2.7	< 2.7	< 2.7	4.8 J	< 2.1	15.2	4.6 J	< 2.7
Iron	**7439-89-6**	**N**	**300**	**NA**	894	15,300	5,050	16,100	15,600	28,100	27,400	2,690	13,800	6,480	865	1,200
Lead	**7439-92-1**	**N**	**25**	**NA**	9.8 J	13.6 J	< 5.1	< 6.9	11.3 J	< 6.9	< 6.9	5.5 J	5.4 J	9.8 J	14.3 J	< 6.9
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	14,800	22,800	12,300	13,900	12,300	26,900	27,800	8,640	13,000	7,150	7,640	23,300
Manganese	**7439-96-5**	**N**	**300**	**NA**	10,900	3,620	1,630	2,590	2,270	3,560	3,680	1,400	1,650	634	1,180	2,150
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	< 5.6	< 1.1	< 5.6	< 5.6	< 1.8	< 1.8	< 1.1	< 1.1	5.6 J	< 5.6	1.8 J
Potassium	**7440-09-7**	**N**	**NA**	**NA**	2,980	3,710	1,900	1,090	1,420	1,740	1,970	1,010	1,190	2,320	1,490	2,970
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 8.9	< 8.9	< 7.5	< 7.5	< 9.4	< 10.7	< 8.9
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.6	< 2.2	< 1.2	< 1.6	< 2.2	< 2.3	< 2.3	< 1.2	< 1.2	< 1.6	< 2.2	< 2.3
Sodium	**7440-23-5**	**N**	**20000**	**NA**	121,000	256,000	101,000	22,900	48,100	156,000	186,000	52,700	67,600	121,000	58,700	406,000
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 14.0	< 14.0	< 5.7	< 5.7	< 13.5	< 14.0	< 14.0
Vanadium	**7440-62-2**	**N**	**NA**	**86**	< 1.5	4.9 J	< 1.3	< 1.5	< 2.5	< 2.5	< 2.5	1.7 J	< 1.3	6.9	< 2.5	< 2.5
Zinc	**7440-66-6**	**N**	**2000**	**NA**	< 8.1	32.8	4.4 J	< 8.1	< 8.1	25.6	< 8.1	4.7 J	< 2.0	30.1	< 8.1	27.9
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	< 0.056	< 0.056	< 0.056

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-61	SWMW-61	SWMW-63	SWMW-63	SWMW-63	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71
Sample Delivery Group (SDG)					1343541	1395576	1021138	1115579	1396587	1021137	1115578	1196055	1343541	1343541	1395576	1463182
Lab Sample ID					6830368	7085920	4956597	5501183	7090576	4956576	5501165	5989954	6830379	6830380	7085922	7412719
Sample Date					10/18/2012	6/6/2013	1/10/2007	10/16/2008	6/11/2013	1/10/2007	10/15/2008	5/25/2010	10/18/2012	10/18/2012	6/6/2013	3/28/2014
Field Sample ID					SWMW-61(101812)	SWMW-61 (060613)	SWMW63011007	SWMW-63(10-16-08)	SWMW-63(061113)	SWMW71011007	SWMW-71(10-15-08)	SWMW-17(5-25-10)	SWMW-71(101812)	SWMW-171(101812)	SWMW-71 (060613)	SWMW-71-032814
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	FD	REG	REG
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019												
Volatile Organic Compounds																
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	4	< 0.6	< 1	< 1	< 0.5	2 J	1 J	< 1	0.8 J	0.8 J	0.7 J	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	0.8 J	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	3 J	< 3	< 3	< 3	< 3	--
2-Hexanone	591-78-6	N	50	NA	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
Acetone	67-64-1	N	50	NA	10 J	< 6	< 6	< 6	< 6	8 J	14 J	13 J	< 6	< 6	< 6	--
Benzene	71-43-2	N	1	NA	2 J	< 0.5	< 0.5	< 0.5	< 0.5	2 J	25	15	13	12	4 J	3
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon disulfide	75-15-0	N	60	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Chlorobenzene	108-90-7	N	5	NA	1 J	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	3 J	3 J	4 J	4 J	2 J	0.7 J
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	N	5	NA	150	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	2 J	2 J	< 0.8	< 0.8	< 0.8	--
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.9 J	1 J	< 0.5	< 0.5	< 0.5	< 0.5	--
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	N	5	NA	4 J	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	7	5	4 J	4 J	2 J	--
trans-1,2-Dichloroethene	156-60-5	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-61	SWMW-61	SWMW-63	SWMW-63	SWMW-63	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71
Sample Delivery Group (SDG)					1343541	1395576	1021138	1115579	1396587	1021137	1115578	1196055	1343541	1343541	1395576	1463182	1546097
Lab Sample ID					6830368	7085920	4956597	5501183	7090576	4956576	5501165	5989954	6830379	6830380	7085922	7412719	7809281
Sample Date					10/18/2012	6/6/2013	1/10/2007	10/16/2008	6/11/2013	1/10/2007	10/15/2008	5/25/2010	10/18/2012	10/18/2012	6/6/2013	3/28/2014	3/17/2015
Field Sample ID					SWMW-61(101812)	SWMW-61 (060613)	SWMW63011007	SWMW-63(10-16-08)	SWMW-63(061113)	SWMW71011007	SWMW-71(10-15-08)	SWMW-17(5-25-10)	SWMW-71(101812)	SWMW-171(101812)	SWMW-71 (060613)	SWMW-71-032814	CVX-0042-01
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	FD
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019													
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5
Xylene (total)	1330-20-7	N	5	NA	11	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	16	9	11	12	6	--	--
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4-Dichlorophenol	120-83-2	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2,4-Dimethylphenol	105-67-9	N	50	NA	< 0.5	< 0.6	< 3	< 3	< 0.5	< 3	< 3	< 3	< 0.5	< 0.5	--	--	--
2,4-Dinitrophenol	51-28-5	N	10	NA	< 10	< 11	< 20	< 20	< 10	< 23	< 19	< 10	< 10	< 10	--	--	--
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	--
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Chloronaphthalene	91-58-7	N	10	NA	< 0.4	< 0.4	< 2	< 2	< 0.4	< 2	< 2	< 2	< 0.4	< 0.4	< 0.4	--	--
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Methyl-Naphthalene	91-57-6	N	NA	36	130	< 0.1	< 1	< 1	< 0.1	7	16	18	20	19	8	--	--
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--	--
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
3-Nitroaniline	99-09-2	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 6	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	--	--	--
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4-Chloroaniline	106-47-8	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 0.5	< 0.6	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	--	--
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 0.5	< 0.6	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	--	--	--
4-Nitroaniline	100-01-6	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 11	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	--	--	--
Acenaphthene	83-32-9	N	20	NA	3	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	0.7	0.4 J	--	--
Acenaphthylene	208-96-8	N	NA	NA	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	0.5 J	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	2 J	< 2	< 2	< 2	< 2	< 2	< 2	3 J	< 2	< 2	< 2	--	--
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Chrysene	218-01-9	N	0.002	NA	0.1 J	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Dibenzofuran	132-64-9	N	NA	7.9	4	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	1	1	0.9 J	--	--
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	--
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	0.1 J	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Fluorene	86-73-7	N	50	NA	7	< 0.1	1 J	< 1	< 0.1	< 1	< 1	1 J	2	2	1	--	--
Hexachlorobenzene	118-74-1	N	0.04	NA	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--	--
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--	--
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 6	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	< 5	--	--

Appendix B-3
OU-1C Groundwater Analytical Results
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Glenham, NY

Location ID					SWMW-61	SWMW-61	SWMW-63	SWMW-63	SWMW-63	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71	SWMW-71
Sample Delivery Group (SDG)					1343541	1395576	1021138	1115579	1396587	1021137	1115578	1196055	1343541	1343541	1395576	1463182
Lab Sample ID					6830368	7085920	4956597	5501183	7090576	4956576	5501165	5989954	6830379	6830380	7085922	7412719
Sample Date					10/18/2012	6/6/2013	1/10/2007	10/16/2008	6/11/2013	1/10/2007	10/15/2008	5/25/2010	10/18/2012	10/18/2012	6/6/2013	3/28/2014
Field Sample ID					SWMW-61(101812)	SWMW-61 (060613)	SWMW63011007	SWMW-63(10-16-08)	SWMW-63(061113)	SWMW71011007	SWMW-71(10-15-08)	SWMW-17(5-25-10)	SWMW-71(101812)	SWMW-171(101812)	SWMW-71 (060613)	SWMW-71-032814
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	FD	REG	REG
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019												
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1	--
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0.5	< 0.6	< 2	< 2	< 0.5	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	8	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	< 0.1	< 0.1	0.2 J	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	--
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	< 1	< 1	< 0.5	< 0.5	--	--
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 1	< 1	< 3	< 3	< 1	< 3	< 3	< 3	< 1	< 1	--	--
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	5	< 0.1	< 1	< 1	< 0.1	< 1	< 1	< 1	0.5	0.6	0.3 J	--
Phenol	**108-95-2**	**N**	**1**	**NA**	< 0.5	< 0.6	< 1	< 1	< 0.5	< 1	1 J	< 1	< 0.5	< 0.5	--	--
Pyrene	**129-00-0**	**N**	**50**	**NA**	0.4 J	< 0.1	4 J	< 1	< 0.1	< 1	< 1	< 1	0.1 J	0.1 J	< 0.1	--
Metals																
Aluminum	**7429-90-5**	**N**	**100**	**NA**	751	496	18,800	210	109 J	4,900	< 80.2	410	923	148 J	1,830	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 3.5	< 3.5	< 9.7	< 9.7	< 3.5	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	< 3.5	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	54.3	67.6	< 10	< 20 J	< 6.8	121	233	170	197	187	114	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	89.9	34.5	104	41.1	15	140	159	366	129	132	164	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.67	< 0.67	1.1 J	< 0.90	< 0.67	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	< 0.67	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.36	< 0.36	< 0.91	< 2.0	< 0.36	< 0.91	< 2.0	< 2.0	< 0.36	< 0.36	< 0.36	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	53,200	51,000	30,300	49,600	15,700	66,000	79,900	144,000	71,400	73,500	105,000	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	1.4 J	< 1.1	26.2	< 3.0	< 1.1	5.9 J	< 3.0	< 3.4	2.3 J	< 1.1	2.8 J	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 0.66	< 0.66	16.1	< 5 J	< 0.66	3.2 J	< 2.1	< 2.1	1.4 J	0.86 J	1.4 J	--
Copper	**7440-50-8**	**N**	**200**	**NA**	2.3 J	4.3 J	47.1	< 10 J	< 2.1	11.3	< 2.7	< 2.7	2.8 J	< 2.1	10.8	--
Iron	**7439-89-6**	**N**	**300**	**NA**	12,700	2,580	33,500	4,760	295	20,200	16,600	33,100	14,400	12,900	18,500	--
Lead	**7439-92-1**	**N**	**25**	**NA**	6.0 J	7.2 J	21	< 6.9	< 5.1	< 6.9	< 6.9	< 6.9	< 5.1	< 5.1	8.2 J	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	12,600	9,440	14,800	10,300	4,190	17,300	15,700	28,000	13,200	13,300	20,600	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	1,560	1,200	2,700	3,690	15.8	4,410	2,700	4,200	1,950	2,010	2,830	2,960
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 1.1	< 1.1	30	< 5.6	< 1.1	8.8 J	< 5.6	< 1.8	1.6 J	< 1.1	1.5 J	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	1,440	2,190	8,010	11,700	4,890	2,810	2,450	3,060	1,890	1,770	1,800	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 7.5	< 7.5	< 9.4	< 10.7	< 7.5	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	< 7.5	--
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.2	< 1.2	< 1.6	< 2.2	< 1.2	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	< 1.2	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	49,500	89,500	16,400	29,300	20,200	68,800	69,300	297,000	97,000	97,300	141,000	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 5.7	< 5.7	< 13.5	< 14.0	< 5.7	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	< 5.7	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	2.3 J	< 1.3	24.7	< 2.5	< 1.3	5.8	< 2.5	< 2.5	2.4 J	1.4 J	2.3 J	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	5.2 J	6.6 J	106	13.9 J	7.1 J	27.8	< 8.1	9.3 J	14.7 J	3.1 J	116	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.070	< 0.070	< 0.056	< 0.056	< 0.070	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	< 0.070	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-71	SWMW-71	SWMW-72	SWMW-72	SWMW-72	SWMW-73	SWMW-73	SWMW-73	SWMW-73	SWMW-74	SWMW-74	SWMW-74	TF-15
Sample Delivery Group (SDG)			NY_TOGS	USEPA Tapwater RSL 2019	1546097	1671684	1196041	1343541	1395579	1021137	1115578	1115578	1395576	1021137	1115578	1395576	997155
Lab Sample ID					7809285	8424624	5989893	6830370	7085954	4956582	5501150	5501151	7085925	4956583	5501149	7085928	4813947
Sample Date					3/17/2015	6/13/2016	5/25/2010	10/18/2012	6/6/2013	1/10/2007	10/15/2008	10/15/2008	6/6/2013	1/10/2007	10/15/2008	6/6/2013	7/11/2006
Field Sample ID					CVX-0042-05	SWMW-71-W-3.00-160613	SWMW-72(5-25-10)	SWMW-72(101812)	SWMW-72 (060613)	SWMW73011007	SWMW-73(10-15-08)	SWMW-173(10-15-08)	SWMW-73 (060613)	SWMW74011007	SWMW-74(10-15-08)	SWMW-74 (060613)	TF-15
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered															
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	N	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
1,2-Dichloroethane	107-06-2	N	0.6	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 0.8
1,2-Dichloropropane	78-87-5	N	1	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
2-Hexanone	591-78-6	N	50	NA	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--
Acetone	67-64-1	N	50	NA	--	--	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	--
Benzene	71-43-2	N	1	NA	0.6 J	7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
Carbon Tetrachloride	56-23-5	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	< 0.5	2	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	< 0.5	< 0.5	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	N	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	N	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	< 2

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	SWMW-71 1546097 7809285 3/17/2015 CVX-0042-05 REG	SWMW-71 1671684 8424624 6/13/2016 SWMW-71-W-3.00-160613 REG	SWMW-72 1196041 5989893 5/25/2010 SWMW-72(5-25-10) REG	SWMW-72 1343541 6830370 10/18/2012 SWMW-72(101812) REG	SWMW-72 1395579 7085954 6/6/2013 SWMW-72 (060613) REG	SWMW-73 1021137 4956582 1/10/2007 SWMW73011007 REG	SWMW-73 1115578 5501150 10/15/2008 SWMW-73(10-15-08) REG	SWMW-73 1115578 5501151 10/15/2008 SWMW-173(10-15-08) FD	SWMW-73 1395576 7085925 6/6/2013 SWMW-73 (060613) REG	SWMW-74 1021137 4956583 1/10/2007 SWMW74011007 REG	SWMW-74 1115578 5501149 10/15/2008 SWMW-74(10-15-08) REG	SWMW-74 1395576 7085928 6/6/2013 SWMW-74 (060613) REG	TF-15 997155 4813947 7/11/2006 TF-15 REG
Vinyl chloride (Chloroethene)	**75-01-4**	**N**	**2**	**NA**	< 0.5	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	**1330-20-7**	**N**	**5**	**NA**	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**N**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**N**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	**58-90-2**	**N**	**NA**	**240**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2,4,6-Trichlorophenol	**88-06-2**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2,4-Dichlorophenol	**120-83-2**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2,4-Dimethylphenol	**105-67-9**	**N**	**50**	**NA**	--	--	8 J	< 0.5	< 0.5	< 3	< 3	< 3	< 0.5	< 3	< 3	< 0.5	< 3
2,4-Dinitrophenol	**51-28-5**	**N**	**10**	**NA**	--	--	< 10	< 10	< 10	< 19	< 19	< 20	< 10	< 21	< 20	< 11	< 20
2,4-Dinitrotoluene	**121-14-2**	**N**	**5**	**NA**	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2-Chloronaphthalene	**91-58-7**	**N**	**10**	**NA**	--	--	< 2	< 0.4	< 0.4	< 2	< 2	< 2	< 0.4	< 2	< 2	< 0.4	< 2
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2-Methyl-Naphthalene	**91-57-6**	**N**	**NA**	**36**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
2-Methylphenol (o-Cresol)	**95-48-7**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
3,3'-Dichlorobenzidine	**91-94-1**	**N**	**5**	**NA**	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	**99-09-2**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**N**	**1**	**NA**	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**N**	**NA**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
4-Chloroaniline	**106-47-8**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
4-Chlorophenyl phenyl ether	**7005-72-3**	**N**	**NA**	**NA**	--	--	< 2	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2
4-Methylphenol (p-Cresol)	**106-44-5**	**N**	**1**	**NA**	--	--	< 2	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2
4-Nitroaniline	**100-01-6**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
4-Nitrophenol	**100-02-7**	**N**	**1**	**NA**	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 11	< 10
Acenaphthene	**83-32-9**	**N**	**20**	**NA**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Acenaphthylene	**208-96-8**	**N**	**NA**	**NA**	--	--	1 J	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Acetophenone	**98-86-2**	**N**	**NA**	**1900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**N**	**50**	**NA**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Atrazine	**1912-24-9**	**N**	**NA**	**0.3**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	**100-52-7**	**N**	**NA**	**19**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**N**	**0.002**	**NA**	--	--	< 1	0.2 J	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(a)pyrene	**50-32-8**	**N**	**NA**	**0.025**	--	--	< 1	0.4 J	0.1 J	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(b)fluoranthene	**205-99-2**	**N**	**0.002**	**NA**	--	--	< 1	0.5	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(g,h,i)perylene	**191-24-2**	**N**	**NA**	**NA**	--	--	< 1	0.4 J	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Benzo(k)fluoranthene	**207-08-9**	**N**	**0.002**	**NA**	--	--	< 1	0.2 J	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
bis(2-Chloroethoxy)methane	**111-91-1**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
bis(2-Chloroethyl) ether	**111-44-4**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
bis(2-chloroisopropyl) ether	**108-60-1**	**N**	**5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**N**	**5**	**NA**	--	--	< 7	4 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	**85-68-7**	**N**	**50**	**NA**	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	**105-60-2**	**N**	**NA**	**9900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**N**	**NA**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
Chrysene	**218-01-9**	**N**	**0.002**	**NA**	--	--	< 1	0.3 J	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Di-n-butylphthalate	**84-74-2**	**N**	**50**	**NA**	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**N**	**50**	**NA**	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**N**	**NA**	**0.025**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Dibenzofuran	**132-64-9**	**N**	**NA**	**7.9**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
Diethylphthalate	**84-66-2**	**N**	**50**	**NA**	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	**131-11-3**	**N**	**50**	**NA**	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	**92-52-4**	**N**	**NA**	**0.83**	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**N**	**50**	**NA**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Fluorene	**86-73-7**	**N**	**50**	**NA**	--	--	1 J	< 0.1	0.2 J	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Hexachlorobenzene	**118-74-1**	**N**	**0.04**	**NA**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**N**	**5**	**NA**	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					SWMW-71	SWMW-71	SWMW-72	SWMW-72	SWMW-72	SWMW-73	SWMW-73	SWMW-73	SWMW-73	SWMW-74	SWMW-74	SWMW-74	TF-15
Sample Delivery Group (SDG)					1546097	1671684	1196041	1343541	1395579	1021137	1115578	1115578	1395576	1021137	1115578	1395576	997155
Lab Sample ID					7809285	8424624	5989893	6830370	7085954	4956582	5501150	5501151	7085925	4956583	5501149	7085928	4813947
Sample Date					3/17/2015	6/13/2016	5/25/2010	10/18/2012	6/6/2013	1/10/2007	10/15/2008	10/15/2008	6/6/2013	1/10/2007	10/15/2008	6/6/2013	7/11/2006
Field Sample ID					CVX-0042-05	SWMW-71-W-3.00-160613	SWMW-72(5-25-10)	SWMW-72(101812)	SWMW-72 (060613)	SWMW73011007	SWMW-73(10-15-08)	SWMW-173(10-15-08)	SWMW-73 (060613)	SWMW74011007	SWMW-74(10-15-08)	SWMW-74 (060613)	TF-15
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019													
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	--	--	< 1	0.3 J	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	--	--	< 2	< 0.5	< 0.5	< 2	< 2	< 2	< 0.5	< 2	< 2	< 0.5	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	< 1	< 0.1	0.1 J	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	--	--	< 3	< 1	< 1	< 3	< 3	< 3	< 1	< 3	< 3	< 1	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	--	--	< 1	< 0.1	< 0.1	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	--	--	< 1	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	--	--	< 1	0.9	0.2 J	< 1	< 1	< 1	< 0.1	< 1	< 1	< 0.1	< 1
Metals																	
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	< 80.2	8,890	15,200	157 J	2,720	9,160	887	520	1,710	3,150	338
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	< 9.7	< 3.5	< 3.5	< 9.7	< 9.7	16.1 J	< 3.5	< 9.7	< 9.7	< 3.5	< 9.7
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	< 7.2	20.8	22.1	< 10	< 10.0	16.1 J	18.2 J	< 10	< 10.0	57.3	< 10
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	122	103	197	20.3	71.1	151	27.8	62.9	94.1	103	23.1
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	< 1.4	< 0.67	0.80 J	< 0.94	< 0.90	< 0.90	< 0.67	< 0.94	< 0.90	< 0.67	< 0.94
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	< 2.0	2.0 J	1.4 J	< 0.91	< 2.0	< 2.0	< 0.36	< 0.91	< 2.0	< 0.36	< 0.91
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	119,000	41,800	109,000	66,600	78,500	82,600	83,200	88,200	92,500	79,000	104,000
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	< 3.4	9.8 J	17	< 2.3	< 3.0	6.2 J	1.4 J	< 2.3	< 3.0	4.3 J	< 2.3
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	< 2.1	6.1	7.6	< 2.1	2.7 J	5.6	< 0.66	< 2.1	3.3 J	2.9 J	< 2.1
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	< 2.7	28.2	35.9	< 2.2	9.0 J	22.7	< 2.1	< 2.2	5.1 J	5.3 J	< 2.2
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	528	17,400	34,900	157 J	2,700	9,320	1,280	977	2,650	11,400	707
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	< 6.9	22.2	24.5	< 6.9	17.3	34.2	< 5.1	< 6.9	14.5 J	7.5 J	< 6.9
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	31,700	14,800	34,600	19,800	23,200	25,100	24,500	21,100	25,300	16,500	38,600
Manganese	**7439-96-5**	**N**	**300**	**NA**	3,230	6,350	1,410	1,570	1,550	29.5	354	782	102	1,740	527	2,660	1,320
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	< 1.8	13.5	21.4	< 5.6	< 5.6	11.9	< 1.1	< 5.6	< 5.6	4.3 J	< 5.6
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	1,440	2,490	3,990	898	3,910	2,270	1,080	1,070	2,430	1,650	28,200
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	< 8.9	< 7.5	< 7.5	< 9.4	< 10.7	< 10.7	< 7.5	< 9.4	< 10.7	< 7.5	< 9.4
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	< 2.3	< 1.2	< 1.2	< 1.6	< 2.2	< 2.2	< 1.2	< 1.6	< 2.2	< 1.2	< 1.6
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	367,000	164,000	211,000	140,000	155,000	158,000	133,000	60,700	127,000	46,600	41,100
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	< 14.0	< 5.7	< 5.7	< 13.5	< 14.0	< 14.0	< 5.7	< 13.5	< 14.0	< 5.7	< 13.5
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	< 2.5	12.7	17.9	< 1.5	< 2.5	5.4	< 1.3	< 1.5	< 2.5	3.8 J	< 1.5
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	11.4 J	282	415	< 8.1	32.9	55.9	6.6 J	< 8.1	9.0 J	17.2 J	< 13.5 J
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	< 0.056	< 0.070	< 0.070	< 0.056	0.10 J	0.064 J	< 0.070	< 0.056	< 0.056	< 0.070	< 0.064 J

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-15 1021138 4956595 1/10/2007 TF15011007 REG	TF-15 1115579 5501171 10/16/2008 TF-15(10-16-08) REG	TF-15 1395579 7085953 6/6/2013 TF-15 (060613) REG	TF-15 NA 4/27/2000 TF-15-0-0-04272000-W REG	TF-15 NA 4/30/2001 TF-15-0-0-04302001-W REG	TF-23 460-185205-1 460-185205-9 6/20/2019 TF-23-W-190620 REG	TF-23 460-195549-1 460-195549-1 10/30/2019 TF-23-W-191030 REG	TF-23 993100 4791556 6/6/2006 TF-23 REG	TF-23 993100 4791557 6/6/2006 TF-23 REG	TF-23 1014759 4919106 11/15/2006 TF-23-111506 REG	TF-23 1052940 5136498 8/21/2007 TF-23-082107 REG	TF-23 1052940 5136499 8/21/2007 TF-123-082107 FD	TF-23 1067563 5223994 11/28/2007 TF-23-112807 REG	TF-23 1067563 5223995 11/28/2007 TF-123-112807 FD	TF-23 1095960 5388893 6/10/2008 TF-23-061008 REG	TF-23 1095960 5388894 6/10/2008 TF-123-061008 FD
Volatile Organic Compounds																					
1,1 Dichloroethene	**75-35-4**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	**71-55-6**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	**79-34-5**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	**79-00-5**	**N**	**1**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	**76-13-1**	**N**	**5**	**NA**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	**75-34-3**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	**87-61-6**	**N**	**NA**	**7**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	**120-82-1**	**N**	**5**	**NA**	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trichlorobenzene	**120-82-1**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	**96-12-8**	**N**	**NA**	**0.00033**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	**106-93-4**	**N**	**NA**	**0.0075**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	**95-50-1**	**N**	**3**	**NA**	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	**95-50-1**	**N**	**3**	**NA**	--	--	--	--	--	--	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane	**107-06-2**	**N**	**0.6**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	**540-59-0**	**N**	**5**	**NA**	--	--	--	--	--	--	--	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	**78-87-5**	**N**	**1**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	**541-73-1**	**N**	**3**	**NA**	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	**541-73-1**	**N**	**3**	**NA**	--	--	--	--	--	--	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	**106-46-7**	**N**	**3**	**NA**	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	**106-46-7**	**N**	**3**	**NA**	--	--	--	--	--	--	--	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Butanone (Methyl ethyl ketone)	**78-93-3**	**N**	**50**	**NA**	< 3	< 3	< 3	--	--	< 5.0	< 5.0	--	--	--	--	--	--	--	--	--
2-Hexanone	**591-78-6**	**N**	**50**	**NA**	< 3	< 3	< 3	--	--	< 5.0	< 5.0	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	**108-10-1**	**N**	**NA**	**6300**	< 3	< 3	< 3	--	--	< 5.0	< 5.0	--	--	--	--	--	--	--	--	--
Acetone	**67-64-1**	**N**	**50**	**NA**	< 6	< 6	< 6	--	--	< 5.0	< 5.0	--	--	--	--	--	--	--	--	--
Benzene	**71-43-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	< 0	< 1	< 1.0	< 1.0	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	**74-97-5**	**N**	**NA**	**83**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Bromodichloromethane	**75-27-4**	**N**	**50**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	**75-25-2**	**N**	**50**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	**74-83-9**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	**75-15-0**	**N**	**60**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	**56-23-5**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	**108-90-7**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	**75-00-3**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	**67-66-3**	**N**	**7**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	**74-87-3**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	**156-59-2**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	--	--	--	--	< 0.8	--	--	--	--
cis-1,3-Dichloropropene	**10061-01-5**	**N**	**0.4**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	--	< 1	< 1	< 1	< 1
Cyclohexane	**110-82-7**	**N**	**NA**	**13000**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Dibromochloromethane	**124-48-1**	**N**	**50**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	**75-71-8**	**N**	**NA**	**200**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Diisopropyl ether	**108-20-3**	**N**	**NA**	**1500**	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	**637-92-3**	**N**	**NA**	**NA**	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	**100-41-4**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0	< 1	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	**98-82-8**	**N**	**NA**	**450**	--	--	--	< 0	< 1	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
m,p-Xylenes	**XYLENES-MP**	**N**	**NA**	**NA**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Methyl acetate	**79-20-9**	**N**	**NA**	**20000**	--	--	--	--	--	< 5.0	< 5.0	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	**1634-04-4**	**N**	**10**	**NA**	< 0.5	< 0.5	< 0.5	< 0	< 1	< 1.0	< 1.0	< 0.5	--	< 0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	**108-87-2**	**N**	**NA**	**NA**	--	--	--	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	**75-09-2**	**N**	**5**	**NA**	< 2	< 2	< 2	--	--	< 1.0	< 1.0	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	**95-47-6**	**N**	**NA**	**190**	--	--	--	--	< 1	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
Styrene	**100-42-5**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	**994-05-8**	**N**	**NA**	**NA**	< 0.8	< 0.8	< 0.8	--	--	--	--	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	**75-65-0**	**N**	**NA**	**NA**	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	**127-18-4**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	**108-88-3**	**N**	**5**	**NA**	< 0.7	< 0.7	< 0.7	< 0	< 1	< 1.0	< 1.0	< 0.7	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	**156-60-5**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	--	--	< 1.0	< 1.0	--	--	--	--	< 0.8	--	--	--	--
trans-1,3-Dichloropropene	**10061-02-6**	**N**	**0.4**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	--	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	**79-01-6**	**N**	**5**	**NA**	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	**75-69-4**	**N**	**5**	**NA**	--	--	--	--	--	< 1.0	< 1.0	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Appendix B-3
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Location ID					TF-15	TF-15	TF-15	TF-15	TF-15	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23
Sample Delivery Group (SDG)					1021138	1115579	1395579			460-185205-1	460-195549-1	993100	993100	1014759	1052940	1052940	1067563	1067563	1095960	1095960
Lab Sample ID					4956595	5501171	7085953			460-185205-9	460-195549-1	4791556	4791557	4919106	5136498	5136499	5223994	5223995	5388893	5388894
Sample Date					1/10/2007	10/16/2008	6/6/2013	NA	NA	6/20/2019	10/30/2019	6/6/2006	6/6/2006	11/15/2006	8/21/2007	8/21/2007	11/28/2007	11/28/2007	6/10/2008	6/10/2008
Field Sample ID					TF15011007	TF-15(10-16-08)	TF-15 (060613)	4/27/2000	4/30/2001	TF-23-W-190620	TF-23-W-191030	TF-23	TF-23	TF-23-111506	TF-23-082107	TF-123-082107	TF-23-112807	TF-123-112807	TF-23-061008	TF-123-061008
Sample Purpose					REG	REG	REG	TF-15-0-0-04272000-W	TF-15-0-0-04302001-W	REG	REG	REG	REG	REG	REG	FD	REG	FD	REG	FD
Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019				REG	REG											
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	--	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	20	< 1	--	--	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																				
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	< 10	< 10	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	< 50	< 50	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	< 10	< 10	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 0.5	--	--	< 10	< 10	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	N	10	NA	< 19	< 21	< 10	--	--	< 20	< 20	< 20	--	< 20	< 20	< 20	< 19	< 19	< 19	< 19
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 1	< 0	--	< 2.0	< 2.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 1	< 0.5	--	--	< 2.0	< 2.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 0.4	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 1	< 0.1	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	--	--	< 20	< 20	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 1	< 0.5	< 0	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 0.5	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 0.5	--	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 10	< 10	--	--	< 20	< 20	< 10	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 1	< 0.1	< 0	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	< 10	< 10	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	< 2.0	< 2.0	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	< 10 *	< 10 *	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 1	< 0.1	< 0	< 10	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 1	< 0.1	< 0	< 10	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 1	< 0.1	< 0	< 10	< 2.0	< 2.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 1	< 0.1	< 0	< 10	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 1	< 0.5	< 0	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 2	< 2	< 2	< 0	--	< 2.0	< 2.0	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	19 *	< 10	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chrysene	218-01-9	N	0.002	NA	< 1	< 1	< 0.1	< 0	< 10	< 2.0	< 2.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	2.8	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 1	< 0.1	< 0	< 10	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	< 10	< 10	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Fluorene	86-73-7	N	50	NA	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 1	< 0.1	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 0	--	< 10	< 10	< 5	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5

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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-15 1021138 4956595 1/10/2007 TF15011007 REG	TF-15 1115579 5501171 10/16/2008 TF-15(10-16-08) REG	TF-15 1395579 7085953 6/6/2013 TF-15 (060613) REG	TF-15 NA 4/27/2000 TF-15-0-0-04272000-W REG	TF-15 NA 4/30/2001 TF-15-0-0-04302001-W REG	TF-23 460-185205-1 460-185205-9 6/20/2019 TF-23-W-190620 REG	TF-23 460-195549-1 460-195549-1 10/30/2019 TF-23-W-191030 REG	TF-23 993100 4791556 6/6/2006 TF-23 REG	TF-23 993100 4791557 6/6/2006 TF-23 REG	TF-23 1014759 4919106 11/15/2006 TF-23-111506 REG	TF-23 1052940 5136498 8/21/2007 TF-23-082107 REG	TF-23 1052940 5136499 8/21/2007 TF-123-082107 FD	TF-23 1067563 5223994 11/28/2007 TF-23-112807 REG	TF-23 1067563 5223995 11/28/2007 TF-123-112807 FD	TF-23 1095960 5388893 6/10/2008 TF-23-061008 REG	TF-23 1095960 5388894 6/10/2008 TF-123-061008 FD
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 0	--	< 2.0 *	< 2.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0	< 10	< 2.0	< 2.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 1	< 0.5	< 0	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 0.5	< 0	--	< 10	< 10	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 1	< 0.1	< 0	< 1	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	< 0	< 10	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0	--	< 1.0	< 1.0	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 1	--	--	< 20	< 20	< 3	--	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 1	< 0.5	--	--	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 0	< 10	< 10	< 10	< 1	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Metals																				
Aluminum	**7429-90-5**	**N**	**100**	**NA**	113 J	< 80.2	9,700	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	< 9.7	< 3.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10	< 20 J	36.7	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	21	25.4	48.9	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.94	< 0.90	< 0.67	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 0.91	< 2.0	< 0.36	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	112,000	119,000	66,800	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	< 2.3	< 3.0	11.8 J	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	< 2.1	7.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	< 2.2	< 2.7	19.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	342	113 J	16,800	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	< 6.9	< 6.9	10.3 J	--	--	--	< 1.2	--	< 6.9	< 6.9	14.7 J	17.7	21.1	25	13.1 J	12.8 J
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	--	< 1.2	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	41,000	44,100	26,400	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	582	1,240	1,100	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	< 5.6	16.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	23,500	27,200	15,600	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 9.4	< 10.7	< 7.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	< 1.6	< 2.2	< 1.2	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	42,500	55,600	61,000	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 13.5	< 14.0	< 5.7	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	< 1.5	< 2.5	10.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	< 8.1	< 8.1	62.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	< 0.056	< 0.070	--	--	--	--	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1115578 5501148 10/15/2008 TF-23(10-15-08) REG	TF-23 1120871 5533998 11/18/2008 TF-23(11-18-08) REG	TF-23 1153748 5724856 7/14/2009 TF-23(7-14-09) REG	TF-23 1153748 5724857 7/14/2009 TF-123(7-14-09) FD	TF-23 1153748 5724858 7/15/2009 TF-23(7-15-09) REG	TF-23 1153748 5724859 7/15/2009 TF-123(7-15-09) FD	TF-23 1170505 5833455 11/10/2009 TF-23(11-10-09) REG	TF-23 1196041 5989892 5/25/2010 TF-23(5-25-10) REG	TF-23 1196247 5991249 5/26/2010 TF-23(5-26-10) REG	TF-23 1216105 6109839 10/12/2010 TF-23(10-12-10) REG	TF-23 1246861 6286839 5/11/2011 TF-23(5-11-11) REG	TF-23 1246861 6286840 5/11/2011 TF-123(5-11-11) FD	TF-23 1276051 6467166 11/10/2011 TF-23(11-10-11) REG	TF-23 1323156 6726071 7/18/2012 TF-23(7-18-12) REG	TF-23 1344432 6834756 10/23/2012 TF-23(102312) REG
Volatile Organic Compounds																				
1,1 Dichloroethene	**75-35-4**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	**71-55-6**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	**79-34-5**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	**79-00-5**	**N**	**1**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	**76-13-1**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	**75-34-3**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-Trichlorobenzene	**87-61-6**	**N**	**NA**	**7**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	**120-82-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	
1,2,4-Trichlorobenzene	**120-82-1**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	**96-12-8**	**N**	**NA**	**0.00033**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	**106-93-4**	**N**	**NA**	**0.0075**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	**95-50-1**	**N**	**3**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	**95-50-1**	**N**	**3**	**NA**	--	< 1	< 1	< 1	--	--	< 1	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	
1,2-Dichloroethane	**107-06-2**	**N**	**0.6**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethene	**540-59-0**	**N**	**5**	**NA**	--	< 0.8	< 0.8	< 0.8	--	--	< 0.8	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
1,2-Dichloropropane	**78-87-5**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	**541-73-1**	**N**	**3**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	**541-73-1**	**N**	**3**	**NA**	--	< 1	< 1	< 1	--	--	< 1	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	
1,4-Dichlorobenzene	**106-46-7**	**N**	**3**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	**106-46-7**	**N**	**3**	**NA**	--	< 1	< 1	< 1	--	--	< 1	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	
2-Butanone (Methyl ethyl ketone)	**78-93-3**	**N**	**50**	**NA**	< 3	--	--	--	--	--	--	< 3	--	--	--	--	--	--	--	--
2-Hexanone	**591-78-6**	**N**	**50**	**NA**	< 3	--	--	--	--	--	--	< 3	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	**108-10-1**	**N**	**NA**	**6300**	< 3	--	--	--	--	--	--	< 3	--	--	--	--	--	--	--	--
Acetone	**67-64-1**	**N**	**50**	**NA**	< 6	--	--	--	--	--	--	< 6	--	--	--	--	--	--	--	--
Benzene	**71-43-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	< 0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	**74-97-5**	**N**	**NA**	**83**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	**75-27-4**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	**75-25-2**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane (Methyl bromide)	**74-83-9**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Carbon disulfide	**75-15-0**	**N**	**60**	**NA**	< 1	--	--	--	--	--	--	< 1	--	--	--	--	--	--	--	--
Carbon Tetrachloride	**56-23-5**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	**108-90-7**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloroethane	**75-00-3**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chloroform	**67-66-3**	**N**	**7**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	**74-87-3**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	**156-59-2**	**N**	**5**	**NA**	< 0.8	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	**10061-01-5**	**N**	**0.4**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Cyclohexane	**110-82-7**	**N**	**NA**	**13000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	**124-48-1**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	**75-71-8**	**N**	**NA**	**200**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	**108-20-3**	**N**	**NA**	**1500**	< 0.8	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
Ethyl-t-butylether	**637-92-3**	**N**	**NA**	**NA**	< 0.8	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
Ethylbenzene	**100-41-4**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Isopropylbenzene	**98-82-8**	**N**	**NA**	**450**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	**XYLENES-MP**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	**79-20-9**	**N**	**NA**	**20000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	**1634-04-4**	**N**	**10**	**NA**	< 0.5	< 0.5	< 0.5	< 0.5	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	**108-87-2**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	**75-09-2**	**N**	**5**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	**95-47-6**	**N**	**NA**	**190**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	**100-42-5**	**N**	**5**	**NA**	< 1	--	--	--	--	--	--	< 1	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	**994-05-8**	**N**	**NA**	**NA**	< 0.8	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	**75-65-0**	**N**	**NA**	**NA**	< 10	--	--	--	--	--	--	< 10	--	--	--	--	--	--	--	--
Tetrachloroethene	**127-18-4**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Toluene	**108-88-3**	**N**	**5**	**NA**	< 0.7	< 0.7	< 0.7	< 0.7	--	--	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	**156-60-5**	**N**	**5**	**NA**	< 0.8	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	**10061-02-6**	**N**	**0.4**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	**79-01-6**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	**75-69-4**	**N**	**5**	**NA**	--	< 2	< 2	< 2	--	--	< 2	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1115578 5501148 10/15/2008 TF-23(10-15-08) REG	TF-23 1120871 5533998 11/18/2008 TF-23(11-18-08) REG	TF-23 1153748 5724856 7/14/2009 TF-23(7-14-09) REG	TF-23 1153748 5724857 7/14/2009 TF-123(7-14-09) FD	TF-23 1153748 5724858 7/15/2009 TF-23(7-15-09) REG	TF-23 1153748 5724859 7/15/2009 TF-123(7-15-09) FD	TF-23 1170505 5833455 11/10/2009 TF-23(11-10-09) REG	TF-23 1196041 5989892 5/25/2010 TF-23(5-25-10) REG	TF-23 1196247 5991249 5/26/2010 TF-23(5-26-10) REG	TF-23 1216105 6109839 10/12/2010 TF-23(10-12-10) REG	TF-23 1246861 6286839 5/11/2011 TF-23(5-11-11) REG	TF-23 1246861 6286840 5/11/2011 TF-123(5-11-11) FD	TF-23 1276051 6467166 11/10/2011 TF-23(11-10-11) REG	TF-23 1323156 6726071 7/18/2012 TF-23(7-18-12) REG	TF-23 1344432 6834756 10/23/2012 TF-23(102312) REG
Vinyl chloride (Chloroethene)	**75-01-4**	**N**	**2**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Xylene (total)	**1330-20-7**	**N**	**5**	**NA**	< 0.8	< 0.8	< 0.8	< 0.8	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																			
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**N**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**N**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	**58-90-2**	**N**	**NA**	**240**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2,4,6-Trichlorophenol	**88-06-2**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2,4-Dichlorophenol	**120-83-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2,4-Dimethylphenol	**105-67-9**	**N**	**50**	**NA**	< 3	< 3	< 3	< 3	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 0.5	< 0.5	< 0.5
2,4-Dinitrophenol	**51-28-5**	**N**	**10**	**NA**	< 19	< 20	< 20	< 20	--	--	< 20	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
2,4-Dinitrotoluene	**121-14-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	**606-20-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2-Chloronaphthalene	**91-58-7**	**N**	**10**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 0.4	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2-Methyl-Naphthalene	**91-57-6**	**N**	**NA**	**36**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
2-Methylphenol (o-Cresol)	**95-48-7**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
3,3'-Dichlorobenzidine	**91-94-1**	**N**	**5**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	**99-09-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**N**	**1**	**NA**	< 5	< 5	< 5	< 5	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	**101-55-3**	**N**	**NA**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
4-Chloroaniline	**106-47-8**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
4-Chlorophenyl phenyl ether	**7005-72-3**	**N**	**NA**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	**106-44-5**	**N**	**1**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5
4-Nitroaniline	**100-01-6**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
4-Nitrophenol	**100-02-7**	**N**	**1**	**NA**	< 10	< 10	< 10	< 10	--	--	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Acenaphthene	**83-32-9**	**N**	**20**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Acenaphthylene	**208-96-8**	**N**	**NA**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Acetophenone	**98-86-2**	**N**	**NA**	**1900**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Atrazine	**1912-24-9**	**N**	**NA**	**0.3**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	**100-52-7**	**N**	**NA**	**19**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**N**	**0.002**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	**50-32-8**	**N**	**NA**	**0.025**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	**205-99-2**	**N**	**0.002**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	**191-24-2**	**N**	**NA**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	**207-08-9**	**N**	**0.002**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	**111-91-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
bis(2-Chloroethyl) ether	**111-44-4**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	**108-60-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	**117-81-7**	**N**	**5**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	**85-68-7**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	**105-60-2**	**N**	**NA**	**9900**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**N**	**NA**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Chrysene	**218-01-9**	**N**	**0.002**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	**84-74-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	**117-84-0**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	**53-70-3**	**N**	**NA**	**0.025**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Dibenzofuran	**132-64-9**	**N**	**NA**	**7.9**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Diethylphthalate	**84-66-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	**131-11-3**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	**92-52-4**	**N**	**NA**	**0.83**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	0.1 J
Fluorene	**86-73-7**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	**118-74-1**	**N**	**0.04**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**N**	**5**	**NA**	< 5	< 5	< 5	< 5	--	--	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1115578 5501148 10/15/2008 TF-23(10-15-08) REG	TF-23 1120871 5533998 11/18/2008 TF-23(11-18-08) REG	TF-23 1153748 5724856 7/14/2009 TF-23(7-14-09) REG	TF-23 1153748 5724857 7/14/2009 TF-123(7-14-09) FD	TF-23 1153748 5724858 7/15/2009 TF-23(7-15-09) REG	TF-23 1153748 5724859 7/15/2009 TF-123(7-15-09) FD	TF-23 1170505 5833455 11/10/2009 TF-23(11-10-09) REG	TF-23 1196041 5989892 5/25/2010 TF-23(5-25-10) REG	TF-23 1196247 5991249 5/26/2010 TF-23(5-26-10) REG	TF-23 1216105 6109839 10/12/2010 TF-23(10-12-10) REG	TF-23 1246861 6286839 5/11/2011 TF-23(5-11-11) REG	TF-23 1246861 6286840 5/11/2011 TF-123(5-11-11) FD	TF-23 1276051 6467166 11/10/2011 TF-23(11-10-11) REG	TF-23 1323156 6726071 7/18/2012 TF-23(7-18-12) REG	TF-23 1344432 6834756 10/23/2012 TF-23(102312) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 2	< 2	--	--	< 2	< 2	< 2	< 2	< 2	< 2	< 0.5	< 0.5	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 3	< 3	--	--	< 3	< 3	< 3	< 3	< 3	< 3	< 1	< 1	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	< 0.1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 1	< 1	< 1	--	--	< 1	< 1	< 1	< 1	< 1	< 1	< 0.1	< 0.1	0.1 J
Metals																			
Aluminum	**7429-90-5**	**N**	**100**	**NA**	87.4 J	--	--	--	--	--	--	112 J	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	< 9.7	--	--	--	--	--	--	< 9.7	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	< 10.0	--	--	--	--	--	--	< 7.2	--	--	--	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	15.8	--	--	--	--	--	--	15.2	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	< 0.90	--	--	--	--	--	--	< 1.4	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	< 2.0	--	--	--	--	--	--	< 2.0	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	48,500	--	--	--	--	--	--	60,900	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	< 3.0	--	--	--	--	--	--	< 3.4	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	< 2.1	--	--	--	--	--	--	< 2.1	--	--	--	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	< 2.7	--	--	--	--	--	--	< 2.7	--	--	--	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	112 J	--	--	--	--	--	--	142 J	--	--	--	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	7.2 J	31.4	--	--	--	--	< 6.9	< 6.9	--	--	--	--	--	--	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	--	--	--	< 6.9	< 6.9	--	--	< 6.9	< 6.9	< 6.9	< 6.9	< 2.2	< 5.1	< 5.1
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	14,400	--	--	--	--	--	--	18,100	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	6.5	--	--	--	--	--	--	3.3 J	--	--	--	--	--	--	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	< 5.6	--	--	--	--	--	--	< 1.8	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	869	--	--	--	--	--	--	913	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	< 10.7	--	--	--	--	--	--	< 8.9	--	--	--	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	< 2.2	--	--	--	--	--	--	< 2.3	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	74,100	--	--	--	--	--	--	67,200	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	< 14.0	--	--	--	--	--	--	< 14.0	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	< 2.5	--	--	--	--	--	--	< 2.5	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	10.4 J	--	--	--	--	--	--	< 8.1	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	< 0.056	--	--	--	--	--	--	< 0.056	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
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Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1396584 7090547 6/11/2013 TF-23(061113) REG	TF-23 1396587 7090572 6/11/2013 TF-23(061113)SW REG	TF-23 1433988 7277107 11/13/2013 TF-23 111313 REG	TF-23 1433988 7277108 11/13/2013 TF-123 111313 FD	TF-23 1480955 7494472 6/10/2014 TF-23-061014 REG	TF-23 1517916 7671562 11/11/2014 CVX-0040-06 REG	TF-23 1570824 7938026 6/19/2015 CVX-0058-01 REG	TF-23 1610359 8139708 11/16/2015 TF-23-W-5.26-151116 REG	TF-23 1671783 8424889 6/13/2016 TF-23-W-5.26-160613 REG	TF-23 1734549 8702413 11/15/2016 TF-23-W-5.26-161115 REG	TF-23 1819683 9078585 6/27/2017 TF-23-W-5.26-170627 REG	TF-23 1819683 9078586 6/27/2017 TF-23-WD-5.26-170627 FD	TF-23 1871380 9300791 10/31/2017 TF-23-W-5.26-171031 REG
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0.5	--	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethene	540-59-0	N	5	NA	< 0.8	--	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0.5	--	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0.5	--	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	< 3	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	N	50	NA	--	< 3	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	< 3	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	N	50	NA	--	< 6	--	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon disulfide	75-15-0	N	60	NA	--	< 1	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloroethene	156-59-2	N	5	NA	--	< 0.8	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 0.5
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	< 1	--	--	--	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	< 0.8	--	--	--	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	< 10	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	< 0.8	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	< 2	--	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1396584 7090547 6/11/2013 TF-23(061113) REG	TF-23 1396587 7090572 6/11/2013 TF-23(061113)SW REG	TF-23 1433988 7277107 11/13/2013 TF-23 111313 REG	TF-23 1433988 7277108 11/13/2013 TF-123 111313 FD	TF-23 1480955 7494472 6/10/2014 TF-23-061014 REG	TF-23 1517916 7671562 11/11/2014 CVX-0040-06 REG	TF-23 1570824 7938026 6/19/2015 CVX-0058-01 REG	TF-23 1610359 8139708 11/16/2015 TF-23-W-5.26-151116 REG	TF-23 1671783 8424889 6/13/2016 TF-23-W-5.26-160613 REG	TF-23 1734549 8702413 11/15/2016 TF-23-W-5.26-161115 REG	TF-23 1819683 9078585 6/27/2017 TF-23-W-5.26-170627 REG	TF-23 1819683 9078586 6/27/2017 TF-23-WD-5.26-170627 FD	TF-23 1871380 9300791 10/31/2017 TF-23-W-5.26-171031 REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	N	50	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	N	10	NA	< 10	< 10	< 10	< 12	< 11	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	N	10	NA	< 0.4	< 0.4	< 0.4	< 0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloroaniline	106-47-8	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 2	< 2	< 2	< 2	< 2	< 2	< 2
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
4-Nitroaniline	100-01-6	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 10	< 10	< 12	< 11	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	208-96-8	N	NA	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	218-01-9	N	0.002	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	132-64-9	N	NA	7.9	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	86-73-7	N	50	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1396584 7090547 6/11/2013 TF-23(061113) REG	TF-23 1396587 7090572 6/11/2013 TF-23(061113)SW REG	TF-23 1433988 7277107 11/13/2013 TF-23 111313 REG	TF-23 1433988 7277108 11/13/2013 TF-123 111313 FD	TF-23 1480955 7494472 6/10/2014 TF-23-061014 REG	TF-23 1517916 7671562 11/11/2014 CVX-0040-06 REG	TF-23 1570824 7938026 6/19/2015 CVX-0058-01 REG	TF-23 1610359 8139708 11/16/2015 TF-23-W-5.26-151116 REG	TF-23 1671783 8424889 6/13/2016 TF-23-W-5.26-160613 REG	TF-23 1734549 8702413 11/15/2016 TF-23-W-5.26-161115 REG	TF-23 1819683 9078585 6/27/2017 TF-23-W-5.26-170627 REG	TF-23 1819683 9078586 6/27/2017 TF-23-WD-5.26-170627 FD	TF-23 1871380 9300791 10/31/2017 TF-23-W-5.26-171031 REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Metals																	
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	< 74.3	--	--	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	< 3.5	--	--	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	< 6.8	--	--	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	15.8	--	--	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	< 0.67	--	--	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	< 0.36	--	--	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	60,100	--	--	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	< 1.1	--	--	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	< 0.66	--	--	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	--	< 2.1	--	--	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	--	57.1 J	--	--	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	--	< 5.1	--	--	--	--	--	--	--	--	--	--	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	< 5.1	--	< 4.7	< 4.7	< 4.7	< 4.7	< 4.7	< 5.1	< 5.1	< 6.2	< 6	< 6	< 6
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	15,900	--	--	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	--	2.1 J	--	--	--	--	--	--	--	--	--	--	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	< 1.1	--	--	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	1,040	--	--	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	< 7.5	--	--	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	--	< 1.2	--	--	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	64,600	--	--	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	< 5.7	--	--	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	< 1.3	--	--	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	12.8 J	--	--	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	< 0.070	--	--	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-23	TF-26	TF-26	TF-26	TF-26	TF-26	TF-26	TF-26
Sample Delivery Group (SDG)					1955779	1955779	2005546					997155	1021137	1115578	1196055	1343541	1395576	
Lab Sample ID			NY_TOGS	USEPA Tapwater RSL 2019	9662303	9662305	9882894	NA	NA	TF-23-032004	TF-23-072004	4813932	4956588	5501154	5989963	6830369	7085927	NA
Sample Date					6/12/2018	6/12/2018	11/1/2018	4/27/2000	6/15/2000	3/1/2004	7/1/2004	7/11/2006	1/10/2007	10/15/2008	5/25/2010	10/18/2012	6/6/2013	3/2/2000
Field Sample ID					TF-23-WD-5.26-180612	TF-23-W-5.26-180612	TF-23-W-5.26-181101	TF-23-0-0-04272000-W	TF-23-0-0-06152000-W	TF-23-032004	TF-23-072004	TF-26	TF26011007	TF-26(10-15-08)	TF-26(5-25-10)	TF-26(101812)	TF-26 (060613)	TF-26-0-0-03022000-W
Sample Purpose					FD	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered																
Volatile Organic Compounds																		
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.5	< 0.5	< 0.3	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	< 0	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	< 0	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	< 0	--	--	--	--	--	--	--	--	--	< 0
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	< 0	--	--	--	--	--	--	--	--	--	< 0
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 0.5	< 0.5	< 0.3	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
1,2-Dichloroethene	540-59-0	N	5	NA	< 0.5	< 0.5	< 0.2	--	< 0	< 0	< 0	< 0.8	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	--	--	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	--	< 0	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 0
2-Hexanone	591-78-6	N	50	NA	--	--	--	< 0	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 0
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	--	< 0	--	--	--	--	< 3	< 3	< 3	< 3	< 3	< 0
Acetone	67-64-1	N	50	NA	--	--	--	< 0	--	--	--	--	88	< 6	< 6	< 6	< 6	< 0
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0
Bromochloromethane	74-97-5	N	NA	83	--	--	--	< 0	--	--	--	--	--	--	--	--	--	< 0
Bromodichloromethane	75-27-4	N	50	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Bromoform	75-25-2	N	50	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 0.5	< 0.5	< 0.3	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Carbon disulfide	75-15-0	N	60	NA	--	--	--	< 0	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0
Carbon Tetrachloride	56-23-5	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Chlorobenzene	108-90-7	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Chloroethane	75-00-3	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Chloroform	67-66-3	N	7	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
cis-1,2-Dichloroethene	156-59-2	N	5	NA	--	--	--	< 0	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	N	5	NA	< 0.5	< 0.5	< 0.4	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	< 0	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.2	< 0	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 0.5	< 0.5	< 0.3	< 0	< 0	< 0	< 0	< 2	< 2	< 2	< 2	< 2	< 2	< 0
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	--	< 0	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 0
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	--	--	--	--	--	< 10	< 10	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	--	< 0	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	--
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 2	--	--	--	--	--	< 0

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1955779 9662303 6/12/2018 TF-23-WD-5.26-180612 FD	TF-23 1955779 9662305 6/12/2018 TF-23-W-5.26-180612 REG	TF-23 2005546 9882894 11/1/2018 TF-23-W-5.26-181101 REG	TF-23 NA 4/27/2000 TF-23-0-0-04272000-W REG	TF-23 NA 6/15/2000 TF-23-0-0-06152000-W REG	TF-23 TF-23-032004 3/1/2004 TF-23-032004 REG	TF-23 TF-23-072004 7/1/2004 TF-23-072004 REG	TF-26 997155 4813932 7/11/2006 TF-26 REG	TF-26 1021137 4956588 1/10/2007 TF26011007 REG	TF-26 1115578 5501154 10/15/2008 TF-26(10-15-08) REG	TF-26 1196055 5989963 5/25/2010 TF-26(5-25-10) REG	TF-26 1343541 6830369 10/18/2012 TF-26(101812) REG	TF-26 1395576 7085927 6/6/2013 TF-26 (060613) REG	TF-26 NA 3/2/2000 TF-26-0-0-03022000-W REG
Vinyl chloride (Chloroethene)	**75-01-4**	**N**	**2**	**NA**	< 0.5	< 0.5	< 0.2	< 0	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 1	< 1	< 0
Xylene (total)	**1330-20-7**	**N**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Semivolatile Organic Compounds																		
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**N**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**N**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	**58-90-2**	**N**	**NA**	**240**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2,4,6-Trichlorophenol	**88-06-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2,4-Dichlorophenol	**120-83-2**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2,4-Dimethylphenol	**105-67-9**	**N**	**50**	**NA**	< 3	< 3	< 3	--	--	--	--	< 3	< 3	< 3	< 3	< 0.5	< 0.5	--
2,4-Dinitrophenol	**51-28-5**	**N**	**10**	**NA**	< 14	< 14	< 14	--	--	--	--	< 19	< 19	< 19	< 10	< 10	< 10	--
2,4-Dinitrotoluene	**121-14-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--
2,6-Dinitrotoluene	**606-20-2**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2-Chloronaphthalene	**91-58-7**	**N**	**10**	**NA**	< 0.4	< 0.4	< 0.4	< 0	--	--	--	< 2	< 2	< 2	< 2	< 0.4	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2-Methyl-Naphthalene	**91-57-6**	**N**	**NA**	**36**	< 0.1	< 0.1	< 0.1	--	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
2-Methylphenol (o-Cresol)	**95-48-7**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**N**	**5**	**NA**	< 2	< 2	< 2	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**N**	**1**	**NA**	< 3	< 3	< 3	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
3,3'-Dichlorobenzidine	**91-94-1**	**N**	**5**	**NA**	< 3	< 3	< 3	< 0	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
3-Nitroaniline	**99-09-2**	**N**	**5**	**NA**	< 3	< 3	< 3	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**N**	**1**	**NA**	< 8	< 8	< 8	--	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	--
4-Bromophenylphenylether	**101-55-3**	**N**	**NA**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
4-Chloroaniline	**106-47-8**	**N**	**5**	**NA**	< 4	< 4	< 4	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**N**	**NA**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--
4-Methylphenol (p-Cresol)	**106-44-5**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 2	< 2	< 2	< 2	< 0.5	< 0.5	--
4-Nitroaniline	**100-01-6**	**N**	**5**	**NA**	< 0.9	< 0.9	< 0.9	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
4-Nitrophenol	**100-02-7**	**N**	**1**	**NA**	< 10	< 10	< 10	--	--	--	--	< 10	< 10	< 10	< 10	< 10	< 10	--
Acenaphthene	**83-32-9**	**N**	**20**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	2 J	1 J	< 1	< 1	< 0.1	0.3 J	--
Acenaphthylene	**208-96-8**	**N**	**NA**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Acetophenone	**98-86-2**	**N**	**NA**	**1900**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Atrazine	**1912-24-9**	**N**	**NA**	**0.3**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	**100-52-7**	**N**	**NA**	**19**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(a)pyrene	**50-32-8**	**N**	**NA**	**0.025**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(b)fluoranthene	**205-99-2**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(g,h,i)perylene	**191-24-2**	**N**	**NA**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Benzo(k)fluoranthene	**207-08-9**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
bis(2-Chloroethoxy)methane	**111-91-1**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
bis(2-Chloroethyl) ether	**111-44-4**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
bis(2-chloroisopropyl) ether	**108-60-1**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
bis(2-Ethylhexyl)phthalate	**117-81-7**	**N**	**5**	**NA**	< 5	< 5	< 5	< 0	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
Butylbenzylphthalate	**85-68-7**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
Caprolactam	**105-60-2**	**N**	**NA**	**9900**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**N**	**NA**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
Chrysene	**218-01-9**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Di-n-butylphthalate	**84-74-2**	**N**	**50**	**NA**	< 2	< 2	< 2	2.8	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
Di-n-octylphthalate	**117-84-0**	**N**	**50**	**NA**	< 5	< 5	< 5	< 0	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	**53-70-3**	**N**	**NA**	**0.025**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Dibenzofuran	**132-64-9**	**N**	**NA**	**7.9**	< 0.5	< 0.5	< 0.5	--	--	--	--	3 J	2 J	< 1	< 1	< 0.5	< 0.5	--
Diethylphthalate	**84-66-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
Dimethyl phthalate	**131-11-3**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	< 2	< 2	< 2	< 2	< 2	< 2	--
Diphenyl (Biphenyl, Phenyl benzene)	**92-52-4**	**N**	**NA**	**0.83**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Fluorene	**86-73-7**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	5	3 J	< 1	1 J	0.1 J	0.6	--
Hexachlorobenzene	**118-74-1**	**N**	**0.04**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**N**	**5**	**NA**	< 5	< 5	< 5	< 0	--	--	--	< 5	< 5	< 5	< 5	< 5	< 5	--

Appendix B-3
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Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-23 1955779 9662303 6/12/2018 TF-23-WD-5.26-180612 FD	TF-23 1955779 9662305 6/12/2018 TF-23-W-5.26-180612 REG	TF-23 2005546 9882894 11/1/2018 TF-23-W-5.26-181101 REG	TF-23 NA 4/27/2000 TF-23-0-0-04272000-W REG	TF-23 NA 6/15/2000 TF-23-0-0-06152000-W REG	TF-23 TF-23-032004 3/1/2004 TF-23-032004 REG	TF-23 TF-23-072004 7/1/2004 TF-23-072004 REG	TF-26 997155 4813932 7/11/2006 TF-26 REG	TF-26 1021137 4956588 1/10/2007 TF26011007 REG	TF-26 1115578 5501154 10/15/2008 TF-26(10-15-08) REG	TF-26 1196055 5989963 5/25/2010 TF-26(5-25-10) REG	TF-26 1343541 6830369 10/18/2012 TF-26(101812) REG	TF-26 1395576 7085927 6/6/2013 TF-26 (060613) REG	TF-26 NA 3/2/2000 TF-26-0-0-03022000-W REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0.7	< 0.7	< 0.7	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0.7	< 0.7	< 0.7	< 0	--	--	--	< 2	3 J	< 2	< 2	< 0.5	< 0.5	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	0.2 J	< 0
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	< 0	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 1	< 1	< 1	--	--	--	--	< 3	< 3	< 3	< 3	< 1	< 1	--
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	4 J	3 J	< 1	< 1	< 0.1	0.2 J	--
Phenol	**108-95-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	< 1	< 1	< 1	< 1	< 0.5	< 0.5	--
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	< 1	< 1	< 1	< 1	< 0.1	< 0.1	--
Metals																		
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	--	--	--	--	< 80.2	117 J	< 80.2	< 80.2	267	2,260	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	--	--	--	--	< 9.7	< 9.7	< 9.7	< 9.7	< 3.5	< 3.5	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	--	--	--	--	< 10	< 10	< 10.0	< 7.2	27.5	< 6.8	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	--	--	--	--	51.2	18.9	39.2	20.6	72.6	43.6	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	--	--	--	--	< 0.94	< 0.94	< 0.90	< 1.4	< 0.67	< 0.67	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	--	--	--	--	< 0.91	< 0.91	< 2.0	< 2.0	0.66 J	< 0.36	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	76,000	77,900	79,900	68,500	97,000	85,800	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	--	--	--	--	< 2.3	< 2.3	< 3.0	< 3.4	1.6 J	2.8 J	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	--	--	--	--	< 2.1	< 2.1	< 2.1	< 2.1	< 0.66	1.1 J	--
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	--	--	--	--	< 2.2	< 2.2	< 2.7	< 2.7	< 2.1	3.0 J	--
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	--	--	--	--	5,910	1,460	696	1,050	7,300	6,110	--
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	--	--	131	37.5	5	< 6.9	< 6.9	7.6 J	< 6.9	< 5.1	8.5 J	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	< 6	< 6	< 7.1	--	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	--	--	--	--	13,100	12,800	12,100	11,900	13,800	12,900	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	--	--	--	--	--	--	--	9,310	2,270	5,850	2,270	4,750	1,930	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	--	--	--	--	< 5.6	< 5.6	< 5.6	1.9 J	< 1.1	2.4 J	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	443 J	424 J	555	731	707	1,160	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	--	--	--	--	< 9.4	< 9.4	< 10.7	< 8.9	< 7.5	< 7.5	--
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	--	--	--	--	< 1.6	< 1.6	< 2.2	< 2.3	< 1.2	< 1.2	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	--	--	--	--	25,400	13,200	10,100	15,100	5,380	5,920	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	< 13.5	< 13.5	< 14.0	< 14.0	< 5.7	< 5.7	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	--	--	--	--	< 1.5	< 1.5	2.8 J	< 2.5	3.5 J	2.9 J	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	--	--	--	--	213	< 8.1	< 8.1	< 8.1	6.2 J	17.7 J	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	--	--	--	--	< 0.056	< 0.056	< 0.056	< 0.056	< 0.070	< 0.070	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-26 NA 4/27/2000 TF-26-0-0-04272000-W REG	TF-5 460-185205-1 460-185205-10 6/20/2019 TF-5-W-190620 REG	TF-5 460-195549-1 460-195549-6 10/30/2019 TF-5-W-191030 REG	TF-5 460-195549-1 460-195549-7 10/30/2019 BD-1-W-191030 FD	TF-5 993100 4791555 6/6/2006 TF-5 REG	TF-5 1014759 4919110 11/15/2006 TF-5-111506 REG	TF-5 1014759 4919111 11/15/2006 TF-105 FD	TF-5 1052940 5136497 8/21/2007 TF-5-082107 REG	TF-5 1067563 5223996 11/28/2007 TF-5-112807 REG	TF-5 1095960 5388892 6/10/2008 TF-5-061008 REG	TF-5 1115578 5501147 10/15/2008 TF-5(10-15-08) REG	TF-5 1120871 5533999 11/18/2008 TF-5(11-18-08) REG	TF-5 1153748 5724860 7/14/2009 TF-5(7-14-09) REG	TF-5 1153748 5724861 7/15/2009 TF-5(7-15-09) REG	TF-5 1170505 5833454 11/10/2009 TF-5(11-10-09) REG	TF-5 1196041 5989888 5/25/2010 TF-5(5-25-10) REG	TF-5 1196247 5991248 5/26/2010 TF-5(5-26-10) REG
Volatile Organic Compounds																						
1,1 Dichloroethene	75-35-4	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
1,1,1-Trichloroethane	71-55-6	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,1,2-Trichloroethane	79-00-5	N	1	NA	--	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	--	< 1	--	< 1
1,2-Dichloroethane	107-06-2	N	0.6	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,2-Dichloroethene	540-59-0	N	5	NA	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	--	< 0.8	--	< 0.8
1,2-Dichloropropane	78-87-5	N	1	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	--	< 1	--	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	--	--	--	--	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	--	< 1	--	< 1
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	< 5.0	< 5.0	< 5.0	--	--	--	--	--	--	< 3	--	--	--	--	< 3	--
2-Hexanone	591-78-6	N	50	NA	--	< 5.0	< 5.0	< 5.0	--	--	--	--	--	--	< 3	--	--	--	--	< 3	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	< 5.0	< 5.0	< 5.0	--	--	--	--	--	--	< 3	--	--	--	--	< 3	--
Acetone	67-64-1	N	50	NA	--	< 5.0	< 5.0	< 5.0	--	--	--	--	--	--	< 6	--	--	--	--	< 6	--
Benzene	71-43-2	N	1	NA	< 0	< 1.0	< 1.0	< 1.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Bromoform	75-25-2	N	50	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Carbon disulfide	75-15-0	N	60	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	< 1	--	--	--	--	< 1	--
Carbon Tetrachloride	56-23-5	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Chlorobenzene	108-90-7	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Chloroethane	75-00-3	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Chloroform	67-66-3	N	7	NA	--	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
cis-1,2-Dichloroethene	156-59-2	N	5	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	< 0.8	--	--	--	--	< 0.8	--
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Cyclohexane	110-82-7	N	NA	13000	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	--	--	--	--	--	--	--	< 0.8	--	--	--	--	< 0.8	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	--	--	--	--	< 0.8	--
Ethylbenzene	100-41-4	N	5	NA	< 0	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Isopropylbenzene	98-82-8	N	NA	450	< 0	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	< 5.0	< 5.0	< 5.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0	< 1.0	< 1.0	< 1.0	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	< 1	--	--	--	--	< 1	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	--	--	--	--	--	--	--	< 0.8	--	--	--	--	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	--	--	--	--	--	--	--	< 10	--	--	--	--	< 10	--
Tetrachloroethene	127-18-4	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Toluene	108-88-3	N	5	NA	< 0	< 1.0	< 1.0	< 1.0	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	--	< 0.7	< 0.7	< 0.7
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	< 1.0	< 1.0	< 1.0	--	--	--	--	--	--	< 0.8	--	--	--	--	< 0.8	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--	< 1.0	< 1.0	< 1.0	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	--	< 2	--	< 2

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-26 NA 4/27/2000 TF-26-0-0-04272000-W REG	TF-5 460-185205-1 460-185205-10 6/20/2019 TF-5-W-190620 REG	TF-5 460-195549-1 460-195549-6 10/30/2019 TF-5-W-191030 REG	TF-5 460-195549-1 460-195549-7 10/30/2019 BD-1-W-191030 FD	TF-5 993100 4791555 6/6/2006 TF-5 REG	TF-5 1014759 4919110 11/15/2006 TF-5-111506 REG	TF-5 1014759 4919111 11/15/2006 TF-105 FD	TF-5 1052940 5136497 8/21/2007 TF-5-082107 REG	TF-5 1067563 5223996 11/28/2007 TF-5-112807 REG	TF-5 1095960 5388892 6/10/2008 TF-5-061008 REG	TF-5 1115578 5501147 10/15/2008 TF-5(10-15-08) REG	TF-5 1120871 5533999 11/18/2008 TF-5(11-18-08) REG	TF-5 1153748 5724860 7/14/2009 TF-5(7-14-09) REG	TF-5 1153748 5724861 7/15/2009 TF-5(7-15-09) REG	TF-5 1170505 5833454 11/10/2009 TF-5(11-10-09) REG	TF-5 1196041 5989888 5/25/2010 TF-5(5-25-10) REG	TF-5 1196247 5991248 5/26/2010 TF-5(5-26-10) REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	--	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Xylene (total)	1330-20-7	N	5	NA	< 0	--	--	--	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.8	< 0.8
Semivolatile Organic Compounds																					
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	< 50	< 50	< 50	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2,4,6-Trichlorophenol	88-06-2	N	1	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2,4-Dichlorophenol	120-83-2	N	5	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2,4-Dimethylphenol	105-67-9	N	50	NA	--	< 10	< 10	< 10	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 3	< 3	< 3
2,4-Dinitrophenol	51-28-5	N	10	NA	--	< 20	< 20	< 20	< 19	< 19	< 19	< 20	< 21	< 20	< 19	< 20	< 20	--	< 19	< 10	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 0	< 2.0	< 2.0	< 2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	--	< 2.0	< 2.0	< 2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2-Chloronaphthalene	91-58-7	N	10	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2-Methyl-Naphthalene	91-57-6	N	NA	36	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	--	< 20	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
4-Chloroaniline	106-47-8	N	5	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	--	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
4-Nitroaniline	100-01-6	N	5	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
4-Nitrophenol	100-02-7	N	1	NA	--	< 20	< 20	< 20	< 10	< 10	< 10	< 10	< 11	< 10	< 10	< 10	< 10	--	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Acenaphthylene	208-96-8	N	NA	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Acetophenone	98-86-2	N	NA	1900	--	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Atrazine	1912-24-9	N	NA	0.3	--	< 2.0	< 2.0	< 2.0	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	< 10 *	< 10 *	< 10 *	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 0	< 2.0	< 2.0	< 2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 0	< 2.0	4	< 2.0	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	< 10 *	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Chrysene	218-01-9	N	0.002	NA	< 0	< 2.0	< 2.0	< 2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Di-n-butylphthalate	84-74-2	N	50	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Dibenzofuran	132-64-9	N	NA	7.9	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Diethylphthalate	84-66-2	N	50	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	< 10	< 10	< 10	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Fluorene	86-73-7	N	50	NA	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 0	< 10	< 10	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-26 NA 4/27/2000 TF-26-0-0-04272000-W REG	TF-5 460-185205-1 460-185205-10 6/20/2019 TF-5-W-190620 REG	TF-5 460-195549-1 460-195549-6 10/30/2019 TF-5-W-191030 REG	TF-5 460-195549-1 460-195549-7 10/30/2019 BD-1-W-191030 FD	TF-5 993100 4791555 6/6/2006 TF-5 REG	TF-5 1014759 4919110 11/15/2006 TF-5-111506 REG	TF-5 1014759 4919111 11/15/2006 TF-105 FD	TF-5 1052940 5136497 8/21/2007 TF-5-082107 REG	TF-5 1067563 5223996 11/28/2007 TF-5-112807 REG	TF-5 1095960 5388892 6/10/2008 TF-5-061008 REG	TF-5 1115578 5501147 10/15/2008 TF-5(10-15-08) REG	TF-5 1120871 5533999 11/18/2008 TF-5(11-18-08) REG	TF-5 1153748 5724860 7/14/2009 TF-5(7-14-09) REG	TF-5 1153748 5724861 7/15/2009 TF-5(7-15-09) REG	TF-5 1170505 5833454 11/10/2009 TF-5(11-10-09) REG	TF-5 1196041 5989888 5/25/2010 TF-5(5-25-10) REG	TF-5 1196247 5991248 5/26/2010 TF-5(5-26-10) REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 0	< 2.0 *	< 2.0	< 2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0	< 2.0	< 2.0	< 2.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0	< 10	< 10	< 10	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 2	< 2
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0	< 1.0	< 1.0	< 1.0	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	--	< 20	< 20	< 20	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	--	< 3	< 3	< 3
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Phenol	**108-95-2**	**N**	**1**	**NA**	--	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 0	< 10	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	--	< 1	< 1	< 1
Metals																					
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	2,810	--	--	--	--	< 80.2	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	10.1 J	--	--	--	--	< 9.7	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	--	--	--	--	--	--	--	< 10.0	--	--	--	--	< 7.2	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	--	--	--	--	--	--	--	59.2	--	--	--	--	34.6	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.90	--	--	--	--	< 1.4	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 2.0	--	--	--	--	< 2.0	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	99,900	--	--	--	--	95,500	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	3.1 J	--	--	--	--	< 3.4	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	--	--	2.6 J	--	--	--	--	< 2.1	--
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	--	--	--	--	--	--	--	14.2	--	--	--	--	2.9 J	--
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	--	--	--	--	--	--	--	4,520	--	--	--	--	< 52.2	--
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	11	4.2	< 6.9	8.3 J	7.0 J	< 6.9	7.6 J	< 6.9	18.5	19.2	--	--	< 6.9	< 6.9	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	--	< 1.2	--	--	--	--	--	--	--	--	--	--	--	< 6.9	--	--	< 6.9
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	--	--	--	--	--	--	--	29,800	--	--	--	--	27,600	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	--	--	--	--	--	--	--	--	--	--	128	--	--	--	--	1.6 J	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	--	--	--	--	--	--	--	< 5.6	--	--	--	--	< 1.8	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	--	--	--	1,920	--	--	--	--	1,130	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	< 10.7	--	--	--	--	< 8.9	--
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	--	--	--	--	--	--	--	< 2.2	--	--	--	--	< 2.3	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	--	--	--	--	--	--	--	435,000	--	--	--	--	426,000	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	< 14.0	--	--	--	--	< 14.0	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	--	--	--	--	--	--	--	3.1 J	--	--	--	--	< 2.5	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	--	--	--	--	--	--	--	48.8	--	--	--	--	35.9	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	--	--	--	--	--	--	--	< 0.056	--	--	--	--	< 0.056	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID					TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5	TF-5
Sample Delivery Group (SDG)					1216105	1246861	1276051	1323156	1344432	1396584	1396587	1433988	1480955	1517916	1570824	1610359	1671783	1734549	1819683
Lab Sample ID			NY_TOGS	USEPA Tapwater RSL 2019	6109838	6286838	6467165	6726070	6834755	7090546	7090571	7277106	7494471	7671563	7938027	8139707	8424888	8702412	9078584
Sample Date					10/12/2010	5/11/2011	11/10/2011	7/18/2012	10/23/2012	6/11/2013	6/11/2013	11/13/2013	6/10/2014	11/11/2014	6/19/2015	11/16/2015	6/13/2016	11/15/2016	6/27/2017
Field Sample ID					TF-5(10-12-10)	TF-5(5-11-11)	TF-5(11-10-11)	TF-5(7-18-12)	TF-05(102312)	TF-5(061113)	TF-5(061113)SW	TF-5 111313	TF-5-061014	CVX-0040-07	CVX-0058-02	TF-5-W-4.59-151116	TF-5-W-4.59-160613	TF-5-W-4.59-161115	TF-5-W-4.59-170627
Sample Purpose					REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
Parameter Name	Parameter Code	Filtered																	
Volatile Organic Compounds																			
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethene	540-59-0	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	--	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloropropane	78-87-5	N	1	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	--	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	--	--	--	--	< 3	--	--	--	--	--	--	--	--
2-Hexanone	591-78-6	N	50	NA	--	--	--	--	--	--	< 3	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	--	--	--	--	< 3	--	--	--	--	--	--	--	--
Acetone	67-64-1	N	50	NA	--	--	--	--	--	--	< 6	--	--	--	--	--	--	--	--
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromoform	75-25-2	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon disulfide	75-15-0	N	60	NA	--	--	--	--	--	--	< 1	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chlorobenzene	108-90-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroethane	75-00-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloroform	67-66-3	N	7	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
cis-1,2-Dichloroethene	156-59-2	N	5	NA	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	95-47-6	N	NA	190	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	--	--	--	--	< 1	--	--	--	--	--	--	--	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	--	--	--	< 10	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	108-88-3	N	5	NA	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	--	--	--	--	< 0.8	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	--	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-5 1216105 6109838 10/12/2010 TF-5(10-12-10) REG	TF-5 1246861 6286838 5/11/2011 TF-5(5-11-11) REG	TF-5 1276051 6467165 11/10/2011 TF-5(11-10-11) REG	TF-5 1323156 6726070 7/18/2012 TF-5(7-18-12) REG	TF-5 1344432 6834755 10/23/2012 TF-05(102312) REG	TF-5 1396584 7090546 6/11/2013 TF-5(061113) REG	TF-5 1396587 7090571 6/11/2013 TF-5(061113)SW REG	TF-5 1433988 7277106 11/13/2013 TF-5 111313 REG	TF-5 1480955 7494471 6/10/2014 TF-5-061014 REG	TF-5 1517916 7671563 11/11/2014 CVX-0040-07 REG	TF-5 1570824 7938027 6/19/2015 CVX-0058-02 REG	TF-5 1610359 8139707 11/16/2015 TF-5-W-4.59-151116 REG	TF-5 1671783 8424888 6/13/2016 TF-5-W-4.59-160613 REG	TF-5 1734549 8702412 11/15/2016 TF-5-W-4.59-161115 REG	TF-5 1819683 9078584 6/27/2017 TF-5-W-4.59-170627 REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylene (total)	1330-20-7	N	5	NA	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Semivolatile Organic Compounds																			
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	N	NA	0.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2,4,6-Trichlorophenol	88-06-2	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dichlorophenol	120-83-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dimethylphenol	105-67-9	N	50	NA	< 3	< 3	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2,4-Dinitrophenol	51-28-5	N	10	NA	< 10	< 10	< 10	< 10	< 9	< 10	< 10	< 12	< 11	< 10	< 10	< 11	< 10	< 10	< 10
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 1	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2,6-Dinitrotoluene	606-20-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Chloronaphthalene	91-58-7	N	10	NA	< 2	< 2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.5	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Methyl-Naphthalene	91-57-6	N	NA	36	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
3-Nitroaniline	99-09-2	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 6	< 5	< 5	< 5	< 5	< 5	< 5
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Chloroaniline	106-47-8	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 2	< 2	< 2	< 2	< 2
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Nitroaniline	100-01-6	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
4-Nitrophenol	100-02-7	N	1	NA	< 10	< 10	< 10	< 10	< 9	< 10	< 10	< 12	< 11	< 10	< 10	< 11	< 10	< 10	< 10
Acenaphthene	83-32-9	N	20	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	208-96-8	N	NA	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acetophenone	98-86-2	N	NA	1900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	120-12-7	N	50	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Atrazine	1912-24-9	N	NA	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	100-52-7	N	NA	19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	6 J	< 2	< 2	< 2	< 2	< 2	< 14	< 2
Butylbenzylphthalate	85-68-7	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Caprolactam	105-60-2	N	NA	9900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	86-74-8	N	NA	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	218-01-9	N	0.002	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	84-74-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Di-n-octylphthalate	117-84-0	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	132-64-9	N	NA	7.9	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Diethylphthalate	84-66-2	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dimethyl phthalate	131-11-3	N	50	NA	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	206-44-0	N	50	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	86-73-7	N	50	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	118-74-1	N	0.04	NA	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Hexachlorobutadiene	87-68-3	N	0.5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 6	< 5	< 5	< 5	< 5	< 5	< 5

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-5 1216105 6109838 10/12/2010 TF-5(10-12-10) REG	TF-5 1246861 6286838 5/11/2011 TF-5(5-11-11) REG	TF-5 1276051 6467165 11/10/2011 TF-5(11-10-11) REG	TF-5 1323156 6726070 7/18/2012 TF-5(7-18-12) REG	TF-5 1344432 6834755 10/23/2012 TF-05(102312) REG	TF-5 1396584 7090546 6/11/2013 TF-5(061113) REG	TF-5 1396587 7090571 6/11/2013 TF-5(061113)SW REG	TF-5 1433988 7277106 11/13/2013 TF-5 111313 REG	TF-5 1480955 7494471 6/10/2014 TF-5-061014 REG	TF-5 1517916 7671563 11/11/2014 CVX-0040-07 REG	TF-5 1570824 7938027 6/19/2015 CVX-0058-02 REG	TF-5 1610359 8139707 11/16/2015 TF-5-W-4.59-151116 REG	TF-5 1671783 8424888 6/13/2016 TF-5-W-4.59-160613 REG	TF-5 1734549 8702412 11/15/2016 TF-5-W-4.59-161115 REG	TF-5 1819683 9078584 6/27/2017 TF-5-W-4.59-170627 REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 2	< 2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 3	< 3	< 1	< 1	< 0.9	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	**108-95-2**	**N**	**1**	**NA**	< 1	< 1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.6	< 0.6	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 1	< 1	< 0.1	< 0.1	< 0.09	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Metals																				
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	--	--	--	4,320	--	--	--	--	--	--	--	--	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	--	--	--	< 3.5	--	--	--	--	--	--	--	--	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	--	--	--	< 6.8	--	--	--	--	--	--	--	--	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	--	--	--	43.6	--	--	--	--	--	--	--	--	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	--	--	--	< 0.67	--	--	--	--	--	--	--	--	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	--	--	--	< 0.36	--	--	--	--	--	--	--	--	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	--	--	--	29,400	--	--	--	--	--	--	--	--	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	--	--	--	5.3 J	--	--	--	--	--	--	--	--	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	--	--	--	2.8 J	--	--	--	--	--	--	--	--	--
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	--	--	--	39.1	--	--	--	--	--	--	--	--	--
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	--	--	--	5,830	--	--	--	--	--	--	--	--	--
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	--	--	--	--	12.2 J	--	--	--	--	--	--	--	--	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	< 6.9	< 6.9	< 2.2	< 5.1	< 5.1	< 5.1	--	< 4.7	< 4.7	< 4.7	< 4.7	< 5.1	< 5.1	< 6.2	< 6	
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	--	--	--	9,420	--	--	--	--	--	--	--	--	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	--	--	--	--	--	--	209	--	--	--	--	--	--	--	--	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	--	--	--	4.7 J	--	--	--	--	--	--	--	--	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	--	--	--	1,840	--	--	--	--	--	--	--	--	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	--	--	--	< 7.5	--	--	--	--	--	--	--	--	--
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	--	--	--	< 1.2	--	--	--	--	--	--	--	--	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	--	--	--	127,000	--	--	--	--	--	--	--	--	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	--	--	--	< 5.7	--	--	--	--	--	--	--	--	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	--	--	--	5.6	--	--	--	--	--	--	--	--	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	--	--	--	91.6	--	--	--	--	--	--	--	--	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	--	--	--	0.074 J	--	--	--	--	--	--	--	--	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-5 1871380 9300790 10/31/2017 TF-5-W-4.59-171031 REG	TF-5 1955779 9662304 6/12/2018 TF-5-W-4.59-180612 REG	TF-5 2005546 9882895 11/1/2018 TF-5-W-4.59-181101 REG	TF-5 NA 4/27/2000 TF-05-0-0-04272000-W REG	TF-5 NA 4/30/2001 TF-05-0-0-04302001-W REG	TF-5 NA 6/15/2000 TF-05-0-0-06152000-W REG	TF-5 TF-5-032004 3/1/2004 TF-5-032004 REG	TF-5 TF-5-072004 7/1/2004 TF-5-072004 REG	TF-6 997155 4813934 7/11/2006 TF-6 REG	TF-6 1021137 4956587 1/10/2007 TF6011007 REG	TF-6 1115578 5501153 10/15/2008 TF-6(10-15-08) REG	TF-6 1395576 7085917 6/6/2013 TF-6 (060613) REG	TF-6 NA 3/2/2000 TF-06-0-0-03022000-W REG
Volatile Organic Compounds																	
1,1 Dichloroethene	75-35-4	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
1,1,1-Trichloroethane	71-55-6	N	5	NA	< 0.5	< 0.5	< 0.3	--	--	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
1,1,2-Trichloroethane	79-00-5	N	1	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--	--	--	--	--	--	--	--	--	--	--	--	< 0
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--	--	--	--	--	--	--	--	--	--	--	--	< 0
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 1	< 1	< 0.2	< 0	--	< 0	< 0	< 0	< 1	< 1	< 1	< 0.5	< 0
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	--	--	--	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	< 0.5	< 0.5	< 0.3	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
1,2-Dichloroethene	540-59-0	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 0.8	--	--	--	--
1,2-Dichloropropane	78-87-5	N	1	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 1	< 1	< 0.2	< 0	--	< 0	< 0	< 0	< 1	< 1	< 1	< 0.5	< 0
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	--	--	--	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 1	< 1	< 0.2	< 0	--	< 0	< 0	< 0	< 1	< 1	< 1	< 0.5	< 0
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	--	--	--	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0
2-Hexanone	591-78-6	N	50	NA	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--	--	--	--	--	--	--	--	--	< 3	< 3	< 3	< 0
Acetone	67-64-1	N	50	NA	--	--	--	--	--	--	--	--	--	< 6	< 6	< 6	< 0
Benzene	71-43-2	N	1	NA	< 0.5	< 0.5	< 0.2	< 0	< 1	< 0	< 0	< 0	< 0.5	< 0.5	< 0.5	< 0.5	< 0
Bromochloromethane	74-97-5	N	NA	83	--	--	--	--	--	--	--	--	--	--	--	--	< 0
Bromodichloromethane	75-27-4	N	50	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Bromoform	75-25-2	N	50	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	< 0.5	< 0.5	< 0.3	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Carbon disulfide	75-15-0	N	60	NA	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0
Carbon Tetrachloride	56-23-5	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Chlorobenzene	108-90-7	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Chloroethane	75-00-3	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Chloroform	67-66-3	N	7	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
cis-1,2-Dichloroethene	156-59-2	N	5	NA	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Cyclohexane	110-82-7	N	NA	13000	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	N	50	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--	--	--	--	--	--	--	--	--	--	--	--	--
Diisopropyl ether	108-20-3	N	NA	1500	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Ethylbenzene	100-41-4	N	5	NA	< 0.5	< 0.5	< 0.4	< 0	< 1	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Isopropylbenzene	98-82-8	N	NA	450	--	--	--	< 0	< 1	--	--	--	--	--	--	--	--
m,p-Xylenes	XYLENES-MP	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl acetate	79-20-9	N	NA	20000	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0.5	< 0.5	< 0.2	< 0	< 1	--	--	--	< 0.5	< 0.5	< 0.5	< 0.5	--
Methylcyclohexane	108-87-2	N	NA	NA	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	< 0.5	< 0.5	< 0.3	--	--	< 0	< 0	< 0	< 2	< 2	< 2	< 2	< 0
o-Xylene	95-47-6	N	NA	190	--	--	--	--	8 J	--	--	--	--	--	--	--	--
Styrene	100-42-5	N	5	NA	--	--	--	--	--	--	--	--	--	< 1	< 1	< 1	< 0
tert-Amyl methyl ether	994-05-8	N	NA	NA	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--	--	--	--	--	--	--	--	--	< 10	< 10	< 10	--
Tetrachloroethene	127-18-4	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	--
Toluene	108-88-3	N	5	NA	< 0.5	< 0.5	< 0.2	< 0	1.2	< 0	< 0	< 0	< 0.7	< 0.7	< 0.7	< 0.7	< 0
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--	--	--	--	--	--	--	--	--	< 0.8	< 0.8	< 0.8	< 0
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	--
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 2	--	--	--	< 0

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-5 1871380 9300790 10/31/2017 TF-5-W-4.59-171031 REG	TF-5 1955779 9662304 6/12/2018 TF-5-W-4.59-180612 REG	TF-5 2005546 9882895 11/1/2018 TF-5-W-4.59-181101 REG	TF-5 NA 4/27/2000 TF-05-0-0-04272000-W REG	TF-5 NA 4/30/2001 TF-05-0-0-04302001-W REG	TF-5 NA 6/15/2000 TF-05-0-0-06152000-W REG	TF-5 TF-5-032004 3/1/2004 TF-5-032004 REG	TF-5 TF-5-072004 7/1/2004 TF-5-072004 REG	TF-6 997155 4813934 7/11/2006 TF-6 REG	TF-6 1021137 4956587 1/10/2007 TF6011007 REG	TF-6 1115578 5501153 10/15/2008 TF-6(10-15-08) REG	TF-6 1395576 7085917 6/6/2013 TF-6 (060613) REG	TF-6 NA 3/2/2000 TF-06-0-0-03022000-W REG
Vinyl chloride (Chloroethene)	**75-01-4**	**N**	**2**	**NA**	< 0.5	< 0.5	< 0.2	--	--	< 0	< 0	< 0	< 1	< 1	< 1	< 1	< 0
Xylene (total)	**1330-20-7**	**N**	**5**	**NA**	< 0.5	< 0.5	< 1	< 0	1.1	< 0	< 0	< 0	< 0.8	< 0.8	< 0.8	< 0.8	< 0
Semivolatile Organic Compounds																	
1,2,4,5-Tetrachlorobenzene	**95-94-3**	**N**	**NA**	**1.7**	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	**123-91-1**	**N**	**NA**	**0.46**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	**58-90-2**	**N**	**NA**	**240**	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	**95-95-4**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2,4,6-Trichlorophenol	**88-06-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2,4-Dichlorophenol	**120-83-2**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2,4-Dimethylphenol	**105-67-9**	**N**	**50**	**NA**	< 0.5	< 3	< 3	--	--	--	--	--	< 4	< 3	< 3	< 0.5	--
2,4-Dinitrophenol	**51-28-5**	**N**	**10**	**NA**	< 10	< 14	< 15	--	--	--	--	--	< 25	< 20	< 19	< 10	--
2,4-Dinitrotoluene	**121-14-2**	**N**	**5**	**NA**	< 1	< 1	< 1	< 0	--	--	--	--	< 1	< 1	< 1	< 1	--
2,6-Dinitrotoluene	**606-20-2**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2-Chloronaphthalene	**91-58-7**	**N**	**10**	**NA**	< 0.4	< 0.4	< 0.4	< 0	--	--	--	--	< 3	< 2	< 2	< 0.4	--
2-Chlorophenol (o-Chlorophenol)	**95-57-8**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2-Methyl-Naphthalene	**91-57-6**	**N**	**NA**	**36**	< 0.1	< 0.1	< 0.1	--	--	--	--	--	< 1	< 1	< 1	< 0.1	--
2-Methylphenol (o-Cresol)	**95-48-7**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2-Nitroaniline (o-Nitroaniline)	**88-74-4**	**N**	**5**	**NA**	< 0.5	< 2	< 2	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
2-Nitrophenol (o-Nitrophenol)	**88-75-5**	**N**	**1**	**NA**	< 0.5	< 3	< 3	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
3,3'-Dichlorobenzidine	**91-94-1**	**N**	**5**	**NA**	< 2	< 3	< 3	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
3-Nitroaniline	**99-09-2**	**N**	**5**	**NA**	< 0.5	< 3	< 3	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	**534-52-1**	**N**	**1**	**NA**	< 5	< 8	< 9	--	--	--	--	--	< 6	< 5	< 5	< 5	--
4-Bromophenylphenylether	**101-55-3**	**N**	**NA**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	--
4-Chloroaniline	**106-47-8**	**N**	**5**	**NA**	< 2	< 4	< 4	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
4-Chlorophenyl phenyl ether	**7005-72-3**	**N**	**NA**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 3	< 2	< 2	< 0.5	--
4-Methylphenol (p-Cresol)	**106-44-5**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 3	< 2	< 2	< 0.5	--
4-Nitroaniline	**100-01-6**	**N**	**5**	**NA**	< 0.5	< 0.9	< 1	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
4-Nitrophenol	**100-02-7**	**N**	**1**	**NA**	< 10	< 10	< 11	--	--	--	--	--	< 13	< 10	< 10	< 10	--
Acenaphthene	**83-32-9**	**N**	**20**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Acenaphthylene	**208-96-8**	**N**	**NA**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	--	< 1	< 1	< 1	< 0.1	--
Acetophenone	**98-86-2**	**N**	**NA**	**1900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	**120-12-7**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Atrazine	**1912-24-9**	**N**	**NA**	**0.3**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzaldehyde	**100-52-7**	**N**	**NA**	**19**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	**56-55-3**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Benzo(a)pyrene	**50-32-8**	**N**	**NA**	**0.025**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Benzo(b)fluoranthene	**205-99-2**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Benzo(g,h,i)perylene	**191-24-2**	**N**	**NA**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Benzo(k)fluoranthene	**207-08-9**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
bis(2-Chloroethoxy)methane	**111-91-1**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	--
bis(2-Chloroethyl) ether	**111-44-4**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	--
bis(2-chloroisopropyl) ether	**108-60-1**	**N**	**5**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
bis(2-Ethylhexyl)phthalate	**117-81-7**	**N**	**5**	**NA**	< 2	< 5	< 5	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
Butylbenzylphthalate	**85-68-7**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
Caprolactam	**105-60-2**	**N**	**NA**	**9900**	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	**86-74-8**	**N**	**NA**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
Chrysene	**218-01-9**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Di-n-butylphthalate	**84-74-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
Di-n-octylphthalate	**117-84-0**	**N**	**50**	**NA**	< 2	< 5	< 5	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
Dibenz(a,h)anthracene	**53-70-3**	**N**	**NA**	**0.025**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Dibenzofuran	**132-64-9**	**N**	**NA**	**7.9**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
Diethylphthalate	**84-66-2**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
Dimethyl phthalate	**131-11-3**	**N**	**50**	**NA**	< 2	< 2	< 2	< 0	--	--	--	--	< 3	< 2	< 2	< 2	--
Diphenyl (Biphenyl, Phenyl benzene)	**92-52-4**	**N**	**NA**	**0.83**	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	**206-44-0**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Fluorene	**86-73-7**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Hexachlorobenzene	**118-74-1**	**N**	**0.04**	**NA**	< 0.1	< 0.1	< 0.1	< 0	--	--	--	--	< 1	< 1	< 1	< 0.1	--
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	< 0
Hexachlorobutadiene	**87-68-3**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	**77-47-4**	**N**	**5**	**NA**	< 5	< 5	< 5	< 0	--	--	--	--	< 6	< 5	< 5	< 5	--

Appendix B-3
OU-1C Groundwater Analytical Results
Chevron Environmental Management Company
Former Texaco Research Center Beacon
Glenham, NY

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-5 1871380 9300790 10/31/2017 TF-5-W-4.59-171031 REG	TF-5 1955779 9662304 6/12/2018 TF-5-W-4.59-180612 REG	TF-5 2005546 9882895 11/1/2018 TF-5-W-4.59-181101 REG	TF-5 NA 4/27/2000 TF-05-0-0-04272000-W REG	TF-5 NA 4/30/2001 TF-05-0-0-04302001-W REG	TF-5 NA 6/15/2000 TF-05-0-0-06152000-W REG	TF-5 TF-5-032004 3/1/2004 TF-5-032004 REG	TF-5 TF-5-072004 7/1/2004 TF-5-072004 REG	TF-6 997155 4813934 7/11/2006 TF-6 REG	TF-6 1021137 4956587 1/10/2007 TF6011007 REG	TF-6 1115578 5501153 10/15/2008 TF-6(10-15-08) REG	TF-6 1395576 7085917 6/6/2013 TF-6 (060613) REG	TF-6 NA 3/2/2000 TF-06-0-0-03022000-W REG
Hexachloroethane	**67-72-1**	**N**	**5**	**NA**	< 1	< 1	< 1	< 0	--	--	--	--	< 1	< 1	< 1	< 1	--
Indeno(1,2,3-cd)Pyrene	**193-39-5**	**N**	**0.002**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Isophorone	**78-59-1**	**N**	**50**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	--
N-Nitrosodi-n-propylamine	**621-64-7**	**N**	**NA**	**0.011**	< 0.5	< 0.7	< 0.8	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	--
N-Nitrosodiphenylamine (Diphenylamine)	**86-30-6**	**N**	**50**	**NA**	< 0.5	< 0.7	< 0.8	< 0	--	--	--	--	< 3	< 2	< 2	< 0.5	--
Naphthalene	**91-20-3**	**N**	**10**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 1	--	--	--	< 1	< 1	< 1	< 0.1	< 0
Naphthalene	**91-20-3**	**N**	**10**	**NA**	--	--	--	< 0	< 10	--	--	--	--	--	--	--	--
Nitrobenzene	**98-95-3**	**N**	**0.4**	**NA**	< 0.5	< 0.5	< 0.5	< 0	--	--	--	--	< 1	< 1	< 1	< 0.5	--
p-Chloro-m-cresol	**59-50-7**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
Pentachlorophenol	**87-86-5**	**N**	**1**	**NA**	< 1	< 1	< 1	--	--	--	--	--	< 4	< 3	< 3	< 1	--
Phenanthrene	**85-01-8**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Phenol	**108-95-2**	**N**	**1**	**NA**	< 0.5	< 0.5	< 0.5	--	--	--	--	--	< 1	< 1	< 1	< 0.5	--
Pyrene	**129-00-0**	**N**	**50**	**NA**	< 0.1	< 0.1	< 0.1	< 0	< 10	--	--	--	< 1	< 1	< 1	< 0.1	--
Metals																	
Aluminum	**7429-90-5**	**N**	**100**	**NA**	--	--	--	--	--	--	--	--	271	< 80.2	268	2,390	--
Antimony	**7440-36-0**	**N**	**3**	**NA**	--	--	--	--	--	--	--	--	< 9.7	< 9.7	< 9.7	< 3.5	--
Arsenic	**7440-38-2**	**N**	**25**	**NA**	--	--	--	--	--	--	--	--	< 10	< 10	< 10.0	< 6.8	--
Barium	**7440-39-3**	**N**	**1000**	**NA**	--	--	--	--	--	--	--	--	87.6	42.1	98.1	80.9	--
Beryllium	**7440-41-7**	**N**	**3**	**NA**	--	--	--	--	--	--	--	--	< 0.94	< 0.94	< 0.90	< 0.67	--
Cadmium	**7440-43-9**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	1.0 J	< 0.91	9	1.6 J	--
Calcium	**7440-70-2**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	--	81,300	87,300	97,500	68,600	--
Chromium	**7440-47-3**	**N**	**50**	**NA**	--	--	--	--	--	--	--	--	< 2.3	< 2.3	< 3.0	2.5 J	--
Cobalt	**7440-48-4**	**N**	**5**	**NA**	--	--	--	--	--	--	--	--	6.4	< 2.1	4.3 J	9.3	--
Copper	**7440-50-8**	**N**	**200**	**NA**	--	--	--	--	--	--	--	--	< 2.2	< 2.2	< 2.7	3.2 J	--
Iron	**7439-89-6**	**N**	**300**	**NA**	--	--	--	--	--	--	--	--	330	< 52.2	262	2,720	--
Lead	**7439-92-1**	**N**	**25**	**NA**	--	--	--	--	--	63.1	3	4	< 6.9	< 6.9	13.2 J	12.8 J	--
Lead (Dissolved)	**7439-92-1**	**Y**	**25**	**NA**	< 6	< 6	< 7.1	--	--	--	--	--	--	--	--	--	--
Magnesium	**7439-95-4**	**N**	**35000**	**NA**	--	--	--	--	--	--	--	--	22,500	25,400	28,300	15,700	--
Manganese	**7439-96-5**	**N**	**300**	**NA**	--	--	--	--	--	--	--	--	4,020	101	1,130	2,270	--
Nickel	**7440-02-0**	**N**	**100**	**NA**	--	--	--	--	--	--	--	--	< 5.6	< 5.6	< 5.6	5.7 J	--
Potassium	**7440-09-7**	**N**	**NA**	**NA**	--	--	--	--	--	--	--	--	1,320	1,040	1,640	1,080	--
Selenium	**7782-49-2**	**N**	**10**	**NA**	--	--	--	--	--	--	--	--	< 9.4	< 9.4	< 10.7	< 7.5	--
Silver	**7440-22-4**	**N**	**50**	**NA**	--	--	--	--	--	--	--	--	< 1.6	< 1.6	< 2.2	< 1.2	--
Sodium	**7440-23-5**	**N**	**20000**	**NA**	--	--	--	--	--	--	--	--	102,000	99,300	158,000	73,700	--
Thallium	**7440-28-0**	**N**	**0.5**	**NA**	--	--	--	--	--	--	--	--	< 13.5	< 13.5	< 14.0	< 5.7	--
Vanadium	**7440-62-2**	**N**	**NA**	**86**	--	--	--	--	--	--	--	--	< 1.5	< 1.5	< 2.5	2.8 J	--
Zinc	**7440-66-6**	**N**	**2000**	**NA**	--	--	--	--	--	--	--	--	25.7	< 8.1	9.9 J	12.3 J	--
Mercury	**7439-97-6**	**N**	**0.7**	**NA**	--	--	--	--	--	--	--	--	< 0.082 J	< 0.056	< 0.056	< 0.070	--

Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-6 NA 4/27/2000 TF-06-0-0-04272000-W REG
Volatile Organic Compounds					
1,1 Dichloroethene	75-35-4	N	5	NA	--
1,1,1-Trichloroethane	71-55-6	N	5	NA	--
1,1,2,2-Tetrachloroethane	79-34-5	N	5	NA	--
1,1,2-Trichloroethane	79-00-5	N	1	NA	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	N	5	NA	--
1,1-Dichloroethane	75-34-3	N	5	NA	--
1,2,3-Trichlorobenzene	87-61-6	N	NA	7	--
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	< 0
1,2,4-Trichlorobenzene	120-82-1	N	5	NA	--
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	N	NA	0.00033	--
1,2-Dibromoethane	106-93-4	N	NA	0.0075	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	< 0
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	N	3	NA	--
1,2-Dichloroethane	107-06-2	N	0.6	NA	--
1,2-Dichloroethene	540-59-0	N	5	NA	--
1,2-Dichloropropane	78-87-5	N	1	NA	--
1,3-Dichlorobenzene	541-73-1	N	3	NA	< 0
1,3-Dichlorobenzene	541-73-1	N	3	NA	--
1,4-Dichlorobenzene	106-46-7	N	3	NA	< 0
1,4-Dichlorobenzene	106-46-7	N	3	NA	--
2-Butanone (Methyl ethyl ketone)	78-93-3	N	50	NA	--
2-Hexanone	591-78-6	N	50	NA	--
4-Methyl-2-pentanone	108-10-1	N	NA	6300	--
Acetone	67-64-1	N	50	NA	--
Benzene	71-43-2	N	1	NA	< 0
Bromochloromethane	74-97-5	N	NA	83	--
Bromodichloromethane	75-27-4	N	50	NA	--
Bromoform	75-25-2	N	50	NA	--
Bromomethane (Methyl bromide)	74-83-9	N	5	NA	--
Carbon disulfide	75-15-0	N	60	NA	--
Carbon Tetrachloride	56-23-5	N	5	NA	--
Chlorobenzene	108-90-7	N	5	NA	--
Chloroethane	75-00-3	N	5	NA	--
Chloroform	67-66-3	N	7	NA	--
Chloromethane (Methyl chloride)	74-87-3	N	5	NA	--
cis-1,2-Dichloroethene	156-59-2	N	5	NA	--
cis-1,3-Dichloropropene	10061-01-5	N	0.4	NA	--
Cyclohexane	110-82-7	N	NA	13000	--
Dibromochloromethane	124-48-1	N	50	NA	--
Dichlorodifluoromethane (Freon 12)	75-71-8	N	NA	200	--
Diisopropyl ether	108-20-3	N	NA	1500	--
Ethyl-t-butylether	637-92-3	N	NA	NA	--
Ethylbenzene	100-41-4	N	5	NA	< 0
Isopropylbenzene	98-82-8	N	NA	450	< 0
m,p-Xylenes	XYLENES-MP	N	NA	NA	--
Methyl acetate	79-20-9	N	NA	20000	--
Methyl-t-butyl ether	1634-04-4	N	10	NA	< 0
Methylcyclohexane	108-87-2	N	NA	NA	--
Methylene chloride (Dichloromethane)	75-09-2	N	5	NA	--
o-Xylene	95-47-6	N	NA	190	--
Styrene	100-42-5	N	5	NA	--
tert-Amyl methyl ether	994-05-8	N	NA	NA	--
Tertiary Butyl Alcohol	75-65-0	N	NA	NA	--
Tetrachloroethene	127-18-4	N	5	NA	--
Toluene	108-88-3	N	5	NA	< 0
trans-1,2-Dichloroethene	156-60-5	N	5	NA	--
trans-1,3-Dichloropropene	10061-02-6	N	0.4	NA	--
Trichloroethene (Trichloroethylene)	79-01-6	N	5	NA	--
Trichlorofluoromethane (Freon 11)	75-69-4	N	5	NA	--

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-6 NA 4/27/2000 TF-06-0-0-04272000-W REG
Vinyl chloride (Chloroethene)	75-01-4	N	2	NA	--
Xylene (total)	1330-20-7	N	5	NA	< 0
Semivolatile Organic Compounds					
1,2,4,5-Tetrachlorobenzene	95-94-3	N	NA	1.7	--
1,4-Dioxane	123-91-1	N	NA	0.46	--
2,3,4,6-Tetrachlorophenol	58-90-2	N	NA	240	--
2,4,5-Trichlorophenol	95-95-4	N	1	NA	--
2,4,6-Trichlorophenol	88-06-2	N	1	NA	--
2,4-Dichlorophenol	120-83-2	N	5	NA	--
2,4-Dimethylphenol	105-67-9	N	50	NA	--
2,4-Dinitrophenol	51-28-5	N	10	NA	--
2,4-Dinitrotoluene	121-14-2	N	5	NA	< 0
2,6-Dinitrotoluene	606-20-2	N	5	NA	--
2-Chloronaphthalene	91-58-7	N	10	NA	< 0
2-Chlorophenol (o-Chlorophenol)	95-57-8	N	1	NA	--
2-Methyl-Naphthalene	91-57-6	N	NA	36	--
2-Methylphenol (o-Cresol)	95-48-7	N	1	NA	--
2-Nitroaniline (o-Nitroaniline)	88-74-4	N	5	NA	--
2-Nitrophenol (o-Nitrophenol)	88-75-5	N	1	NA	--
3,3'-Dichlorobenzidine	91-94-1	N	5	NA	< 0
3-Nitroaniline	99-09-2	N	5	NA	--
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	534-52-1	N	1	NA	--
4-Bromophenylphenylether	101-55-3	N	NA	NA	< 0
4-Chloroaniline	106-47-8	N	5	NA	--
4-Chlorophenyl phenyl ether	7005-72-3	N	NA	NA	< 0
4-Methylphenol (p-Cresol)	106-44-5	N	1	NA	--
4-Nitroaniline	100-01-6	N	5	NA	--
4-Nitrophenol	100-02-7	N	1	NA	--
Acenaphthene	83-32-9	N	20	NA	< 0
Acenaphthylene	208-96-8	N	NA	NA	< 0
Acetophenone	98-86-2	N	NA	1900	--
Anthracene	120-12-7	N	50	NA	< 0
Atrazine	1912-24-9	N	NA	0.3	--
Benzaldehyde	100-52-7	N	NA	19	--
Benzo(a)anthracene	56-55-3	N	0.002	NA	< 0
Benzo(a)pyrene	50-32-8	N	NA	0.025	< 0
Benzo(b)fluoranthene	205-99-2	N	0.002	NA	< 0
Benzo(g,h,i)perylene	191-24-2	N	NA	NA	< 0
Benzo(k)fluoranthene	207-08-9	N	0.002	NA	< 0
bis(2-Chloroethoxy)methane	111-91-1	N	5	NA	< 0
bis(2-Chloroethyl) ether	111-44-4	N	1	NA	< 0
bis(2-chloroisopropyl) ether	108-60-1	N	5	NA	--
bis(2-Ethylhexyl)phthalate	117-81-7	N	5	NA	< 0
Butylbenzylphthalate	85-68-7	N	50	NA	< 0
Caprolactam	105-60-2	N	NA	9900	--
Carbazole	86-74-8	N	NA	NA	--
Chrysene	218-01-9	N	0.002	NA	< 0
Di-n-butylphthalate	84-74-2	N	50	NA	< 0
Di-n-octylphthalate	117-84-0	N	50	NA	< 0
Dibenz(a,h)anthracene	53-70-3	N	NA	0.025	< 0
Dibenzofuran	132-64-9	N	NA	7.9	--
Diethylphthalate	84-66-2	N	50	NA	< 0
Dimethyl phthalate	131-11-3	N	50	NA	< 0
Diphenyl (Biphenyl, Phenyl benzene)	92-52-4	N	NA	0.83	--
Fluoranthene	206-44-0	N	50	NA	< 0
Fluorene	86-73-7	N	50	NA	< 0
Hexachlorobenzene	118-74-1	N	0.04	NA	< 0
Hexachlorobutadiene	87-68-3	N	0.5	NA	< 0
Hexachlorobutadiene	87-68-3	N	0.5	NA	--
Hexachlorocyclopentadiene	77-47-4	N	5	NA	< 0

Location ID Sample Delivery Group (SDG) Lab Sample ID Sample Date Field Sample ID Sample Purpose Parameter Name	Parameter Code	Filtered	NY_TOGS	USEPA Tapwater RSL 2019	TF-6 NA 4/27/2000 TF-06-0-0-04272000-W REG
Hexachloroethane	67-72-1	N	5	NA	< 0
Indeno(1,2,3-cd)Pyrene	193-39-5	N	0.002	NA	< 0
Isophorone	78-59-1	N	50	NA	< 0
N-Nitrosodi-n-propylamine	621-64-7	N	NA	0.011	< 0
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	N	50	NA	< 0
Naphthalene	91-20-3	N	10	NA	< 0
Naphthalene	91-20-3	N	10	NA	< 0
Nitrobenzene	98-95-3	N	0.4	NA	< 0
p-Chloro-m-cresol	59-50-7	N	1	NA	--
Pentachlorophenol	87-86-5	N	1	NA	--
Phenanthrene	85-01-8	N	50	NA	< 0
Phenol	108-95-2	N	1	NA	--
Pyrene	129-00-0	N	50	NA	< 0
Metals					
Aluminum	7429-90-5	N	100	NA	--
Antimony	7440-36-0	N	3	NA	--
Arsenic	7440-38-2	N	25	NA	--
Barium	7440-39-3	N	1000	NA	--
Beryllium	7440-41-7	N	3	NA	--
Cadmium	7440-43-9	N	5	NA	--
Calcium	7440-70-2	N	NA	NA	--
Chromium	7440-47-3	N	50	NA	--
Cobalt	7440-48-4	N	5	NA	--
Copper	7440-50-8	N	200	NA	--
Iron	7439-89-6	N	300	NA	--
Lead	7439-92-1	N	25	NA	--
Lead (Dissolved)	7439-92-1	Y	25	NA	--
Magnesium	7439-95-4	N	35000	NA	--
Manganese	7439-96-5	N	300	NA	--
Nickel	7440-02-0	N	100	NA	--
Potassium	7440-09-7	N	NA	NA	--
Selenium	7782-49-2	N	10	NA	--
Silver	7440-22-4	N	50	NA	--
Sodium	7440-23-5	N	20000	NA	--
Thallium	7440-28-0	N	0.5	NA	--
Vanadium	7440-62-2	N	NA	86	--
Zinc	7440-66-6	N	2000	NA	--
Mercury	7439-97-6	N	0.7	NA	--

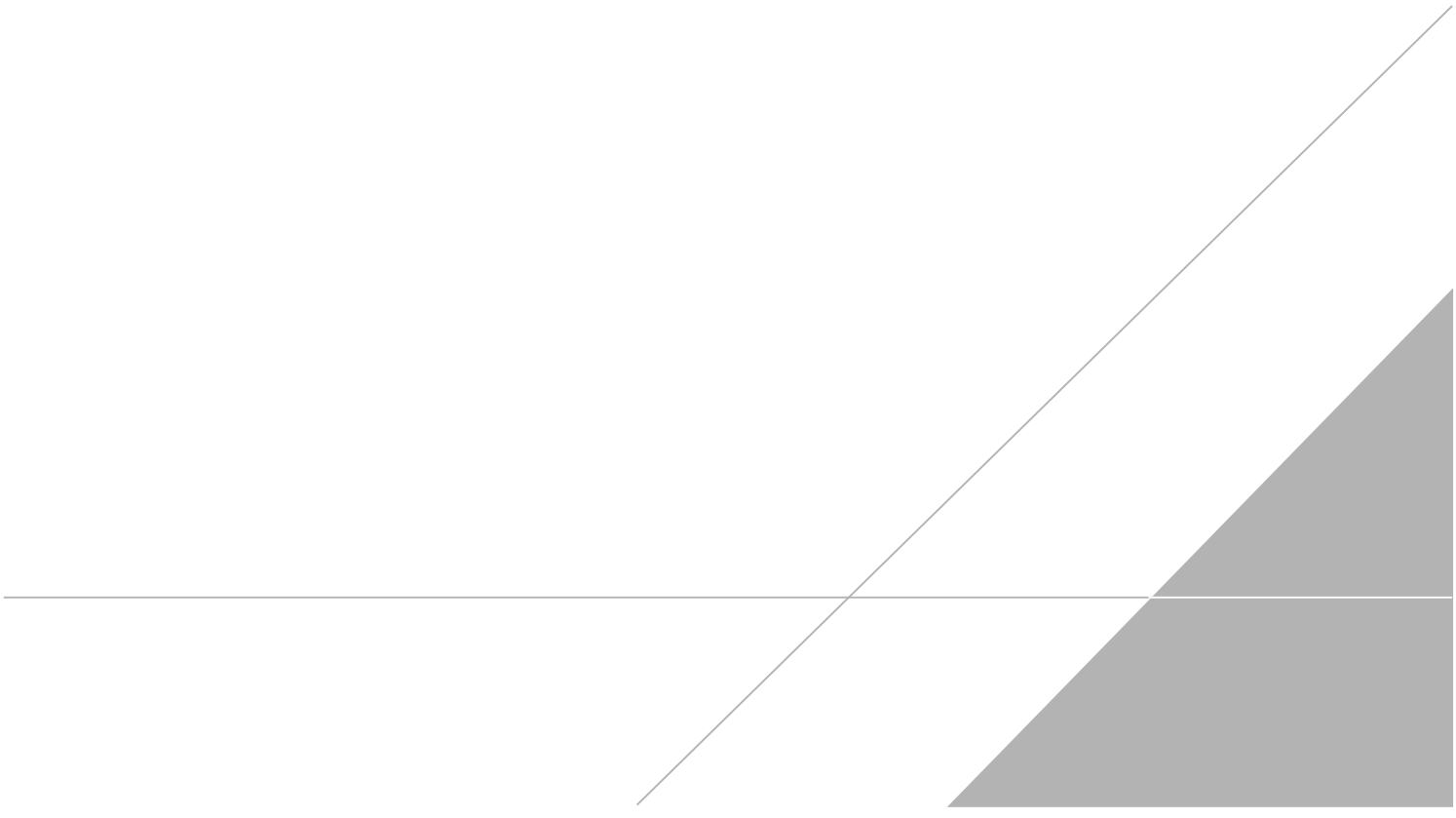
Report Units are in ug/L.
Grey Background: Result Exceeds TOGS or Tapwater RSL
< : Not detected at the laboratory method detection limit.
J : Result detected between the reporting limit and the method detection limit.
--: Not analyzed for
NA: Standard not Applicable

Appendix C

Arcadis Guidance Documents

APPENDIX C-1

Arcadis Standard Groundwater Sampling for Monitoring Wells Guidance

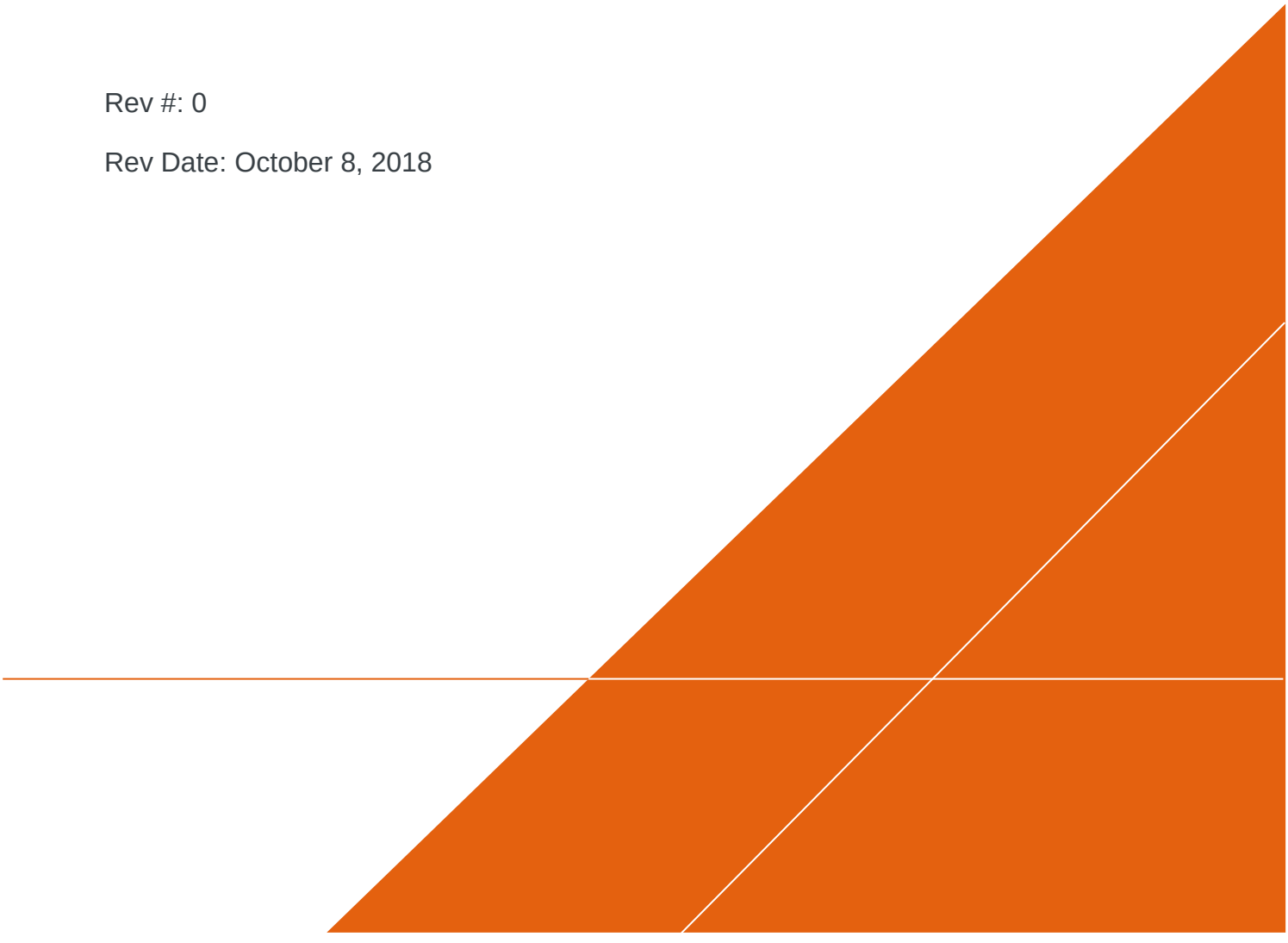


ARCADIS Design & Consultancy for natural and built assets

TGI - STANDARD GROUNDWATER SAMPLING FOR MONITORING WELLS

Rev #: 0

Rev Date: October 8, 2018

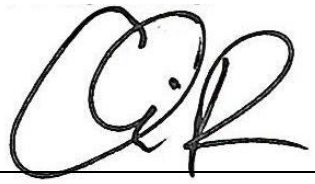


VERSION CONTROL

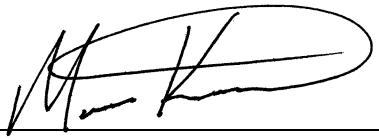
Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	October 8, 2018	All	Updated and re-written as a TGI	Marc Killingstad

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APPROVAL SIGNATURES

Prepared by:  10/08/2018

Christopher Keen Date:

Technical Expert Reviewed by:  10/08/2018

Marc Killingstad (Technical Expert) Date:

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1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to any and all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, state-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

This Technical Guidance Instruction (TGI) describes the methods to be used to collect groundwater samples using traditional purging and sampling techniques. For low-flow purging techniques, please refer to the *TGI - Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells*. For no-purge/passive sampling techniques such as passive diffusion bag (PDB), HydraSleeve™ and bailer-grab groundwater sampling please refer to: *TGI – Passive Diffusion Bag Sampling, TGI – Groundwater Sampling with HydraSleeves™*, and *TGI - Bailer-Grab Groundwater Sampling*.

NOTE: *Monitoring wells will not be sampled until the well has been properly developed. Monitoring wells must be appropriately developed after installation and at least one (1) week prior to groundwater sample collection (refer TGI – Monitoring Well Development). Project teams will consider the last time the wells were developed and if additional development may be required to ensure adequate communication with the surrounding formation and collection of representative groundwater samples.*

During precipitation events, groundwater sampling will be discontinued until precipitation ceases or a cover has been erected over the sampling area and monitoring well.

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Both filtered and unfiltered groundwater samples may be collected using this TGI. Filtered samples may be obtained using a 1.0-, 0.45-, or 0.1-micron disposable filter.

3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as identified in the site-specific Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. The HASP will also identify any access control requirements.

Prior to mobilizing to the field, the groundwater sampling team will review and be thoroughly familiar with relevant site-specific documents including but not limited to the task-specific work plan or field implementation plan (FIP)/field sampling plan, Quality Assurance Project Plan (QAPP), HASP, historical information, and other relevant site documents.

Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and TGIs and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. Additionally, the groundwater sampling team will review and be thoroughly familiar with documentation provided by equipment manufacturers and become familiar with the operation of (i.e., hands-on experience) all equipment that will be used in the field prior to mobilization.

Ideally, Arcadis personnel directing, supervising, or leading groundwater sample collection activities will have a minimum of one (1) year of previous groundwater sampling experience. Field employees with less than six (6) months of experience will be accompanied by a supervisor (as described above) to ensure that proper sample collection techniques are employed.

4 EQUIPMENT LIST

The following materials will be available, as required, during groundwater sampling:

- Site-specific HASP and health and safety documents identified in the HASP
- Field Implementation Plan (FIP) that includes site map, well construction records (table or logs), sampling plan (sample analyses, sample volume required, and sample holding time), and prior groundwater sampling records (if available)
- Field notebook and/or smart device (smart phone or tablet)
- Groundwater sampling field forms (**Attachment A**)
- Appropriate personal protective equipment (PPE) (e.g., latex or nitrile gloves, safety glasses, etc.) as specified in the HASP
- Traffic cones, delineators, and caution tape as appropriate for securing the work area as specified in the Traffic Safety Plan (TSP)

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- Photoionization detector (PID), flame ionization detector (FID) or other air monitoring equipment, as needed, in accordance with the HASP
- Dedicated plastic sheeting (e.g., Weatherall Visqueen) or other clean surface to prevent sampling equipment from coming in contact with the ground
- If bailers are to be used in sampling:
    - appropriate number of dedicated bottom-loading, bottom-emptying bailers (i.e., polyvinyl chloride [PVC], polyethylene, Teflon®, or stainless steel)
    - polypropylene or nylon rope
- If submersible pumps are to be used in sampling:
    - appropriate amount of dedicated tubing (polyethylene, Teflon®, Teflon®-lined polyethylene, Tygon®) and other equipment necessary for purging selected in accordance with the FIP/sampling plan/work plan
    - generator or battery for operation of pumps (if required)
    - a pump selected in accordance with the FIP/sampling plan/work plan (parameter-specific [e.g., submersible, bladder, peristaltic])
- Graduated buckets to measure purge water volume
- Electronic water-level indicator (e.g., Solinist Model 101) or oil/water interface probe with 0.01-foot accuracy (oil/water as appropriate, note that sampling will not be performed when sheen or light non-aqueous phase liquid [LNAPL] is present)
- Down-hole multiparameter water-quality sonde (temperature/pH/specific conductivity/oxidation reduction [ORP]/turbidity/dissolved oxygen) meter and flow-through measurement cell; for example:
    - YSI 6-Series Multi-Parameter Instrument
    - Horiba U-22 Multi-Parameter Instrument.
    - Hydrolab Series 3 or Series 4a Multiprobe and Display.
- Groundwater sample containers and labels (supplied by the laboratory) appropriate for the analytical method(s) with preservative, as needed (parameter-specific)
- Filter, as needed, in accordance with the analytical method and parameter, and as specified in the FIP/sampling plan
- Decontamination equipment (buckets, distilled or deionized water, cleansers appropriate for removing expected chemicals of concern, paper towels)
- Appropriate blanks (trip blank supplied by the laboratory), as specified in the FIP/sampling plan
- Ziploc-type freezer bags for use as ice containers;
- Appropriate transport containers (coolers) with ice and appropriate labeling, packing, and shipping materials

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- Chain-of-custody forms
- Digital camera (or phone with camera)
- Keys to wells and contingent bolt cutters for rusted locks and replacement keyed-alike locks
- Drums or other containers appropriate for purge water, as specified by the site investigation-derived waste (IDW) management plan and/or FIP/sampling plan and appropriate drum labels

5 CAUTIONS

Different USEPA regions and/or state regulatory agencies may stipulate deviations from this document. It is the responsibility of the Project Team (Project Manager and Technical Lead) to be fully aware of the requirements from the applicable regulatory framework.

If heavy precipitation occurs and no cover over the sampling area and monitoring well can be erected, sampling must be discontinued until adequate cover is provided. Rain water could contaminate groundwater samples.

Avoid extreme weather situations. Be aware that thermal currents and vertical mixing of cold and warm water inside the well casing could create a convection cell within the well and compromise data collection (e.g., biological mechanisms).

- Direct sunlight and hot ambient temperatures may cause the groundwater in the tubing or flow-through-cell to heat up and de-gas. This may result in the loss of volatile organic compounds (VOCs) and dissolved gases. Shade the equipment from direct sunlight, keep the tubing as short as possible, and avoid the hottest times of the day. Store and/or stage empty and full sample containers and coolers out of direct sunlight.
- Sampling during freezing conditions may adversely impact the data quality objectives. USEPA recommends low-flow sampling be conducted at air temperatures above 32°F (0°C) or taking special precautions to prevent groundwater from freezing in the equipment.

It may be necessary to field filter the groundwater for some parameters (e.g., metals) during collection, depending on preservation, analytical method, and project quality objectives. The task-kick-off notes and the FIP/sampling plan will list the samples that require field filtering.

To mitigate potential cross-contamination, groundwater samples are to be collected in a pre-determined order from least impacted to more impacted based on previous analytical data. If no analytical data are available, samples are to be collected in the following order:

1. First sample the upgradient well(s).
2. Next, sample the well located furthest downgradient of the interpreted or known source.
3. The remaining wells will be progressively sampled in order from downgradient to upgradient, such that the wells closest to the interpreted or known source are sampled last.

When using a gasoline generator, this power source will be set-up at least 30 feet downwind from the well to avoid exhaust fumes to contaminate samples.

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Be careful not to over-tighten lids with Teflon® liners or septa (e.g., 40-mL vials). Over-tightening can cause the glass to shatter and/or impair the integrity of the seal.

NOTE: *Field logs and some forms are considered to be legal documents. All field logs and forms will be filled out in indelible ink. Do not use permanent marker or felt-tipped pens for labels on sample container or sample coolers. Permanent markers could introduce volatile constituents into the samples.*

NOTE: *An Arcadis employee that is appropriately trained at the correct level of internal hazardous materials/DOT (Department of Transportation) shipping must complete an Arcadis shipping determination to address applicable DOT and IATA (International Air Transport Association) shipping requirements. Review the applicable Arcadis procedures and guidance instructions for sample packaging and labeling. Prior to using air transportation, confirm air shipment is acceptable under DOT and IATA regulations.*

6 HEALTH AND SAFETY CONSIDERATIONS

The HASP will be followed, as appropriate, to ensure the safety of field personnel.

Appropriate personal protective equipment (PPE) will be worn at all times in line with the task and the site-specific HASP.

Review all site-specific and procedural hazards as they are provided in the HASP, and review Job Safety Analysis (JSA) documents in the field each day prior to beginning work.

Access to wells may expose field personnel to hazardous materials such as contaminated groundwater or non-aqueous phase liquid (NAPL) (e.g., oil). Other potential hazards include pressurized wells, stinging insects that may inhabit well heads, other biologic hazards (e.g. ticks in long grass/weeds around well head), and potentially the use of sharp cutting tools (scissors, knife)—open well caps slowly and keep face and body away to allow to vent any built-up pressure; only use non-toxic peppermint oil spray for stinging insect nests; review client-specific health and safety requirements, which may preclude the use of fixed/folding-blade knives, and use appropriate hand protection. Overtightening of lids with Teflon® liners can cause the glass to shatter and create a risk for hand injuries.

Generators and cord and plug equipment will employ an overcurrent protection device such as an integrated ground fault circuit interrupter (GFCI) cord. Grundfos pump controllers will not run properly with a GFCI, so the power source will be equipped with other overcurrent protection means.

If thunder or lighting is present, discontinue sampling until 30 minutes have passed after the last occurrence of thunder or lighting.

7 PROCEDURE

The general procedure for using traditional purging and sampling techniques to sample monitoring wells are outlined below:

1. Review equipment list (**Section 4** above) to confirm that the appropriate equipment has been acquired.
2. Don PPE as required in the HASP

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   a. NOTE: *Depending on site-specific security and safety considerations, this often must be done prior to entering the work area*

3. Calibrate field instruments according to manufacturer procedures for calibration and document accordingly on the calibration logs, field form, and/or field logbook
4. All equipment will either be new or decontaminated in accordance with appropriate guidance document (*TGI – Groundwater and Soil Sampling Equipment Decontamination)* prior to use
5. Record site and monitoring well identification on the groundwater sampling log (**Attachment A**), along with date, arrival time, weather conditions, personnel present, equipment utilized, and other relevant data requested on the log.
6. Label all sample containers with indelible ink
7. Place plastic sheeting adjacent to the well for use as a clean work area, if conditions allow, otherwise, exercise care to prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity
8. Visually inspect the well to ensure that it is undamaged, properly labeled and secured
   a. Damage or other conditions that may affect the integrity of the well will be recorded in the Field Activity Daily Log and brought to the attention of the designated Field Manager and/or Project Manager
   b. Record well construction and conditions on the Groundwater Sampling Field Form (**Attachment A**)
9. Remove lock from well and if rusted or broken, replace with a new brass keyed-alike lock
10. Safely open well
    a. Unlock and open the well cover while standing upwind of the well
    b. Remove well cap and place on the plastic sheeting
    c. Insert the PID probe approximately 4 to 6 inches into the casing or the well headspace and cover it with a gloved hand
    d. Record the PID reading on the field log
    e. Perform air monitoring in the breathing zone according to the HASP and/or JSA
11. Set the sampling device, meters, and other sampling equipment on the plastic sheeting
    a. If a dedicated sampling device stored in the well is to be used, this may also be set temporarily on the plastic sheeting
    b. If a dedicated sampling device is stored below the water table, removing it may compromise water-level data, so water-level measurements will be taken prior to removing the device (see next step)
12. Obtain a water-level depth and bottom-of-well depth using an electric well probe prior to placing the pump and record on the groundwater sampling log using indelible ink

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a. Make sure to decontaminate the probe(s) after each use in accord with the FIP/sampling plan or the equipment decontamination TGI

NOTE: *Water levels may be measured at all wells prior to initiating any sampling activities, depending on FIP requirements.*

13. Prepare for pump installation:
    a. For submersible and non-dedicated bladder pumps, decontaminate the pump according to site decontamination procedures
    b. Non-dedicated bladder pumps will require a new bladder and attachment of an air-line, sample discharge line, and safety cable prior to placement in the well
    c. Attach the air-line tubing to the air-port on the top of the bladder pump
    d. Attach the sample discharge tubing to the water port on the top of the bladder pump taking care not to reverse the air and discharge tubing lines during bladder pump setup, as this could result in bladder failure or rupture
    e. Attach and secure a safety cable to the eyebolt on the top of bladder pump (if present, depending on pump model used)
14. Slowly lower the pump, safety cable, tubing, and electrical lines into the well to a depth corresponding to the approximate center of the saturated screen section of the well
    a. Avoid twisting and tangling of safety cable, tubing, and electrical lines while lowering the pump into the well; twisted and tangled lines could result in the pump becoming stuck in the well casing
    b. Make sure to keep tubing and lines from touching the ground or other surfaces while introducing them into the well, as this could lead to well contamination
    c. If a peristaltic pump is being used, slowly lower the sample tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well
    d. The pump intake or sample tubing must be kept at least 2 feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well
15. If using a bladder pump, connect the air-line to the pump controller output port
    a. The pump controller will then be connected to a supply line from an air compressor or compressed gas cylinder using an appropriate regulator and air hose
    b. Tighten the regulator connector onto the gas cylinder (if used) to prevent leaks. Teflon® tape may be used on the threads of the cylinder to provide a tighter seal
    c. Once the air compressor or gas cylinder is connected to the pump controller, turn on the compressor or open the valve on the cylinder to begin the gas flow
    d. Turn on the pump controller power if an on/off switch is present and verify that all batteries are charged and fully operating before beginning to pump

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16. Calculate the number of gallons of water in the well using the length of water column (in feet). Record the well volume on the groundwater sampling log using indelible ink
17. Remove the required purge volume of water from the well (measure purge water volume in measuring buckets)
    a. The required purge volume will be three to five well volumes (the water column in the well screen and casing) unless the well runs dry, in which case, the water that comes into the well will be sampled (USEPA, 1986)
    b. For wells screened across the water table, the well may be pumped dry and sampling can commence as soon as the volume in the well has recovered sufficiently to permit collection of samples
    c. For wells screened entirely below the water table, the well may be pumped until the drawdown is at a level slightly higher than top of the well screen
    d. Sampling may commence after one well volume has been removed and the well has recovered sufficiently to permit collection of samples
    e. In any case, the pumping rate will be decreased during sampling to limit the potential for volatilization of organics potentially present in the groundwater
18. Field parameter measurements will be periodically collected in accordance with FIP/sampling plan specifications
    a. Typical time intervals of field parameter measurement are (1) after each well volume removed, and (2) before sampling
    b. If the field parameters are being measured above-ground (rather than with a downhole probe), then the final pre-sampling parameter measurement will be collected at the reduced flow rate to be used during sampling
    c. Physical appearance of the purged water will be noted on the groundwater sampling log
    d. Water-level measurements will be collected and recorded to verify that the well purging is in accordance with the guidelines set forth in the previous step
19. Unless otherwise specified by the applicable regulatory agencies, all purge water will be containerized
    a. Containerized purge water will be managed in accordance with the FIP/sampling plan/work plan
    b. If historical concentrations in the well are less than federal- or state-regulated concentrations appropriate for current land use, *and permission has been granted by the oversight regulatory agency* to dispose of clean purge water on the ground next to the well(s), then purge water may be allowed to infiltrate into the ground surface downgradient from the monitoring well after the well is sampled—*this will be specified in the FIP/sampling plan*

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20. After the appropriate purge volume of groundwater in the well has been removed, or if the well has run dry and allowed to recover, obtain the groundwater sample needed for analysis via the dedicated bailer or from the dedicated sample tubing, pour the groundwater directly from the sampling device into the appropriate container in the order of volatilization sensitivity of the parameters sampled, and tightly screw on the cap (snug, but not too tight)

    NOTE: *The suggested order for sample parameter collection, based on volatilization sensitivity, is presented below:*

    a. *volatile organic compounds (VOCs);*
    b. *semi-volatile organic compounds (SVOCs);*
    c. *polychlorinated biphenyls (PCBs)/pesticides;*
    d. *metals; and*
    e. *wet chemistry*.

    NOTE: *When sampling for volatiles, water samples will be collected directly from the bailer or dedicated tubing into 40-mL vials with Teflon®-lined septa*.

    NOTE: *For other analytical samples, sample containers for each analyte type will be filled in the order specified by the FIP/sampling plan. If a bailer is used, then the sample for dissolved metals and/or filtered PCBs will either be placed directly from the bailer into a pressure filter apparatus or pumped directly from the bailer with a peristaltic pump, through an in-line filter, into the pre-preserved sample bottle. If dedicated sample tubing is used, then the filter will be installed in-line just prior to filtered sample collection.*

    NOTE: *If sampling for total and filtered metals and/or PCBs, a filtered and unfiltered sample will be collected. Sample filtration for the filtered sample will be performed in the field utilizing a pump prior to preservation. Attach (clamp) a new 1.0-, 0.45-, or 0.1-micron filter to the discharge tubing of the pump (note the filter flow direction). Turn the pump on and allow 100 mL (or manufacturer recommended amount) of fluid to flow through the filter before sample collection. Dispense the filtered liquid directly into the laboratory sample bottles. If bailers are used for purging and sampling, a proper volume of purge water will be placed in a disposable or decontaminated polyethylene container and pumped through the filter and into the sample container using a peristaltic pump.*

21. As samples are collected, note the corresponding time on the sample label
22. Secure sample containers with packing material and maintain at approximately 4°C on wet ice contained in double Ziploc-type freezer bags stored in an insulated, durable transport cooler
23. Turn off the pump and air compressor or close the gas cylinder valve if using a bladder pump setup.
24. Slowly remove the pump, tubing, lines, and safety cable from the well
    a. If using dedicated tubing/lines, do not allow them to touch the ground or any other surfaces which could result in contamination

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b. If tubing is to be dedicated to a well, it will be folded to a length – without pinching it – that will allow the well to be capped and also facilitate retrieval of the tubing during later sampling events

c. Use a length of rope or string to tie the tubing to the well cap

d. Alternatively, if tubing and safety line are to be saved and reused for sampling the well at a later date, they may be coiled neatly and placed in a clean plastic bag that is clearly labeled with the well ID and tightly sealed before placing it in storage

25. Record the time sampling procedures were completed on the groundwater sampling field forms using indelible ink

26. Secure the well: replace the well cap and lock well or install a new lock if needed

    a. If new locks were installed, forward copies of the keys to the client Project Manager (PM) and Arcadis CPM at the end of the sampling activities

27. Complete the procedures for chain-of-custody, handling, packing, and shipping

    a. Chain-of-custody forms will be filled out and checked against the labels on the sample containers progressively after each sample is collected

28. Properly dispose of personal protective equipment (PPE) and disposable equipment—place all disposable sampling materials (e.g., plastic sheeting, disposable tubing or bailers, and PPE) in appropriate containers

29. Complete decontamination of sampling equipment (e.g., submersible or bladder pump) as appropriate (*TGI – Groundwater and Soil Sampling Equipment Decontamination*)

30. At the end of each day of the sampling event, perform calibration check of field instruments and record procedure and results in field log

8 WASTE MANAGEMENT

Investigation-Derived Waste (IDW), including purge water, decontamination liquids, and disposable materials (plastic sheeting, PPE, etc.) will be stored on site in appropriately labeled containers (disposable materials will be contained separately) and disposed of properly. Containers must be labeled at the time of collection and will include date, location(s), site name, city, state, and description of matrix contained (e.g., soil, PPE). Waste will be managed in accordance with the *TGI – Investigation-Derived Waste Handling and Storage,* the procedures identified in the FIP or QAPP as well as state-, federal- or client-specific requirements. Be certain that waste containers are properly labeled and documented in the field log book.

9 DATA RECORDING AND MANAGEMENT

Management of the original documents from the field will be completed in accordance with the site-specific QAPP. Records generated as a result of this TGI will be controlled and maintained in the project record files in accordance with project requirements.

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In general, sampling activities will be documented on appropriate field logs as well as in a proper field notebook. All field data will be recorded in indelible ink. Field forms, logs/notes (including daily field and calibration logs), digital records, and chain-of-custody records will be maintained by the field team lead.

Initial field logs and chain-of-custody records will be transmitted to the Arcadis CPM and/or Technical Lead at the end of each day unless otherwise directed by the CPM. The field team leader retains copies of the field documentation.

Additionally, all documents (and photographs) will be scanned and electronically filed in the appropriate project directory for easy access.

10 QUALITY ASSURANCE

Quality assurance procedures will be conducted in accordance with the Arcadis Quality Management System or the site-specific QAPP.

Field-derived quality assurance blanks will be collected as specified in the FIP/sampling plan, depending on the project quality objectives. Typically, field rinse blanks (equipment blanks) will be collected when non-dedicated equipment (e.g., submersible pump) is used during groundwater sampling. Field rinse blanks will be used to confirm that decontamination procedures are sufficient and samples are representative of site conditions. Trip blanks for VOCs, which aid in the detection of contaminants from other media, sources, or the container itself, will be kept with the coolers and the sample containers throughout the sampling activities and during transport to the laboratory.

In addition to the quality control samples to be collected in accordance with this TGI, the following quality control procedures will be observed in the field:

- Collect samples from monitoring wells, in order of increasing concentration, to the extent known based on review of historical site information if available
- Equipment blanks will include the pump and tubing (if using disposable tubing) or the pump only (if using tubing dedicated to each well)
- Collect equipment blanks after wells with higher concentrations (if known) have been sampled
- Operate all monitoring instrumentation in accordance with manufacturer's instructions and calibration procedures
    - Calibrate instruments at the beginning of each day and verify the calibration at the end of each day
    - Record all calibration activities in the field notebook
- Clean all groundwater sampling equipment prior to use in the first well and after each subsequent well following the procedures outlined for equipment decontamination

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11 REFERENCES

United States Environmental Protection Agency (USEPA). 1986. RCRA Groundwater Monitoring Technical Enforcement Guidance Document (September 1986).

USEPA. 1991. Handbook Ground Water, Volume II: Methodology, Office of Research and Development, Washington, DC. EPA/625/6-90/016b (July 1991).

U.S. Geological Survey (USGS). 1977. National Handbook of Recommended Methods for Water-Data Acquisition: USGS Office of Water Data Coordination. Reston, Virginia.

12 ATTACHMENTS

Attachment 1 – Groundwater Sampling Field Form

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ATTACHMENTS 1

Groundwater Sampling Field Form

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GROUNDWATER SAMPLING FORM

ARCADIS

Project No. _____ Well ID _____ Date _____

Project Name/Location _____ Weather _____

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material ____ PVC ____ SS

Static Water Level (ft-bmp) _____ Total Depth (ft-bmp) _____ Water Column (ft) _____ Gallons in Well _____

MP Elevation _____ Pump Intake (ft-bmp) _____ Purge Method: _____ Sample Method _____

Pump On/Off _____ Volumes Purged _____ Centrifugal / Submersible / Other _____

Sample Time: Label _____ Gallons Purged _____

Purge Start _____ Replicate/ Code No. _____ Sampled by _____

Purge End _____

Time	Minutes Elapsed	Rate (gpm)/(mL/min) 200mL/min +	Depth to Water (ft) -0.3	Gallons Purged	pH ± 0.1	Cond. (µMhos)/(mS/cm) ± 3%	Turbidity (NTU) ± 10%	DO (mg/L) ± 10%	Temp. (°C)/(°F) ± 3%	Redox (mV) ± 10mV	Appearance	
											Color	Odor
Stabilization Calculations (±)												
Stabilization Criteria					**± 0.1 s.u.**	**±3%**	**± 10% or within 1 NTU (1)**	**± 10%**	**±3%**	**±10 mV**		

(1) **Turbidity** < 50 NTU and ±10% or within 1 NTU of a previous reading when <10 NTU

Constituents Sampled	Container	Number	Preservative

Comments _____

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

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APPENDIX C-2

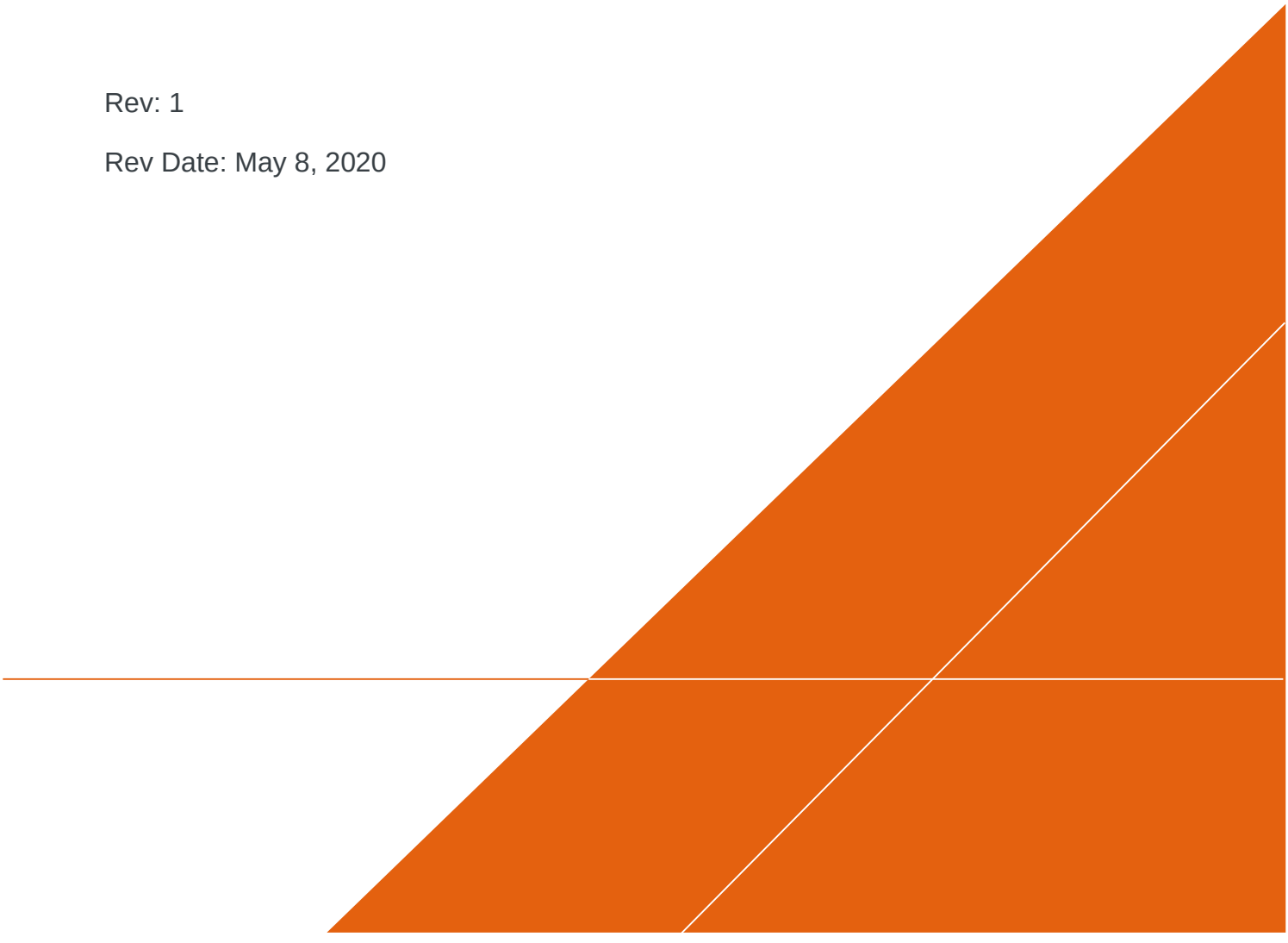
Arcadis Groundwater and Soil Sampling Equipment Decontamination Guidance

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TGI – GROUNDWATER AND SOIL SAMPLING EQUIPMENT DECONTAMINATION

Rev: 1

Rev Date: May 8, 2020



VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	February 23, 2017	ALL	Conversion from SOP to TGI	Cassandra McCloud / Pete Frederick
1	May 8, 2020	4-5	Added note regarding use of Liquinox and 1,4-Dioxane	Marc Killingstad

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APPROVAL SIGNATURES

Prepared by:  Date: 02/23/2017

Derrick Maurer

Technical Expert Reviewed by:  Date: May 8, 2020

Marc Killingstad (Technical Expert)

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1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to any and all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, state-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

Decontamination is performed on sampling equipment prior to sample collection to ensure that the sampling equipment that contacts a sample, or monitoring equipment that is brought into contact with environmental media to be sampled, is free from analytes of interest and/or constituents that could interfere with laboratory analysis for analytes of interest. Sampling equipment must be appropriately cleaned prior to use for sampling or coming into contact with environmental media to be sampled, and following completion of the sampling event prior to shipment or storage. The effectiveness of the decontamination procedure should be verified by collecting and analyzing equipment blank samples.

The sampling equipment cleaning procedures described herein includes pre-field, in the field, and post-field cleaning of sampling equipment which may be conducted at an established equipment decontamination area (EDA) on site, as appropriate and necessary. Sampling equipment that may require decontamination at a given site includes: soil sampling tools; groundwater, sediment, and surface-water sampling devices; water testing instruments; down-hole instruments; and other activity-specific sampling equipment. Non-disposable equipment will be cleaned before collecting each sample, between each

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sample collected, and prior to placing sampling equipment in protective cases, or containers for transport. Cleaning procedures for sampling equipment should be monitored by collecting equipment blank samples as required in project work plans, field sampling plans, quality assurance project plans (QAPP), or other pertinent project documents. Dedicated and/or single-use (i.e., not to be re-used) sampling equipment will not require decontamination.

3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as specified in the Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and Technical Guidance Instructions (TGIs) and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The project health and safety plan (HASP) and other documents will identify other training requirements or access control requirements.

4 EQUIPMENT LIST

The equipment required for equipment decontamination is presented below:

- Health and safety equipment, including appropriate PPE, as required in the site Health and Safety Plan (HASP)
- Deionized water that meets that analytical criteria for deionized water with no detectable constituents above the reporting limits for the methods to be used and analytes being analyzed for. Deionized water is used for inorganics, and organic-free water for VOCs, SVOCs, pesticides, etc.
- Non-phosphate detergent such as Alconox or, if sampling for phosphorus or phosphorus-containing compounds, Liquinox (or equivalent). NOTE: *Liquinox has shown to provide false positives for 1,4-Dioxane and should not be used at sites where that may be a constituent of concern (COC).*
- Tap water
- Rinsate collection plastic containers
- DOT-approved waste shipping container(s), as specified in the work plan, field sampling plan, or regulatory requirements if decontamination waste is to be shipped for disposal
- Brushes
- Large heavy-duty garbage bags
- Spray bottles

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- (Optional) – Isopropyl alcohol (free of ketones) or methanol. These can be wipes or diluted with water (usually 1part isopropyl/methanol to 10 parts water) if a spray is needed.
- Airtight, sealable plastic baggies, such as Ziploc-type
- Plastic sheeting

5 CAUTIONS

Rinse equipment thoroughly and allow the equipment to dry before re-use or storage to prevent introducing solvent into sample medium. If manual drying of equipment is required, use clean lint-free material to wipe the equipment dry. Ensure all rinsate materials do not adversely affect sample collection efficiency or analytical results.

Store decontaminated equipment in a clean, dry environment. Do not store near combustion engine exhausts. Properly containerize equipment to ensure cross-contamination doesn't happen from other uncontaminated surfaces or equipment.

If equipment is damaged to the extent that decontamination is uncertain due to cracks, gouges, crevices, or dents, the equipment should not be used and should be discarded or submitted for repair prior to use for sample collection.

A proper shipping determination regarding hazardous materials will be performed by a DOT-trained individual for cleaning materials shipped by Arcadis.

Caution should be exercised to avoid contact with the pump casing and water in the container while the pump is running (do not use metal drums or garbage cans) to avoid electric shock.

6 HEALTH AND SAFETY CONSIDERATIONS

Review the safety data sheets (SDS) for the cleaning agents and materials used in decontamination. If solvent is used during decontamination, use appropriate PPE and work in a well-ventilated area and stand upwind while applying solvent to equipment. Apply solvent in a manner that minimizes potential for exposure to workers and bystanders. Follow health and safety procedures outlined in the HASP.

7 PROCEDURE

A designated area will be established to clean sampling equipment in the field prior to and following sample collection. Equipment cleaning areas will be set up within or adjacent to the specific work area, but not at a location that expose equipment to contamination (i.e. exposed to combustion engine exhaust). Detergent solutions will be prepared in clean containers for use in equipment decontamination. Decontaminated equipment should be handled by workers wearing clean gloves, properly changed to prevent cross-contamination.

Cleaning Sampling Equipment

1. Wash the equipment/pump with potable water.

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2. Wash with detergent solution (Alconox, Liquinox or equivalent) to remove all visible particulate matter and any residual oils or grease. NOTE: *Liquinox has shown to provide false positives for 1,4-Dioxane and should not be used at sites where that may be a constituent of concern (COC).*
3. If equipment is very dirty, precleaning gross debris with a brush and tap water may be necessary.
4. If non-aqueous phase liquids are present, the use of isopropyl alcohol (free of ketones) or methanol is recommended. Cloth wipes or diluted solution can be used to remove the non-aqueous phase liquids that are hard to remove with detergent solution in step 2. Consult with project manager if non-aqueous phase liquids are present onsite and design an appropriate decontamination procedure that includes step 4.
5. Rinse with deionized water.

Decontaminating Submersible Pumps

Submersible pumps may be used during well development, groundwater sampling, or other investigative activities. The pumps must be cleaned and flushed before and between uses. This cleaning process will consist of an external detergent solution wash and tap water rinse, a flush of detergent solution through the pump, followed by a flush of potable water through the pump. Flushing will be accomplished by using an appropriate container filled with detergent solution and another container filled with potable water. The pump should be flushed with deionized water as the last step prior to use. The pump will run long enough to effectively flush the pump housing and hose (unless new, disposable hose is used). Disconnect the pump from the power source before handling. The pump and hose should be placed on or in clean polyethylene sheeting to avoid contact with the ground surface.

8 WASTE MANAGEMENT

Equipment decontamination rinsate will be managed in conjunction with all other waste produced during the field sampling effort. Waste management procedures are outlined in the work plan or Waste Management Plan (WMP).

9 DATA RECORDING AND MANAGEMENT

Equipment cleaning and decontamination will be noted in the field notebook for project documentation. Information will include the type of equipment cleaned, the decontamination location, specific procedures utilized, solvents and/or cleaning agents used, source of water, and deviations or omissions from this TGI.

Unusual field conditions should be noted if there is potential to impact the efficacy of the decontamination or subsequent sample collection.

An inventory of the solvents brought on site and used and removed from the site will be maintained in the project documentation. Records will be maintained for solvents used in decontamination, including lot number and expiration date.

Containers with decontamination fluids will be labeled.

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10 QUALITY ASSURANCE

Equipment blanks should be collected to verify that the decontamination procedures are effective in minimizing potential for cross contamination. The equipment blank is prepared by pouring deionized water (or organic-free water, for organic analyses) over the clean and dry tools and collecting the water into appropriate sample containers. Equipment blanks should be analyzed for the same set of parameters that are performed on the field samples collected with the equipment that was cleaned as specified in the sampling and analysis plan. Equipment blanks are collected per equipment set, which represents all of the tools needed to collect a specific sample.

11 REFERENCES

USEPA Region 9 - Field Sampling Guidance #1230, Sampling Equipment Decontamination.

USEPA Region 1 - Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells.

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Appendix D

Health and Safety Plan and COVID-19 Guidance

APPENDIX D

Arcadis Health and Safety Plan and COVID-19 Guidance

Site Specific Health and Safety Plan

Revision 16

Project Name:	Former Texaco Research Center (Chevron Facility No. 314004) 45 Old Glenham Road Glenham, New York 12527
Project Number:	30064362
Client Name:	Chevron Environmental Management Company
Date:	2/8/2021
HASP Expires	2/8/2022
Revision:	4

Approvals:

HASP Developer: Mosam Shah

Project Manager: Edward Meyer

HASP Reviewer: Edward Meyer

Arcadis Culture of Caring

Arcadis is committed to a Culture of Caring that ensures each Arcadis employee, part time as needed employee (PTAN), temporary agency employee under Arcadis day to day control, Inexperienced Workers and contractor (cumulatively referred to here as "field staff") goes home at the end of the day free from injury or illness. I certify that the following has been performed with all Arcadis field staff on this project either in person or by Skype:

[x] Reviewed the HASP including a discussion of hazard identification and controls.

- [x] If conducting activities deemed by Arcadis to be "High Risk", frontline management has reviewed applicable H&S standards (Job Safety Analysis [JSA] when authorized by H&S) for these activities with field staff.
- [x] If permit to work is required, frontline management has reviewed the permit(s) with field staff.

[x] Reviewed proactive H&S engagement expectations/injury prevention actions.
[x] Reviewed Stop Work Authority.
[x] Reviewed the incident reporting process and expectations including when WorkCare should be contacted by staff (WorkCare incident intervention for all minor, non-emergency injuries) and that the WorkCare phone number is programmed into field team cell phone.
[x] For Inexperienced Workers, a mentor has been assigned for the new task being performed.

For short service employees (SSEs), PTANS* and temporary agency employees* :

[x] Provided coaching and mentoring on Arcadis H&S expectations during project work. Reviewed in detail specific hazards and controls and provided a resource who can be contacted if individual has questions regarding planned or unplanned work tasks.

Mentor/Resource # Chris Davern (Name) 518-256-4640 (Phone Number)

Signed:

_____ Project Manager

* Upon hiring/contracting for the first time.

Emergency Information

Site Address: 45 Old Glenham Road, Glenham, NY 12527

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
Local Police		845-831-1110
Local Fire Department		845-831-2322
Local Ambulance		845-561-5698
Primary Client Contact:	Rachel Puechner	661-437-8040
WorkCare (non-life-threatening injury/illness):		1-888-449-7787
Project H&S:	Edward Meyer	315-254-8520 (m)
Project Manager:	Edward Meyer	315-254-8520 (m)
Alternate Contact:	Ellen Haggerty	908-447-1540 (m)
Chevron OE/HES Manager:	Aaron Svitana	925-360-2313 (m)
Corporate H&S Specialist:	Greg Mason	925-360-2312 (m)
Corporate H&S Director:	Denis Balcer	614-778-9171

Hospital Name and Address: Vassar Brothers Medical Center
45 Reade Place, Poughkeepsie, NY 12601

Hospital Phone Number: (845) 454-8500

Workcare Facility Vassar Brothers Medical Center
45 Reade Place, Poughkeepsie, NY 12601

Workcare Phone Number: (845) 454-8500

Supplemental Client Contact Information:

Chevron Alternative Contact 1 - Nicholas Longo	832-854-5711 (o)
	303-726-5240 (m)
Chevron Public Affairs - Jaclyn Kruzich	801-539-7183 (o)
Chevron HES Team Lead - Steve Annala	575-586-7638 (o)
	505-288-7814 (m)

Other Important Phone Numbers:

Poison Control Center	1-800-222-1222
Nat. Response Ctr. (spills in reportable quantities)	1-800-424-8802
U.S. Coast Guard (spills to water)	1-800-424-8802
Excel Urgent Care of Fishkill, NY	1-845-765-2240

Incident Reporting Protocol Within Arcadis

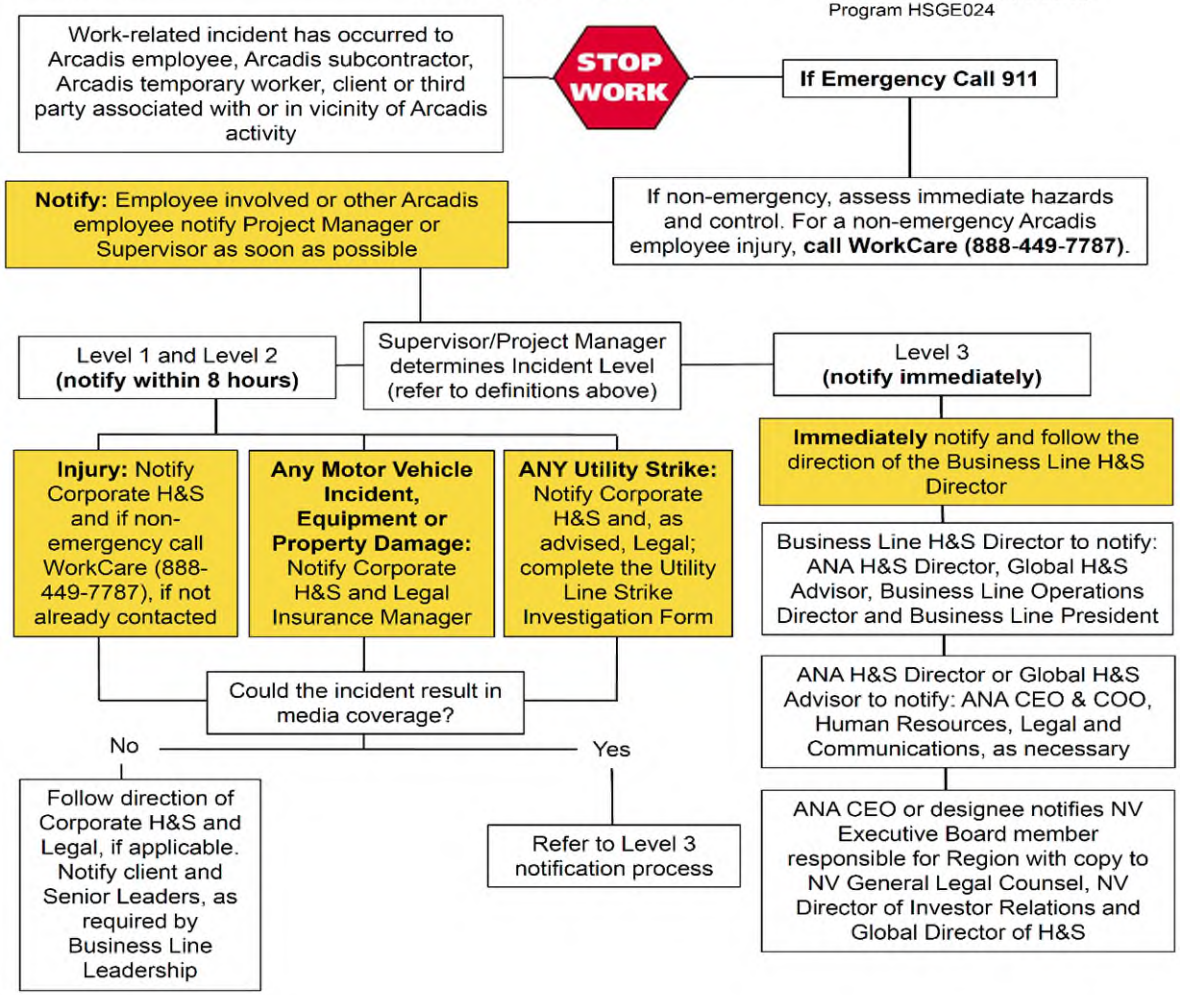
Incident Levels

Level 1: First aid/self-treated, work-related injury (contact WorkCare as soon as possible); minor property or equipment damage (less than or equal to $100); vehicle loss event* (no injuries, no third-party involvement or other vehicle involvement).

Level 2: Professional Medical Treatment (if non-emergency injury or illness, employee must contact WorkCare as soon as possible); moderate property or equipment damage (greater than $100 but less than or equal to $5,000); ANY utility strike incident, any motor vehicle accident* (including injury or third-party involvement).

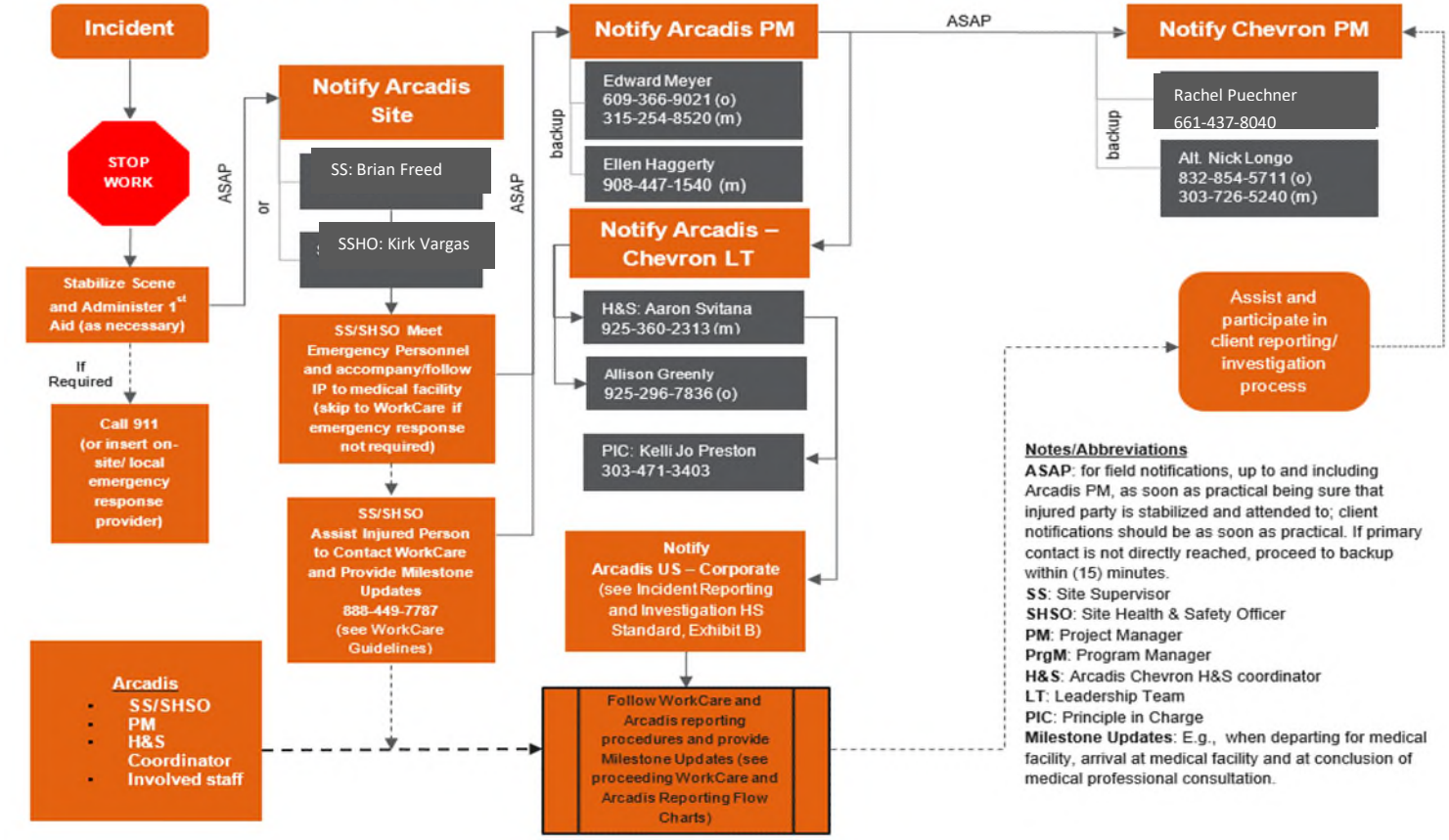
Level 3: Immediately report fatality, severe or catastrophic injury and/or overnight hospitalization required; significant property or equipment damage (greater than $5,000); missing person or incident that generates media coverage.

* Refer to Motor Vehicle Safety Program HSGE024



SS: Brian Freed

Reporting Plan – Former Texaco Research Center (Chevron Facility No. 314004). 45 Old Glenham Rd., Glenham, NY 12527



Notes/Abbreviations

ASAP: for field notifications, up to and including Arcadis PM, as soon as practical being sure that injured party is stabilized and attended to; client notifications should be as soon as practical. If primary contact is not directly reached, proceed to backup within (15) minutes.
SS: Site Supervisor
SHSO: Site Health & Safety Officer
PM: Project Manager
PrgM: Program Manager
H&S: Arcadis Chevron H&S coordinator
LT: Leadership Team
PIC: Principle in Charge
Milestone Updates: E.g., when departing for medical facility, arrival at medical facility and at conclusion of medical professional consultation.

Route to the Hospital

Excel Urgent Care of Fishkill, NY

992 Main St, Fishkill, NY 12524

1. Head northwest on Cary Ave toward Main St

184 ft

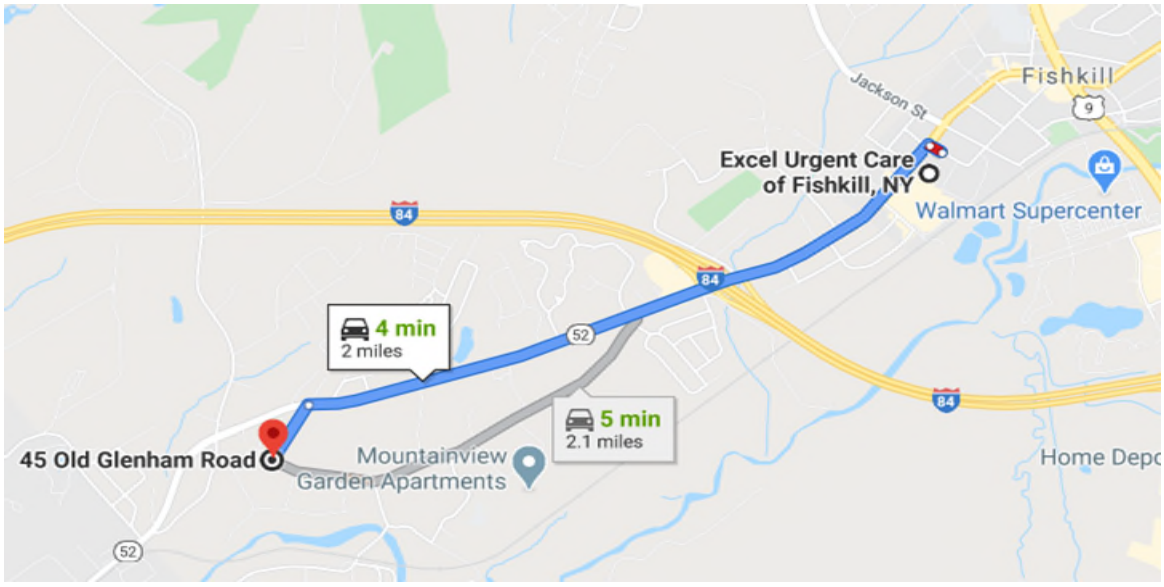
2. Turn left onto NY-52 W/Main St

Continue to follow NY-52 W

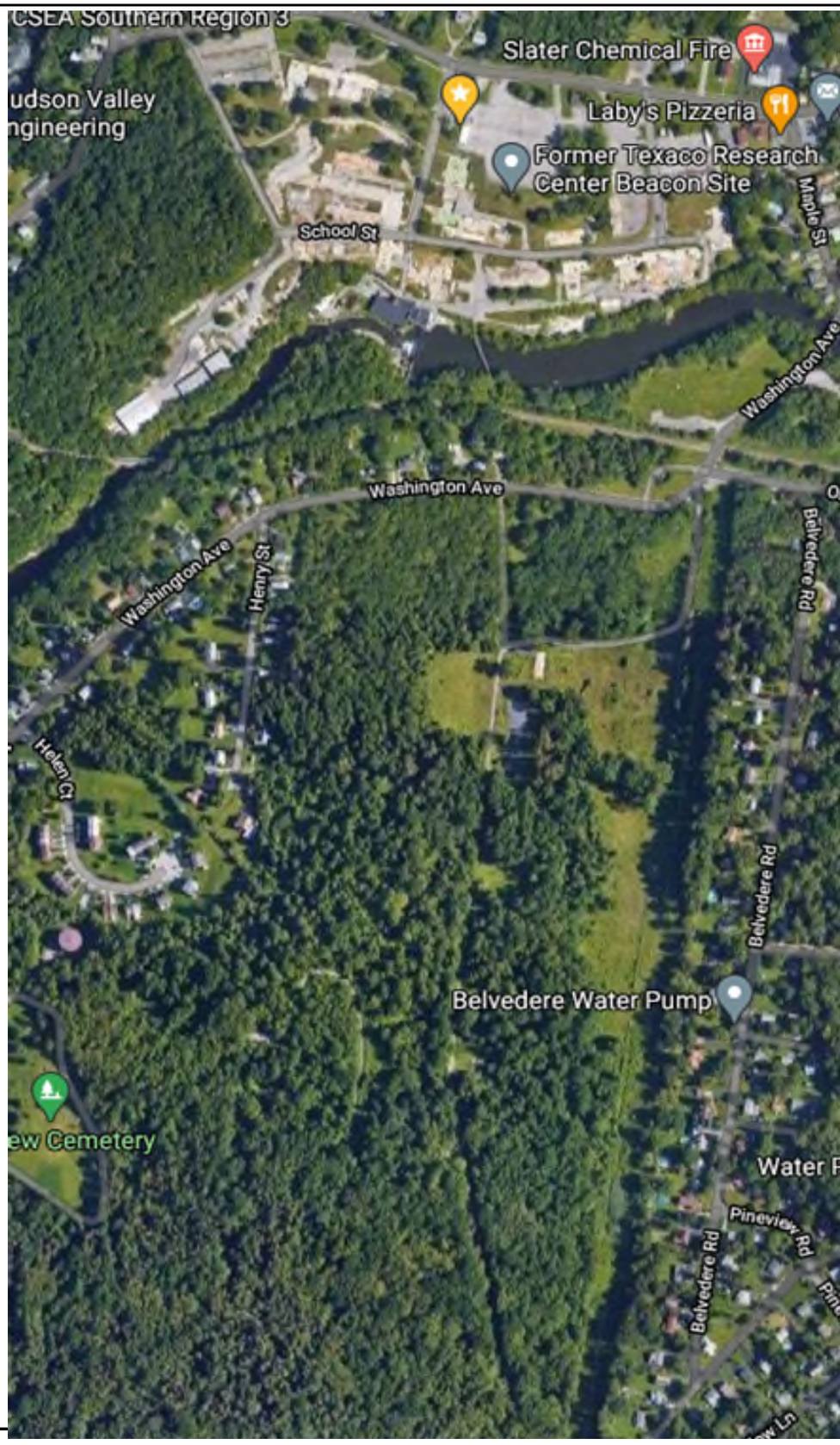
1.8 mi

3. Turn left onto Tompkins Ave

0.2 mi



Site Map Showing Assembly Areas



Site Type

The project site is an inactive facility which historically had the following attributes:

Commercial	
Buildings	
Remote Area	
Undeveloped	

Texaco Inc. operated a research center located in Glenham, New York between 1931 until its closure in 2003. The site is located on approximately 153 acres of land and includes four (4) distinct areas: The former Recreation Area (Operable Unit (OU) No. 1E) consists of 93.66 acres of land and includes undeveloped land located south of Washington Avenue. The Main Facility (OU-1A) consists of 35.9 acres of land and includes all of the developed areas located north of Fishkill Creek. The Washington Avenue Tank Farm (WATF; OU-1C) consists of 5.11 acres of land and is located south of Fishkill Creek and north of Washington Avenue. The former Church Property (OU-1B) is an undeveloped parcel located to the northwest of the Main Facility.

The site also consists of four (4) other land parcels or Operable Units: OU-2 is a 0.23 acre parcel along and underneath Washington Avenue that has not been dedicated to the Town of Fishkill. This parcel is located outside of the fence line of the main property and is maintained by the Town of Fishkill. OU-1D and OU-3 are 2.06 acre and 0.67 acre vacant parcels, respectively, on Washington Avenue. OU-4 is described as the "Hydroelectric Facility & Dam". The operable unit includes the hydroelectric buildings and the dam itself with access on the north side via an easement to Old Glenham Road, and on the south side via an easement to Washington Avenue.

Surrounding Land Use and Topography

The facility is located on approximately 153 acres of land which is bisected by a creek (Fishkill Creek) and is divided into distinct OUs. Groundwater at the Site occurs in the shallow overburden and in the bedrock. Groundwater is present in the fill, as well as the native deposits but is not found across the entirety of the facility. Overburden and bedrock groundwater flow is generally toward Fishkill Creek from either side of the creek. In most areas of the facility where overburden groundwater is present, there is no confining layer and bedrock and overburden groundwater are connected.

Simultaneous Operations (SimOps)

Planned Arcadis site work will not be in proximity to SimOps work activities performed by non Arcadis employees or subcontractors. Arcadis will initiate stop work and evaluate the work activities through the JSA process if during the course of work a SimOps activity is identified that could reasonably affect health and safety of Arcadis employees and subcontractors.

Site Background

From 1811 until 1930, the Site was the location of textile mills. The mills were powered by water wheels and steam engines. Blacksmith and carpentry shops operated in support of the mills. Between 1931 until its closure in 2003, the Site operated as the Texaco Research Center by Texaco, Inc. The facility has been used as an on-shore, non-production, non-transportation laboratory complex engaged in research, development, and technical services related to petroleum products and energy. Petroleum, coal products, and solvents have been used at the Main Facility in connection with research operations.

Project Tasks

The following tasks are identified for this project:

1	Sampling - Well sampling using pumps requiring pump installation/removal
2	Sampling - Well sampling using bailers
3	Monitor well - Well sounding, water level or product measurements using probes, tapes or downhole wate
4	Utilities - Clearance
5	Decontamination - Small or hand-held objects using manual methods
6	Drilling - Using mechanical methods
7	Sampling - Non-pressurized or passive air sampling using summa canisters, sample canisters, tedlar ba
8	Driving - Motor vehicles
9	Mobilization - Loading and unloading vehicles
10	Oversight - Oversight of contractors
11	Waste - Containment of IDW in large containment devices greater than 119 gallons capacity
12	Waste - Containment of IDW in small containment devices greater than 10 gallons but less than or equal
13	Survey - Land surveying
14	Monitoring - Air monitoring using hand held or stationary equipment - non-radiation
15	Inspections and audits - Buildings
16	Survey - Geophysical
17	Non-Permited Confined Space Entry
18	Building Heating/ Night Work
19	Drilling - Using manual methods

Supplemental requirements associated with the above task(s):
Client H&S information is attached.

Site access agreements and/or a discussion of proper procedures for accessing off-site non-client owned private property must be provided to the field team.

[X] Required Checklists/Work Forms

- *Tailgate Safety Briefing Form*
- *Vehicle Inspection Checklist*
- *Utility and Structures Checklist*

[ ] Required Permits

- *Safe Work Permit (Client Issued)*

[x] Required H&S Standards

- *Health & Safety Plans_ARC HSFS010*
- *Stop Work Authority_ARC HSGE009*
- *Heavy and Mechanized Equipment_ARC HSCS*
- *Utility Location Procedures_ARC HSFS019*
- *Heat Stress Prevention_ARC HSIH013*
- *Confined Space Entry_ARC HSFS003*
- *Hearing Conservation_ARC HSIH008*
- *Hazard Identification, Risk Assessment and Ris*
- *Incident Reporting and Investigation_ARC HSM*

Short Service Employees (SSEs)

SSEs (employees who are employed with Arcadis for less than 1 year or are Inexperienced Workers) have the potential to work on this project. If SSEs are utilized, the project team working in conjunction with the SSE's administrative supervisor will ensure requirements of ARC HSGE019 "Short Service

Employees" are completed. SSE's will be identified on the project Tailgate Safety Meeting Form.

Roles and Responsibilities

	Name	Role	Short Service Employee
1	Edward Meyer	Project Manager (PM)	No
2	Aaron Svitana	OE/HES Manager	No
3	Chris Davern	Site Technical Supervisor (VI Work)	No
4	Kirk Vargas	Site Safety Officer (SSO) - VI Work	No
5	See Permit To Work	Sr. Field Support Staff	No
6	See Permit To Work	Jr. Field Support Staff	Yes
7			
8			
9			
10			

Training

All Arcadis employees are required to have the following training to be on site:

Diving
Hazwoper 40-Hour
Hazwoper 8-Hour Annual Refresher
Defensive Driving - Smith On-Line
H&S Program Orientation (non-certificat
Defensive Driving - Smith On-Line
Client specific:
Chevron 101
Other:

Selected Arcadis employees are required to have the following additional training:

	Names or Numbers from above
BBP (Bloodborne Pathogens)	SSO
Fire Extinguisher (non-certificate)	SSO
Hazwoper 8-Hour Supervisor	SSO
First Aid/CPR	SSO
Confined Space Awareness	SSO/SS
First Aid/CPR	SSO
DOT HazMat #1	
None	
Other:	

The Arcadis Fundamental H&S Principles

Staff working on any of the task(s) listed above must utilize the six Arcadis Fundamental H&S Principles to ensure work is conducted safely. These principles include: 1) Use of TRACK, 2) H&S Planning, 3) Stop Work Authority, 4) "If Not Me Then Who", 5) Stewardship, and 6) Incident Reporting. Every project team member plays an important role in project health and safety. This is more than just having a HASP, training, or PPE. Proactive staff engagement with these principles is critical to a safe work environment.



General Task Hazard Assessment and Risk Control (HARC)

General: **Hazards Applicable to All Project Tasks**

The 12 hazard category HARC ratings are not available in this General THA. The mitigated and unmitigated ratings for the hazards presented are based on the Risk Assessment Matrix below. Modify hazards and ratings as necessary to meet project needs.

Risk Assessment Matrix		Likelihood Ratings			
Consequences Ratings		A	B	C	D
People	Property	0 Almost Impossible	1 Possible but Unlikely	2 Likely to Happen	3 Almost Certain to Happen
1-Slight or No Health Effect	Slight or No Damage	0-Low	1-Low	2-Low	3-Low
2-Minor Health Effect	Minor Damage	0-Low	2-Low	4-Medium	6-Medium
3-Major Health Effect	Local Damage	0-Low	3-Low	6-Medium	9-High
4-Fatalities	Major Damage	0-Low	4-Medium	8-High	12-High

Hazard #1

Driving - On road - Injury or vehicle damage from motor vehicle accident or incident

Suggested FHSHB Ref:	III V, W, U, AO	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	MEDIUM	JSAs
Comments:	Use Smith System "5-Keys" when driving. See Driving JSA for details.	

Hazard #2

Driving - Driver - Injury, death or property damage due to driver distraction, fatigue, etc.

Suggested FHSHB Ref:	III V, AO	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Smith System (on line)
Mitigated Risk:	LOW	Driver awareness and use of stop work authority
Comments:	Use route planning. Keep eyes moving while driving. See Driving JSA.	

Hazard #3

Biological - skin/eye irritation or damage from poisonous plants

Suggested FHSHB Ref:	III N, AE	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Use skin pre-treatment lotions when available.	

Hazard #4

Biological - bites or stings from exposure to insects or arachnids

Suggested FHSHB Ref:	III N	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Do body check daily.	

Hazard #5

Biological - cuts, scrapes, skin/eye puncture from exposure to physically damaging plants

Suggested FHSHB Ref:	III N, AE	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

General Task HARC (continued)

Hazard #6		
Environmental - Thermal stress - Injury or illness from heat or cold		
Suggested FHSHB Ref:	III M	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook (see ref. above)
Mitigated Risk:	LOW	JSAs
Comments:	Use job rotation or rest breaks. Stay hydrated and eat regularly.	
Hazard #7		
Environmental - Inclement weather -Injury or equipment damage from inclement weather		
Suggested FHSHB Ref:	III I	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Weather Monitoring
Mitigated Risk:	LOW	Cont./Emerg. Planning
Comments:	Use 30/30 rule for lightning. See FHSHB for details.	
Hazard #8		
Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions		
Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #9		
Motion - Musculoskeletal - Injury from repeated work activity or body motion		
Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #10		
Sound - Noise - Injury or illness due to noise exposure		
Suggested FHSHB Ref:	III L	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Increase distance from source if possible. Maintain equipment.	
Hazard #11		
Gravity - Falls - Injury due to slips and trips		
Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Housekeeping
Comments:	Use footwear appropriate for site conditions, plan routes and do not hurry while walking.	
Hazard #12		
Biological - skin or eye injury from exposure to mammal, reptile, amphibian, fish, bird or invertebrate bites		
Suggested FHSHB Ref:	III N	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Use snake chaps to protect against poisonous snakes.	

Task Specific HARC

Task 1:	Sampling - Well sampling using pumps requiring pump installation/removal

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	-	Electrical	L
Environmental	L	Gravity	L	Mechanical	L	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Cones, Barriers,	

Hazard #2

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #3

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	LOW	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Task Specific HARC (continued)

Task 2:	Sampling - Well sampling using bailers

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	M	Mechanical	-	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Cones, Barriers, TSP	

Hazard #2

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #3

Chemical - liquids - injury or illness from vapor inhalation

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Task Specific HARC (continued)

Task 3:	Monitor well - Well sounding, water level or product measurements using probes, ta

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	-	Electrical	-
Environmental	L	Gravity	M	Mechanical	-	Motion	L
Personal Safety	-	Pressure	L	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Cones, Barriers, TSP	

Hazard #2

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Select
Comments:	Work gloves should be worn when bolting/unbolting monitor well lids	

Hazard #3

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #4

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Task Specific HARC (continued)

Task 4:	Utilities - Clearance

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III AN

Biological	L	Chemical	L	Driving	-	Electrical	H
Environmental	L	Gravity	L	Mechanical	M	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Cones, Barriers	

Hazard #2

Chemical - solids/particulates, injury or illness from inhalation

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Masks	

Hazard #3

Chemical - solids/particulates, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Eye glasses	

Hazard #4

Electrical - Process failure - Injury or death from improper lockout/tagout

Suggested FHSHB Ref:	III AB	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Lockout/Tagout
Mitigated Risk:	MEDIUM	Permits
Comments:		

Task Specific HARC (continued)

Task 5:	Decontamination - Small or hand-held objects using manual methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III G

Biological	L	Chemical	M	Driving	-	Electrical	-
Environmental	L	Gravity	L	Mechanical	-	Motion	L
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

Hazard #2

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

Task Specific HARC (continued)

Task 6:	Drilling - Using mechanical methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: IV E

Biological	L	Chemical	L	Driving	-	Electrical	M
Environmental	L	Gravity	M	Mechanical	M	Motion	H
Personal Safety	L	Pressure	L	Radiation	-	Sound	M

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook (see ref. above)
Mitigated Risk:	LOW	Site Awareness
Comments:		

Hazard #2

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Field H&S Handbook (see ref. above)
Comments:		

Hazard #3

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Inspections
Comments:		

Hazard #4

Mechanical - Crushing - Injury by crushing body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Machine Guarding
Comments:		

Hazard #5

Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions

Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Housekeeping
Comments:		

Hazard #6

Environmental - Utilities - Injury or property damage from utility strike/damage

Suggested FHSHB Ref:	III AN	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Inspections
Mitigated Risk:	MEDIUM	Permits
Comments:		

Task Specific HARC (continued)

Task 7:	Sampling - Non-pressurized or passive air sampling using summa canisters, sample

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	L
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Hazard #1

Chemical - gasses - injury due to inhalation, asphyxiation, skin/eye contact

Suggested FHSHB Ref:	III S, AI	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #2

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:		

Task Specific HARC (continued)

Task 8:	Driving - Motor vehicles

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III V

Biological	-	Chemical	-	Driving	H	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	L	Pressure	-	Radiation	-	Sound	-

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Select
Comments:		

Hazard #2

Personal Safety - Fatigue - Injury or illness caused while working when fatigued

Suggested FHSHB Ref:	III R	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook (see ref. above)
Mitigated Risk:	LOW	Job Rotation
Comments:		

Task Specific HARC (continued)

Task 9:	Mobilization - Loading and unloading vehicles

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	-	Chemical	L	Driving	-	Electrical	L
Environmental	L	Gravity	M	Mechanical	L	Motion	M
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref: III S
Overall Unmitigated Risk: MEDIUM
Mitigated Risk: LOW
Comments: Cones, PPE

To mitigate this hazard, use TRACK and the following:
Engineering Controls (specify in comments)
Site Awareness

Hazard #2

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref: III AC, IV A
Overall Unmitigated Risk: MEDIUM
Mitigated Risk: LOW
Comments:

To mitigate this hazard, use TRACK and the following:
Job Briefing/Site Awareness
H&S Standards

Task Specific HARC (continued)

Task 10:	Oversight - Oversight of contractors

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: II M

Biological	L	Chemical	L	Driving	L	Electrical	L
Environmental	L	Gravity	L	Mechanical	L	Motion	L
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Hazard #1

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Work Plan
Comments:		

Hazard #2

Mechanical - Crushing - Injury by crushing body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Work Plan
Comments:		

Task Specific HARC (continued)

Task 11:	Waste - Containment of IDW in large containment devices greater than 119 gallons

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III AG

Biological	L	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	H	Mechanical	L	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #2

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #3

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	III AC, IV A	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	H&S Standards
Comments:		

Hazard #4

Task Specific HARC (continued)

Task 12:	Waste - Containment of IDW in small containment devices greater than 10 gallons bu

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III AG

Biological	L	Chemical	M	Driving	-	Electrical	-
Environmental	M	Gravity	M	Mechanical	L	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #2

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #3

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	III AC, IV A	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	H&S Standards
Comments:		

Task Specific HARC (continued)

Task 13:	Survey - Land surveying

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	M	Chemical	-	Driving	-	Electrical	-
Environmental	M	Gravity	M	Mechanical	-	Motion	M
Personal Safety	L	Pressure	-	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Cones, Barriers	

Hazard #2

Biological - skin/eye irritation or damage from poisonous plants

Suggested FHSHB Ref:	III N, AE	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Select
Comments:		

Hazard #3

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Select
Comments:		

Hazard #4

Environmental - Thermal stress - Injury or illness from heat or cold

Suggested FHSHB Ref:	III M	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Select
Comments:		

Hazard #5

Gravity - Struck by - Injury from falling object

Suggested FHSHB Ref:	III AC, IV A	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	UAV operation, take-off and landing.	

Task Specific HARC (continued)

Task 14:	Monitoring - Air monitoring using hand held or stationary equipment - non-radiation

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: V I

Biological	L	Chemical	M	Driving	-	Electrical	L
Environmental	L	Gravity	L	Mechanical	L	Motion	L
Personal Safety	L	Pressure	-	Radiation	-	Sound	L

Hazard #1

Chemical - solids/particulates, injury or illness from inhalation

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Select
Comments:		

Task Specific HARC (continued)

Task 15:	Inspections and audits - Buildings

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	L	Electrical	L
Environmental	L	Gravity	M	Mechanical	L	Motion	L
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Hazard #1

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref: III F

Overall Unmitigated Risk: MEDIUM

Mitigated Risk: LOW

Comments:

To mitigate this hazard, use TRACK and the following:

Select

Select

Task Specific HARC (continued)

Task 16:	Survey - Geophysical

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	M	Chemical	-	Driving	-	Electrical	L
Environmental	M	Gravity	L	Mechanical	-	Motion	M
Personal Safety	L	Pressure	-	Radiation	-	Sound	L

Hazard #1

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Housekeeping
Comments:		

Hazard #2

Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions

Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Ergonomic Lifting discussion	

Hazard #3

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	III S IV, E, F, G, O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Operator Competency per Standard
Comments:		

Task Specific HARC (continued)

Task 17:	Non-Permited Confined Space Entry

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 0

Biological	L	Chemical	L	Driving	-	Electrical	L
Environmental	L	Gravity	M	Mechanical	-	Motion	M
Personal Safety	L	Pressure	-	Radiation	-	Sound	-

Hazard #1

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Inspections
Comments:		

Hazard #2

Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions

Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Assess site conditions, crawl space hight for overhead hazards	

Task Specific HARC (continued)

Task 18:	Building Heating/ Night Work

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: NA

Biological	-	Chemical	-	Driving	-	Electrical	M
Environmental	M	Gravity	M	Mechanical	-	Motion	-
Personal Safety	L	Pressure	-	Radiation	-	Sound	L

Hazard #1

Environmental - Lighting - Injury or property damage working in poorly lit areas

Suggested FHSHB Ref:	III O	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Select
Comments:	Supplimental lighting	

Hazard #2

Gravity - Falls - Injury due to slips and trips

Suggested FHSHB Ref:	III F	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Housekeeping
Comments:		

Hazard #3

Electrical - Housekeeping - Injury or property damage due to frayed wiring, improperly mounted wiring, missing

Suggested FHSHB Ref:	III AB, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	Inspections
Comments:	Confirm all eqlectrical components are installed correctly, and manage wire placement to mitigate S/T/F.	

Task Specific HARC (continued)

Task 19:	Drilling - Using manual methods

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: III F

Biological	L	Chemical	L	Driving	-	Electrical	M
Environmental	M	Gravity	L	Mechanical	-	Motion	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical- solids/particulates - injury or illness from skin absorption

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

Hazard #2

Environmental - Utilities - Injury or property damage from utility strike/damage

Suggested FHSHB Ref:	III AN	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	Permits
Mitigated Risk:	MEDIUM	Inspections
Comments:	Locate Utilities via third party and One Call	

Hazard #3

Chemical - solids/particulates, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	III C, F, G, K, S, AG	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:		

Hazard #4

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Job Briefing/Site Awareness
Comments:	Traffic Control/Exclusion Zone	

Hazard #5

Motion - Cuts and scrapes - Injury from moving object impacting skin or eye

Suggested FHSHB Ref:	III S	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:		

Hazard #6

Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions

Suggested FHSHB Ref:	III AF	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Housekeeping
Comments:		

Hazard Communication (HAZCOM)/Global Harmonization System (GHS)

[ ] HAZCOM/GHS for this project is managed by the client or general contractor

List the chemicals anticipated to be used by Arcadis on this project per HAZCOM/GHS requirements.
(Modify quantities as needed)

	Preservatives	Qty
[ ]	Not applicable	
[X]	Hydrochloric acid	<500 ml
[X]	Nitric acid	<500 ml
[ ]	Sulfuric acid	<500 ml
[ ]	Sodium hydroxide	<500 ml
[ ]	Zinc acetate	<500 ml
[ ]	Ascorbic acid	<500 ml
[ ]	Acetic acid	<500 ml
[ ]	Isopropyl alcohol	< 4 gal.
[ ]	Formalin (<10%)	< 4 gal.
[ ]	Methanol	<500 ml
[ ]	Sodium bisulfate	<500 ml

	Decontamination	Qty
[ ]	Not applicable	
[X]	Alconox	≤ 5 lbs
[ ]	Liquinox	≤ 1 gal
[ ]	Acetone	≤ 1 gal
[ ]	Methanol	≤ 1 gal
[ ]	Hexane	≤ 1 gal
[ ]	Isopropyl alcohol	≤ 4 gal
[ ]	Nitric acid	≤ 1 L
[X]	Other:	
X	Hand Sanitizer	
X	Disinfecting Wipes	

	Calibration	Qty.
[ ]	Not applicable	
[X]	Isobutylene/air	1 cyl
[ ]	Methane/air	1 cyl
[ ]	Pentane/air	1 cyl
[ ]	Hydrogen/air	1 cyl
[ ]	Propane/air	1 cyl
[ ]	Hydrogen sulfide/air	1 cyl
[ ]	Carbon monoxide/air	1 cyl
[X]	pH standards (4,7,10)	≤ 1 gal
[X]	Conductivity standards	≤ 1 gal
[ ]	Other:	

	Fuels	Qty.
[ ]	Not applicable	
[ ]	Gasoline	≤ 5 gal
[ ]	Diesel	≤ 5 gal
[ ]	Kerosene	≤ 5 gal
[ ]	Propane	1 cyl
[ ]	Other:	

	Kits	Qty.
[X]	Not applicable	
[ ]	Hach (specify):	1 kit
[ ]	DTECH (specify):	1 kit
[ ]	Other:	1 kit

	Remediation	Qty.
[ ]	Not applicable	
[ ]		
[ ]		
[ ]		
[ ]		
[ ]		

	Other:	Qty.
[ ]	Not applicable	
[X]	Spray paint	≤ 6 cans
[ ]	WD-40	≤ 1 can
[ ]	Pipe cement	≤ 1 can
[ ]	Pipe primer	≤ 1 can
[ ]	Mineral spirits	≤ 1 gal

	DOT(1):	Qty.
[ ]	MOT eligible soils	
[ ]	MOT eligible water	
[ ]	MOT eligible solids	
[ ]	MOT eligible liquids	
[ ]		
[ ]		
[ ]		

(1) Attach applicable Materials of Trade (MOT) generic shipping determination. SDS not generally applicable to this category.

SDSs for this project are attached to this HASP.

Contractor SDSs will be submitted to Arcadis in advance of work and will be filed with Arcadis SDSs as indicated above.

Air Monitoring

☐ There are no atmospheric chemical, radiological, or particulate hazards on this project requiring air monitoring.
☐ Air monitoring is the responsibility of the client or subcontractor.

Constituents of Interest:

Time Weighted Averages (TWAs) are ACGIH 8-Hr Threshold Limit Values (TLVs) unless noted.

Benzene			
TWA	0.5 ppm, OSHA Reg. See Notes	LEL/UEL (%):	1.2/7.8
STEL	2.5 ppm	VD (Air = 1):	NA
IDLH	500 ppm, NIOSH	VP (mmHg):	75

cis 1,2-Dichloroethene			
TWA	200 ppm	LEL/UEL (%):	5.6/12.8
STEL	NA	VD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	180-265

Vinyl chloride			
TWA	1 ppm, OSHA Reg. See Notes	LEL/UEL (%):	3.6/33.0
STEL	5 ppm, ceiling, OSHA	VD (Air = 1):	2.21
IDLH	NA	VP (mmHg):	2508

TCE			
TWA	10 ppm	LEL/UEL (%):	8/10.5
STEL	25 ppm	VD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	58

Asbestos		Anticipated Breathing Zone Concentration <=	3	f/cc
TWA	0.1 f/cc, MONITORING NOTICE See Notes	LEL/UEL (%):	NA/NA	
STEL	NA	VD (Air = 1):	NA	
IDLH	NA	VP (mmHg):	NA	

Chlorobenzene			
TWA	10 ppm	LEL/UEL (%):	1.3/9.6
STEL	NA	RGD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	9

TWA - Time Weighted Average (ACGIH TLV unless noted)
STEL - Short Term Exposure Limit
IDLH - Immediately Dangerous to Life and Health
LEL/UEL - Lower /Upper Explosive Limit
RGD - Relative Gas Density
VP - Vapor Pressure

Notes:
Asbestos monitoring must be addressed through a HASP supplement or permit. Particulate monitoring action levels in this HASP do not take asbestos into account when computing action levels.

As noted, one or more of the above constituents is an OSHA regulated substance. If exposure is expected to be above the TWA or STEL, contact a CIH or CSP for assistance unless otherwise permitted by a substance specific plan template identified in this section.

Required Monitoring Instruments, Action Levels and Monitoring Frequency

Gray fields below are not automated. Make necessary selections from drop down menus.

Photoionization Detector — Select Lamp: 10.6 eV

Computed action levels (PID units) (1):			Computed action levels have been manually adjusted.
<	1.3		Continue working
	1.3	- 2.5	Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.
>	2.5		Stop work and contact SSO

(1) Computed action levels are for PIDs which have not been programmed to correct TLVs for specific constituents or mixtures.

Particulate/Aerosol monitoring is required.

Action levels are in mg/m3 and excludes asbestos (see not			Computed action levels have been manually adjusted.
<	1.5		Continue working
	1.5 - 3		Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.
>	3		Stop work and contact SSO

Breathing zone air monitoring using the above instruments will be performed at the following frequency:
Continuously

The monitoring instrument(s) used must be capable of data logging if continuous monitoring is required. Staff using these instruments must be trained in data logging procedures for the actual instrument(s) used. Data logging results must be backed up daily.

Standard 4 Gas Monitoring (LEL,O2,H2S,CO) with a multigas meter is required

LEL/O2 Meter Monitoring Required	0-5% LEL	Continue work
	>5-10% LEL	Continually monitor, review engineering controls, proceed with caution
	>10% LEL	Stop work, evacuate, contact SSO
	19.5%-23.5% O2	Normal, continue work
	<19.5% O2	O2 deficient, stop work, evacuate, contact SSO
	>23.5% O2	O2 enriched, stop work, evacuate, contact SSO

Checked gases require monitoring:

		1/2 TLV	Stop Work Action Level
	Ammonia	12.5 ppm	25 ppm
	Carbon dioxide	2500 ppm	5000 ppm
X	Carbon monoxide	12.5 ppm	25 ppm
	Chlorine	0.05 ppm	0.1 ppm
	Hydrogen cyanide	2.35 ppm (skin)	4.7 ppm* (skin)
X	Hydrogen sulfide	0.5 ppm	1 ppm
	Nitrogen dioxide	0.1 ppm	0.2 ppm
	Phosphine	0.025 ppm	0.05 ppm
	Sulfur dioxide	0.125 ppm	0.25* ppm
x	Mercury vapor	0.0125 mg/m3	0.025 mg/m3

Comments

Use a multigas meter equipped with a sensor(s) capable of detecting checked gases identified to the right. For mercury vapor, a Jerome mercury vapor meter or equivalent device must be used. Review engineering controls and perform continuous monitoring with data logging at concentrations >1/2 TLV. Stop work action levels are based on Level D protection.

* Ceiling or STEL value

All air-monitoring instruments must be calibration checked daily, if used, per manufacturer's instructions. Calibration checks, including calibration gases used, must be documented.

Compound specific monitoring using colorimetric indicator tubes/chips is required

Indicator:			≤TWA	Continue work
	Tube	x Monitor	>TWA	Stop work, review engineering controls and PPE, contact SSO
Compound(s): mercury vapor testing via handheld monitor				

Indicator tube/chip monitoring frequency: Continuously during intrusive work or in confined spaces

Air Monitoring

Task or Area of Concern: Soil Vapor Sampling and Confined Space Work

Constituents of Interest:

Time Weighted Averages (TWAs) are ACGIH 8 Hr Threshold Limit Values (TLVs) unless noted.

Manganese		Anticipated Breathing Zone Concentration <=	3	mg/m3
TWA	0.02 mg/m3, respirable	LEL/UEL (%):	NA/NA	
STEL	3 mg/m3, NIOSH	VD (Air = 1):	NA	
IDLH	500 mg/m3, NIOSH	VP (mmHg):	NA	
Lead		Anticipated Breathing Zone Concentration <=	3	mg/m3
TWA	0.05 mg/m3, OSHA Reg. See Notes	LEL/UEL (%):	NA/NA	
STEL	NA	VD (Air = 1):	NA	
IDLH	100 mg/m3	VP (mmHg):	NA	
Mercury (elemental and inorg.)		Anticipated Breathing Zone Concentration <=	3	mg/m3
TWA	0.025 mg/m3, skin	LEL/UEL (%):	NA/NA	
STEL	0.1 mg/m3, NIOSH	VD (Air = 1):	NA	
IDLH	10 mg/m3, NIOSH	VP (mmHg):	0.0012	

TWA - Time Weighted Average (ACGIH TLV unless noted)
STEL - Short Term Exposure Limit
IDLH - Immediately Dangerous to Life and Health
LEL/UEL - Lower/Upper Explosive Limit
RGD - Relative Gas Density
VP - Vapor Pressure

Notes:

One or more constituents above is listed with a skin notation. Avoid conditions where dusts, mists, or aerosols are created. Avoid skin contact with impacted media.

One or more constituents listed above is a particulate hazard. Use wetting as the primary control to eliminate dust hazards.

As noted, one or more of the above constituents is an OSHA regulated substance. If exposure is expected to be above the TWA, contact a CIH or CSP for assistance unless otherwise permitted by a substance specific plan template identified in this section.

Standard 4 Gas Monitoring (LEL,O2,H2S,CO) with a multigas meter is required

LEL/O2 Meter	0-5% LEL	Continue work
	>5-10% LEL	Continually monitor, review engineering controls, proceed with caution
	>10% LEL	Stop work, evacuate, contact SSO
Monitoring Required	19.5%-23.5% O2	Normal, continue work
	<19.5% O2	O2 deficient, stop work, evacuate, contact SSO
	>23.5% O2	O2 enriched, stop work, evacuate, contact SSO

Checked gases require monitoring:

		1/2 TLV	Stop Work Action Level
	Ammonia	12.5 ppm	25 ppm
	Carbon dioxide	2500 ppm	5000 ppm
X	Carbon monoxide	12.5 ppm	25 ppm
	Chlorine	0.05 ppm	0.1 ppm
	Hydrogen cyanide	2.35 ppm (skin)	4.7 ppm* (skin)
X	Hydrogen sulfide	0.5 ppm	1 ppm
	Nitrogen dioxide	0.1 ppm	0.2 ppm
	Phosphine	0.025 ppm	0.05 ppm
	Sulfur dioxide	0.125 ppm	0.25 ppm
x	Mercury vapor	0.0125 mg/m3	0.025 mg/m3

Comments

Use a multigas meter equipped with a sensor(s) capable of detecting checked gases identified to the right. For mercury vapor, a Jerome mercury vapor meter or equivalent device must be used. Review engineering controls and perform continuous monitoring with data logging at concentrations >1/2 TLV. Stop work action levels are based on Level D protection.

* Ceiling or STEL value

All air-monitoring instruments must be calibration checked daily, if used, per manufacturer's instructions. Calibration checks, including calibration gases used, must be documented.

Personal Protective Equipment (PPE)

See JSA or Permit for the task being performed for required PPE. If work is not conducted under a JSA or Permit, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work (outside of field office trailers and vehicles) not covered by a JSA or Permit on this project:

Minimum PPE required to be worn by all staff on project:

						Specify Type:
X	Hard hat		Snake chaps/guards		Coveralls:	
X	Safety glasses		Briar chaps		Apron:	
	Safety goggles		Chainsaw chaps	X	Chem. resistant gloves:	Nitrile
X	Face shield		Sturdy boot	X	Gloves other:	Work gloves
X	Hearing protection	X	Steel or comp. toe boot		Chemical boot:	
	Rain suit		Metatarsal boot		Boot other:	
X	Other:	X	Long Sleeve Shirt	X	Traffic vest, shirt or coat:	Class II
	Cloth Face Covering				Life vest:	

Task specific PPE: Hearing Protection is required during all drilling activities.

Comments:

Field staff must review Arcadis Field and Embedded Staff COVID-19 Guidance document in appendices to completing work.

See Control of Ticks and Poisonous Plants section for important PPE information.

Medical Surveillance

All Arcadis employees and subcontractors performing field work will be required to be current in HAZWOPER medical surveillance.

Hazardous Materials Shipping and Transportation

A shipping determination package has been prepared, reviewed and provided to Arcadis field staff for this project.

Traffic Safety and Traffic Safety Plans (TSPs)

The scope of work on this project will not expose Arcadis workers or subcontractors to vehicular traffic. A traffic safety plan will not be required.

Arcadis Commercial Motor Vehicles (CMVs)

CMVs operated by Arcadis employees on public roadways will not be utilized on this project. Arcadis defines a CMV as any single vehicle with a gross vehicle weight rating (GVWR) ≥10,001 pounds or a truck and trailer combination with a combined GVWR ≥10,001 pounds (GVWR of truck + GVWR of trailer = ≥10,001 pounds).

Site Control

The scope of work on this project does not require use of site control.

Decontamination

Decontamination protocols are addressed in the applicable task JSA(s) for this project. The applicable JSAs are attached to this HASP.

Sanitation

Portable restroom facilities and potable water will be provided by the Arcadis project team. Unless alternate requirements are stipulated in a plan supplement (i.e. Heat Injury and Illness Prevention Plan), permit or JSA, temporary restroom facilities will be provided with one toilet for every 20 project workers and bottled or non-plumbed potable water will be provided to project workers at 1 gallon/worker/day.

Safety Briefings

Safety briefings will occur twice each day. One safety briefing will occur at the beginning of the day and the second briefing will generally occur after the lunch break. All safety briefings will be documented on a Tailgate Safety Meeting form or logbook. All project workers, including Arcadis subcontractors, will participate in the safety briefings if they are scheduled to be working at the time when the briefing is offered. Site visitors and project workers not on duty during the morning safety briefing will receive the safety briefing upon their arrival onto the project site for the day.

Behavior Based Safety (BBS) Program

The CPM or APM is responsible for reviewing and establishing BBS goals for the project. These goals are summarized below.

TIP required at the following frequency on this project:

1 per task

Near Miss reporting goals for this project:

1 NM per event

Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA or Permit for the task being performed. If work is not performed under a JSA or Permit, the following safety equipment is required to be present on site in good condition (Check all that apply):

X	First aid kit	X	Insect repellent:	20%-40%
	Bloodborne pathogens kit	X	Sunscreen	
X	Fire extinguisher		Air horn	
X	Eyewash (ANSI compliant)	X	Traffic cones	
X	Eyewash (bottle)		2-way radios	
X	Drinking water		Heat stress monitor	
	Other:	X	Poisonous plant pre/post exposure lotion/soap	

Control of Ticks and Poisonous Plants

Work on this project has a high tick exposure hazard. Use of permethrin (apply to clothing at least 4 hours prior to work) is required with DEET (20%-40%) protection on skin. Wear light colored clothing to help identify presence of ticks on staff. Keep shirt tails inside pants. Use of Tyvek or similar light colored outer pant/suit with legs taped to ankles. In high hazard areas, use of a Tyvek suit with ankles and wrists taped is required. Perform tick checks upon conclusion of work for day.

Work on this project has a medium poisonous plant exposure hazard. Workers known to have a sensitivity to poisonous plants should use a pre-exposure lotion on exposed skin as an Arcadis expectation. First aid kits must be equipped with post-exposure soap. Inspect work area for presence of hazard prior to initiating work at the location. Wear disposable gloves during work and while removing outer footwear. Use of clothing with long sleeves to protect forearms is an Arcadis expectation.

International Travel

International travel is not required for this project.

Spill Control and Containment

Spill control and containment protocols, including required equipment and supplies, are located in a JSA prepared by Arcadis. Implementation of the JSA requirements are the responsiblity of Arcadis.

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

You have an absolute right to STOP WORK if unsafe conditions exist!

PID Calibration Log

Zero Gas Source: ____________________ Instrument Type: __________________________ PAGE ____ of ____

Lot Number/Expiration Date: ____________________ Serial Number: __________________________

Calibration Gas Source: ____________________ Instrument Type: __________________________

Lot Number/Expiration Date: ____________________ Serial Number: __________________________

Concentration: ____________________ __________________________

Instrument Number	Date	Time	Zero Cal. OK (Y/N)	Calibration Gas Reading	Comments	Calibration w/in 2% (Y/N)?	Alarms Set (Yes/No)?	User Initials

LEL/O_2 Calibration Log

ARCADIS Design & Consultancy for natural and built assets

Calibration Gas Source: ____________ Instrument Type: ____________

Lot Number/Expiration Date: ____________ Serial Number: ____________

Concentration: ____________ Instrument Type: ____________ PAGE ____ of ____

Other: ____________ Serial Number: ____________

Other: ____________ ____________

Instrument Number	Date	Time		Alarms OK? (Y/N)	Oxygen Reading	Zero Cal. OK? (Y/N)	Span Reading	Calibration OK? (Y/N)	User Initials

PID Calibration Log

ARCADIS Design & Consultancy for natural and built assets

Zero Gas Source: ____________________ Instrument Type: ____________________ PAGE ____ of ____

Lot Number/Expiration Date: ____________________ Serial Number: ____________________

Calibration Gas Source: ____________________ Instrument Type: ____________________

Lot Number/Expiration Date: ____________________ Serial Number: ____________________

Concentration: ____________________ ____________________

Instrument Number	Date	Time	Zero Cal. OK (Y/N)	Calibration Gas Reading	Comments	Calibration w/in 2% (Y/N)?	Alarms Set (Yes/No)?	User Initials

Air Monitoring Documentation Form

ARCADIS Design & Consultancy for natural and built assets

PID Model: _____ Monitor Frequency: _____

LEL/O_2 Model: _____

CIT Model: _____

Dust Mon. Model: _____

Air Monitoring Results

Date	Time	PID (units)	O_2 (%)	LEL (% LEL)	CIT (ppm)	Dusts (mg/m^3)	Location

CIT = Colorimetric Indicator Tube
LEL = Lower Explosive Limit
mg/m3 = Milligram per cubic meter
O2 = Oxygen
ppm = Part per million
% = Percent
PID = Photoionization Detector

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THIS FORM MUST BE COMPLETED IN ENTIRETY PRIOR TO BEGINNING ANY INTRUSIVE WORK

Project: Former Texaco Research Center (Chevron Facility No. 3140

Project Number: 30064362

Form Completion Date: _____ Form Expiration Date: _____
(15 business days post form completion date)

Pre-Field Work

Required: One Call or "811" notified 48-72 hours in advance of work? #: _____

Ticket Expiration Date _____ (Review State Requirements)

Utility companies notified during the One Call process ☐ See attached ticket

_____ _____ _____ _____

_____ _____ _____ _____

List any other utilities requiring notification:

☐ None

_____ _____ _____

Private Locator Contacted ☐ Yes ☐ No

Plan private utility clearance subcontractor assignments, areas, required clearance equipment, depth of clearance needed, types of utilities. When possible re-clear 811 markings to confirm utility locations.

Client provided utility maps or "as built" drawings showing utilities? ☐ Yes ☐ No

Field Work - This must be completed on site, by staff who have a minimum of one year of field experience in identifying utilities. Review check list with PM or designee prior to beginning intrusive work.

List Soil Boring / Well IDs or Excavation Locations applicable to this clearance checklist:

3 Reliable Lines of Evidence Required Prior to Starting any Subsurface Intrusive Work

☐ One Call/"811" (Reliable as a line of evidence when working in public right of way or easement)

Utility Markings Present: ☐ Paint ☐ Pin flags/stakes ☐ Other ☐ None

☐ Client Provided Maps/Drawings **OR** ☐ Maps/Drawings requested but not provided

☐ Client Clearance Name(s)/Affiliation(s) _____

☐ Interview(s): Name(s)/Affiliation(s) _____

_____

Did person(s) interviewed indicate depths of any utilities in the subsurface?

☐ Yes, depths provided: ☐ Did not know or refused to answer

Additional Comments:

☐ Site Inspection (**Complete Page 2 & Photo Document Marked Utilities & Utility Structures**)

☐ Public Records / Maps / Asbuilts

☐ Private Locator: (Name and Company) _____

☐ Ground Penetrating Radar (GPR)

☐ Radiofrequency (RFLoc)

☐ Electromagnetic (EM)

☐ Metal Detector

Soft Dig Methods

☐ Termination Depth _____ft. bgs

☐ Potholing / Vacuum Extraction

☐ Air-Knife or Hydro-Knife

☐ Probing

☐ Hand Auguring

☐ Other: _____

☐ Marine Locator: (Name and Company) _____

Tips for Successful Utility Location:

1. Don't forget to look up
2. Be on site with Private Utility Locators
3. Ask Private Locators to "confirm" other's markings
4. Select alternate/backup locations during clearance process
5. Mark out all known utilities. Leave nothing to question
6. No hammering - no pickaxes - no digging bars - no shortcutting
7. No excessive turning or downward force of hand augers/shovels
8. Utilities may run in or directly under asphalt/concrete

During the site inspection look for the following: **("YES" requires additional investigation and the utility must be marked properly prior to beginning subsurface intrusive work)**:

Site Inspection	**Utility Color Codes**	**Present**	
a) Natural gas line present (evidence of a gas meter)?	Yellow	☐ Yes	☐ No
i) Feeder Lines to buildings or homes?		☐ Yes	☐ No
b) Evidence of electric lines:	Red		
i) Conduits to ground from electric meter or along wall?		☐ Yes	☐ No
iii) Conduits from power poles running into ground?		☐ Yes	☐ No
ii) Light poles, electric devices with no overhead lines?		☐ Yes	☐ No
iii) Overhead electric lines present? (See Section l)		☐ Yes	☐ No
c) Evidence of sewer drains:	Green		
i) Restrooms or kitchen on site?		☐ Yes	☐ No
ii) Sewer cleanouts present?		☐ Yes	☐ No
iii) Combined sewer/storm lines or multiple sewer lines?		☐ Yes	☐ No
d) Evidence of water lines:	Blue		
i) Water meter on site or multiple water lines?		☐ Yes	☐ No
ii) Fire hydrants in vicinity of work?		☐ Yes	☐ No
iii) Irrigation systems? (Sprinkler heads, valve boxes, controls in building)		☐ Yes	☐ No
e) Evidence of storm drains:	Green		
i) Open curbside or slotted grate storm drains		☐ Yes	☐ No
ii) Gutter down spouts going into ground		☐ Yes	☐ No
f) Evidence of telecommunication lines:	Orange		
i) Fiber optic warning signs in areas?		☐ Yes	☐ No
iv) Aboveground cable boxes or housings or wires in work area?		☐ Yes	☐ No
g) Underground storage tanks:			
i) Tank pit present, tank vent present?		☐ Yes	☐ No
ii) Product lines running to dispensers/buildings?		☐ Yes	☐ No
h) Do utilities enter or exit existing structures/buildings?			
If Yes, confirm the utility markings outside of structure/building match up.		☐ Yes	☐ No
i) Proposed excavation marked in white?	White	☐ Yes	☐ No
j) Unclassed utilities / anomalies marked in pink?	Pink	☐ Yes	☐ No
k) **Overhead** Utilities/Communication Lines - **Look Up**:			
i) Overhead electrical conduit, pipe chases, cable trays, product lines?		☐ Yes	☐ No
ii) Overhead fire sprinkler system?		☐ Yes	☐ No
l) **Overhead** Power lines in or near the work area:			
i) < 50 kV within 10 ft. of work area?		☐ Yes	☐ No
ii) >50 - 200 kV within 15 ft. of work area?		☐ Yes	☐ No
iii) >200-350 kV within 20 ft. of work area?		☐ Yes	☐ No
iv) >350-500 kV within 25 ft. of work area?		☐ Yes	☐ No
v) >500-750 kV within 35 ft. or work area?		☐ Yes	☐ No
vi) >750-1000 kV within 45 ft. of work area?		☐ Yes	☐ No
m) Other:			
i) Evidence of linear asphalt or concrete repair?		☐ Yes	☐ No
ii) Evidence of linear ground subsidence or change in vegetation?		☐ Yes	☐ No
iii) Unmarked manholes or valve covers in work area?		☐ Yes	☐ No
iv) Warning signs ("Call Before you Dig", etc.) on or adjacent to site?		☐ Yes	☐ No
v) Utility color markings not illustrated in this checklist?	Purple	☐ Yes	☐ No
n) Has the Utilities & Structures Checklist been reviewed by the PM or Designee		☐ Yes	☐ No
PM or Designee Name: _____			

Name and Signature of person completing the checklist: _____

Date: _____ _____

Do not perform **mechanized** intrusive work within 30 inches of a utility marking without receiving pre-approval by Corporate H&S .

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Chevron Environmental Management and Real Estate Company

CHEVRON-SPECIFIC HEALTH AND SAFETY REQUIREMENTS



Enter title in dialogue box

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DIRECTIONS TO OCCUPATIONAL HEALTH CLINIC (FOR NON – EMERGENCY, WORKCARE SCENARIOS)

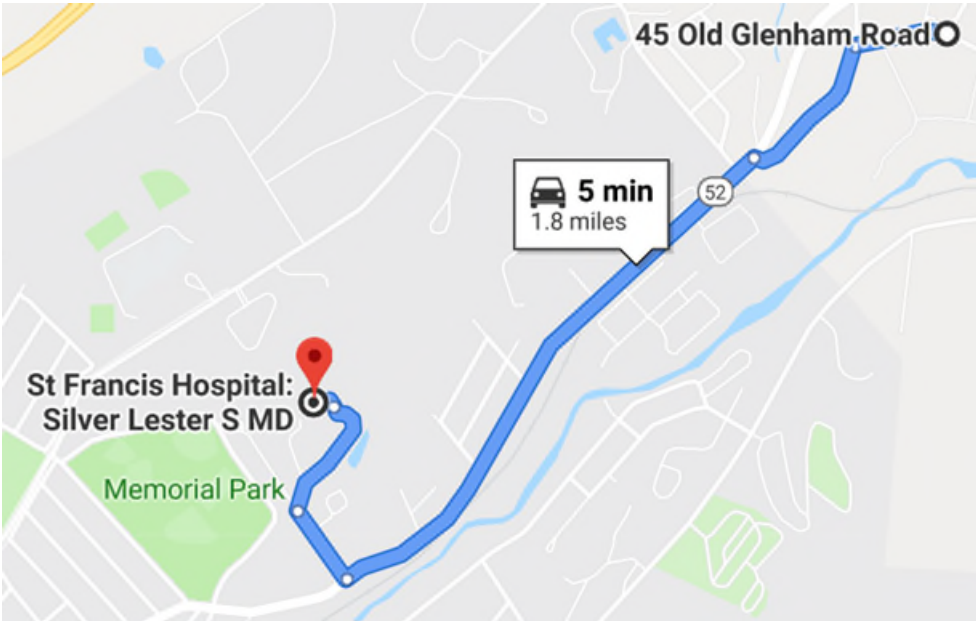
Post Prominently at Job-Site with copy of Near Loss/Loss Reporting Procedure found in Appendix B Section 5!

Clinic Name: St. Francis Hospital: Silver Lester S MD.

Address: 100 Port Washington Blvd., Roslyn, NY 11576

Clinic Phone Number: 516-562-6000

Hours of Operation: 24 Hours



- Head west on Old Glenham Rd toward Red Schoolhouse Road. Go 0.2 Miles.
- Turn left to stay on Old Glenham Rd. Go 0.3 Miles.
- Turn left onto NY-52/Fishkill Avenue. Go 1.0 Miles.
- Turn right onto Delavan Avenue. Go 0.1 Miles.
- Turn right onto Hastings Drive. Go 0.2 Miles.
- Continue Straight., Destination will be on the right. Go 200 feet.

SUMMARY

Driving Distance: 1.8 miles

Trip Duration: 5 minutes

Driving Time: 5 minutes

Enter title in dialogue box

1 INTRODUCTION

This Appendix to the Health and Safety Plan (HASP) describes Chevron-specific policies, procedures, and/or recommendations that must be followed in addition to requirements detailed in the HASP. When Arcadis U.S., Inc. (Arcadis) and Chevron Environmental Management and Real Estate Company (Chevron) policies or procedures overlap, personnel are expected to adhere to the most stringent version. This appendix does not provide specific recommendations when policies conflict or overlap; therefore, personnel are expected to be familiar with policy variations in order to make informed decisions regarding compliance with company and client policies and procedures.

The HASP and this appendix must be in a location at the site that is readily available to personnel. All project personnel will review and sign the HASP prior to starting work. Outdated copies or sections of the HASP must be discarded.

1.1 Chevron Compliance Reporting Process and Hotline

Chevron has established a Compliance Reporting Hotline. This is a risk-free and anonymous way to report a violation of federal, state, or local laws and/or company policies, by Chevron or a contractor, including but not limited to:

- Health, safety, and environmental (not reporting incidents);
- Discrimination/harassment/retaliation;
- Conflicts of interest;
- Theft, bribes, and kickbacks; and
- Fraudulent transactions

When appropriate (when appropriate action is not taken by Arcadis and/or Chevron management), Chevron contractors may use the reporting hotline. The Chevron hotline poster is provided at the end of this appendix.

COMPLIANCE REPORTING HOTLINE: 800.284.3084

1.2 Subcontractors

A copy of this HASP must be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the potential hazards at the site. This HASP presents the minimum H&S requirements for the work completed by Arcadis and its subcontractors. Each subcontractor, in coordination with Arcadis H&S personnel, is expected to perform work in accordance with its own HASP, policies, and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to Arcadis for review prior to the start of on-site activities. Subcontractors may have access to and manage their training certifications in the Staff Training Management System (STMS), further described in Section 3, below.

If the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and Arcadis project H&S personnel. Hazards not listed in this HASP but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the Arcadis PM or task manager and Site Health & Safety Officer (SHSO) prior to beginning work operations. If multiple contractors or subcontractors (who are directly contracted to Chevron) are working on site at the same location, a Communication Plan will be prepared to ensure safe work.

The PM, Task Manager, and SHSO (or authorized representative) have the authority to stop the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the site for failure to comply with established H&S procedures or for operating in an unsafe manner.

2 GENERAL PRINCIPLES

2.1 Stop Work Authority

Every Arcadis employee, Arcadis subcontractor, and Chevron employee at a Chevron work site is empowered, expected, and responsible for stopping the work of another coworker if the working conditions or behaviors are considered unsafe. No repercussions will result from this action.

If anyone is discouraged from exercising Stop Work Authority or is penalized for doing so, they should report this action to Arcadis' PIC. If corrective measures are not satisfactorily implemented in a timely manner, they should report this action to the Chevron PM or Chevron's Health and Environmental Safety Manager.

2.2 Tenets of Operational Excellence

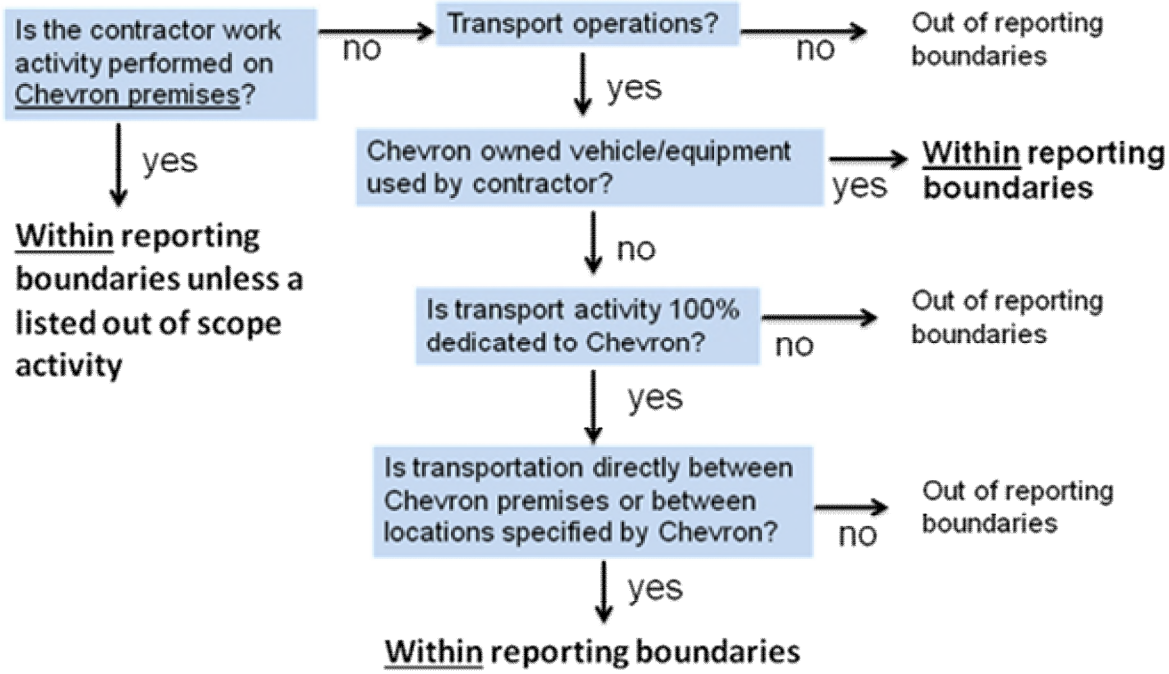
The Tenets of Operational Excellence (OE Tenets) are an extension of Chevron's values and principles that apply to all Arcadis employees, Arcadis subcontractors, and Chevron employees at Chevron work sites. Any deviation from "always" in the OE Tenets requires a Management of Change (MOC), including a risk assessment involving appropriate subject matter experts. An MOC Form and the MOC Tracking Log is included in the HASP. The following OE Tenets are intended to protect people, the environment, and equipment:

1. Always operate within design or environmental limits.
2. Always operate in a safe and controlled condition.
3. Always confirm that safety devices are in place and functioning.
4. Always follow safe work practices and procedures.
5. Always meet or exceed customer's requirements.
6. Always maintain integrity of dedicated systems.
7. Always comply with all applicable rules and regulations.
8. Always address abnormal conditions.
9. Always follow written procedures for high risk of unusual situations.
10. Always involve the right people in decisions that affect procedures and equipment.

Every Arcadis employee, Arcadis subcontractor, and Chevron employee at a Chevron work site must take action if a tenet is violated. Well-designed and effectively implemented processes are necessary to deliver operational excellence (OE). The OE processes can be viewed in their entirety on the Arcadis Chevron Team SharePoint site.

2.3 Reporting Boundary

The Operational Excellence Reporting Boundary services to help determine which contractor activities, work hours, transportation miles, and events should be monitored and considered for reporting to Chevron. During the Pre-Project Health and Environmental Safety Planning Meeting (Section 1.4 of the HASP), the project team should discuss and agree upon the site-specific reporting boundary. The chart provided below is a simple illustration of the decision process to be used in evaluating OE reporting boundaries for safety reporting.



2.4 Drug, Alcohol, and Search Policy

Employees will comply with Chevron's Drug, Alcohol, and Search Policy (Exhibit-Safety Regulations, Contract No. 99014516). Subcontractors, by acceptance of Arcadis Subcontractor Agreement Form and the Schedule "D" Flowdown provisions, must also comply with this policy. According to the policy:

- CONTRACTOR (Arcadis) shall have the right to perform controlled substance and alcohol tests based on a reasonable belief by CONTRACTOR or COMPANY (Chevron) that an individual is using alcohol or drugs on the basis of specific physical, behavioral, or performance indicators.
- CONTRACTOR shall have the right to remove any employee from performing work if the individual exhibits unusual job behavior or unacceptable job performance and it is believed by CONTRACTOR

or COMPANY that he/she may be using controlled substances or presently under the influence of alcohol.

Stop work immediately if an employee or subcontractor's employee is suspected of being under the influence. Contact the employee's supervisor and arrange for transportation of the employee from the site.

3 TRAINING

3.1 Staff Training Management System

Training records are maintained in a Staff Training Management System (STMS) database. Computer-based training modules on SWPs are located in STMS. Individuals working on Chevron projects are expected to view courses relative to their scope of work and pass an exam associated with each module.

https://solutions.arcadis-us.com/stms/index.cfm

3.2 Site-Specific Training Requirements

Project teams will need to review the Arcadis Training Matrix (available on The Source), the Chevron Training Compliance Matrix (available on the Chevron Team Website), and the corresponding Arcadis H&S standard (available on The Source) to prepare a site-specific list of required training. All training dates and certificates of completion should be stored on the Staff Training Management System database.

3.2.1 Arcadis Employees

Arcadis employees are to adhere to company training requirements, as specified in the most current Environmental Division H&S Training and Related Requirements Matrix, located on Arcadis' Learning Center Resources Intranet Site: https://arcadiso365.sharepoint.com/:x:/r/sites/naintranet/en-us/humanresources/_layouts/15/Doc.aspx?sourcedoc=%7BF9F69A8E-D1BA-47CE-B51C-90270F25519E%7D&file=HS%20Training%20Matrix%20-%20Corp%20Admin%20Groups.xlsx&action=default&mobileredirect=true&DefaultItemOpen=1

The level of training for Arcadis employees is relative to the project scope.

3.2.1.1 Chevron-specific Training Requirements for Arcadis Employees

In addition to Arcadis-required training, subcontractor employees WORKING on Chevron project sites must be briefed and have awareness of the following:

- Smith System® Forward and Backing Motion (online) – for anyone driving a motor vehicle within Chevron reporting boundaries.
- Commentary Drive Training (every 3 years) – for anyone driving a motor vehicle within Chevron reporting boundaries > 1000 miles per year.

- Chevron 101 Classroom – required for all Arcadis employees. Workers that have not had Chevron 101 Classroom are to be designated as Short Service Employees (SSE) BY ARCADIS (not Chevron).
- Managing Safe Work OE Process Safe Work Practice Training based on Scope of Work – computer-based training on STMS for workers subject to a SWP (e.g. at a minimum Hazard Analysis including Human Performance and Permit to Work; other SWPs as applicable to scope of work)
- Heat Stress Training – required by law if site is in California or Washington.
- Portable Gas Detection
- Delegation of Authority - (DOA; includes Chevron manifest awareness, Resource Conservation and Recovery Act Hazardous Waste training, and Department of Transportation [DOT] No. 1 training) – required for Arcadis employees that sign waste manifests on behalf of Chevron.

3.2.2 Arcadis Subcontractors

Arcadis Subcontractors are expected to complete the same training courses or courses equivalent to the Arcadis training requirements. When applicable, Subcontractors that operate heavy equipment are to provide training documents or a Letter of Competency from his/her employer prior to commencing work.

3.3 Short-Service Employee Programs

Employees who are new to are potentially at a greater risk for incidents since, in general, they are not as aware of work-related hazards and are more susceptible to incidents that could result in personal injury, injury to others, environmental impact, or property damage. Therefore, Arcadis U.S. (Arcadis) has developed an SSE Health and Safety Policy (HSGE019, dated October 2017), which outlines the mentoring and coaching requirements to ensure the health, safety, and security of SSEs. Chevron Environmental Management and Real Estate Company (CEMREC) has also established minimum expectations regarding managing SSEs as part of the Contractor Health Environment and Safety Management (CHESM) OE Process (most recent version available on the Arcadis Chevron Team Site). An Arcadis Chevron Account Team SSE Policy (Policy) has been developed and is aligned with both the Arcadis and the Chevron SSE requirements and expectations.

The Arcadis and the Chevron SSE Policies both require mentoring for unfamiliar tasks. A summary of both policies is provided below:

3.3.1 Arcadis SSE Policy

The Arcadis Policy HSGE019 is referenced herein but must be read and followed in full in addition to this Policy. It includes the following six (6) mandatory core elements to help introduce the Arcadis Health & Safety Culture to the SSE while fostering a strong relationship with their supervisor and project management.

The minimum requirements below apply to all employees with less than 1 year of employment at Arcadis.

- New Hire Orientation Call
- New Hire Health & Safety Program Orientation

- New Hire / Short Service Employee Task Improvement Process (TIP)
- New Hire Health & Safety Culture Assessment
- Culture of Caring Review
- SSE Mentoring

The Arcadis Policy HSGE019 can be found on the Health and Safety Documents page located below:

https://arcadiso365.sharepoint.com/sites/naintranet/en-us/PoliciesIntegrity/HS/Documents/Short%20Service%20Employee%20HS%20Standard.pdf

3.3.2 Chevron Team SSE Program

SSEs will have an assigned field mentor to assist them in adjusting to the project requirements and procedures. SSEs will be identified in the field by wearing an orange hardhat. The following procedures apply to SSEs:

- Employees or subcontractor's employees with less than 6 months experience in their trade/craft will be designated as an SSE for 6 months.

Additionally, the following apply:

- All SSEs must be approved by the Chevron PM by submitting the SSE Form. The SSE Form is provided on the Arcadis-Chevron Client Team Intranet Site.
- A two- to four-person crew may have only one SSE on site.
- A crew of five or more may have no more than 20 percent of the crew staffed with SSEs on site.

The following situations do not fall under the requirement for SSE:

- A change in employer or company name does not necessitate SSE designation.
- Being new to a site does not necessitate a Contractor's inclusion in an SSE program.

The following exclusions apply:

- Contractors who only perform work activities classified as low-consequence potential are not required to participate in a compliant SSE program.

Individual Contractors who are promoted (within the same trade), regardless of location, are not required to participate in an SSE program.

The Arcadis Chevron team SSE Policy and documents can be found at the below sharepoint site:

Arcadis Chevron SSE Policy

4 PLANNING

4.1 Pre-Project Health and Environmental Safety Planning Meetings

Prior to preparing a HASP, the project team will conduct a pre-project health and environmental safety planning meeting. During this meeting, the project team will review:

- Scope of the work to be completed
- Site hazards
- Plan to evaluate and mitigate hazards
- Applicable Arcadis standards, best practices, or safe work processes
- Required Job Safety Analysis (JSA) and identification of JSA writers

Prior to conducting work in the field, a Project Safety Plan Pre-Meeting should be held with Arcadis staff, Subcontractors, and client(s) involved in the project scope.

4.2 Hazard Identification

4.2.1 Chevron Hazard Identification Tool

The Chevron Hazard Identification Tool is designed as an additional hazard recognition tool for the control of 10 types of hazardous energy on the job. The objectives in using this tool are:

- Provide a method to identify energy sources in an environment.
- Enable the identification of potential hazards associated with energy sources.
- Enhance hazard assessment skills through the integration of this tool.



Gravity
The force caused by the attraction of all other masses to the mass of the earth.
Examples: falling object, collapsing roof and a body tripping or falling

Motion
The change in position of objects or substances.
Examples: vehicle, vessel or equipment movement; flowing water; wind and body positioning when lifting, straining or bending

Mechanical
The energy of the components of a mechanical system, i.e., rotation, vibration or motion within an otherwise stationary piece of equipment or machinery.
Examples: rotating equipment, compressed springs, drive belts, conveyors and motors

Electrical
The presence and flow of an electric charge.
Examples: power lines, transformers, static charges, lightning, energized equipment, wiring and batteries

Pressure
Energy applied by a liquid or gas that has been compressed or is under a vacuum.
Examples: pressure piping, compressed cylinders, control lines, vessels, tanks, hoses and pneumatic and hydraulic equipment

Temperature
The measurement of differences in the thermal energy of objects or the environment which the human body senses as either heat or cold.
Examples: open flame; ignition sources; hot or cold surfaces, liquids or gases; steam; friction; and general environmental and weather conditions

Chemical
The energy present in chemicals that inherently or through reaction has the potential to create a physical or health hazard to people.
Examples: flammable vapors, reactive hazards, carcinogens or other toxic compounds, corrosives, pyrophorics, combustibles, oxygen-deficient atmospheres, welding fumes and dusts

Biological
Living organisms that can present a hazard.
Examples: animals, bacteria, viruses, insects, blood-borne pathogens, improperly handled food and contaminated water

Radiation
The energy emitted from radioactive elements or sources and naturally occurring radioactive materials (NORM).
Examples: lighting issues, welding arcs, solar rays, microwaves, lasers, X-rays and NORM scale

Sound
Sound is produced when a force causes an object or substance to vibrate and the energy is transferred through the substance in waves.
Examples: equipment noise, impact noise, vibration, high-pressure release and the impact of noise to communication

4.3 Planning Phase Hazard Analysis

High level work scope hazards shall be identified or reviewed during the work planning phase (PPHA) to evaluate potential hazards and their control or mitigation. A PPHA is completed during the planning phase of work, based on process and operational documentation and knowledge. The PPHA template can be found on the Chevon-Arcadis Client Team Intranet Site. A PPHA is required for the following activities due to a high hazard potential:

- Simultaneous Operations activities
- One activity requiring two or more Specialized Permits (e.g. hot work in a confined space, hot work during dive operations, etc.)
- Bypassing critical protections
- Commercial diving activities
- Confined space entries with special hazardous characteristics
- Work on energized electrical equipment or over 50 volts
- Excavation activities requiring protective systems (e.g. shoring, bracing, sloping, etc.)
- Hot work in a Hazardous (Classified) Area
- Hot work inside a tank or vessel
- Hot tapping
- Activities requiring Positive Physical Isolation (PPI)
- Complicated, complex, heavy, blind and/or personnel lifts using man riding baskets
- Activities requiring continuous portable gas testing/monitoring
- Any activities involving explosives (e.g., perforating, etc.)

4.4 Health and Safety Standards and Forms

This section references the Arcadis Standards and Chevron Standards that are available to project teams. Forms that accompany the Standards are also listed below. The Standards are stand-alone documents and are not to be included in their entirety in this HASP.

Table 4-1 Applicable Health and Safety Standards

Arcadis H&S Standard	Associated Required Forms and Checklists
Aerial Work Platform	- Equipment Operator Permit - Aerial Work Platform Inspection Checklist - Written Rescue Plan
Asbestos H&S Standard	N/A

Arcadis H&S Standard	Associated Required Forms and Checklists
Benzene H&S Standard	N/A
Bloodborne Pathogens H&S Standard	N/A
Cadmium H&S Standard	N/A
Cold Stress H&S Standard	-
Confined Space Entry H&S Standard	- Confined Space Entry Evaluation Form - Confined Space Entry Checklist - Confined Space Entry Permit - Written Rescue Plan
Documentation and Document Control H&S Standard	N/A
Electrical Safety H&S Standard	- Energized Electrical Work Permit
Emergency Response and Fire Safety H&S Standard	N/A
Excavation and Trenching H&S Standard	- Daily/Periodic Excavation Inspection Checklist - Competent Person Evaluation Form for Excavation and Trenching
Fall Protection H&S Standard	- Elevated Work Permit
First Aid H&S Standard	N/A
HARC H&S Standard	N/A
HASP H&S Standard	N/A
Hazard Communication H&S Standard	N/A
HAZWOPER H&S Standard	N/A
Health and Safety Management System H&S Standard	N/A
Hearing Conservation H&S Standard	N/A
Heat Stress Prevention H&S Standard	N/A
Heavy Equipment H&S Standard	- Heavy Equipment Operator Permit - Heavy Equipment Inspection Checklist
Hoisting and Rigging H&S Standard	- Lift Plan - Crane/Lifting Inspection List
Hot Work H&S Standard	- Hot Work Permit
Hydrogen Sulfide H&S Standard	N/A
Incident Reporting and Investigation H&S Standard	N/A
Industrial Hygiene H&S Standard	N/A
Injury and Illness Prevention H&S Standard	N/A
Ladder Safety H&S Standard	N/A
Lead H&S Standard	N/A
LOTO H&S Standard	- LOTO Permit To Work - LOTO Inspection Checklist
Medical Surveillance H&S Standard	N/A
Motor Vehicle Safety H&S Standard	- *Note: Arcadis Weekly Inspection Checklist is not required, provided the daily pre-trip inspection form is used.*

Arcadis H&S Standard	Associated Required Forms and Checklists
OSHA Inspections H&S Standard	N/A
Personal Protective Equipment H&S Standard	N/A
Powered Industrial Truck (Forklift) H&S Standard	- Powered Industrial Truck Inspection Checklist - Instrument Inspection Log
Radiation Sealed Source H&S Standard	
Railroad Workplace H&S Standard	N/A
Respiratory Protection H&S Standard	N/A
Respirable Crystalline Silica H&S Standard	N/A
Roadway Work Zone Safety, Traffic Control and Employee Safety on Private Roadways and Parking Areas (note: a gas station is considered a private roadway)	- STAR Plan - *Note: a STAR Plan is not required, provided a Chevron-compliant TCP is prepared.*
Roadway Work Zone Safety, Traffic Control and Employee Safety on Public Roadway (Requires approval by Arcadis employee with Engineering Judgment – May be found in Arcadis Transportation Safety section	- DOT TCP - *Note: Project team will also need to comply with local permitting authority requirements.*
Root Cause Analysis H&S Standard	N/A
Scaffold H&S Standard	N/A
Stop Work H&S Standard	N/A
Tailgate Meetings H&S Standard	N/A *Note: Arcadis General PTW cannot be used in replace of the Chevron General PTW.*
Utility Clearance H&S Standard	N/A
Water Operations	Float Plan
Workstation Setup H&S Standard	N/A
Chevron Standards	
Chevron Ground Disturbance Standard (required for all ground intrusive work for Chevron sites)	- Chevron Line Locating Technologies Selection Tool - Excavation or Drilling Permit - Excavation and Trenching Inspection Checklist - Daily Equipment Inspection Form
Chevron Permit to Work Standard	- Chevron General PTW and applicable Specialized Permits or Plans based on work activity
Chevron Manual Handling Standard	N/A
Chevron Hazard Analysis Standard	- Applicable JSAs and PPHA
Chevron Bypassing Critical Devices Standard	- Bypass register
Chevron Portable Gas Detection Standard	N/A
Chevron Commercial Diving Standard	- Chevron Commercial Diving Permit

Arcadis H&S Standard	Associated Required Forms and Checklists
Chevron Confined Space Standard	- Chevron Confined Space Entry Permit
Chevron Electrical Safe Work Standard	- Chevron Energized Electrical Permit
Chevron Hot Work Standard	- Chevron Hot Work Permit
Chevron Isolation of Hazardous Energy Standard	- Chevron Isolation of Hazardous Energy Permit
Chevron Lifting and Rigging Standard	- Chevron Critical Lift Plan
Chevron Simultaneous Operations Standard	- Simultaneous Operations Plan
Chevron Vacuum Truck Standard	- Chevron Vacuum Truck Essentials Checklist (Dry and/or liquid material)
Chevron Working at Heights Standard	- Chevron Fall Rescue Plan - Chevron Working at Height Review Checklist

Notes:
LOTO = lock out/tag out
N/A = Not Applicable
MBUAW = Marketing Business Unit Americas West
STAR = Site Traffic Awareness and Response
TCP = Traffic Control Plan

4.5 Field Health and Safety Handbook

Arcadis' Field Health and Safety Handbook (FHSHB) contains information about topic-specific H&S requirements for the field. The FHSHB contains relevant general topics and is used as part of the overall HASP process. To aid in the consistency of the HASP process, the FHSHB will be used as an informational source in conjunction with this HASP.

4.6 Emergency Drills

Emergency drills are to be conducted and documented at every project site or applicable portfolio of sites at least annually. Any learning opportunities that arise from the drills should be shared with the Chevron Team. A form used to document emergency drill events is available on the Chevron Team Site.

5 FIELD EXECUTION

5.1 Tailgate Safety Meetings

Tailgate safety meetings must be conducted daily. There MUST be a safety meeting that takes place before work begins and, adhering to Chevron's JSA policy, a lookback discussion must take place at the end of the work day. Based on project scope, a mid-day safety meeting may be required.

5.2 Permit to Work

Chevron uses a PTW process to ensure that daily work activities have been evaluated for potential hazards and that all identified hazards have been effectively mitigated. The appropriate Chevron permit(s) must be utilized based on the scope of work. Permits will be completed by an authorized (signed) PTW Requester and verified by an authorized (field signed or remote) PTW Approver. The PTW Requester may function in the dual role as the PTW Approver; however, the same person cannot be listed as both the Requester and Approver on a PTW. Only designated, qualified personnel may serve as a PTW Requester/Approver.

At sites that are actively operated by Chevron personnel, Chevron serves as the permitting authority. In such instances, Arcadis personnel must complete all necessary Chevron-provided paperwork and permit(s) in addition to the General PTW.

Specialized Permits are required to be accepted by the Chevron PM prior to conducting the activity and include the following tasks:

- Commercial diving
- Confined space entry
- Environmental drilling
- Energized electrical work
- Excavation
- Hot work
- Isolation of hazardous energy

Teams should always strive for the most effective method of hazard control. The following illustration presents the most effective to least effective methods, PPE being the least protective. When PPE controls fail, workers are exposed or injured.



5.3 Job Safety Analysis

During pre-job health and safety planning, a JSA must be completed for each safety critical task. A Arcadis-Chevron Team JSA template must be utilized to develop all JSAs. The JSA also lists the type of PPE required for completion of the project. JSAs must be reviewed in the field by the following personnel performing the work:

- A Responsible Person(s) to acknowledge that potential hazards are identified and controlled prior to beginning work.
- All individuals working under the JSA, including those who join the work group after the initial review, to acknowledge that the identified hazards and controls have been communicated and that they are understood.
- A Verifier who also serves as the Person Managing the Control of Work (PMCoW) (i.e., person that is in charge at the project site, subcontractor or Arcadis site lead).

JSAs must be "field modified" based on current site conditions prior to starting work and following any changes to the original scope of work or following significant changes at the job site (such a change in job supervisor, weather conditions, or a new work crew) to include up-to-the-minute evaluation of site hazards. Scope applicable JSAs are reviewed daily.

JSAs must be site specific and communicated in a language appropriate for the work team. During in-field JSA review, the use of Stop Work Authority by anyone present at the job site must be discussed.

5.3.1 Job Safety Analysis Library

Arcadis maintains a library of 'seed' JSAs that can be downloaded and modified to be site specific. Site-specific JSAs are then stored in the project file and managed locally. This library is available on the Arcadis Chevron Team Site.

5.3.2 Personal Protective Equipment Determination

Chevron's minimum level of PPE is required for all active project sites to protect eyes, head, hands, arms, feet, legs, and body. During the Project Planning phase, a PPE Hazard Assessment must be completed, documented and retained in project files. The results of this PPE Hazard Assessment can be transferred to the applicable PPE section of the Arcadis-Chevron JSAs that can capture additional task-specific PPE required beyond the minimum expectations described below. Minimum PPE requirements include:

- Gloves – Appropriate for the task; high visibility preferred.
- **Long** shirt and pants.
- Clothing with hoods or drawstrings shall not be worn around rotating equipment or machinery. If hoods are worn the potential peripheral vision hazards shall be addressed in the project site's JSAs.
- Rain gear hoods and hoods on jackets or sweatshirts to protect against inclement weather can be worn over the hard hat as long as they do not compress the suspension of the hat which will compromise the protection of the hard hat or around rotating equipment or machinery.
- If a hood or winter liner is worn under the hard hat then it shall comply with Section 5.5.2 of ANSI Z89.1-1971: "winter liners should be made of fabric, plastic, or other suitable material. Colored materials shall be fast-dyed. The outer surface may be water resistant. There shall be no metal parts in winter liners for use with Class B helmets. "
- High-visibility vest or appropriate high-visibility clothing.
- Hard hat
- Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames.
- Safety footwear meeting ASTM F2413-05 standard with chemical- or oil-resistant soles.

5.3.3 Jewelry, Hair, and Loose Clothing

Jewelry, hair, and loose clothing can easily get caught in moving machinery, which may result in serious bodily injury or death. Always remove all jewelry before beginning work and make certain that clothing and hair cannot become entangled in moving equipment.

Jewelry should not be worn if it could compromise the integrity of hand protection by tearing or puncturing protective gloves.

5.3.4 Flame-Resistant Clothing

Flame-resistant (FR) clothing may be required at some Chevron project sites. These typically include refineries, oil fields, bulk terminals, etc. Generally, clothing with a minimum Hazard Risk Category of 2 are to be selected.

FR clothing is made of natural materials (cotton) that has been treated with a product that makes it fire resistant. Follow manufacturer's instructions on washing and drying the material, as well as how long it is anticipated to maintain fire resistant properties. By it's nature, FR clothing is poorly ventilated and will increase sweating and retention of heat. Crews should anticipate negative consequences when wearing FR clothing and increase the frequency of breaks, rest in shaded areas and water intake.

The insect repellant DEET should not be applied to FR clothing as it will reduce or eliminate flame resistance in the garment. Permethrin has been proven to not have a negative effect on FR clothing.

5.4 Preventing Serious Injuries and Fatalities

5.4.1 Field Health and Safety Handbook

In addition to existing permitting procedures and safe work practices, Chevron's field guide, Preventing Serious Injury and Fatalities, provides a quick reference allowing the user to identify and control significant potential hazards associated with each task at a project site.

Field guide applications include:

- Review of significant potential hazards and associated prevention before the start of a high-risk activity
- Reference during all phases of hazard assessment (planning, permitting, implementation, and closeout)
- Integration on the local level regarding fatality and serious injury prevention
- Tool for building awareness among all staff at meetings, field visits, shift changes, and other applicable opportunities
- Augment the Managing Safe Work field engagement and Contractor Health, Environment and Safety Management activities
- Near-miss and incident investigations
- Operational Excellence audit or self-audit toll for high-risk observations

The Preventing Serious Injury and Fatalities field guide will be provided to all field staff, task managers, and PMs; and reviewed by all staff before commencing field activities and as applicable during field activities. A copy of the field guide must be present at the site along with this HASP.

5.4.2 Save Your Life Actions

Save Your Life Actions (SYLAs) are Safeguards designed to prevent fatalities when performing work associated with Managing Safe Work (MSW) Standards. They are important when performing activities that have an elevated risk. These include:

- Commercial Diving
- Confined Space Entry
- Electrical Safe Work

  - De-energized electrical work

  - Energized / Live electrical work

- Excavation
- Hot work
- Isolation of hazardous energy
- Lifting and rigging
- Working at heights

Reference guides are available for the above-referenced activities. These guides provide critical actions that workers must consider when performing the work. Safe Your Life Actions should be provided to workers early in the planning-phase and/or immediately prior to mobilizing to project sites.

5.4.3 Start Work Checks

Start Work Checks (SWCs) are verification tools designed to help workers confirm Save Your Life Actions are completed immediately prior to the start of work. These checklists are to be utilized by the work crew immediately prior to performing the work activities identified in Section 5.4.2. The checklists must be Verified by the Person Managing Control of Work before work may commence.

5.5 General Requirements

5.5.1 Photographs

Some Chevron locations require special permission to take photographs. These are typically office building, refineries, and bulk terminals.

5.5.2 Visitors

All visitors to Arcadis work areas must check in with the SHSO. Visitors will be cautioned to avoid skin contact with surfaces, soil, groundwater, or other materials that may impacted or be suspected to be impacted by constituents of concern (COCs).

Visitors requesting to observe work at the site must wear appropriate PPE prior to entry to the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices

are necessary, visitors who wish to enter the work area must have been respirator trained and fit tested for a respirator within the past 12 months.

5.5.3 Contact Lenses

According to the National Institute for Occupational Safety and Health, wearing contact lenses does not require enhanced eye and face protection. For chemical vapor, liquid, or caustic dust hazards, the minimum protection consists of well-fitting non-vented or indirectly vented goggles or full-facepiece respirators. Close-fitting safety glasses with side protection provide limited chemical protection but do not prevent chemicals from bypassing the protection. Workers should wear face shields over other eye protection when needed for additional face protection, but they should not wear face shields instead of goggles or safety glasses regardless of contact lens wear. Arcadis personnel and subcontractors are permitted to wear contact lens at this site when performing routine tasks identified in the HASP.

5.5.4 Use of Ground Fault Circuit Interrupter Line Cord

Ground fault circuit interrupter (GFCI) line protection must be used when operating portable corded equipment. GFCI protection may be built-in or included in a GFCI line cord or “whip cord” at the power-providing end of the setup. It is important to place the GFCI as close to the power source as possible.



5.5.5 Fixed Open-Blade Knives

The use of fixed open-blade knives (FOBKs) are prohibited without written approval from the Program Manager. Whenever possible, use an alternative cutting tool that is suitable for the job.

Always perform a thorough JSA to define the proper cutting tool for the task. If an FOBK is specified for use, submit an FOBK Exception Permit to your Program Manager for approval. If you are working on a MBUAW site, the FOBK Exception Permit must be signed or verbally approved by the MBU PM and approved by the Area Manager before beginning the task.

5.6 Tick Management Plan

A Tick Management Plan (TMP) has been developed to address tick-related risks while working in the field at affected sites. This plan serves to set clear Chevron expectations and to present the requirements for personnel working at Chevron and Arcadis sites located in tick prone areas and performing activities where tick encounters are likely (e.g. tall vegetation, grubbing/clearing, wooded areas, dormant undisturbed sites, etc.). This document is structured to focus on tick awareness and prevention of tick

bites, outlining expected site requirements in an order which follows the hierarchy of hazard controls. For completeness, procedures on proper tick removal and incident reporting are also presented.

5.7 Ground Disturbance

Ground disturbance includes any activity that breaks the surface of the ground (including pavement, concrete, asphalt, etc.). Examples of ground disturbance include drilling, hand augering, soil sampling, post or stake driving, ground rod installation, silt fence installation, excavations, trenching, etc. Ground disturbance is broken into Drilling and Excavation categories and there is a corresponding Drilling Specialized Permit or Excavation Specialized Permit to complete, both include a Ground Disturbance Safety Precaution Checklist. Chevron no longer requires the Ground Disturbance Checklist. Instead, there is a Line Strike Prevention Guidance and Line Locating Technologies Selection Tool.

If any public or private utility, whether active or inactive, or other buried material resembling a utility, conduit, artifact, or anomaly of potential significance (pea gravel, painted gravel, string, etc.), Stop Work must be initiated. Notification must be made to the Arcadis Project Manager immediately.

Utilities identified within 5 feet, vertically or horizontally, from a proposed excavation must be positively verified so it can be adequately protected. This may include exposing it using soft digging methods

5.7.1 Borehole Clearance

When applicable, crews must hand clear subsurface utilities to a depth of 5 feet below the ground surface. The diameter of the clearing borehole must be at least 110% of the diameter of the auger.

5.8 Traffic Control

Personnel working on and around retail and terminal sites must be aware of workplace hazards related to traffic control. Personnel must also understand the various levels of workspace protection and PPE requirements.

A Traffic Control Plan (TCP) may be required at the site. This plan includes the designation of pedestrian and motor vehicle areas at the site. The SHSO may modify the TCP, as needed, to address potential changes in site conditions. A detailed TCP, including a site map depicting traffic control measures, is included with the JMP in the HASP.

All personnel working at the site must wear Class 2 or higher high-visibility vests. The class identification is located on the garment tag. Class 3 vests are required for any night-time work or for work where traffic flows at more than 50 miles per hour. If drums, cones, or tubular markers are used to channelize pedestrians, the devices will be located so that there are no gaps between the bases in order to create a continuous bottom. The cap height of each individual drum, cone, or tubular marker will be no less than 36 inches to be detectable to people who use walking canes. Type 2 or Type 3 barricades are acceptable for use on Chevron project sites.

Type 1 Barricade	
Type 2 Barricade	
Type 3 Barricade	

When establishing work zones in parking lots or other areas with the potential for vehicle traffic, use high-visibility traffic cones (with one or more flags) or delineators with a height of 48 inches.

5.8.1 Requirement for Two-Person Crew

If there are questions regarding the number of personnel required to work safely at the site, a two-person crew must be dispatched for the first site visit. Subsequent review with these employees will determine if the site remains a two-person job. A two-person crew (minimum) is required if the location requires traffic to be redirected into another lane, a public traffic lane is temporarily closed, work is completed along the shoulder of a heavily trafficked roadway, or it is deemed otherwise necessary for the safety of the field crew. Consider using the buddy system for work in areas where hybrid or electric vehicles are popular because they can't be heard at slow speeds.

5.8.2 Level 1

Use of Level 1 protection may be acceptable for routine tasks of very short duration (less than 10 minutes in one area) where a worker can stay aware of traffic in the vicinity, such as during initial well gauging or surveying.

Maintain a maximum distance of 4 feet between cones and always leave an exit point from the work zone. If possible, use a vehicle with flashers activated to provide visual warning and protection from traffic. Use the buddy system or a watchperson when conditions warrant.

5.8.3 Level 2

If tasks of any duration are such that the worker cannot remain aware of traffic, elevate traffic control to Level 2. Level 2 traffic control is also necessary when working more than 10 minutes in one location, where Level 3 control is not warranted.

Level 2 requires using barrier tape on delineators with flags, field vehicles with flashing yellow lights or vehicle hazard lights, and/or other lane control devices. Barricades may also be used in conjunction with tape to improve warning because of the noise they make if overturned. Use the buddy system in areas where workers cannot give undivided attention to traffic when exposed to traffic hazards. Use Level 2 when temporarily securing an area for activities such as groundwater sampling, hand digging, or temporarily isolating an area for storage or moving equipment/supplies.

5.8.4 Level 3

High task loads that distract attention from vehicle traffic (including noise), work that is performed in low light conditions, or when there is a closure of access from public right-of-way to a work site (e.g., station entrance is closed) warrants Level 3 traffic control.

Use plastic security fencing and/or Type 2 or Type 3 barricades. A flashing yellow light on the vehicle may be used for additional visibility. Be cognizant of blocking the pump island or any other facility concerns. Use Level 3 traffic control when heavy equipment or power tools are used in areas near electrically energized or rotating equipment. Use Level 3 protection for workers or the public near slow-moving traffic or with high traffic volume, in driveways, around tripping hazards, and to control third-party foot traffic. If there is no third-party traffic potential, Level 3 is NOT required.

5.8.5 Level 4

Level 4 traffic control is warranted when work is being performed in a public right-of-way. Level 4 often requires oversight by a licensed traffic controller. Traffic control requirements may vary depending upon the authority having jurisdiction over the roadway (city, county, state, or federal).

5.9 Manual Handling

Manual handling of materials should only be conducted when all other alternatives (e.g. mechanical equipment, no action) have been evaluated and are inappropriate. Chevron has developed a Manual Handling Standard with a purpose to improve the identification, assessment, mitigation, or elimination of the risks associated with materials handling.

The amount of weight an individual can safely lift will depend on the individuals' physical condition, fatigue, perceived stress, layout of the work area, and worksite conditions. Individuals in good physical condition must not exceed the following limits:

1. For **non-ideal lifting** circumstances (bent over or when reaching out beyond elbow length from the front of the body), the maximum weight to be lifted and carried shall not exceed **25 lbs.** For weights over 25 lbs, seek use of mechanical devices.
2. For **ideal lifting** circumstances, the maximum weight to be lifted or carried by one person in good physical condition using two hands and standing erect with item held close to the body shall not exceed **50lbs.**

When performing a **team manual lift** with individuals in good physical condition the maximum weight to be lifted and carried shall not exceed **100 lbs**. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analyses, including updating any JSAs, before proceeding with a team lift of 2 or more persons.***

Max. Weight Table

Type of Lift	Number of Persons	Max. Weight
Non-ideal	1	**25 lbs (11kg)**
Ideal	1	**50 lbs (22kg)**
Ideal Team	2 or more	**100 lbs (45kg)**

**Information in Max. Weight Table is derived from NIOSH.*

Individuals in good physical condition must not exceed the following limits:

1. Carts and other assisting devices shall be used when moving items, especially for those items that are not ideal, bulky, have poor handles, shift from side to side, uneven loads, and place high stress and force on the hands.
2. Where manual carrying cannot be eliminated by using a handling/assisting device alone, refer to **Table – Carrying Limits** for carrying limits:

Carrying Limits

Position	# of Persons	Hand Contact	Max. Weight	Max. Travel Distance
Front of Body	1	2	**50 lbs (22kg)**	**10 yds/m**
Front of Body	1	2	**40 lbs (18 kg)**	**20 yds/m**
Front or Side of Body	1	2 or top handle	**30 lbs (13kg)**	**30 yds/m**

**Information in Carrying Limits Table is derived from Chevron's Safety in Design Standard.*

6 BEHAVIOR-BASED SAFETY PROGRAM AND TASK IMPROVEMENT PROCESS

Arcadis has a Behavior-Based Safety (BBS) Program (Risk Management Program) that focuses on proactively identifying and mitigating hazards, re-enforcing positive worker behaviors, and systematically identifying and correcting behaviors that may negatively impact worker safety.

One of the proactive tools in Arcadis' Risk Management Program is the TIP. As part of any project, no matter how simple or complex, TIPs should be conducted when practical and when able to integrate into normal business activities. TIPs are used as a hazard recognition tool for safety critical tasks, new or never performed tasks, and tasks that are performed routinely so as to avoid complacency. Chevron also uses BBS Observations. TIPs should be performed at a frequency of 1/400 hours for low risk work and 1/200 hours for high risk work (e.g. work requiring a Specialized Permit or Plan). Specific Business Units within Chevron may have varying observation metrics.

Similarly, near losses are opportunities to learn from events that could result in an injury or some other type of loss under different circumstances.

6.1 4-Sight Database

Arcadis uses a BBS system database known as 4-Sight to track TIP observations, near misses, and incident investigations.

6.2 Impact Database

Chevron only uses the Impact Database to track near misses and incidents. However, Arcadis employees will document near misses and incidents in both 4-Sight and Impact. Impact database reporting forms are available on the Chevron One Team Site.

7 MOTOR VEHICLES

Chevron has a Motor Vehicle Safety (MVS) Process that mainly affects motor carriers and vehicle operators under Chevron Reporting Boundaries. Traveling to and from project sites, to lunch or to purchase supplies, and other project-related travel are NOT under Chevron Reporting Boundaries. However, travel on site and travel between sites is under Chevron Reporting Boundaries and may affect Arcadis employees. This is particularly important at large facilities. Chevron's MVS Process is located on the Chevron One Team Site.

7.1 Training

To comply with Chevron's MVS process, Arcadis requires forward motion and backing online training. In addition, Arcadis staff who may drive within the Chevron Reporting Boundary are required to take

Commentary Driver training every 3 years. Commentary Driver training also includes off-tracking and spotter training. Commentary Drive Trainers are listed on the Arcadis Chevron Team Site.

7.2 Prior to Driving

7.2.1 Securing Cargo

Cargo must be secured in vehicles. Debris must be kept off of floors. Items should not be stored in back seats or behind seats because they could be projectiles if harsh braking or a crash occurs. Secure all items in the bed of the vehicle or in the back of an SUV (use vehicle-specific netting or straps).

7.2.2 Pre-Trip Vehicle Inspection

Prior to mobilizing to a site, a pre-trip inspection of the vehicle must be completed.

7.3 Forward Motion

Several operation strategies apply when driving at low speeds or prior to operating a vehicle:

- always maintain a minimum 3-foot cushion between vehicles and objects, and travel at low speeds
- always conduct a 360-degree walk around (Get Out And Look [GOAL]) prior to operating a vehicle.
- When passenger vehicles are in motion, all occupants must be seated in designated areas of the vehicle and must wear safety belts. Personnel may not occupy the bed of trucks or trailers while the vehicle is in motion.
- Cell phone use while driving is prohibited when working on all Arcadis and Chevron projects. This includes driving on site, as well as driving to and from the site. Hands-free devices are also prohibited.

7.4 Backward Motion

7.4.1 Use of Spotters

Spotters must be used when backing a vehicle. If more than one Arcadis employee is present at the site, request a spotter before moving a vehicle. A spotter is REQUIRED for forward or backward movement if the vehicle must get within 3 feet of a stationary object. Prior to moving a vehicle, communicate a plan with the spotter. The spotter must:

- Be familiar with how to properly spot a vehicle and/or receive spotter training.
- Stay a safe distance from the vehicle while acting as spotter.
- STOP the vehicle if a new spotting location is necessary.
- Stay in constant visual or verbal communication with the driver.
- Avoid standing on uneven terrain.

- Do not walk while spotting.
- Use common hand signals. Communicate these signals with the driver before moving the vehicle.
- Be able to focus on spotting.

The driver must:

- Ensure that the spotter is a safe distance from vehicle.
- STOP the vehicle if the spotter is no longer visible.
- STOP and TRACK with the spotter if terrain is unfavorable.
- Understand the hand signals to be used by the spotter.
- Proceed at very slow rate of speed.
- Be aware of surroundings at all times.

7.5 Parking

When parking, every attempt must be made so that the first movement is forward when leaving the parking space. Vehicles should be parked in a designated safe and legal location with parking brakes set. When not parked in a designated parking space (e.g. near a groundwater monitoring well), vehicles should not be parked within 3 feet of a stationary object. In addition:

- When a driver leaves a vehicle, the engine shall be turned off, the transmission placed in park (placed in first gear or reverse for manual transmission), the parking brake set, the keys removed from the ignition and doors closed. Exception to this is for operational needs/power take off (e.g., vacuum trucks, drill rigs, or other similar vehicles). Vehicles that fall into this exception category must have the parking brake set and wheels chocked.

Vehicle idling is not permitting at Chevron project sites. In the event the motor vehicle serves as the best location to keep personnel and/or equipment warm or cool, a variance request must be submitted and approved by the Chevron Project Manager (See Section below).

7.5.1 Wheel Chocks

Wheel chocks are required for all heavy vehicles with a GVW of 10,000 lbs or greater, utility trucks with dual wheels, and all disconnected trailers. Wheel chocks must be engineered and cannot be field fabricated.

7.6 Discouraged Vehicles

All-terrain vehicles, snow mobiles, and motorcycles are all strongly discouraged and requires a variance (as described below) to use on a project site.

7.7 Motor Vehicle Safety Variance Process

Chevron has established an MVS Variance Process in the event that suppliers cannot adhere to all of the process. Use of this process is unlikely; however, in the event it becomes necessary, Arcadis must define the current circumstances on an MVS Variance Request Form and submit it to the Chevron MVS Advisor and the Chevron Area Manager/Team Leader within 20 business days. Arcadis must detail what will be done to ensure an acceptable level of risk. The most current MVS Variance Form is provided on the Chevron One Team Site.

8 PERSONAL EXPOSURE MONITORING AND RESPIRATORY PROTECTION

Personal exposure monitoring and area monitoring (for confined space and/or hot work) will be documented on the Real-Time Exposure Monitoring Data Collection Log or on a Confined Space Entry Specialized Permit or Hot Work Specialized Permit, respectively. The above-referenced monitoring activities are synonymous in Chevron's Portable Gas Detection Standard; therefore, "gas detection" and "exposure monitoring" may be used interchangeably. All monitoring equipment will be maintained and calibrated in accordance with manufacturer's recommendations.

8.1 Training

Individuals performing real-time air monitoring must be trained, by an Authorized Trainer, on the instrument they will utilize at the project site. Arcadis provides "Portable Gas Detection" training as a classroom course. Contact Greg Mason or Aaron Svitana for details.

8.2 Hydrogen Sulfide

Teams may be required to provide individual hydrogen sulfide monitors for all field staff. Typically, these locations include but are not limited to: oil fields, refineries, bulk terminals. Chevron requires the individual monitors be placed within 12 inches of the nose. Chevron discourages the practice of placing monitors on hard hats. Hydrogen sulfide is very slightly heavier than air and may settle in low areas if wind is minimal or absent. Personal Hydrogen Sulfide monitors are typically set to alarm at 10ppm. Arcadis policy allows for an 8-hour time weighted average of Hydrogen Sulfide at 1ppm and a short-term exposure limit at 5 ppm. Instruments may require alarm point modification or additional meters may be utilized to measure the breathing zone, leaving the individual monitors set at 10ppm to follow regulatory actions levels and Chevron protocol. Regardless of the chosen methodology, Arcadis employees are not to be exposed above an 8-hour time-weighted average of 1ppm or for more than 15 minutes at 5ppm.

9 INCIDENT INVESTIGATION AND REPORTING PROCESS (II&R) AND INCIDENT CARE MANAGEMENT (ICM)

This Process outlines Arcadis' expectations for the investigation and reporting of incidents that may occur on Chevron projects and/or with Chevron's Reporting Boundaries. The objective of this process is to assure that incidents are properly reported and investigated and that lessons learned are shared to reduce the potential for future incidents in a manner consistent with Arcadis and Chevron expectations.

This process provides instruction to Arcadis' Chevron-Team members regarding:

- What types of incidents must be reported;
- Who to notify;
- Expectations for injury case management;
- Notification timing; and
- How to investigate and report incidents.

This process supplements the guidance and expectations outlined in Arcadis' Incident Reporting and Investigation H&S Standard (ARC HSMS010), Arcadis' Employee Field Health & Safety Handbook Section F on Incident Investigation and Chevron's Incident Investigation and Reporting (II&R) Process Document.

9.1 IMPACT Incident Reporting and Investigation Forms

All incidents and near misses must be documented in Chevron's IMPACT database within 24 hours. Arcadis does not have direct access to IMPACT; therefore, Arcadis must fill out an IMPACT Incident Report Offline Template and provide to the Chevron PM with sufficient time to enter into IMPACT. The most current version of Chevron's Offline IMPACT Template can be found on the Team Site.

The final Root Cause Analysis (RCA) investigation data must be entered into IMPACT and an investigation report generated within 15 days for all Level 1 events and 45 days for Level 2 & 3a/b events of the incident with the first day beginning on the first work day after the incident. The incident investigation must be documented on an IMPACT Investigation Report Offline Template and provided to the Chevron PM with sufficient time to enter into IMPACT. This applies to all RCAs regardless of the classification (Level 1, 2, 3a/b). If delays are expected, for example, due to waiting on laboratory analysis or other reasons, then the investigation team leader should inform the management sponsor of the need for the delay. The management sponsor will notify and obtain General Manager approval for extending the RCA due date. Below is a suggested schedule for meeting the investigation due date:

- Schedule the Investigation/RCA meeting within the first days after the incident.
- Submit a draft IMPACT Investigation Report to the Chevron PM within three days after the incident.
- Between Day 4 to 14 incorporate comments and submit the draft final Investigation Report.

Please note that rigor of investigation will depending on the severity of the incident or potential for undesirable consequences. The investigation shall include a RCA which must be facilitated by a

competent and trained RCA Facilitator. An Arcadis trained facilitator may facilitate a Level 1 incident (if approved by the Chevron PM). For Level 2 or 3 incidents, the investigation facilitator must be a Chevron employee. In these situations, a trained Arcadis facilitator must be included on the investigation team. Contact Program Managers or the PIC for the name of trained RCA facilitators within Arcadis.

9.2 Near Loss and Loss Reporting and Incident Care Management

Incident Care Management (ICM) is incorporated in the Near Loss/Loss Reporting plan referenced above and depicted in the attached process diagram. Chevron has specific requirements for ICM that include: a) 24/7 Injury Consultation Services, b) pre-identified occupational medical facilities, c) actions for injuries and d) injured status updates. These requirements are for both Arcadis staff and subcontractor staff. Arcadis has contracted with WorkCare to provide these services for both Arcadis and subcontractors working on Chevron projects.

Following the process and roles and responsibilities outlined in our Near Loss/Loss Reporting process will meet Chevron's requirements. Details of this process relative to Arcadis managed Chevron project sites can be found on the Arcadis SharePoint Site.

The reporting process and project team expectations are shown in the Near Loss/Loss Reporting Plan and Roles and Responsibilities matrix at the end of this section. This Reporting Plan is required to be completed prior to implementing field work and updated if key contacts listed change. It is expected that all project team members (including subcontractors) understand this project-specific plan and their roles and responsibilities associated with the plan. This plan will be prominently displayed at the job site and reviewed regularly with the team.

Issued Jan. 2019 – Version 1

CEMREC Incident Notification & Reporting

Incident Notification	Level 1 Not Reportable[1]			Level 2 All Corporate Reportable			Level 3a All Corporate Reportable			Level 3b All Corporate Reportable		
	Immediate	Within 8 hrs.	Within 24 hrs.	Immediate	Within 8 hrs.	Within 24 hrs.	Immediate	Within 8 hrs.	Within 24 hrs.	Immediate	Within 8 hrs.	Within 24 hrs.
CEMREC Supervisor	X			X			X[2*]			X[2*]		
CEMREC Area Manager			X	X			X[2*]			X[2*]		
CEMREC OE/HES Specialists	X			X			X[2*]			X[2*]		
CEMREC OE/HES Manager				X			X[2*]			X[2*]		
General/Regional Manager				X			X[2*]			X[2*]		
EM/RE VP / CEMREC President					X		X[2*]			X[2*]		
CEMREC CHESM Specialist[3]						X			X			X
Chevron Legal								X		X[*]		
Chevron VP HES							X[4*]	X		X[*]		
Chevron Emergency Information Center									X[*]	X[2*]		
Chevron Chairman							X[4*]			X[*]		
Additional Notifications							OSHA[5]		NRC[6]	OSHA[5]		NRC[6]

Documentation	Within 48 hrs.	Within 15 Days	Incident Closed	Within 24 hrs.	Within 45 Days	Incident Closed	Within 24 hrs.	Within 45 Days	Incident Closed	Within 24 hrs.	Within 45 Days	Incident Closed
First Report in OE IMPACT in "Open" status[7]	X			X			X			X		
Final Incident Report		X			X			X			X	
Quick Share^		A			A			A			A	
Alert[B]						X			X			X
Bulletin[B]						X			X			X
Chairman's Fatality Review												X

Notes

- Operations is responsible to communicate event through their chain of command and HES is responsible to communicate event through their chain of command to ensure proper notifications per the CEMREC Incident Notification & Classification Guide.
- Based on the evidence gathered, the Chevron Supervisor makes an initial severity determination of the event using the classification matrix. Classification is verified by the IIR Specialist.
- Near misses do not need to be reported to CEIC or the Chairman. Both incidents and near misses shall be investigated at their most probable classification level.

Notifications

1. Reportable to the Corporation: recordable injury/DAFW, >1 bbl. to secondary containment/land, any sheen to water, all spills to water, all fires, all MVCs
2. Report all HES incidents requiring immediate notification to the Chevron Emergency Information Center as defined in HES Incidents Requiring Immediate Notification*. Contact the PGPA Rep. in this instance as well. (CEIC) at 1-(800) 231-0623 or 1-(510) 231-0623.
3. CHESM Specialist is notified through the First Report generated from opening event in IMPACT and will notify Contractor Owner of event to confirm alignment with the CHESM Process.
4. Applies only to incidents requiring multiple employee, contractor or 3rd party overnight hospitalizations (for more than observation), or an LOC event resulting in spill of 50 bbl. petroleum product to water or 500 bbl. to land
5. OSHA – Notify OSHA of all work-related fatalities within 8 hours and all in-patient hospitalizations, amputations, and losses of an eye within 24 hours of finding out about the incident. Notification must be completed by the employer of the worker(s) injured. Notification may be made with the nearest OSHA area office, report online at http://www.osha.gov/report.html, or by calling the hotline at 1-800-321-6742.
6. For U.S. offshore operations, immediately notify US Coast Guard (USCG) National Response Center (NRC) at 1-(800) 424-8802
7. First Report is optional for L1 Actual/L1 Probable hydrocarbon spills to secondary containment/land unless investigated.

* Refer to the Chairman's serious incident reporting requirements link on the CEMREC IIR website for detailed instructions

For injury / illness events:

- U.S. based CEMREC Employees - Call Axiom at 1-877-502-9466.
- U.S. based Contractor - Call Axiom or Contractor's Injury Care/Case Management Service
- For non-U.S. Chevron Employees and Contractors, familiarize yourself with the local notification process and identified treatment sites.

Security incidents (i.e., fatalities, work place violence, theft or loss of property, suspicious activity) must be reported to the Global Security Advisor and the CEMREC SOPA Specialist.

Level 1 Actual or Potential Instance of Non-Compliance - Notify Project Manager immediately. Notifications to Area Manager and HES Manager at the discretion/judgment of the PM; notifications to other CEMREC BU, OE/HES, PGPA and legal resources based upon the magnitude of the event.

Notifications must be given for all employee or contractor loss of life on Chevron premises or within OE reporting boundaries, third party loss of life if they involve Chevron assets or operations, or incidents in Non-Operated Joint Ventures (NOJVs) for loss of life if reported by the operator to Chevron within 72 hours of the incident or significant media. Also, for fire, explosion, well blowout or other incident damaging Company and/or third-party assets with costs likely to exceed $1,000,000 for direct physical damage to equipment or property, loss of inventory, and incident response.

Documentation

A. Quick Share template is an optional template to share learnings from an HES event or trend of HES events in the field and is found on the CEMREC IIR website.
B. Alerts and Bulletin templates are found on the CEMREC IIR website.

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CEMREC Event Severity Determination Matrix

*Refer to Table 1 of the Chairman's Serious Incident Reporting Requirements to determine if event meets criteria for immediate notification to the Chairman. If yes, follow immediate notification requirements.

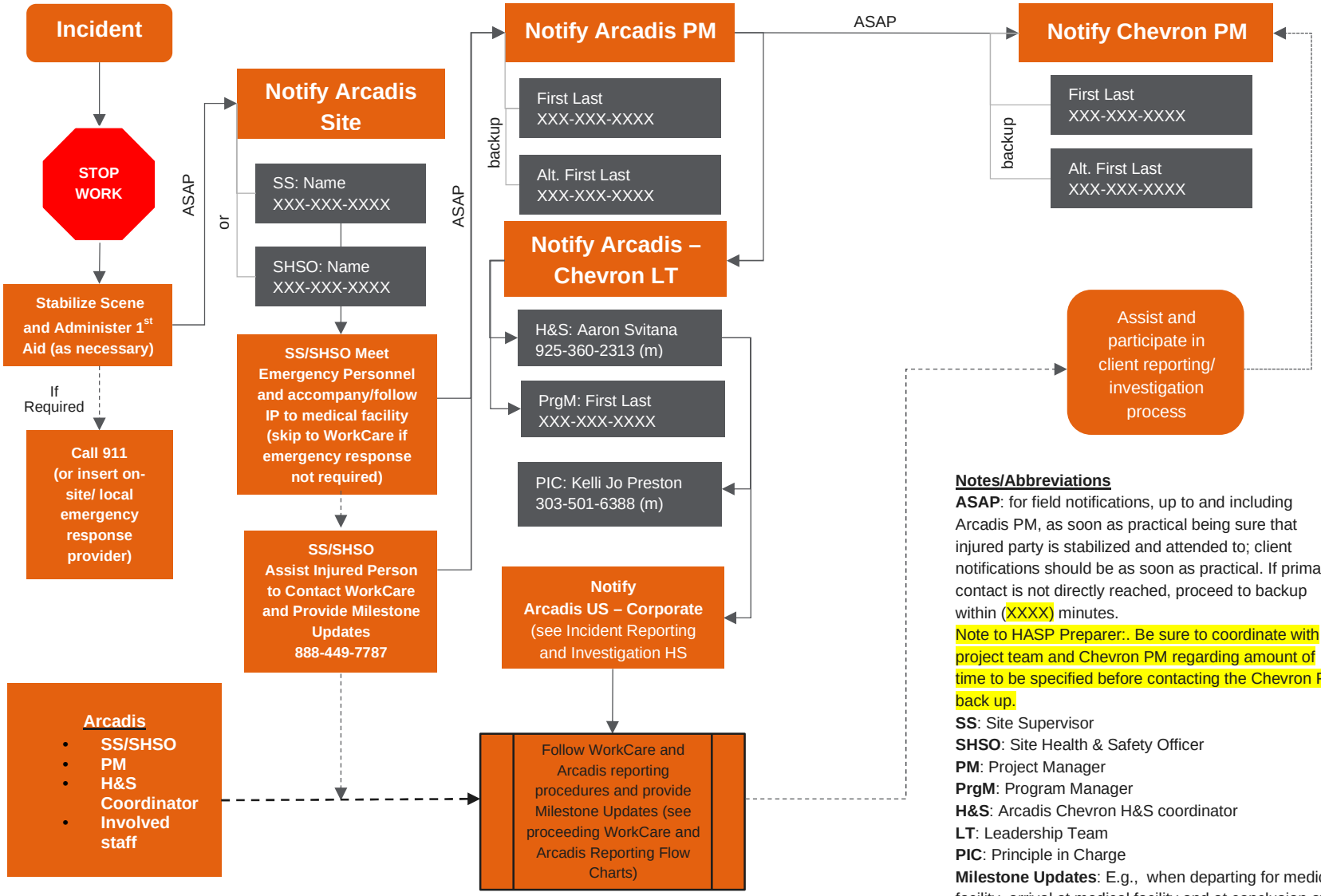
What	Level 1	Level 2	Level 3a	Level 3b
Injury / Illness*	Includes Company, Contractor, and Third Party			
Injury / Illness[1, 5]	▲ First aid ▲ Work-related illness	• Recordable (all recordable injuries not meeting SIF OEDRS definitions)	Injury/Illness SIF: • All Serious Injuries and Fatalities, as defined by OEDRS • Will be combined with former 3b to create a single SIF classification. • IMS: 3a = Serious Injury / 3b = Fatality	
Spills / Releases	Consider process safety and LOC decision criteria. All spills/releases that may meet LOC criteria should be reviewed by a designated LOC Specialist.			
Liquid Petroleum to land or secondary containment[1, 2, 5]	1 bbl to 5 bbl	> 5 bbl to 50 bbl	> 50 bbl to 500 bbl	> 500 bbl
Liquid Petroleum to water[1, 2]	≤ 1 bbl	> 1 bbl to 10 bbl	> 10 bbl to 50 bbl	> 50 bbl
Chemical to land or secondary containment[1, 2, 5]	160 kg to 800 kg	> 800 kg to 8,000 kg	> 8,000 kg	> 8,000 kg that threatens human safety, health or environment
Chemical to water[1, 2]	≤ 160 kg	> 160 kg to 1,600 kg	> 1600 kg to 8,000 kg	> 8,000 kg that threatens human safety, health or environment
Flammable Gas to Air[1, 2, 5]	50 kg to 500 kg actual quantity released	> 500 kg to 5,000 kg actual quantity released	> 5,000 kg to 200,000 kg actual quantity released	• Release of gas or LPG greater than 200,000 kg or • Release of material that introduces a fire or explosion hazard to a populated area or • Incidents resulting in the need for employees or public to shelter-in-place or evacuate
Threshold Quantity (TQ) vapors or gases[1, 2, 5]	10% TQ Toxicity	> 10% TQ Toxicity to TQ Toxicity	> TQ Toxicity to 10x TQ Toxicity	• > 10x TQ Toxicity or • Incidents resulting in the need for employees or public to shelter-in-place or evacuate
Environmental Impact[3]	Minor and reversible impact	Serious but reversible impact	Irreversible impact	
Agency Reportable	Spill/release reportable to any outside agency	Spill/release reportable to any outside agency that results in an official consequence		
Loss of Containment*	Injury/illness, Environmental (Spills/Releases), fire/explosion, Pressure Relief Device (PRD) incidents, Process Safety, and well control events are potentially reportable LOC events. Reportable Tier 1, Tier 2, and Tier 3 LOC events criteria do not directly correspond to severity levels in this matrix. Consult local LOC Specialist for assistance.			
Fire / Explosion	Consider process safety and LOC decision criteria. All fire/explosions that may meet LOC criteria should be reviewed by a designated LOC Specialist.			
Fire / Explosion[1, 4]	≤ $2500 damage	> $2500 to $500,000 damage	> $500,000 damage	• > $500,000 damage to company and/or third-party assets or • Release of material that introduces a fire or explosion hazard to a populated area
Cost of Incident (COI)*	USD on a Chevron share basis. Refer to COI values to determine property damage severity levels.			
Cost[4]	$100,000 to $500,000	> $500,000 to $3MM	> $3MM	N/A
Customer Impact NOTE: Customer events are calculated using $125/hr. rate and entered in IMPACT as Reliability Consequence.	Disruption of working hours caused by an equipment or process failure within RE control with loss of productivity of $100,000 to $500,000	Disruption of working hours caused by an equipment or process failure within RE control with loss of productivity of > $500,000 to $3MM	Disruption of working hours caused by an equipment or process failure within RE control with loss of productivity of > $3MM	N/A
Reputation				
Media Attention*	None	Local	National	Worldwide
Company Reputation	No impact	May have minor impact	May have moderate impact	May have major impact
Work-related MVC				
Motor Vehicle Crash[4]	Light	Serious	Major	Catastrophic
Compliance	Regulatory incidents (on a Chevron-share basis)			
Agency Fines	Incidental agency notifications or warnings that carry a financial penalty with an estimated cost ≤ $500,000	Agency fines and interventions that carry a financial penalty with an estimated total cost > $500,000 to $3MM	Agency fines and interventions that carry a financial penalty with an estimated total cost > $3MM to $10MM	• Agency fines and interventions that threaten company reputation and the ability to operate or • Carry a financial penalty with an estimated total cost > $10MM
Permit	Permit exceedance			
Aviation (ASRE)	Reference Aviation Safety, Reliability, and Efficiency (ASRE) for guidance specific to aviation events.			
Marine (MSRE)	Reference the Marine Incident Severity Matrix for guidance specific to marine events.			
Global Security	Reference the Global Security site for guidance specific to security events such as kidnapping and ransom.			

1 If LOC has multiple consequences, classify according to most severe consequence.
2 If release duration > 1 hour, use largest quantity of kg released in any one hour period for severity level determination. Refer to OEDRS Section 12.
3 Environmental Impact - Any change to the environment, adverse or beneficial, wholly or partly resulting from environmental aspects relating to an operation.
4 Defined in OE Data and Reporting Standard. Severity determination for any consequence not covered above shall be based on cost of incident.
5 Tier 3 LOC thresholds may be below IIR thresholds in these categories. Consult LOC Specialist and OEDRS for reporting requirements.

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Enter title in dialogue box

Loss/Near Loss Reporting Plan – Former Texaco Research Center, 45 Old Glenham Road, Glenham, NY 12527



Notes/Abbreviations

ASAP: for field notifications, up to and including Arcadis PM, as soon as practical being sure that injured party is stabilized and attended to; client notifications should be as soon as practical. If primary contact is not directly reached, proceed to backup within (XXXX) minutes.

Note to HASP Preparer:. Be sure to coordinate with project team and Chevron PM regarding amount of time to be specified before contacting the Chevron PM back up.

SS: Site Supervisor
SHSO: Site Health & Safety Officer
PM: Project Manager
PrgM: Program Manager
H&S: Arcadis Chevron H&S coordinator
LT: Leadership Team
PIC: Principle in Charge
Milestone Updates: E.g., when departing for medical facility, arrival at medical facility and at conclusion of medical professional consultation.

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Reporting Plan Roles and Responsibilities:

Role	Responsibility
Site Worker (all including SS, SHSO, PM, etc.)	• Recognize hazards/unsafe conditions • Use Stop Work Authority • Report near losses (NL)/incidents/injuries immediately to SS or SHSO
Site Supervisor (SS) and Site Health & Safety Officer (SSHO)	• Review and understand this procedure • Verify and validate site worker(s) review and understand this procedure • Assure appropriate Stop Work Authority has been utilized and secure incident site/equipment/site workers • Respond to reports of NL/incidents/injuries and initiate reporting and care management actions • Verify that emergency medical services (e.g. 911) has been notified, as necessary • Assist injured person (IP) to contact WorkCare • Gather appropriate initial facts regarding event and contact Arcadis PM or backups as soon as possible (must have live conversation) • Accompany IP to medical facilities and report milestone updates to Arcadis PM and Arcadis Chevron Leadership Team (LT). E.g. mile stone updates include when departing for medical facility, arrival at medical facility and at conclusion of medical professional consultation. • Coordinate gathering of facts, timelines and information to support Arcadis and Chevron incident investigation and reporting process (IIR) • Test this procedure by conducting credible mock person-down drill at least annually
Arcadis PM or backup	• Report facts regarding the event ASAP (i.e. within 1-2 hours and absolutely no later than end of shift) to Chevron PM or backup (must have live conversation), then Arcadis Chevron LT and Arcadis Corporate H&S • To the extent practical, given event circumstances, Arcadis Chevron LT notification should be done by Arcadis PM (for consistent transfer of facts) but may be delegated (preferably SS or SHSO) • Assist SS/SHSO in gathering of facts, timelines and information to support Arcadis and Chevron incident investigation and reporting process • Act as primary point of contact with Chevron PM throughout this process • Verify that project team has conducted mock person-down drills at least annually
Arcadis Chevron H&S Coordinator	• Coordinate with Arcadis PM, SS and SHSO to verify that appropriate facts, timelines and information are gathered to support Arcadis and Chevron incident investigation and reporting process • Participate in Arcadis and Chevron incident reporting process and review documentation • Assist Arcadis PM as point of contact with Chevron PM and Chevron H&S management • Coordinate with WorkCare and Corporate H&S to ensure appropriate care management

9.3 IMPACT Incident Reporting and Investigation Forms

All incidents and near misses must be documented in Chevron's IMPACT database within 24 hours. Arcadis does not have direct access to IMPACT; therefore, Arcadis must fill out an IMPACT Incident Report Offline Template and provide to the Chevron PM with sufficient time to enter into IMPACT. The most current version of Chevron's Offline IMPACT Template can be found on the Team Site.

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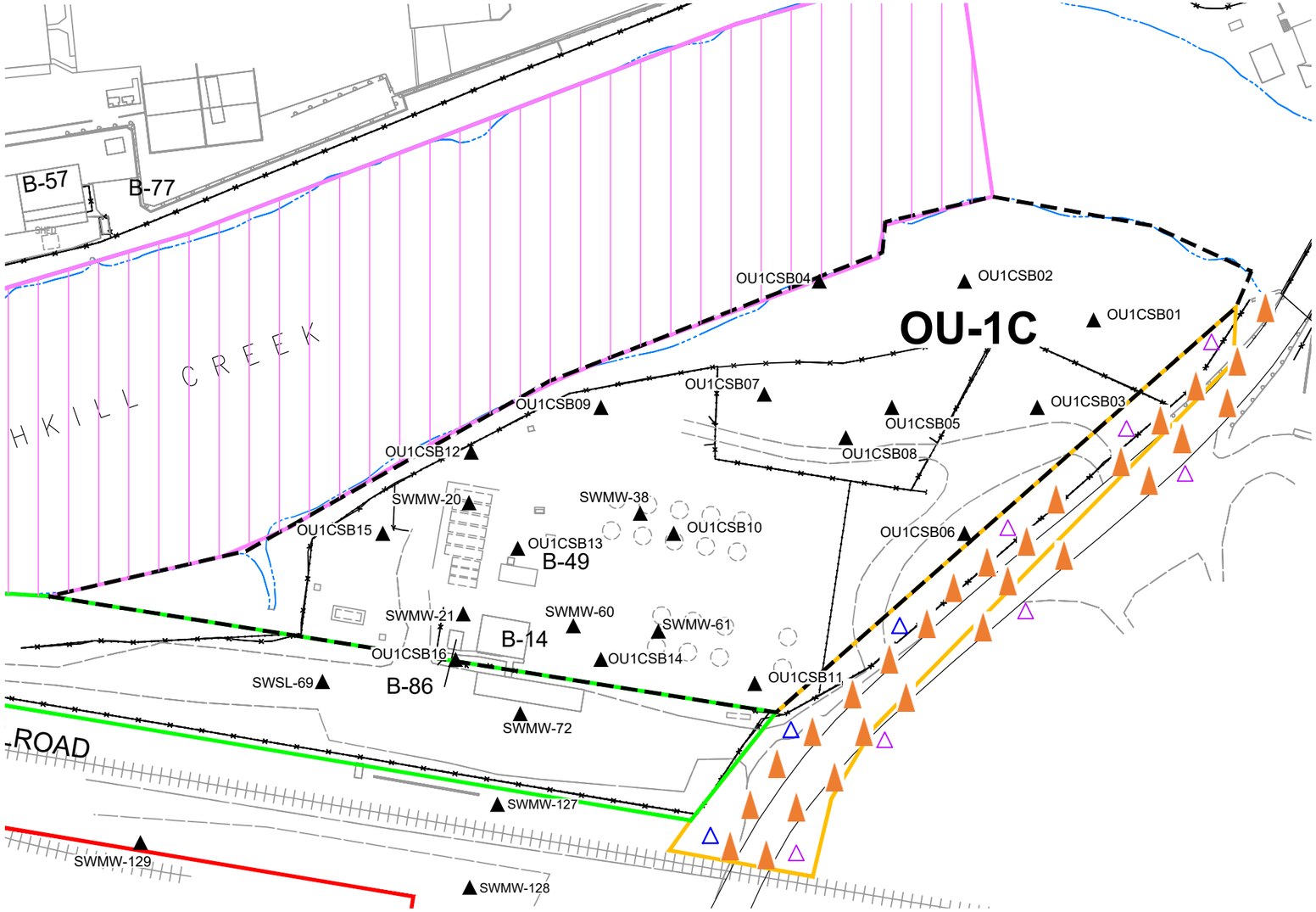
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Enter title in dialogue box

https://thesource.arcadissource.com/clients/Chevron/HASP/Selection%20of%20Occupational%20Medical%20Clinic%20(WorkCare%20Clinic)/Arcadis%20CVX%20ICM%20LI_NLI%20Reporting.pdf



LEGEND:

- FENCE
- RAILROAD
- WETLAND
- STREAM
- FORMER SITE FEATURES
- FORMER BUILDING
- SOIL BORING LOCATIONS
- PROPOSED SOIL BORING LOCATIONS (MAXIMUM DEPTH 15 FT)
- PROPOSED SOIL BORING LOCATIONS (MAXIMUM DEPTH 2.5 FT)

PARCELS

LEGEND	DESCRIPTION, NAME
	OU-1 MAIN FACILITY PARCEL
	OU-1C FORMER WASHINGTON AVENUE TANK FARM PARCEL
	OU-1D RESIDENTIAL PROPERTY PARCEL
	OU-1F FISHKILL CREEK
	OU-2 ROAD PARCEL
	OU-4 HYDROELECTRIC FACILITY & DAM PARCEL

48" TALL CONE

NOTES:

1. THE OU-2 FOOTPRINT IDENTIFIED ON THIS FIGURES IS KNOWN TO BE APPROXIMATE AND BASED ON THE FIGURE PRESENTED IN THE SITE'S OCTOBER 31, 2013 ORDER OF CONSENT. ARCADIS WILL CONFIRM THE PROPOSED BORING LOCATIONS IN THE FIELD WITH A NEW YORK STATE LICENSED LAND SURVEY TO VERIFY THEIR PRESENCE ON CHEVRON OWNED LAND BEFORE MOBILIZING THE NEW YORK STATE LICENSED DRILLER.

SOURCE:

1. BASEMAP PROVIDED BY PARSONS COMMERCIAL TECHNOLOGY GROUP, SURVEYED 2007 BY BADEY & WATSON, SURVEY & ENGINEERING, P.C. THE MERIDIAN AND COORDINATE VALUES HEREON REFER TO THE NEW YORK STATE COORDINATE SYSTEM, EAST ZONE NAD83, EXPRESSED IN FEET.
2. WELL AND BORING ELEVATIONS ARE REFERENCED TO A SITE VERTICAL DATUM ESTABLISHED BY TEXACO IN 1957, HEREINAFTER REFERRED TO AS THE TEXACO DATUM, THIS DATUM IS 1.07' BELOW NAVD 1988.

0 80' 160'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER TEXACO RESEARCH CENTER BEACON
GLENHAM, NEW YORK

TRAFFIC CONTROL PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1

CITY:CRANBURY-NJ DIV/GROUP:IMDV-ENVCAD DB:JMEYER LD:JMEYER PIC:(Opt) PM:EMEYER TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\jmeyer\BIM 360\Arcadis\ANA - CHEVRON CORPORATION\Project Files\BEACON-SITE\2021101-DWG\OU2SIWP-FIGS-PROPOSED SAMPLE LOCATIONS.dwg LAYOUT: 5 SAVED: 1/27/2021 9:00 PM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 1/27/2021
9:00 PM BY: MEYER, JULIE
XREFS: IMAGES: PROJECTNAME: ---
BEACON-BASEMAP
OU2SIWP-TITLEBLOCK-LB


Site entrance
Old Glenham Rd
School St
Gate
School St
Drum Storage Area
RCRA drums (empty drums) - Located between buildings
Google
Imagery ©2020 Maxar Technologies, New York GIS, USDA Farm Service Agency, Map data ©2020
United States
Terms
Send feedback
200 ft

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox
Synonyms:
Product number: Alconox

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer
Alconox, Inc.
30 Glenn Street
White Plains, NY 10603
1-914-948-4040

Supplier
Not Applicable

Emergency telephone number:
ChemTel Inc
North America: 1-800-255-3924
International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:



Signal word: Warning

Hazard statements:
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

4.2 Most important symptoms and effects, both acute and delayed

None

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

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

8 Exposure controls/personal protection





8.1 Control parameters :

7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3.

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower**: **Explosion limit upper**:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density**:	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition temperature**:	Not determined or not available.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: None
ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name: None
ADR, ADN, DOT, IMDG, IATA

14.3 Transport hazard classes:
ADR, ADN, DOT, IMDG, IATA

Class: None
Label: None
LTD. QTY: None

US DOT
Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

	Comments: None	**Comments:** None
14.4	**Packing group:** ADR, ADN, DOT, IMDG, IATA	None
14.5	**Environmental hazards** :	None
14.6	**Special precautions for user:**	None
	Danger code (Kemler):	None
	EMS number:	None
	Segregation groups:	None
14.7	**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.	
14.8	**Transport/Additional information:**	
	Transport category:	None
	Tunnel restriction code:	None
	UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

Germany MAK: Not classified.

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

NFPA: 1-0-0

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 12.08.2015 **Revision** : 12.10.2015

Trade Name: Alconox

HMIS: 1-0-0

SAFETY DATA SHEET

Nonflammable Gas Mixture: Isobutylene / Nitrogen / Oxygen

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier : Nonflammable Gas Mixture: Isobutylene / Nitrogen / Oxygen

Other means of identification : Not available.

Product use : Synthetic/Analytical chemistry.

SDS # : 002103

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.

Product code : 002103

Section 3. Composition/information on ingredients

Ingredient name	%	CAS number
Nitrogen oxygen Isobutylene	75 - 80.5 19.5 - 23.5 0.0001 - 1.13	7727-37-9 7782-44-7 115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Section 7. Handling and storage

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Nitrogen	Oxygen Depletion [Asphyxiant]
oxygen	None.
Isobutylene	**ACGIH TLV (United States, 3/2015).** TWA: 250 ppm 8 hours.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas.

Color : Not available.

Melting/freezing point : -140.7°C (-221.3°F) This is based on data for the following ingredient: isobutylene. Weighted average: -211.14°C (-348.1°F)

Critical temperature : Lowest known value: -146.95°C (-232.5°F) (nitrogen).

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Flash point : Not available.

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Highest known value: 1.94 (Air = 1) (isobutylene). Weighted average: 1.01 (Air = 1)

Gas Density (lb/ft ^{3}) : Weighted average: 0.07

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : No specific data.

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

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Section 11. Toxicological information

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Nitrogen	0.67	-	low
oxygen	0.65	-	low
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1956	UN1956	UN1956	UN1956	UN1956
UN proper shipping name	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)	COMPRESSED GAS, N.O.S. (nitrogen, oxygen)
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	-	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2). **Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Clean Air Act (CAA) 112 regulated flammable substances: isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

Section 15. Regulatory information

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Nitrogen	75 - 80.5	No.	Yes.	No.	No.	No.
oxygen	19.5 - 23.5	No.	Yes.	No.	No.	No.
Isobutylene	0.0001 - 1.13	Yes.	Yes.	No.	No.	No.

State regulations

Massachusetts : The following components are listed: NITROGEN; OXYGEN (LIQUID); 2-METHYLPROPENE

New York : None of the components are listed.

New Jersey : The following components are listed: NITROGEN; OXYGEN; ISOBUTYLENE; 1-PROPENE, 2-METHYL-

Pennsylvania : The following components are listed: NITROGEN; OXYGEN; 1-PROPENE, 2-METHYL-

International regulations

International lists

National inventory

Australia : All components are listed or exempted.

Canada : All components are listed or exempted.

China : All components are listed or exempted.

Europe : All components are listed or exempted.

Japan : Not determined.

Malaysia : Not determined.

New Zealand : All components are listed or exempted.

Philippines : All components are listed or exempted.

Republic of Korea : All components are listed or exempted.

Taiwan : All components are listed or exempted.

Canada

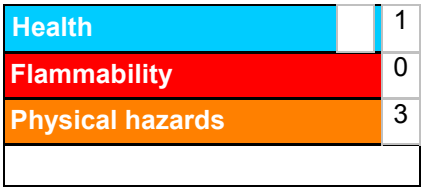
WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Butene (all isomers)
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Section 16. Other information

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Press. Gas Comp. Gas, H280	On basis of test data

History

Date of printing : 6/24/2016

Date of issue/Date of revision : 6/24/2016

Date of previous issue : 1/26/2016

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950
US GHS

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

* * * 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:

Flammable Liquid - Category 2
Skin Corrosion/Irritation - Category 2
Germ Cell Mutagenicity - Category 1B
Carcinogenicity - Category 1B
Toxic to Reproduction - Category 1A
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Specific Target Organ Toxicity (Repeat Exposure) - Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)
Aspiration Hazard - Category 1
Hazardous to the Aquatic Environment – Acute Hazard - Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Highly flammable liquid and vapour.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe mist/vapours/spray.
Use only outdoors or in well-ventilated area.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog, dry chemical fire extinguishers or hand held fire extinguisher.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Get medical advice/attention if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting.

Storage

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

Disposal

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

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

CAS #	Component	Percent
86290-81-5	Gasoline, motor fuel	100
108-88-3	Toluene	1-25
106-97-8	Butane	<10
1330-20-7	Xylenes (o-, m-, p- isomers)	1-15
95-63-6	Benzene, 1,2,4-trimethyl-	<6
64-17-5	Ethyl alcohol	0-10
100-41-4	Ethylbenzene	<3
71-43-2	Benzene	0.1-4.9

110-54-3	Hexane	0.5-4

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

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

First Aid: 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.

First Aid: Skin

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

First Aid: 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. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

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.

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

General Fire Hazards

See Section 9 for Flammability Properties.

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.

Hazardous Combustion Products

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

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.

Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration.

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.

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

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 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

Keep away from strong oxidizers.

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

Component Exposure Limits

Gasoline, motor fuel (86290-81-5)

ACGIH: 300 ppm TWA
500 ppm STEL

Toluene (108-88-3)

ACGIH: 20 ppm TWA
OSHA: 200 ppm TWA; 375 mg/m3 TWA
150 ppm STEL; 560 mg/m3 STEL
NIOSH: 100 ppm TWA; 375 mg/m3 TWA
150 ppm STEL; 560 mg/m3 STEL

Butane (106-97-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)
OSHA: 800 ppm TWA; 1900 mg/m3 TWA
NIOSH: 800 ppm TWA; 1900 mg/m3 TWA

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA
150 ppm STEL
OSHA: 100 ppm TWA; 435 mg/m3 TWA
150 ppm STEL; 655 mg/m3 STEL

Benzene, 1,2,4-trimethyl- (95-63-6)

NIOSH: 25 ppm TWA; 125 mg/m3 TWA

Ethyl alcohol (64-17-5)

ACGIH: 1000 ppm STEL
OSHA: 1000 ppm TWA; 1900 mg/m3 TWA
NIOSH: 1000 ppm TWA; 1900 mg/m3 TWA

Ethylbenzene (100-41-4)

ACGIH: 20 ppm TWA
OSHA: 100 ppm TWA; 435 mg/m3 TWA
125 ppm STEL; 545 mg/m3 STEL
NIOSH: 100 ppm TWA; 435 mg/m3 TWA
125 ppm STEL; 545 mg/m3 STEL

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: 0.1 ppm TWA
1 ppm STEL

Hexane (110-54-3)

ACGIH: 50 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 500 ppm TWA; 1800 mg/m3 TWA
NIOSH: 50 ppm TWA; 180 mg/m3 TWA

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

Gloves constructed of nitrile, neoprene, or PVC are recommended.

PERSONAL PROTECTIVE EQUIPMENT

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

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent 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.

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

Appearance:	Translucent, straw-colored or light yellow	**Odor:**	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	**Vapor Density:**	AP 3-4
Boiling Point:	85-437 °F (39-200 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible to Slight	**Specific Gravity:**	0.70-0.78
Evaporation Rate:	10-11	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	-45 °F (-43 °C)	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.6%	**Lower Flammability Limit (LFL):**	1.4%
Burning Rate:	ND	**Auto Ignition:**	>530°F (>280°C)

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

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

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.

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Gasoline, motor fuel (86290-81-5)

Inhalation LC50 Rat >5.2 mg/L 4 h; Oral LD50 Rat 14000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat 12.5 mg/L 4 h; Inhalation LC50 Rat >26700 ppm 1 h; Oral LD50 Rat 636 mg/kg; Dermal LD50 Rabbit 8390 mg/kg; Dermal LD50 Rat 12124 mg/kg

Butane (106-97-8)

Inhalation LC50 Rat 658 mg/L 4 h

Xylenes (o-, m-, p- isomers) (1330-20-7)
Inhalation LC50 Rat 5000 ppm 4 h; Inhalation LC50 Rat 47635 mg/L 4 h; Oral LD50 Rat 4300 mg/kg; Dermal LD50 Rabbit >1700 mg/kg

Benzene, 1,2,4-trimethyl- (95-63-6)
Inhalation LC50 Rat 18 g/m3 4 h; Oral LD50 Rat 3400 mg/kg; Dermal LD50 Rabbit >3160 mg/kg

Ethyl alcohol (64-17-5)
Oral LD50 Rat 7060 mg/kg; Inhalation LC50 Rat 124.7 mg/L 4 h

Ethylbenzene (100-41-4)
Inhalation LC50 Rat 17.2 mg/L 4 h; Oral LD50 Rat 3500 mg/kg; Dermal LD50 Rabbit 15354 mg/kg

Benzene (71-43-2)
Inhalation LC50 Rat 13050-14380 ppm 4 h; Oral LD50 Rat 1800 mg/kg

Hexane (110-54-3)
Inhalation LC50 Rat 48000 ppm 4 h; Oral LD50 Rat 25 g/kg; Dermal LD50 Rabbit 3000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

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 repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

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

Potential Health Effects: Ingestion

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.

Potential Health Effects: 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.

Respiratory Organs Sensitization/Skin Sensitization

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

Generative Cell Mutagenicity

This product may cause genetic defects.

Carcinogenicity

A: General Product Information

May cause cancer.

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.

B: Component Carcinogenicity

Gasoline, motor fuel (86290-81-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Ethyl alcohol (64-17-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 100E [in preparation] (in alcoholic beverages); Monograph 96 [2010] (in alcoholic beverages) (Group 1 (carcinogenic to humans))

Ethylbenzene (100-41-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: potential occupational carcinogen
NTP: Known Human Carcinogen (Select Carcinogen)
IARC: Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Reproductive Toxicity

This product is suspected of damaging fertility or the unborn child.

Specified Target Organ General Toxicity: Single Exposure

This product may cause drowsiness or dizziness.

Specified Target Organ General Toxicity: Repeated Exposure

This product causes damage to organs through prolonged or repeated exposure.

Aspiration Respiratory Organs Hazard

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.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. 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

Gasoline, motor fuel (86290-81-5)

Test & Species		Conditions
96 Hr LC50 Alburnus alburnus	119 mg/L [static]	
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]	
72 Hr EC50 Pseudokirchneriella subcapitata	56 mg/L	
24 Hr EC50 Daphnia magna	170 mg/L	

Toluene (108-88-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through]	1 day old
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]	
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]	
96 Hr LC50 Oryzias latipes	54 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]	
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L	
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]	
48 Hr EC50 Daphnia magna	5.46 - 9.83 mg/L [Static]	
48 Hr EC50 Daphnia magna	11.5 mg/L	

Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]	

96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi-static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

Benzene, 1,2,4-trimethyl- (95-63-6)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]
48 Hr EC50 Daphnia magna	6.14 mg/L

Ethyl alcohol (64-17-5)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	12.0 - 16.0 mL/L [static]
96 Hr LC50 Pimephales promelas	>100 mg/L [static]
96 Hr LC50 Pimephales promelas	13400 - 15100 mg/L [flow-through]
48 Hr LC50 Daphnia magna	9268 - 14221 mg/L
24 Hr EC50 Daphnia magna	10800 mg/L
48 Hr EC50 Daphnia magna	2 mg/L [Static]

Ethylbenzene (100-41-4)

Test & Species	Conditions
96 Hr LC50 Oncorhynchus mykiss	11.0-18.0 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [semi-static]
96 Hr LC50 Pimephales promelas	7.55-11 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]
96 Hr LC50 Pimephales promelas	9.1-15.6 mg/L [static]
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6 - 11.3 mg/L [static]

96 Hr EC50 Pseudokirchneriella subcapitata	1.7 - 7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8 - 2.4 mg/L

Benzene (71-43-2)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

Hexane (110-54-3)

Test & Species	Conditions
96 Hr LC50 Pimephales promelas	2.1-2.98 mg/L [flow-through]
24 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 * * *

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

DOT Information

Shipping Name: Gasoline
UN #: 1203 **Hazard Class:** 3 **Packing Group:** II
Placard:



* * * Section 15 - Regulatory Information * * *

Regulatory Information

A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)
SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (o-, m-, p- isomers) (1330-20-7)
SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Benzene, 1,2,4-trimethyl- (95-63-6)
SARA 313: 1.0 % de minimis concentration

Ethylbenzene (100-41-4)
SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Benzene (71-43-2)
SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Hexane (110-54-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA Section 311/312 – Hazard Classes

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

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	**CAS**	**CA**	**MA**	**MN**	**NJ**	**PA**	**RI**
Gasoline, motor fuel	86290-81-5	No	No	No	No	Yes	No
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	No
Butane	106-97-8	Yes	Yes	Yes	Yes	Yes	No
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	No
Benzene, 1,2,4-trimethyl-	95-63-6	No	Yes	Yes	Yes	Yes	No
Ethyl alcohol	64-17-5	Yes	Yes	Yes	Yes	Yes	No
Ethylbenzene	100-41-4	Yes	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	No
Hexane	110-54-3	No	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.
WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Butane	106-97-8	1 %
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 %
Ethyl alcohol	64-17-5	0.1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %
Hexane	110-54-3	1 %

Additional Regulatory Information

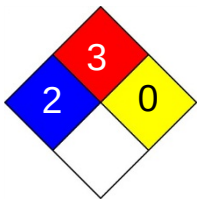
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Gasoline, motor fuel	86290-81-5	No	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Butane	106-97-8	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene, 1,2,4-trimethyl-	95-63-6	Yes	DSL	EINECS
Ethyl alcohol	64-17-5	Yes	DSL	EINECS
Ethylbenzene	100-41-4	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Hexane	110-54-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	2
Fire	3
Reactivity	0



HMIS® Hazard Rating

Health	2	Moderate
Fire	3	Serious
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

CHEVRON - ARCADIS
PROJECT CHECKLIST
Last revised June 2019

Facility: _____
City/State: _____
Chevron PM: _____
Arcadis CPM: _____

Consult your Digital Lead and GEC coordinator to ensure consideration of digital tools and GEC support.

1 - Pre-Field Work	**Status**	**Assigned to (optional)**
Training Records Reviewed		
Training up to date for Arcadis and Subcontractor personnel - Use Staff Training Management System (STMS)	Not Started	
If Specialized Permit activities are required, review STMS to confirm staff have required training (e.g. hot work, confined space entry, LOTO, excavation, ground disturbance, critical lifting, diving, energized electrical, SIMOPS)	Not Started	
Short Service Employee (SSE)		
Arcadis PM completed Culture of Caring conversation & signed form	Not Started	
Arcadis PM confirm adequate SSE management planned per policy	Not Started	
Sites in Operational Control Only: Chevron PM reviewed and acknowledged SSE form for Arcadis and/or Subcontractor staff	Not Started	
Access agreement required		
Access agreement reviewed and is current/valid *(if no, then complete below)*	Not Started	
New access agreement requested	Not Started	
Arcadis field teams will carry copies of access agreements in the field	Not Started	
Offsite access agreement required - *(if yes, then complete below)*		
Access agreement reviewed and is current/valid *(if no, then complete below)*	Not Started	
Access agreement requested	Not Started	
Encroachment permit required - *(if yes, then complete below)*		
Permit reviewed and is current/valid *(if no, then complete below)*	Not Started	
Encroachment permit requested	Not Started	
Any other type of permitting (well installation, soil boring, building, etc.) **required** -- *(if yes, then complete below)*		
Permit applications submitted	Not Started	
Permits approved/received	Not Started	
1.1 - Waste/Contracting Planning		
Waste Removal Planning		
Consult Arcadis' Chevron Team Waste Management Guidance	Not Started	
Refer to Waste Management guidance document posted on Sharepoint site.	Not Started	
Prepare Laboratory WA and Task Order (LTO) - *(at least 1 week prior to scheduled field work)*		
Standard TAT or Short TAT appropriate	Not Started	
Sample containers received from lab. If returning on Fri, notify lab of Sat delivery	Not Started	
Complete Arcadis USDOT hazardous material shipping determination	Not Started	
Prepare or Update Health and Safety Plan (HASP)		
Complete JSAs for work tasks	Not Started	
For Sites in Operational Control Only: Complete Planning Phase Hazard Analysis (PPHA) depending on the Hazard Potential (see CEMC Hazard Analysis Standard)	Not Started	
Prepare traffic control plan and obtain engineering judgement review	Not Started	
Approved HASP reviewer engaged at least one week prior to job (https://thesource.arcadissource.com/clients/Chevron/Pages/HealthSafety.aspx)	Not Started	
HASP Addendums included (ensure Appendix B Loss/Near Loss Reporting Plan is reviewed, approved)	Not Started	

CHEVRON - ARCADIS
PROJECT CHECKLIST
Last revised June 2019

Facility: _____
City/State: _____
Chevron PM: _____
Arcadis CPM: _____

2 - Field Work Preparation

Work Request Packet (WRP)		
Prepare WRP	Not Started	
WRP approved by PM	Not Started	
Review WRP with field personnel	Not Started	
Permit to Work		
For sites in Operational Control: Specialized Permit work planned, ensure Permit Requester and Permit Approver trained for scope of work and obtain Chevron PM approval as required.	Not Started	
(includes hot work, confined space entry, LOTO, excavation, drilling, critical lifting, diving, energized electrical, SIMOPS)		
Permit To Work permit approver trained for scope of work	Not Started	
Planning Intrusive Activities		
Review CEMC Line Locating Technologies Selection Tool to select appropriate additional geophysical methods	Not Started	
Request public and private underground utility markout (verify geophysical methods used and limitations)	Not Started	
Utilize Arcadis Utility Clearance SOP and checklist	Not Started	
Complete utility locate (generally one to two weeks before intrusive work) and review results with Project Team	Not Started	
If utility conflicts within 30-inches of utility, required to engage Arcadis Corporate H&S		
For Sites In Operational Control: Review Ground Disturbance Safety Precaution Checklist	Not Started	
(included in the CEMC Environmental Drilling Permit or Excavation Permit)		
For excavation, ensure Excavation Permit and Excavation Inspection Checklist (daily) included in WRP	Not Started	
For drilling, ensure Environmental Drilling Permit and Equipment Inspection (daily) included in WRP	Not Started	
Save Your Life Actions (only sites in Operational Control) - (required for Commercial Diving, Confined Space Entry, De-Energized Electrical Work, Energized / Live Electrical Work, Excavation, Hot Work, Isolation of Hazardous Energy, Lifting & Rigging, Working at Heights)		
Review Safe Your Life Actions prior to work	Not Started	
Include applicable Start Work Checks in WRP for field staff to complete prior to starting work	Not Started	
Schedule TIPs		
Schedule senior stewardship TIPs with project/program leadership at least two weeks in advance once per quarter	Not Started	
Add field event to SSMS		
Schedule Arcadis personnel and subcontractors	Not Started	
https://solutions.arcadis-us.com/fieldcalendar/		
Field Tablet Preparation		
Confirm Field Now apps (e.g. Fulcrum) and associated forms are downloaded and accessible on field tablets.	Not Started	
Mobile TIP saved to favorites on Field Tablet: http://apps2.arcadis-us.com/4-Sight/Mobile/TIP_Mobile.aspx/	Not Started	
Confirm Stop Work App is downloaded on field tablets		
Review SWA and enter field data entries prior to mobilizing to site.	Not Started	
Notify onsite and offsite property owner(s)/tenant(s) at least 2 weeks in advance of work & schedule		
Is the schedule acceptable to the owner(s)	Not Started	
Method of notification _____		
Date of notification _____		
Name of person(s) notified _____		
Notify regulatory agency of tentative work schedule		
Is the schedule acceptable to the regulatory agency	Not Started	
Method of notification _____		
Date of notification _____		
Name of person notified _____		
Consider additional notification needs (grout inspector, city inspector, etc.)	Not Started	
Schedule Kick-off call with Project Team, Subcontractors (and Chevron PM only if in Operational Control)	Not Started	

CHEVRON - ARCADIS
PROJECT CHECKLIST
Last revised June 2019

Facility: _____
City/State: _____
Chevron PM: _____
Arcadis CPM: _____

3 - Waste Disposal – (*covers activities for field implementation and demobilization)*

Refer to Waste Management guidance document found on Sharepoint site.	Not Started

4 - Post-Field Activities

Samples shipped to laboratory	
For samples shipped on Friday: Mark samples for Saturday delivery if required and acceptable to lab	Not Started
Email FedEx tracking number to lab contact	Not Started
Confirm samples received by lab	Not Started
Review lab log-in of samples, confirm all requested analyses	Not Started
Confirm all billing is complete:	
Complete Unit Billing Form	Not Started
Email form to Unit.Admin@arcadis.com	Not Started
Confirm all subcontractor and rental invoices are submitted	Not Started
Confirm all expense reports have been submitted.	Not Started
H&S Forms updated:	
Update JSAs in the HASP according to field markup	Not Started
Enter all TIPS into 4-sight; follow up as action items are completed	Not Started
Document all best practices and share lessons learned	Not Started
Track field hours & mileage - *(Arcadis & Subs)*	Not Started
Provide SSMS feedback u	Not Started
EIM Database	
Lab data uploaded	Not Started
Boring logs uploaded	Not Started
Other EIM-tracked data uploads	Not Started

Please see also the Project Planning and Reporting Checklist for project initiation, execution, and close out

Status	Required Status
Not Started	Not Started
In Progress	Complete
Complete	Not Required
Not Applicable	

TAILGATE MEETING FORM – Chevron

Form version: 2020 Aug 7

*(PRINT AS 11"x17" – **FRONT & BACK – DO NOT ALLOW TWO PAGES**)*

Project Name: _____ Address: _____
Project No: _____ City: _____ State:
Date: _____ Time:

Completing this Form

This Tailgate Safety Meeting Form serves as a tool to assist members of the Arcadis-Chevron client team with having a successful safety tailgate meeting as well as helps to identify hazards that may need to be resolved prior to beginning work. The form is not a work permit; however, it does become a written record and should be saved in project files with other project documents.

SCOPE	1a.	What TASKS for ARCADIS and ARCADIS subcontractors will be performed? Every TASK identified below must be accompanied by a JSA (or be included in a broader JSA). Examples: Vacuum excavation, utility marking, monitoring well development	Level of Traffic Control (1 – 4)	List Company Responsible
	A.			
	B.			
	C.			
	D.			
	E.			
	F.			
	G.			
	H.			
	1b.	Where on the property will the work take place? (this becomes the Reporting Boundary):		
	1c.	Will work conducted in multiple work zones or by multiple crews have the potential to impact each other (SIMOPs)? If so, is there a plan to address communication between work zones/companies? Check all that apply (must check at least 1)	☐ All participate in Tailgate Meeting ☐ Written SIMOPs Plan ☐ Detailed in JSA ☐ N/A ☐ Other:	
	1d.	Take a moment to review aloud the Human Error Traps on the back page of this form? Does the team agree these are minimal to nonexistent on the project?		☐ Yes ☐ No (Stop and contact Arcadis OE Resource for Guidance)
PERMIT GUIDANCE	2a.	Have necessary work permits (local, state and/or federal) been obtained (including those for subcontractors)? Permits posted as per requirements specified by authority having jurisdiction?		☐ Yes ☐ No ☐ N/A
	2b.	Will a **CHEVRON GENERAL PERMIT TO WORK** be completed? The following are conditions requiring a General Permit to Work		
		Work requiring one or more specialized permits and plans: • Hot Work • Confined Space Entry	• Isolation of Hazardous Energy • Excavation • Drilling • Critical Lift Plan	• Diving • Energized Electrical • SIMOPS
		Work has a significant potential for injury, incident or loss of containment **Work identified through historical incidents as having high hazard potential** • Work involving breaking into a line, equipment or vessel • Vacuum Truck Operations involving hazardous, combustible, or flammable materials • Work requiring fall protection • Equipment working within the minimum clearance distances of an energized power line, • Bypassing Critical Protections	**Transfer of work and responsibility from one group to another.** • Transfer of work between crafts/trades • Transfer of work between contract companies **Transfer of work between contract companies and Chevron** **Simultaneous operations (SIMOPs).** • Operations and maintenance activities taking place in the same area • Construction and operations activities taking place in the same area • Production and drilling operations taking place at the same location	**Upon request by** • Permit Acceptor • Permit Approver • Permit Requester • Permit User • Any member of the work team
	2c.	If excavating under the conditions identified below, will an **EXCAVATION PERMIT** be completed? • Use of power tools • When excavating 5 feet (1.52 m) or deeper (using either power tools or hand tools). • When specialized work permits (e.g., Isolation of Hazardous Energy, Confined Space Entry) are required to manage the risks of the Excavation. • When Gas testing is required.		☐ Yes ☐ No ☐ N/A
	2d.	If drilling is to be conducted will an **ENVIRONMENTAL DRILLING PERMIT** be completed?		☐ Yes ☐ No ☐ N/A
	2e.	If hotwork activities are to be conducted will a **HOT WORK PERMIT** and GAS TESTING LOG be completed? Hotwork includes: 1. Any equipment that generates an exposed flame or hot filament (open flame) 2. Burning acetylene or other gas (open flame) 3. Welding, brazing, cutting, grinding or soldering (open flame) 4. Using electric resistance heaters (non-open flame) 5. Using abrasion blasting (open flame) or using high-pressure hydro-jet (non-open flame) 6. Using battery, electric or air-driven power tools or equipment capable of causing "hot" sparks of enough energy to ignite a flammable mixture (e.g., jack hammers, rattle guns, air compressors, generator sets and drilling) (non-open flame) 7. Operating motorized vehicles or equipment (battery or internal combustion) within areas where flammable vapors may be present (non-open flame). Examples of equipment include: battery operated drill, golf cart, video equipment, etc. Note: a HOTWORK permit is not required in an established and demarcated safe hotwork area. See the OE Standard for more information.		☐ Yes ☐ No ☐ N/A
	2f..	If isolation of hazardous energy (aka Lock Out/Tag Out) is to be performed will an **Isolation of Hazardous Energy Permit** be completed**? EXCEPTIONS ARE:** 1. Servicing or maintenance of cord and plug connected electrical equipment when the power is under the exclusive control at all times of personnel performing the work 2. Simple isolations involving equipment (e.g., analyzers and instrumentation) where the isolation points are closed as part of routine servicing and do not involve taking the equipment out of service or offline. The activity shall be described in a Qualified Standard Operating Procedure or Maintenance Procedure. 3. Normal production operations (e.g., minor adjustments or servicing) under the following conditions: i. A guard or other safety device is not bypassed, altered or removed ii. Personnel are not required to put any part of their body into a machine or equipment to perform work at a point of operation or in a designated zone of danger around machinery		☐ Yes ☐ No ☐ N/A
	2g.	If **DIVING** activities are to be conducted will a **DIVING PERMIT** been completed?		☐ Yes ☐ No ☐ N/A
EMERGENCY	3.	+ Who is the designated SHSO for today?	**Name:**	
	4.	+ Does everyone know the location, directions, and name of the nearest hospital?		☐ Yes ☐ No ☐ N/A
	5.	+ Has a plan been established to ensure emergency responders can easily locate or be escorted to the work site?		☐ Yes ☐ No ☐ N/A
	6.	+ Will traffic control comply with Chevron and ARCADIS requirements? (See Back Page for Chevron Requirements)		☐ Yes ☐ No ☐ N/A
	7.	+ Where is the nearest working phone located (non-cell phone)	**Location:**	
	8.	+ Where is the location of the primary first aid kit (including portable eyewash & CPR shield)?	**Location:**	
	9.	+ Where is the location of the primary fire extinguisher?	**Location:**	
	10.	+ Document last inspection date of primary fire extinguisher and expiration of primary first aid kit contents:	**Extinguisher inspected:**	**First Aid Kit complete?**
	11.	+ Have signals or alarms (stop work, sheltering, evacuation, etc.) been communicated to everyone on site? Without conflicts with other work activity?		☐ Yes ☐ No ☐ N/A
	12.	+ Are weather conditions acceptable or have associated risks been mitigated? Are hydrating fluids (not caffeine) available to workers? Shade? Shelter within reasonable distance?		☐ Yes ☐ No ☐ N/A
	13.	+ Are SDS for ALL chemicals being used at site (oils, detergents, preservatives, etc.) available at the project site? Have crews using these chemicals read the SDS? Are they readily available for quick review or to hand off to EMS personnel?		☐ Yes ☐ No ☐ N/A
	14.	+ Do crews know what to do in the event of an emergency?		☐ Yes ☐ No ☐ N/A
	15.	+ Has an emergency drill been conducted at the site in the past year?		☐ Yes ☐ No ☐ N/A
	16a.	**Air Monitoring:** Air monitoring required by HASP for this scope of work? (If yes, then complete 16 b - d)		☐ Yes ☐ N/A
	16b.	**Air Monitoring:** Proper calibration gas available to support daily/pre-work calibration of monitoring equipment? Calibration log available?		☐ Yes ☐ No ☐ N/A
	16c.	**Air Monitoring:** Personnel conducting air monitoring have received Portable Gas Detection Training?		☐ Yes ☐ N/A
	16d.	**Air Monitoring:** Breathing zone data must be recorded per HASP requirements. Where will data be recorded?	☐ Monitoring Log ☐ Field Book ☐ Other:	
	17.	**HASP:** Have all sections of the Health & Safety Plan (HASP) applying to today's tasks been reviewed?		☐ Yes ☐ No ☐ N/A
	18.	Has Chevron's hand safety policy, including fixed open blade knife prohibition, been discussed with all workers?		☐ Yes ☐ No ☐ N/A
	19.	Has **Stop Work Authority** been discussed and highlighted during the health and safety meeting?		☐ Yes ☐ No ☐ N/A
	20.	Have Operational Excellence Tenets been discussed and highlighted during the daily health and safety meeting? (See OE Tenets below)		☐ Yes ☐ No ☐ N/A
	21.	Motor vehicle precautions discussed? Maintain a minimum of 3 feet from objects; always use spotter when available; forward motion always preferred; set parking brake, no idling.		☐ Yes ☐ No ☐ N/A
	22.	Have sections of the ***"Preventing Serious Injury and Fatalities – Field Guide"*** been reviewed for relevant scope(s) of work? All affected workers included in discussion?		☐ Yes ☐ No
	23.	Are Save Your Life Actions forms and Start Work Checks available for high risk work including Commercial **Diving**, **Confined Space** Entry, **Electrical** Safe Work, (De-energized electrical work, Energized / Live electrical work, **Excavation**, **Hot work**, Isolation of hazardous energy (**LOTO**), **Lifting and rigging**, Working at Heights.		☐ Yes ☐ No ☐ N/A
	24.	Does the activity require the preparation of a Planning Phase Hazard Analysis (PPHA)? Note: Triggers for PPHA are identified below.		☐ Yes ☐ No ☐ N/A
	25.	Are personnel qualified to perform work at site? Training records verified and available onsite OR the Staff Training Management System (STMS) for review?		☐ Yes ☐ No ☐ N/A

RETAIN THIS DOCUMENT WITH PROJECT FIELD DOCUMENTS

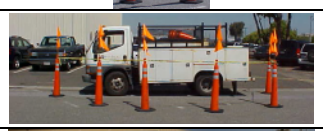
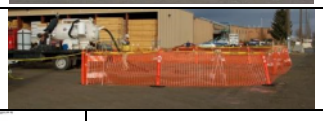
	26.	**Equipment Operation:** Are above-ground utilities identified and clearly visible by equipment operators? Underground utilities marked? Width of utility considered when marked?	☐ Yes ☐ No ☐ N/A
	27.	**Equipment Operation:** Rotating equipment shielded and guarded and pinch points identified and marked? Prohibition on loose clothing, jewelry, hair hooded/drawstring clothing discussed?	☐ Yes ☐ No ☐ N/A
	28.	**Equipment Operation:** Has **an** equipment inspection checklist been completed for all equipment being used today? Note: Checklists may vary by office, subcontractor and equipment	☐ Yes ☐ No ☐ N/A
	29.	Are appropriate tools on-site to complete tasks safely and appropriately? Discussed in JSAs?	☐ Yes ☐ No ☐ N/A
	30.	Do workers understand locally fabricated equipment, such as field repairs not to original condition or equipment modified or used outside of original intent is prohibited?	☐ Yes ☐ No ☐ N/A
	31.	Have utility shut-off switches/valves been located (as required by scope work) and communicated to relevant crew members?	☐ N/A ☐ Electric ☐ Gas ☐ Water ☐ Other
	32.	**Traffic:** Are proper traffic and/or fire control measures in-place?	☐ Traffic ☐ Fire Prevention ☐ N/A
	33.	**Traffic**: Have modifications to safety procedures or documentation (i.e. JMP, TCP) been made and communicated to onsite personnel?	☐ Yes ☐ No ☐ N/A
	34.	**Traffic**: For work in the Right or Way on Public Roadway has an ARCADIS employee with Engineering Judgment approved the traffic control plan (TCP)?	☐ Yes ☐ No ☐ N/A
	35.	**Traffic**: Do workers understand they are not allowed to alter the flow of traffic on a public roadway without a written and approved plan? Some states also require flagger training.	☐ Yes ☐ No ☐ N/A
	36.	PPE Level required for each task specified to workers (Level C, Level D, etc.)? PPE specifics discussed and documented in JSAs and PPE Assessment?	☐ Yes ☐ No ☐ N/A
	37.	PPE is clean and been inspected before use? (Entire team should evaluate his/her safety glasses, hard hats, vests, etc.)	☐ Yes ☐ No
	38.	**Waste**: Has ARCADIS obtained Delegation of Authority (DOA) approval if signing waste manifest on behalf of Chevron? If YES, does DOA understand copy of manifest is to be sent to Chevron Waste Tracking Desk?	☐ Yes ☐ No ☐ N/A
	39.	**Waste**: Is waste currently on site? If so, what is the status of the disposal process: CIRCLE ONE of the FOLLOWING: **1.** Characterization or Sample collection **/ 2.** Profile **/ 3.** Scheduled pickup **/ 4.** OTHER:	☐ Yes ☐ No ☐ N/A
	40.	**Electrical:** GFI protection on portable AC equipment in place?	☐ Yes ☐ No ☐ N/A
	41.	**Electrical:** If working in live panels with over 60V, are workers trained on NFPA 70E or equivalent? ARCADIS Energized Electrical Work Permit completed?	☐ Yes ☐ No ☐ N/A
	42.	**Vacuum Truck:** If pumping flammable liquids, is conductivity from the farthest hose end to the grounding rod < 10,000 Ω OR < 100 Ω from end to end on individual hose sections and < 10 Ω at each hose connection? See Vacuum Truck Guidance	☐ Yes ☐ No ☐ N/A

Short Service Employee List w/Mentor (requires prior Chevron PM approval – no more than 1 SSE if < 5 Workers on Site)

	Name:	Mentor:	Name:	Mentor:
	Name:	Mentor:	Name:	Mentor:

Tailgate Meeting Acknowledgement

Name (PRINT)	Company	Prior to Shift Meeting Time	Mid Shift Meeting Time (if applicable)	Signature	Time Out	Time In	Time Out
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Level I		Min. of 4 delineators, with max. space of 4 feet between delineators. Use buddy system and vehicle with flashers as necessary.	Used in no to low traffic volume conditions for routine tasks of very short duration (< 10 minutes) where worker can stay aware of traffic in the vicinity.
Level II		Barrier tape on delineators with flags and the use of field vehicles (with flashing yellow light or vehicle hazard lights) and\or other lane control devices. Metal barricades may be used in conjunction with tape. Use buddy system when the worker cannot give undivided attention to oncoming traffic hazards.	Used when worker cannot stay alert of traffic; tasks take longer than 10 minutes but level III workspace protection is not required
Level III		Plastic Security Fencing and\or Type 2 or 3 barricades. A flashing yellow light on the vehicle may be used for additional visibility. Be cognizant of blocking of pump islands and any other dealer concerns.	Used when high task loads are present to distract attention from traffic including noise from tools and heavy equipments; when work is conducted at low daylight or nighttime; when access to site from a public right-of-way is to be closed (use appropriate warning signage).
Level IV	 **Requires review by ARCADIS staff with Engineering Judgment IF a preapproved traffic template is NOT used.**	DOT approved signage and traffic protection devices as presented in TCP approved by staff with Engineering Judgment (EJ) IF a preapproved template is not used. State/local traffic control requirements may apply. Often requires oversight by a licensed traffic controller.	Used when traffic control is required in the public right-of-way.

Activity	Hazard Potential	Hazard Analysis Requirement(s)
• SIMOPs activities • 1 activity requiring 2 or more specialized permits (e.g. hot work in a confined space, hot work during dive operations, etc.) • Bypassing critical protections • Commercial diving activities • Confined space entries with special hazardous characteristics • Work on energized electrical equipment over 50 volts • Excavation activities requiring protective systems (e.g. shoring, bracing, sloping, etc.) • Hot work in a Hazardous (Classified) Area • Hot work inside a tank or vessel • Hot tapping • Activities requiring Positive Physical Isolation (PPI) • Complicated, complex, heavy, blind and/or personnel lifts using man riding baskets • Activities requiring continuous portable gas testing/monitoring • Any activities involving explosives (e.g. perforating, etc.)	High	• Documented planning phase hazard analysis (PPHA) • Documented onsite Job Safety Analysis (JSA) • Undocumented Individual Hazard Assessment and/or Personal Safety Plan
• Activities requiring a general permit to work and one specialized permit, unless the activity is specified as having high hazard potential. • Activities that only require a general permit to work (e.g. vacuum truck operations involving hazardous combustible or flammable material, erecting modifying or dismantling scaffolding, activities requiring the use of personal fall protection systems)	Medium	• Documented onsite Job Safety Analysis (JSA) • Undocumented Individual Hazard Assessment and/or Personal Safety Plan
• Work activities that have not resulted in a known serious incident or fatality. • Work not requiring a General Permit to Work or specialized permits and plans (utilize CEMC PTW Standard 3.1 Table to identify when a General PTW is needed).	Low	



CEMC Confined Space Entry (CSE) Permit

Confined Space Entry Permit Number:
Permit to work numbering instructions – Contractor company name, permit type, date with no dashes, and a sequential number for the permit issued on that day e.g., Company X-CSE-01102016-1

General Permit to Work Number:
Enter the number from the CEMC General Permit to Work

SECTION 1 Site Conditions *(this permit shall be used in conjunction with and attached to the CEMC General Permit to Work)*
This permit is only valid for ONE working shift. Confined Space Entry (CSE) Permits cannot be extended or renewed.

Date:	Valid from (time):	Valid to (time):
Requester (name):	Company:	

Reason for Entry:

Description of Confined Space:

Previous Contents of Confined Space: ☐Not Applicable

This Confined Space has been classified as:

☐**Confined Space** *(note: this type of CSE requires the completion of this permit in conjunction with the CEMC General Permit to Work. However, on site emergency response is not required)*

☐**Confined Space with Special Hazardous Characteristics** *(Contains hazardous atmospheres, potential for engulfing entrant, internal configuration that entrant could be trapped or asphyxiated by inwardly converging walls or a floor that slopes downward and tapers to smaller cross sections, and/or potential to contain any other recognized serious potential safety or health hazard.)*

Entry Supervisor Name (print):	Entry Attendant Name (print):

Person(s) entering the Confined Space (refer to Entrant Log in Section 6 of this CSE permit)
Name(s) (print name(s) of all authorized entrants):

Check all that apply for the Confined Space Entry: (to be completed by the permit requester) The following review is required in addition to the requirements listed on the General Permit to Work:

Yes	No	N/A		
☐	☐	☐	All provisions of associated General Permit to Work and additional high risk permits are met	
☐	☐	☐	Isolation of CSE has been verified (check type(s) of isolation) IHE PTW #_____ ☐Blinds ☐Block & Bleed ☐ Lock & Tag Out ☐ Disconnect/Daylight ☐Other:	
☐	☐	☐	Area barricaded with warning signs installed	
☐	☐	☐	Review permit conditions, JSA and emergency procedures with all applicable personnel	
☐	☐	☐	Verify Entry Attendant is competent, present, and aware of roles and responsibilities during CSE	
☐	☐	☐	Rescue Plan in place and attached to CSE Permit	
☐	☐	☐	Rescue Team contact has been verified	Contact number:
☐	☐	☐	Hot work required in CSE? If yes - Hot Work Permit – Hot Work Permit #	
☐	☐	☐	Respiratory Protection *(check type(s))* Air Purifying respirator, Type: ☐Half face ☐Full face ☐PAPR Supplied Air, Type: ☐Airline ☐ SCBA	

Possible Hazards *(check all that may apply)*
☐Benzene ☐Dust/Sludge ☐NORM ☐ Temperature ☐Internal configuration ☐Mechanical/Electrical equipment
☐Lighting ☐Oxygen deficiency ☐Flammable vapor ☐Carbon monoxide ☐Hydrogen sulfide

List any additional hazards, equipment, site precautions, special requirements, instructions, and/or PPE

CEMC Confined Space Entry (CSE) Permit

SECTION 2 Gas Testing *to be completed by Qualified Gas Tester*

Gas Testing Requirements (all gas testing to be performed by a Qualified Gas Tester. See gas testing results log for additional results as required)

☐ Initial ☐ Hourly ☐ Every _____Hours ☐Continuous: record gas test result every ☐ 1hr ☐ 2hr ☐ other:

Initial Gas Test Readings

Time	% O_2	% LEL	H_2S ppm	CO ppm	Temp. °F/°C	VOC	Other	Qualified Gas Tester Name

Instrument (Model & Serial #):

SECTION 3 Entry Supervisor and Attendant

Entry Supervisor (I agree the defined scope of work can be carried out provided all conditions specified on the PTW, associated Job Safety Analysis (JSA) and specialized permits are met)

Signature:	Date:	Time:

Entry Attendant (I understand my roles and responsibilities for the scope of work and conditions of the General PTW and Confined Space Entry permit)

Signature:	Date:	Time:

SECTION 4 Approval & Acceptance *to be completed by Relevant Parties*

Permit Requester (I understand and agree to the conditions within the General Permit to Work as well as this Specialized Permit and have communicated these conditions with the Permit User's)

Name:	Signature:	Date:	Time:

Permit Approver (I agree the scope of work can be carried out provided all conditions specified on this permit, the General PTW, associated Job Safety Analysis (JSA) and other specialized permit(s) are met)

Permit Approver Remote: ☐Yes ☐No	If approval is obtained remotely note method of approval (email, phone, etc.):		
Name:	Signature:	Date:	Time:

CEMC Acceptance (I agree the scope of work can be carried out provided all conditions specified on this PTW, associated JSA and specialized permit(s) are met)

CEMC Acceptor Remote: ☐Yes ☐No	If acceptance is obtained remotely note method of acceptance (email, phone, etc.):		
Name:	Signature:	Date:	Time:

SECTION 5 CSE Permit Close Out *to be completed by Relevant Parties*

Permit Requester (work is completed and site returned to safe condition)

Name:	Signature:	Date:	Time:

Permit Approver (work is completed and permit is closed)

Permit Approver Remote: ☐Yes ☐No	If close out is obtained remotely note method of close out (email, phone, etc.):		
Name:	Signature:	Date:	Time:

CEMC Confined Space Entry (CSE) Permit

SECTION 6 Confined Space Entrant Log					
Entrant Name (print):	Entrant Initials:	Time In	Time Out	Time In	Time Out

CEMC Confined Space Entry (CSE) Permit

SECTION 7 Gas Testing Log *(all gas testing to be performed by a Qualified Gas Tester)*

Instrument (Model & Serial #)

Time	% 0_2	% LEL	H_2S ppm	CO ppm	Temp. °F/°C	VOC	Other	Qualified Gas Tester Initials

CEMC Excavation Permit

Excavation Permit Number:
Permit to work numbering instructions – Contactor company name, permit type, date with no dashes, and a sequential number for the permit issued on that day e.g., Company X-EX-01102016-1

General Permit to Work Number:
Enter the number from the CEMC General Permit to Work

SECTION 1 Site Conditions *(This permit shall be used in conjunction with and attached to the CEMC General Permit to Work)*
This permit is valid for one working shift and then can be renewed using the CEMC General Permit to Work.

Date:	Valid from (time):	Valid to (time):
Requester (name):	Company:	
Job/Task Scope of Work Description:		
Location of Excavation:		
List Tools and Equipment:		
List all subsurface locating technology and day-lighting methods used:		
Line locator operator training and competency verified: ☐ Yes ☐ No		

DO NOT DISTURB GROUND if you answered NO to any of the questions. The Business Partner Project Manager (PM) shall contact the CEMC PM to discuss mitigation measures required. The CEMC PM shall provide written or verbal (when remote) acceptance to continue work through the use of the permit.

Yes	No	N/A	Safety Precautions. Check all that apply	Comments
☐	☐	☐	If available, have persons with substantial site knowledge been consulted regarding the locations of subsurface encumbrances? (i.e., landowner)	
☐	☐	☐	Have current and historical site plans (including utility reports and as-builts) been reviewed for subsurface, surface, and overhead hazards?	
☐	☐	☐	If excavation >20' deep, do you have documented engineering approval?	Name of PE:
☐	☐	☐	If there are structures that may be affected by excavation, do you have documented engineering approval? (e.g., buildings, roadways, retaining walls)	Name of PE:
☐	☐	☐	Has a competent person been designated to, and evaluate on-site conditions at least daily?	Name of Competent Person:
☐	☐	☐	Has the training and/or certification of the excavation equipment operators been validated?	
☐	☐	☐	Is safe access into/egress from excavations >4' deep identified/in place at a minimum distance of 25' of lateral travel?	
☐	☐	☐	Has site been walked to check for indications of subsurface encumbrances that were not marked/identified?	
☐	☐	☐	Are all above ground utility services identified?	
☐	☐	☐	Did choice of line locating technology align with guidance from matrix?	
☐	☐	☐	Is a valid, non-expired One Call on site and are the markings visible?	
☐	☐	☐	Are all known subsurface encumbrances marked (e.g., piping, utilities)?	
☐	☐	☐	Do proposed subsurface locations have required overhead clearance?	
☐	☐	☐	If utility mark-outs do not match, has a revised site map with marked-out utilities been provided to affected personnel?	
☐	☐	☐	Are all below ground services within 5' of excavation isolated? (if yes, use in conjunction with the CEMC IHE Standard)	
☐	☐	☐	Are all subsurface encumbrances exposed within 5' of excavation (e.g., piping, utilities)?	
☐	☐	☐	If Confined Space entry is applicable, is there a CSE permit in place?	
☐	☐	☐	If Hot Work will take place within the excavation, is there a Hot Work permit in place?	
☐	☐	☐	Is the excavated material >2 feet from edge of excavation?	
☐	☐	☐	If there is water accumulation within excavation, is there a water management plan in place?	
☐	☐	☐	If SIMOPS is applicable, is there a plan in place?	

CEMC Excavation Permit

Check all that apply			
Identified Underground Installations	**Other Known Obstructions**	**Controls**	**Warning Systems Precautions**
☐ Electrical ☐ Fuel/Oil ☐ Natural Gas ☐ Drainage ☐ Water ☐ Steam ☐ Sewer ☐ Other:	☐ Footings ☐ Encasements ☐ Pilings ☐ Tank(s) ☐ Above Ground Power Lines	☐ Bracing ☐ Shoring ☐ Sloping – ratio:_____ ☐ Benching ☐ Shielding Systems	☐ Barricades ☐ Signaling Devices ☐ Posted Signage ☐ Lighting ☐ Flagman
Type of Soil: ☐ A ☐ B ☐ C			

SECTION 2 Gas Testing *to be completed by Qualified Gas Tester*

Gas Testing Requirements (all gas testing to be performed by a Qualified Gas Tester. See gas testing results log for additional results as required)

☐ Initial ☐ Hourly ☐ Every _____Hours ☐Continuous: record gas test result every ☐ 1hr ☐ 2hr ☐ other:

Initial Gas Test Readings

Time	$\%0_2$	%LEL	H_2S ppm	CO ppm	Temp. °F/°C	VOC	Other	Qualified Gas Tester Name

Instrument (Model & Serial #)

SECTION 3 Approval & Acceptance *to be completed by Relevant Parties*

Permit Requester (I understand and agree to the conditions within the General Permit to Work as well as this Specialized Permit and have communicated these conditions with the Permit User's)

Name:	Signature:	Date:	Time:

Permit Approver (I agree the scope of work can be carried out provided all conditions specified on this permit, the General PTW, associated Job Safety Analysis (JSA) and other specialized permit(s) are met)

Permit Approver Remote: ☐Yes ☐No	If approval is obtained remotely note method of approval (email, phone, etc.):		
Name:	Signature:	Date:	Time:

CEMC Acceptance (I agree the scope of work can be carried out provided all conditions specified on this PTW, associated JSA and specialized permit(s) are met)

For work requiring specialized permits or plans occurring for several continuous days of operation, the CEMC representative will accept the specialized permits and plans prior to the start of the work activity and at a minimum weekly thereafter.

CEMC Acceptor Remote: ☐Yes ☐No	If acceptance is obtained remotely note method of acceptance (email, phone, etc.):		
Name:	Signature:	Date:	Time:

Renewal of Specialized Permits and Plans are documented and managed on the General Permit to Work

SECTION 4 Excavation Permit Close Out *to be completed by Relevant Parties*

Permit Requester (work is completed and site returned to safe condition)

Name:	Signature:	Date:	Time:

Permit Approver (work is completed and permit is closed)

Permit Approver Remote: ☐Yes ☐No	If close out is obtained remotely note method of close out (email, phone, etc.):		
Name:	Signature:	Date:	Time:

Section 5 Gas Testing Log *(all gas testing to be performed by a Qualified Gas Tester)*

Instrument (Model & Serial #)

Time	% 0_2	% LEL	H_2S ppm	CO ppm	Temp. ºF/ºC	VOC	Other	Qualified Gas Tester Initials

CEMC General Permit to Work

General Permit to Work Number:
Permit to work numbering instructions – Contractor Company Name, permit type, date with no dashes, and a sequential number for the permit issued on that day e.g., Company X-GPTW 01102016-1

SECTION 1 Work Scope *to be completed by Permit Requester*

Date:	Valid from (time):	Valid to (time):
Requester (name):	Company:	
Project Site:		
Job/Task Scope of Work Description:		

Check Additional Specialized High-Risk Permits Required for Scope of Work

☐	Hot Work	☐	Drilling	☐	Commercial Diving
☐	Confined Space Entry	☐	Energized Electrical	☒	Not Applicable
☐	Isolation of Hazardous Energy	☐	Critical Lift Plan		
☐	Excavation	☐	SIMOPs Plan		

Required Protections for Scope of Work

Fall Prevention/Restraint		Fall Protection				Barricade/Sign Requirements	
☐	Guardrail	☐	Full Body Harness	☐	Horizontal Lifeline	☐	Caution tape
☐	Restraint Line	☐	Single Lanyard	☐	Vertical Lifeline	☐	Barricade/fencing
☐	Designated Area	☐	Dual Lanyard	☒	Safety Attendant	☐	Signs/markers
☐	Other (describe):	☐	Retractable Lanyard	☐	Other (describe):	☐	Other (describe):

SECTION 2 Approval & Acknowledgement *to be completed by Relevant Parties*

Permit Requester (I understand and agree to the conditions within the General Permit to Work as well as any attached Specialized Permits and have communicated these conditions with the Permit User's)

Name:	Signature:	Date:	Time:

Permit Approver (I agree the scope of work can be carried out provided all conditions specified on this permit, the General PTW, associated Job Safety Analysis (JSA) and other specialized permit(s) are met)

Permit Approver Remote: ☐Yes ☐No	If approval is obtained remotely note method of approval (email, phone, etc.):		
Name:	Signature: phone	Date:	Time:

Section 2a Verification of Permit Conditions to *be completed by site checker while permitted work is in progress (must be competent person for scope of work)*

Site Checker (I verify and agree that Permit conditions have been met and all conditions were communicated with permit User's)

Name:	Signature:	Date:	Time:

Section 2b Revalidation of Permit Conditions (if applicable) to *be completed by Permit Requester in the event of a work suspension (e.g., general alarm/emergency, operational reasons, an incident or serious near miss, or site left unattended for more than 60 minutes.)*

Permit Requester (I verify and agree that General Permit to Work, and if applicable, Specialized Work Permit conditions have been revalidated and all conditions were communicated to the Permit Approver who has authorized work to continue)

Reason for Suspension:

Name:	Signature:	Date:	Time:

If applicable, check all Specialized Permits and/or Plans that apply

☐ Confined Space ☐ Commercial Diving ☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan

Section 2c Permit Requester Designee (if applicable) *to be completed when the Permit Requester for an existing Permit to Work becomes unavailable the Permit to Work is considered invalid until a replacement signature can be obtained.*

Designee (I assume all responsibilities of the previous Permit Requester)

CEMC General Permit to Work

Name:	Signature:	Date:	Time:

SECTION 3 Permit Renewal *to be completed by permit requester*

Permits can be renewed for up to six consecutive days (excluding Confined Space Entry). All steps in the initial permit procedure shall be completed for the renewal of the permit.

#1	Valid From (date & time):		Valid To (date & time):	
	Permit Requester	Name:	Initial:	Approver remote ☐ Yes ☐ No If Yes, method of approval:
	Permit Approver	Name:	Initial:	
	Site Checker	Name:	Initial	
	If applicable, check all Specialized Permits and/or Plans that apply			
	☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan			
#2	Valid From (date & time):		Valid To (date & time):	
	Permit Requester	Name:	Initial:	Approver remote ☐ Yes ☐ No If Yes, method of approval:
	Permit Approver	Name:	Initial:	
	Site Checker	Name:	Initial	
	If applicable, check all Specialized Permits and/or Plans that apply			
	☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan			
#3	Valid From (date & time):		Valid To (date & time):	
	Permit Requester	Name:	Initial:	Approver remote ☐ Yes ☐ No If Yes, method of approval:
	Permit Approver	Name:	Initial:	
	Site Checker	Name:	Initial	
	If applicable, check all Specialized Permits and/or Plans that apply			
	☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan			
#4	Valid From (date & time):		Valid To (date & time):	
	Permit Requester	Name:	Initial:	Approver remote ☐ Yes ☐ No If Yes, method of approval:
	Permit Approver	Name:	Initial:	
	Site Checker	Name:	Initial	
	If applicable, check all Specialized Permits and/or Plans that apply			
	☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan			
#5	Valid From (date & time):		Valid To (date & time):	
	Permit Requester	Name:	Initial:	Approver remote ☐ Yes ☐ No If Yes, method of approval:
	Permit Approver	Name:	Initial:	
	Site Checker	Name:	Initial	
	If applicable, check all Specialized Permits and/or Plans that apply			
	☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan			
#6	Valid From (date & time):		Valid To (date & time):	
	Permit Requester	Name:	Initial:	Approver remote ☐ Yes ☐ No If Yes, method of approval:
	Permit Approver	Name:	Initial:	
	Site Checker	Name:	Initial	
	If applicable, check all Specialized Permits and/or Plans that apply			

	☐ Drilling ☐ Electrical ☐ Excavation ☐ Hot Work ☐ Isolation of Hazardous Energy ☐ Critical Lift Plan ☐ SimOps Plan		
SECTION 4 General Permit to Work Close Out *to be completed by Relevant Parties*			
Permit Requester (work is completed, and site returned to safe condition)			
Name:	Signature:	Date:	Time:
Permit Approver (work is completed, and this permit is closed)			
Permit Approver Remote: ☐Yes ☐No	If close out is obtained remotely note method of close out (email, phone, etc.):		
Name:	Signature:	Date:	Time:

CEMC Hot Work Permit

Hot Work Permit Number:
Permit to work numbering instructions – Contractor company name, permit type, date with no dashes, and a sequential number for the permit issued on that day e.g.,Company X- HW-01102016-1

General Permit to Work Number:
Enter the number from the CEMC General Permit to Work

SECTION 1 Site Conditions *(This permit shall be used in conjunction with and attached to the CEMC General Permit to Work)*
This permit is valid for one working shift and then can be renewed using the CEMC General Permit to Work.

Date:	Valid from (time):	Valid to (time):
Requester (name):	Company:	
Job/Task Scope of Work Description:		
List Tools and Equipment:		

Yes	No	N/A	Check all that apply	Permit Requester initial	Permit Approver initial
☐	☐	☐	Task is considered open flame hot work (ex. welding, brazing, cutting, burning)		
☐	☐	☐	All provisions and requirements specified on the associated CEMC Permit to Work and other specialized permits are met		
☐	☐	☐	Drain/Vents within 50 feet of open flame hot work (If Yes, they must be sealed, re-routed, and/or isolated at the import source away from the hot work)		
☐	☐	☐	Equipment to be positively isolated (e.g., blinded, electrical breaker removal) (use in conjunction with CEMC IHE Standard)		
☐	☐	☐	Competent Fire Watch at job site for open flame hot work		
☐	☐	☐	Fire Extinguisher(s) designated for Hot Work ONLY		
☐	☐	☐	Spark containment		
☐	☐	☐	Fire hose/water hose on site		
☐	☐	☐	Respiratory protection - list below		
☐	☐	☐	Area to be barricaded with warning signs installed		
☐	☐	☐	Additional instructions, conditions, special requirements - list below		

List any additional hazards, equipment, site precautions, special requirements, instructions, and/or PPE:

SECTION 2 Gas Testing *to be completed by Qualified Gas Tester*

Gas Testing Requirements (all gas testing to be performed by a Qualified Gas Tester, see gas testing results log for additional results as required)

☐ Initial ☐ Hourly ☐ Every _____Hours ☐Continuous: record gas test result every ☐ 1hr ☐ 2hr ☐ other:

Initial Gas Test Readings

Time	% 0_2	% LEL	H_2S ppm	CO ppm	Temp. $^oF/^oC$	VOC	Other	Qualified Gas Tester Name

Instrument (Model & Serial #)

CEMC Hot Work Permit

SECTION 3 Approval & Acceptance *to be completed by Relevant Parties*			
Fire Watch (I understand my roles and responsibilities, the scope of work, and conditions of the PTW and Hot Work Permit)			
Name:	Signature:	Date:	Time:
Permit Requester (I understand and agree to the conditions within the General Permit to Work as well as this Specialized Permit and have communicated these conditions with the Permit User's)			
Name:	Signature:	Date:	Time:
Permit Approver (I agree the scope of work can be carried out provided all conditions specified on this permit, the General PTW, associated Job Safety Analysis (JSA) and other specialized permit(s) are met)			
Permit Approver Remote: ☐Yes ☐No	If approval is obtained remotely note method of approval (email, phone, etc.):		
Name:	Signature:	Date:	Time:
CEMC Acceptance (I agree the scope of work can be carried out provided all conditions specified on this PTW, associated JSA and specialized permit(s) are met)			
For work requiring specialized permits or plans occurring for several continuous days of operation, the CEMC representative will accept the specialized permits and plans prior to the start of the work activity and at a minimum weekly thereafter.			
CEMC Acceptor Remote: ☐Yes ☐No	If acceptance is obtained remotely note method of acceptance (email, phone, etc.):		
Name:	Signature:	Date:	Time:
Renewal of Specialized Permits and Plans are documented and managed on the General Permit to Work			
SECTION 4 Fire Watch *to be completed by competent Fire Watch*			
Work area and adjacent areas within 50 feet of the hot work operations were monitored for 30 minutes after the hot work was completed and were found to be safe	Fire Watch Initials:		
SECTION 5 Hot Work Permit Close Out *to be completed by Relevant Parties*			
Permit Requester (work is completed and site returned to safe condition)			
Name:	Signature:	Date:	Time:
Permit Approver (work is completed and permit is closed)			
Permit Approver Remote: ☐Yes ☐No	If close out is obtained remotely note method of close out (email, phone, etc.):		
Name:	Signature:	Date:	Time:

CEMC Hot Work Permit

SECTION 6 Gas Testing Log *(all gas testing to be performed by a Qualified Gas Tester)*

Instrument (Model & Serial #)

Time	% 0_2	% LEL	H_2S ppm	CO ppm	Temp. $^{o}F/^{o}C$	VOC	Other	Qualified Gas Tester Initials

Drilling/ Excavation/ Trenching/ Abandonment/ Ground Disturbance WRP Example Does not include:

- Site Specific JSAs – go to JSA Library
- Site Specific Traffic Control Plan
- Chevron Lifting and Hoisting SWP Standard (if applicable)
- Chevron Vacuum Truck SWP Standard (If applicable)
- SOPs (if applicable)

2015 CHEVRON PROJECT WORK REQUEST

PROJECT NAME:		**PROJ. NUMBER:**	
STREET ADDRESS:		**TASK NUMBER:**	
CITY, STATE:		**Proj. Manager:**	
Facility Number:		**Site Safety Officer:**	
Site Contact:		**Field Supervisor:**	
Chevron PM:		**Site Worker:**	
Laboratory:		**Site Worker:**	
Laboratory SO # :		**Site Worker:**	
Date Needed:		**Site Worker:**	
Budgeted Hours:		**Site Worker:**	
Date Requested:		**Site Worker:**	
Project Category:	☐ MT2 ☐ Non-MT2	**Site Worker:**	

CHECK APPLICABLE ARCADIS AND CHEVRON STANDARDS AND PROCDURES APPLY TO THIS WORK REQUEST.
INCLUDE APPLICABLE STANDARDS AND PROCEDURES IN THIS PACKET. CONSIDER PRINTING IN BOOKLET FORMAT.

ARCADIS H&S STANDARDS - US ENVIRONMENTAL

☐ Aerial Work Platform	☐ First Aid	☐ Motor Vehicle
☐ Asbestos	☐ Hearing Conservation	☐ Powered Ind. Truck (Forklift)
☐ Benzene	☐ Heat Stress Prevention	☐ Radiation-Sealed Source
☐ Bloodborne Pathogens	☐ Heavy Equipment	☐ Railroad Workplace
☐ Cadmium	☐ Hoisting and Rigging	☐ Respiratory Protection
☐ Cold Stress	☐ Hot Work	☐ Scaffold
☐ Confined Space Entry	☐ Hydrogen Sulfide	☐ Utility Clearance
☐ Electrical Safety	☐ International Travel	
☐ Emer. Resp. & Fire Safety	☐ Ladder Safety	
☐ Excavation and Trenching	☐ Lead	
☐ Fall Protection	☐ Lock Out/Tag Out	

Chevron SWPs

- ☐ Electrical Safe Work
- ☐ Excavation and Trenching
- ☐ Hot Work
- ☐ Lock Out/Tag Out
- ☐ Lifting and Rigging
- ☐ Manual Handling
- ☐ Portable Gas Detection
- ☐ Simultaneous Operations
- ☐ Vacuum Truck
- ☐ Working At Height
- ☐ Bypassing Critical Devices
- ☐ Commercial Diving
- ☐ Confined Space Entry

☐ Task 1 Complete	Print the checked ARCADIS Standards and Chevron Safe Work Practices and review/discuss with affected field staff. Standards and Safe Work Practices are to be reviewed, understood and readily available at all times.
☐ Task 2 Complete	
☐ Task 3 Complete	
☐ Task 4 Complete	

1 Project Manager's Approval: PRE JOB
(Scope and Work Packet Approval)

_____ (Name) _____ (Date)

2 Field Manager's Approval
(Scope and Work Packet COMPLETION)

_____ (Name) _____ (Date)

3 Second Field Person V&V - when possible
(Scope and Work Packet Completion)

_____ (Name) _____ (Date)

4 Project Manager's Approval: POST JOB
(Scope and Work Packet Approval Before Filing)

_____ (Name) _____ (Date)

Hours Billed: _____

Generator → Project Manager → Field Supervisor → Field V&V → Project Manager → Central File

PROJECT NAME:	**DATE:**
Facility Number:	
Site Contact:	
☐ Task 5 Complete	
☐ Task 6 Complete	
☐ Task 7 Complete	
☐ Task 8 Complete	
☐ Task 9 Complete	
☐ Task 10 Complete	
☐ Task 11 Complete	
☐ Task 12 Complete	
☐ Task 13 Complete	
☐ Task 14 Complete	
☐ Task 15Complete	

Name: _____

Work Date: _____

GOAL

Get Out And Look

3 FEET of CUSHION for SAFETY

ARCADIS Design & Consultancy for natural and built assets

Smith System® Five Keys (Forward Driving)

1. ***Aim High in Steering*** ® - *Avoid Collisions by seeing, evaluating, and acting upon all information available.*
2. ***Get the Big Picture*** ® - *Fewer mistakes are made when you have the complete traffic picture.*
3. ***Keep Your Eyes Moving*** ® - *Proper scanning techniques separate safe drivers from people who make costly errors.*
4. ***Leave Yourself an Out*** ® - *All that separates drivers from a collision is space. Use it to your advantage. This also applies to parking—to ensure safe and easy exit in case of emergency, choose pull through spaces or back into parking spaces when possible.*
5. ***Make Sure They See You*** ® - *Seek eye contact and use your warning devices at the same time*

Smith System® Five Keys (Backing-Up Driving)

AVOID BACKING WHENEVER POSSIBLE - But When It's Unavoidable:

1. *Check The Backing Area First*
2. *Back Slowly And Carefully – Use A Spotter If Necessary*
3. *Remain Aware Of The Blind Areas*
4. *Look Front, Sides, And Rear As You Back*
5. *Back No Further Than You Must*

PRE-TRIP VEHICLE INSPECTION CHECKLIST

Date: **Beginning Mileage:** **Ending Mileage:**

Unit:
Operator:

NR = Needs Repair

CHECK BEFORE OPERATING	OK	NR	COMMENTS
Driver's License on Hand			
ARCADIS Insurance Card in Vehicle			
Back-up Alarm Operational (if installed)			
Tires (tread, pressure, cracking)			
Taillights Operational			
Turn Signals Operational			
Brake Lights Operational			
Back-Up Lights Operational			
Headlights Operational			
Parking Lights Operational			
Mirrors Adjusted to Minimize Blind Spots			
Under the Vehicle (nothing hanging or leaking)			
Windshield Wipers and Fluid all Functional			
Cargo Secured or in Trunk			
Doors are Fully Closed and Locked			
Seat Adjusted, Head Restraint to Match Height of Head			
Driver and All Passengers Must Fasten Safety Belt			
Scan the Gauges to Make Sure Everything is Normal			
Adjust the Vents, Windows, and Heater or Air Conditioner for Comfort			
Review Driving JSA			
Driver is Mentally and Physically Prepared to Drive			
DOT Materials of Trade are Properly Stowed (ie. Compressed gas)			
Perform a Driving-Related Safety Moment (record in comments)			



2/32" remaining **4/32" remaining** **6/32" remaining**

Tread guide: If a tread gauge is not available coins may be used to determine remaining tread. 2/32" is the minimum by law in most states (top of Lincoln's head on penny), 4/32" is minimum recommended for wet surfaces (top of Washington's head on quarter), 6/32" is minimum recommended for snowy surfaces (top of Lincoln Memorial on penny). Our vehicle tires must be replaced if the tread depth is less than 6/32"

Arcadis US | CallisonRTKL

If renting from Enterprise/National, be sure the Enterprise ID/National (XZ12140) is on the rental agreement.

Coverage:

Rented Auto Physical Damage - ACV or cost to repair or replace, whichever is less.

Comprehensive	$2,000 Deductible
Collision:	$2,000 Deductible
Liability:	$10,000 Deductible

Hartford Fire Insurance Company

Policy No:	20 UEN OL5319 (AOS)
	20 AB OL5320 (Hawaii)
Policy Period:	10/01/2020 to 10/01/2021

In the event of a claim, contact:

The Hartford

1-800-327-3636

ARCADIS
Infrastructure · Water · Environment · Buildings

Heavy Equipment Inspection Checklist [1]

CHECK BEFORE THE FIRST USE ON EACH SHIFT THAT EQUIPMENT IS UTILIZED

Vehicle/Equip No.	Hour Meter Reading Start of Week	Operator	Date

MON ☐	TUES ☐	WED ☐	THUR ☐	FRI ☐	SAT ☐	SUN ☐

VISUAL CHECKS	OK	Needs Repair	N/A
1. Engine oil level	☐	☐	☐
2. Radiator water level	☐	☐	☐
3. Fuel level	☐	☐	☐
4. Belts and Hoses	☐	☐	☐
5. Battery: check for corrosion, loose terminal, hold downs	☐	☐	☐
6. Obvious damage and leaks (fuel/oil/hydraulic fluid/coolant/transmission/differential oil)	☐	☐	☐
7. Tire or Track (loose rollers, broken flanges) condition	☐	☐	☐
8. Body/Cab/Covers	☐	☐	☐
9. Grab Bars and Steps	☐	☐	☐
10. Rock and radiator guards securely mounted	☐	☐	☐
11. Headlights and taillights	☐	☐	☐
12. Warning lights	☐	☐	☐
13. Hour meter	☐	☐	☐
14. Other gauges and instruments (oil pressure/temperature)	☐	☐	☐
15. Roll-over protection system (ROPS): properly secured to main frame/Seat belts	☐	☐	☐
16. Windshield	☐	☐	☐
OPERATIONAL CHECKS	**OK**	**Needs Repair**	**N/A**
17. Fire extinguisher present (monthly inspection current)	☐	☐	☐
18. Mirror(s)	☐	☐	☐
19. Horn	☐	☐	☐
20. Steering	☐	☐	☐
21. Service brakes	☐	☐	☐
22. Parking brake	☐	☐	☐
23. Check blade, ripper, winch (operates smoothly and will hold at any point)	☐	☐	☐
24. Warning light (strobe)	☐	☐	☐
25. Warning alarm (reverse travel)	☐	☐	☐

NOTES: 1. Carbon Monoxide monitoring is required whenever operation of fossil-fuel burning equipment is operated indoors or within enclosed areas.

Operator's Signature_____

REMARKS: Explain all items needing attention or repair; use number to identify.	

Chevron Environmental Management Company (CEMC)
GROUND DISTURBANCE REVIEW CHECKLIST

(Note: This checklist does not apply to Upstream Business Unit (UBU) project site work conducted within OPCO SBU controlled areas. Nor does it apply to oil and gas well plug and abandonment (P&A) activities. UBU will follow the Opco SBU requirements to ensure work is safe to proceed.)

CEMC Site Name/Number: _____ CEMC Project Manager: _____

Location(s) Reviewed: _____ Date: _____

Clearance Inspected by: _____ Business Partnerr Review by: _____

Questions 1 - 20 must be answered prior to any intrusive subsurface work (e.g. soil borings, excavation, well installation, piezometer, vapor probe, etc.). **DO NOT DISTURB GROUND if you answered NO or Not Applicable (N/A) to any of the questions.** The Business Partner Project Manager (PM) shall contact the CEMC PM to discuss mitigation measures required. The CEMC PM shall provide written or verbal (when remote) acceptance to continue work through the use of the general work permit, or determine that a high risk permit is required. The supplier must document written and/or verbal CEMC acceptance on applicable work permits prior to starting work. Refer to CEMC's Permit to Work Standard for high hazard work permit information.

Yes	No	N/A	
☐	☐	☐	1. Is a scaled site plan showing the proposed subsurface locations and utility conduits attached to this form?
☐	☐	☐	2. Are all of the proposed subsurface locations at least 5 feet from any subsurface utilities (including fuel product lines) as shown on the building plans? (if answered No, a "high risk" permit is required)
☐	☐	☐	3. Are all of the proposed subsurface locations at least 7 feet from the pad surrounding the underground storage tanks (USTs) shown on the site plans? (if answered No, a "high risk" permit is required)
☐	☐	☐	4. Are all of the proposed subsurface locations at least 5 feet from any subsurface utilities shown on public right-of-way street improvement plans? (*Work with respective utility company to determine if they require a representative present during drilling / excavation activities*) (if answered No, a "high risk" permit is required)
☐	☐	☐	5. Were individuals with unique knowledge contacted to see if he/she has any knowledge of any subsurface utilities within 5 feet of the proposed subsurface / intrusive locations? (*Review locations with the manager / owner*)
☐	☐	☐	6. Were all circuits on during subsurface checks if the checks were for identifying energized lines? (e.g., circuits on timers or light sensing switches)
☐	☐	☐	7. Are all of the proposed subsurface locations at least 5 feet from any subsurface utilities identified during a geophysical survey performed using ground penetrating radar (GPR) in conjunction with other technologies? (if answered No, a "high risk" permit is required)
☐	☐	☐	8. Have all state "One Call" providers marked out their facilities in the vicinity of the proposed subsurface locations or otherwise notified EMC's Business Partner that they do not have any facilities near the proposed subsurface / intrusive locations?
☐	☐	☐	9. Was there visual verification that each of the proposed subsurface locations do not lay on a line connecting two similar looking manhole covers (e.g. sanitary sewer or storm drains)? (*Consider having the line snaked to confirm their locations*)
☐	☐	☐	10. Was there visual verification that each of the proposed subsurface locations do not lie on a line with any water, gas, electrical meters, utility clean-outs, or other utility boxes in the surrounding areas?
☐	☐	☐	11. Was there visual verification that the ground in the vicinity of each of the proposed subsurface locations has not subsided or give the appearance it may be covering a former trench? (e.g., linear cracks or sagging curbs)
☐	☐	☐	12. Was there visual verification that each of the proposed subsurface locations has adequate overhead clearance for the rig? (e.g., minimum of 10 feet from overhead utility line to prevent damage) (if answered No, a "high risk" permit is required)
☐	☐	☐	13. Was there visual verification that no changes have been made to the grout collar and the surface around the existing wells? (e.g. comparing current site conditions to photographs taken when the existing borings / wells were installed to identify different colors/textures of concrete in or saw cuts through the area of the well bore)
☐	☐	☐	14. Was a review of the original boring logs for the existing borings / wells completed? (*Please document any discrepancies and/or changes*)
☐	☐	☐	15. Are all of the proposed subsurface locations at least 5 feet from active lines shown on the as-built drawings? (if answered No, a "high risk" permit is required)
☐	☐	☐	16. Are copies of the completed ground disturbance review checklist(s) and the findings from items 1 through 15 documented in a report?
☐	☐	☐	17. Have all appropriate permits been obtained?
☐	☐	☐	**18. Have you carefully cleared the borehole (using an air knife, hand auger, or other mechanical methods) to a minimum depth of 8 feet below grade before using a drill rig or day-lighted utilities as appropriate for other locations (e.g., excavations, trenches, etc..)?**
☐	☐	☐	19. When drilling, is the diameter of the hand cleared hole at a minimum 2 inches greater than the outer diameter of the drilling tools you will be using? (e.g., hollow stem augur, direct push rod, sonic / rotary drill bit, etc…)
☐	☐	☐	20. Was the soil encountered in the cleared subsurface location free of clean gravel, clean sand, aggregate base (gravelly sand with ~10% fines), or non-native looking material?

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

EXECUTIVE SUMMARY

This Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary and that an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

All excavations over four feet in depth (or less than 4 feet in depth if deemed necessary by the Competent Person) shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades *when the excavations are not readily seen because of plant growth or other visual barrier*.

Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard requires use of a protective system.

All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

1. POLICY

It is ARCADIS US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, any work involving trenching and excavation that is under the control or direction of ARCADIS or an ARCADIS subcontractor will be accomplished following, at a minimum, this Standard.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary. If there are no suitable alternatives and it becomes necessary to enter excavations or trenches, this standard, at a minimum will be strictly followed.

It is also the policy of ARCADIS to ensure an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

2. PURPOSE AND SCOPE

2.1 Purpose

To effectively control or eliminate the hazards presented by working near or entry into excavations or trenches, this Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

2.2 Scope

This standard along with associated checklists and the Utility Location Standard (ARC HSFS019) apply to all employees of ARCADIS-US. Only trained and authorized personnel are permitted to work near or enter excavations and trenches, perform rescue services, or act as the excavation competent person.

3. DEFINITIONS

Exhibit 1 includes relevant definitions to this Standard including that for competent person qualifications.

4. RESPONSIBILITIES

4.1 Corporate H&S with Division and Practice Experts

- On a routine basis, review and update, as necessary, this standard.
- As requested by Operations Leadership, review cancelled checklists periodically to ensure conformance to this standard.
- Coordinate with the Training Group to ensure that the excavation competent person qualifications and training/retraining requirements are met.

- Conduct excavation competent person evaluations for nominated individuals as necessary, in order to approve and designate them as competent.
- Recommend qualified training provider for excavation awareness training for employees working in or around excavation/trenching operations.
- Provide technical assistance regarding excavation and trench protocol, atmospheric testing equipment, PPE, hazard assessment and research information on unusual hazards.
- Audit project-specific excavation sites for compliance with this standard.

4.2 Principal in Charge (PIC), Project Manager (PM), and/or Task Manager (TM)

- Verify that excavation and trench protocols are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Verify that their divisional or project team employees have received the proper training provided by Corporate Health & Safety or qualified training source prior to conducting excavation/trenching entry activities.
- Verify that any ARCADIS employee acting as the Excavation Competent person has been designated and authorized to do so per the requirements specified in section 4.4 of this standard.
- Verify that the proper entry equipment, including personal protective equipment (PPE), atmospheric testing equipment and safety equipment, is available for use by their divisional employees.
- Verify that copies of the completed checklists are available for Corporate Health and Safety review and retained with the project files.
- Request that Corporate Health and Safety review cancelled checklists as necessary and appropriate

4.3 Health and Safety Plan Writers and Reviewers

Use this standard as guidance to ensure the appropriate identification, assessment and control of excavation and trenching hazards for documentation in project HASPs and development of task specific Job Safety Analysis (JSA).

4.4 Competent Person

Competent Person responsibilities include:

- Anticipation, identification and control of excavation and trenching hazards, as well as the signs and symptoms of exposure to the hazard(s), and the Authority to implement all corrective actions including Stopping Work.

  Note: An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in

determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

- Review existing soil sampling data (if any) or other pertinent hazard characterization information recorded by the client.
- Investigate the client's excavation/trenching protocol, to verify that any identified hazards and previous experience with earthwork at the site is properly communicated.
- Coordinate entry operations with the client's employees when both client and ARCADIS employees will be working in or near an excavation/trench.
- Offer all entrants an opportunity to review the applicable control measures and testing results and an opportunity to request a reevaluation as necessary.
- Design of structural ramps that are used solely by employees as a means of access or egress from excavations.
- Monitoring of water removal equipment and operations, if water is controlled or prevented from accumulating by the use of water removal equipment,
- Inspection of excavations subject to runoff from heavy rains.
- Daily inspections of excavations, the adjacent areas, and protective systems when required.
- If evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions are present, the Competent Person is responsible for ensuring that exposed employees are removed from the hazardous area until the necessary precautions have been taken to ensure their safety.
- Examining material or equipment used for protective systems that is damaged to evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.
- For excavations less than 5 feet (1.52 m) in depth, in which employees will be entering, a Competent Person must examine the ground to determine if there are indications of a potential cave-in hazard. If there are potential indicators of a cave-in

hazard, the Competent Person will require some form of cave-in protection be implemented before employees can enter.

- Classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits.

- Soil and rock deposits shall be classified by a Competent Person as Stable Rock, Type A, Type B, or Type C based on the results of at least one visual and at least one manual analysis.

- If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a Competent Person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

- When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved.

- Order evacuation of the excavation/trench if an uncontrolled hazard develops, either within or outside the space, or upon observing a behavioral effect of hazard exposure among excavation/trench entrants.

- Verify that all tests and precautionary measures identified on the Daily/Periodic Inspection Checklist located in Exhibit 2 and the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.

ARCADIS employees must meet the following requirements to be a designated and approved Competent Person:

- Attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training; and

- Approval by Corporate Health and Safety through demonstration of practical field experience and/or knowledge of the subject matter.

    - Documentation of the evaluation and approval of each excavation competent person will be completed using the form provided in Exhibit 3.

    - This documentation and a listing of the approved ARCADIS excavation competent person will be maintained by the Training Group; and

- If on an Environmental project where HAZWOPER training is required by ARCADIS, the Competent Person must also have completed the 40 Hour HAZWOPER training, be current on their annual 8 Hour HAZWOPER refresher and it is recommended, but

not required, that the Competent Person completed the HAZWOPER Supervisor training course.

4.5 Site Safety Officer (SSO)

When ARCADIS and/or our subcontractor is in control of an excavation project, the SSO will be responsible for the following:

- Interface with the client representative and Competent Person to identify and understand hazards associated with the client's excavation and trenching and/or work permit programs.
- Implement the ARCADIS Utility Clearance Policy and Procedure and complete the Daily/Periodic Excavation Inspection Checklist, when the excavation project is under the control of ARCADIS.
- Verify adequate training and experience of those ARCADIS employees working in and around excavations.
- Verify that the safety procedures identified in this Standard, the site specific HASP, and applicable regulatory requirements are used when required to protect employees during excavation activities.
- Verify that the client takes the necessary precautions in notifying their employees that our employees will be installing an excavation or trench.
- Review the lockout/tagout and isolation measures implemented by ARCADIS, our subcontractor and/or the client as necessary based on proximity of utilities or other energy sources in the area of the excavation/trench.
- Immediately report any unusual or unplanned excavation or trenching hazards to both the Competent Person and the Project Manager or Task Manager.
- Keep unauthorized persons away from the excavation area.
- Confirm that the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.
- Issue, authorize, and have the Utility Clearance and Daily/Periodic Inspection forms readily available for review
- Verify that copies of the completed clearance forms and checklists are properly disseminated to Corporate Health and Safety and retained with the project files, as specified in Section 8.0 – Records.

4.6 Employees

- Notify the PIC, PM, TM or SSO if they have not received appropriate training.
- Review the site specific HASP, task specific JSAs, and other written plans that are associated with their work.

- Use the TRACK process regularly and frequently to recognize the hazards which may be faced during work around or in excavation/trenches, as well as to understand the signs and symptoms of exposure to airborne hazard(s).

- Never enter an excavation/trench without verifying that the required Utility Location Procedure, Daily/Periodic Inspection Checklist and required air monitoring is conducted.

- Use Stop Work Authority if excavation/trenching hazard(s) have not been appropriately addressed. Immediately consult with SSO, Competent Person and ARCADIS Project/Task Manager.

- Use the PPE, air monitoring and testing equipment that has been provided or have access to the information documenting that results are within the defined Action Levels established within the HASP.

- Maintain an awareness of all required hazard controls and consult with the Competent Person as necessary.

- If unexpected conditions arise during entry, immediately notify other entrants, evacuate the space and inform the designated Competent Person

- Obey evacuation orders given by the Competent Person, SSO, automatic alarm activation, or when self-perceived.

- At least one person on site must maintain current certification in basic first aid and cardiopulmonary resuscitation (CPR).

5. PROCEDURE

5.1 General Safety Requirements for all Excavations

- If excavation work encounters unanticipated groundwater contamination, soil contamination or other unanticipated contaminants, ARCADIS staff will Stop Work and notify the Project Manager. An appropriate work plan to sample the suspected contaminants shall be developed, samples collected by HAZWOPER trained personnel, the HASP modified and a contaminant management plan developed, as necessary.

- All surface obstructions must be moved or supported so as to protect employees and equipment.

- Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

- When excavating in areas near underground installations, proper precautions must be taken to determine the exact location of the installations and to adequately protect and support them. While an excavation is open, underground installations shall be protected, supported or removed as necessary to protect employees.

- Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person.

- Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

- Ladders must extend at least 36” (3 feet) above the landing surface.

- All excavations over four feet in depth shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel. As deemed necessary by the competent person, excavations less than 4 feet in depth will be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

- If personnel are working in a location exposed to vehicular traffic they must be provided with and be required to wear reflective safety vests. Adequate, signs, barriers or other equivalent traffic controls must be used to protect employees.

- Personnel are not permitted to be beneath elevated loads handled by equipment or be in excavations when heavy equipment is digging in or near the excavation.

- Mobile equipment located near open excavations must be adequately protected from falling or rolling into excavations by the use of barricades or warning devices.

- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

- Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

- Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

- All structures adjacent to an open excavation must be supported, or a registered professional engineer (PE) must determine that the structure will not be affected by the excavation activities.

- Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

- Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.

- Employees at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

- Work tasks will be designed to limit the number of personnel required to enter any excavation. All tasks that can be completed remotely from outside the excavation (such as soil sampling) will be conducted in such a manner.

- Personnel will not be allowed to enter any excavation unless required protective systems and procedures are used to prevent accidents and injury.

Best Management Practice: *In some instances, an excavation will not have any protective systems in place when employees will not be entering into the excavation. Even if employees are not entering into this type of excavation, a competent person should be consulted to establish a safe zone distance away from the edge of any open excavation to minimize the hazard of falling into this type of excavation. Standing at the edge of an excavation places an employee at risk of falling into the excavation, thereby subjecting themselves to the hazard of excavation/trench collapse, which then triggers the requirement for protective system use as defined in this standard. General guidance would be for employees to remain 6 feet or more away from the edge of any excavation.*

- Dust control measures will be implemented during excavation and soil-moving activities as required by the Health and Safety Plan (HASP). As necessary, dust control measures will also be used to manage soil located in temporary storage areas or stockpile areas. Specific dust control measures will be detailed in the HASP. The Competent Person must be consulted prior to initiating “wet” dust control measures to discuss limits/impact to protective systems.

- Excavations cut through a firewall or containment berm/bund shall provide alternate means of containment while the job is progressing. A specific containment procedure or diversion procedure will be included as a supplement to the HASP or defined in the Remedial Work Plan.

- Excavating in archeological sites requires special consideration and compliance with local legal requirements and shall be avoided wherever possible. Archaeological investigations on federal and state lands have additional requirements. For example, permit provisions are established in federal (specifically the federal Archaeological Resources Protection Act) and some state statutes. If an artifact or archeological feature is unearthed during excavation, ARCADIS shall stop work and consult with client, regulatory agencies and professional archaeologist, as necessary.

5.2 Excavations Requiring Protective Systems

This section defines excavations that require protective systems.

- All excavations into which employees will enter, regardless of depth, where the potential for cave-in exists.
- Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard.
- Any excavation near a structure, (e.g. foundations, piers, footers, walls, sidewalks, tanks, roadways, etc.), as required by the registered professional engineer reviewing the stability of the excavation and the structure.
- All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.
- All excavations that could potentially impact adjacent structures shall be reviewed by a registered professional engineer to determine if the stability of the structure will be affected by the excavation.
- Support systems for an adjacent structure must be designed by a registered professional engineer.

5.3 Selection and Use of Protective Systems

5.3.1 Shoring or Shielding

If shoring or shielding is selected as the protective system for an excavation, soil classification in accordance with 1926 Subpart P Appendix A is required.

One of the following options must be used for excavations which will be shored or shielded.

- Timber shoring as specified in 1926 Subpart P Appendix C must be utilized
- Hydraulic shoring, trench jacks, air shores, or shields as required in 1926.652 (c)(2) must be utilized following the system manufacturer's data
- A system which follows other tabulated data (approved by a registered professional engineer) must be utilized
- The excavation must be designed by a registered professional engineer

5.3.2 Sloping

If sloping is selected as the protective system for an excavation, the excavation sides must be sloped at a maximum of 34 degrees (1.5 Horizontal: 1 Vertical), unless the procedure listed above is followed.

Soil classification is required for all excavations with sides which will be sloped greater than 34^{o} (1.5 Horizontal: 1 Vertical). If it will be sloped greater than 34^{o}, the one of the following options must be utilized:

- Option 1 - assume Type C and slope 1.5/1 - default sloping classification
- Option 2 - classify soil according to the standard and use Type A/B sloping requirements
- Option 3 – use other tabulated data with PE approval
- Option 4 – PE approval of sloping/benching design

5.4 Atmospheric Testing for Entry

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

The site designated "Competent Person" and/or SSO will document initial and periodic air monitoring results for all activities requiring entry into the excavation. All atmospheric testing of excavations must be conducted in the following sequence and meet the following air quality criteria.

- Oxygen content must be between 19.5% to 23.5%
- Combustible gas or vapor less than (<) or equal to 5% of its lower explosive limit (LEL): Level D. Continue to monitor atmospheric conditions as detailed in project specific Health and Safety Plan.
- Combustible gas or vapor levels greater than (>) 5%, but < 10% of its LEL: Continuous atmospheric monitoring required; review use/implementation of engineering controls (ventilation, etc.) and PPE; evaluate potential source(s) of ignition and where feasible, remove from the area; fire extinguisher must be available; and use TRACK to assess condition/controls and proceed with caution.
- Combustible gas or vapor levels > or equal to 10% of its LEL: Stop Work; evacuate the excavation/trench; contact the Competent Person and SSO; and re-evaluate source/controls of combustible gas,
- Carbon monoxide levels must not exceed 25 ppm as an 8-hour Time Weighted Average (TWA).

- Hydrogen sulfide must not exceed 5 ppm as a Short-Term Exposure Limit (STEL) value or 1 ppm as an 8-hour TWA.

- Toxic air contaminant levels must not exceed 50% of the PEL or the TLV for the specific contaminant (whichever is lower).

5.5 Location of Underground/Overhead Utilities

- The competent person and the project manager shall both verify that local underground facilities location/protection agencies are notified within the required time frame prior to the initiation of excavation activities and meet all requirements in the ARCADIS Utility Location Policy and Standard ARC HSFS019.

- Prior to initiation of excavation or trenching operations the competent person shall verify that all utilities have been located.

5.6 Daily/Periodic Inspections

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person:

- Prior to initiation of daily excavation or trenching operations the competent person shall complete a daily inspection of the excavation.

- During excavation or trenching operations the competent person shall complete a periodic inspection after any event (e.g., thunderstorm, vibration, excessive drying) that may affect excavation stability.

Note: In order to correctly ascertain the soil types, the competent person must identify the locations and the limits of each type of soil, and must conduct visual and all appropriate manual tests to classify the initial (opening) soil types observed.

Note: These inspections are only required when employee exposure can be reasonably anticipated. Not just in-trench exposure, but also ANY hazardous condition in the area that an employee could be exposed to.

The competent person shall complete the daily/periodic inspection checklist (A copy of the checklist is attached to this Policy as Exhibit A) – Subcontractors must complete the ARCADIS checklist or an equivalent inspection form for each inspection of excavation and trenching activities.

5.7 Soil Classification for Selection of Protective Systems

5.7.1 Soil Classification

This section describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. This

section contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

This section applies when a sloping, benching or shoring system is utilized as a method of protection for employees from cave-ins.

5.7.2 Soil Classification Definitions

5.7.2.1 Types/Classes of Soil

5.7.2.1.1 Type Class A Soils

Type/Class A Soils are cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are: Clay, silty clay, sandy clay, clay loam and in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if the following apply.

- The soil is fissured;
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects;
- The soil has been previously disturbed;
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or greater;
- The material is subject to other factors that would require it to be classified as a less stable material

5.7.2.1.2 Type Class B Soils

Type/Class B Soils are:

- Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa)
- Granular cohesion-less soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam
- Previously disturbed soils except those which would otherwise be classed as Type C soil
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4 Horizontal:1 Vertical), but only if the material would otherwise be classified as Type B

5.7.2.1.3 Type/Class C Soils

Type/Class C Soils are:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less

- Granular soils including gravel, sand, and loamy sand
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or steeper

5.7.2.2 Methods for Classifying Soils

Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in this section. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis conducted by a competent person using tests described below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

The visual and manual analyses, such as those noted as being acceptable in this section, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

Observe the following:

- Samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine grained material is cohesive material. Soil composed primarily of coarse grained sand or gravel is granular material.

- Soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

- The side of the open excavation and the surface area adjacent to the excavation. Crack like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

- The area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

- The open side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

- The area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

- The area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

5.7.2.3 Classifications

- *Plasticity*. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8 inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8 inch thread can be held on one end without tearing, the soil is cohesive.

- *Dry strength*. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

- *Thumb penetration*. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

- *Other strength tests*. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand operated shearvane.

- *Drying test*. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:

    1. If the sample develops cracks as it dries, significant fissures are indicated.

    2. Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined by using the thumb penetration or other test.

5.7.2.4 Cohesive with Fissures vs Granular

If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

5.7.2.5 Layered system

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

5.7.2.6 Reclassifying Soils

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

In most instances the ARCADIS designated Excavation/Trenching Competent person will assume Type C soil, unless they have conclusive data to validate Type A or B.

5.7.2.7 Excavation Construction Based on Soil Type

The maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V). Short-term exposure means a period of time less than or equal to 24 hours that an excavation is open. Soil and rock deposits must be classified in accordance with Appendix A to Subpart P of Part 1926. The maximum allowable slope for a soil or rock deposit must be determined from the table provided below. The actual slope must not be steeper than the maximum allowable slope. The actual slope must be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope must be cut back to an actual slope which is at least horizontal to one vertical (1/2H:1V) less steep than the maximum allowable slope. When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person must determine the degree to which the actual slope must be reduced below the maximum allowable slope, and must assure that such reduction is achieved. Surcharge loads from adjacent structures must be evaluated in accordance with 1926.651(I). Configurations of sloping and benching systems must be in accordance with 29 CFR 1926 Subpart P, Appendix B.

EXCAVATION SLOPE INFORMATION FROM 29 CFR 1926 SUBPART P APPENDIX B MAXIMUM ALLOWABLE SLOPES	
Soil or Rock Type	**Maximum Allowable Slopes (H:V)[1] for Excavations Less Than 20 Feet Deep[2]**
Stable Rock	Vertical (90 degrees)
Type A[3]	¾:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1½:1 (34 degrees)

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal (H). Angles have been rounded off.

2. Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.
3. A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth must be 3/4H:1V (53 degrees).

6. TRAINING

6.1 Project - Specific Orientation

All staff working on a site where trenching and excavation activities are being conducted by ARCADIS or its subcontractors will be provided with site orientation on excavation projects and participate in daily safety meetings that include a discussion of the following:

- Site excavation hazards and procedures;
- Requirements for conducting activities remotely whenever possible;
- Client requirements and procedures for excavation activities;
- Review of applicable federal, state and/or local excavation requirements; and
- This Excavation and Trenching Standard, as appropriate

6.2 Employee Training

Besides site orientation training, additional training will be provided as follows based on the employee's activities:

- All employees who work in the area of potential excavation/trenching sites will receive awareness level training as provided and/or approved by ARCADIS Corporate H&S in order to recognize and to understand the hazards associated with trenching/excavation work.
- On an as needed basis, employees will receive site specific instruction regarding the excavation/trenching operation from the Competent Person and/or the SSO.

6.3 Competent Person Training

Competent Persons will be provided training as follows:

In order for ARCADIS employees to be assigned duties as a competent person, with respect to excavation and trenching, in addition to the criteria noted in section 4.4, personnel must attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training. The course shall include, but is not limited to the following:

- Introduction to and definition of trenches and excavations.
- General requirements of OSHA 29 CFR 1926 Subpart P.
- Responsibilities and requirements of a competent person.
- Hazards associated with trenches/excavations and Identification and Assessment of these hazards.
- Hazard controls

- Soil analysis and testing (visual and manual;
- Protective systems;
- Personal protective equipment;
- Utility location;
- Atmospheric testing;
- Water drainage and pumping;
- Site housekeeping and management;
- Communications;
- Access and egress

- Emergency Procedures.
- Inspections.

All training provided must be reviewed and approved by Corporate Health & Safety and will be managed through the Training Team.

Documentation of training certification received by attendance at any training course including externally provided training courses will be kept by the employee with copies provided to the Training Team.

7. REFERENCES

ARCADIS Health and Safety Standard ARC HSFS010– Health and Safety Planning

ARCADIS Health and Safety Standard ARC HSFS004 – Control of Hazardous Energy (Lockout/Tagout)

ARCADIS Utility Clearance Policy and Standard ARC HSF019

OSHA 29 CFR Part 1926 Subpart P - Excavations

8. RECORDS

8.1 Training records will be kept by the individual employee with copies of such certificates kept by the Training Team. Training dates and times will be kept by the Training Team.

8.2 Completed clearance forms and checklists will be kept in the project files with copies available for Corporate H&S review.

8.3 Copies of all HASPs that document excavation trenching procedures will be kept in the project files.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Anthony Tremblay, CSP, CIAQP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
12 May 2008	01	Greg Ertel	Original document
13 June 2008	02		Modified Section 5.1 – 4th bullet related to structural ramps. Modified Section 5.2 to designate a 6x factor for structural integrity of structures near the excavation. Revised Exhibit 1 to modify the definition of a Competent person
9 January 2009	03		Cleaned up definitions, deleted training requirements from Section 5.0 and moved them to Section 6.0, modified purpose statement
31 March 2011	04		Updated Competent Person training and qualification requirements in section 4.6, section 6.2 and definition in Exhibit 1.
27 March 2012	05	Tremblay	Section 4 competent person, SSO and employee responsibilities revised; Confined Space references eliminated; Training requirements clarified; use of ladders detailed; Fall prevention requirements clarified in section 5.1; depth of protective system requirement corrected to 5 feet; spoils pile must be minimum 2 feet from edge of excavation; Atmospheric Monitoring Action Levels revised; Employee Awareness Training and Competent Person Training requirements clarified
4 June 2012	06	Tremblay	Section 4.4 typo corrected; 8-hour HAZWOPER Supervisor course for competent person was made a recommended practice instead of a requirement; Section 4.5 SSO responsibilities revised to eliminate those responsibilities that belong with the Competent Person; Section 5 Best Management Guidance to maintain safe distance from the edge of excavation; checklists hyperlinked

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
18 September 2013	07	Tremblay	Tracking table format updated; Section 5.1 revised to include information about encountering unanticipated contaminants, implementing dust control measures, instituting containment measures when breeching a containment berm and avoiding excavating in archeological sites
26 September 2013	08	Tremblay	Section 5.7.2.7 Maximum Allowable Slope Table had a typo in Type C soil line H:V ratio (corrected the ratio to read 1 ½ : 1). The value of 34 degrees is correct; Header format update and pages renumbered
23 February 2015	09	Tremblay	Page numbering correction; Exhibit 2 checklist and Exhibit 3 Competent Person Checklist inserted to supplement the existing hyperlink to documents

Exhibit 1 – Definitions

Attendant is a trained qualified individual stationed outside the excavation whose duty is to monitor authorized entrants inside the excavation or trench and have a means of communication with the designated rescue services.

Benching/Benching system means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury or otherwise injure and immobilize a person.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sides, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Competent person means one who, through education, training, and/or experience, is capable of identifying existing and predictable hazards or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Dry soil means soil that does not exhibit visible signs of moisture content.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal into which a person can bodily enter.

Entry constitutes the act by which an employee proceeds into an excavation or trench. Consideration of hazards, especially cave-ins and fall protection must still be considered and accounted for when equipment or personnel are near an excavation or trench, even if personnel will not be entering.

Entrants are employee's who are trained and authorized to enter a trench or excavation. Entrants must have attended a Qualified Excavation Training course offered or approved by Corporate Health and Safety.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Hazardous Atmosphere is an atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following:

- An atmospheric concentration of any substance in excess of 50% of its established permissible exposure limit (PEL); or its assigned threshold limit value (TLV) or other value listed on the Material Safety Data Sheet (MSDS) for the chemical constituent, whichever is lower.
- A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL).
- An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric oxygen concentration below 19.5% (oxygen-deficient atmosphere) or above 23.5% (oxygen-enriched atmosphere).
- An atmosphere which is immediately dangerous to life and health.

Immediately Danger to Life and Health (IDLH) means any condition which poses an immediate threat to loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage, irritation, or other conditions which could impair escape from the space.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems and other systems that provide protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce. To oversee an excavation/trench activity the PE must have experience with and expertise in excavation, soil and stability considerations.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shield can be

either pre-manufactured or job-built in accordance with 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Soil classification system means, for the purpose of this procedure, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Submerged soil means soil which is underwater or is free seeping.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench means a narrow excavation (in relation to its length) made below the surface of the ground to which a person can bodily enter. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 meters) or less (measured at the bottom of the excavation), the excavation is considered to be a trench.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Exhibit 2 – Daily / Periodic Excavation Inspection Checklist

Daily / Periodic Excavation Inspection Checklist

ARCADIS	Daily / Periodic Excavation Inspection Checklist
Project Name:	Date / Time:
Project Number:	Location:
Prepared By:	Project Manager:

This checklist must be completed for all excavations. It documents that daily and post-event / periodic inspections are conducted.

Soil Classified As:	☐ Stable Rock	☐ Type A	☐ Type B	☐ Type C
Soil Classified On:	By:			
Type of Protective System in Use	☐ Sloping	☐ Shoring	☐ Shielding	☐ Benching	☐ Other
Description:				

Inspection Item	YES	NO	N/A	Comments
Has the ARCADIS Utility Clearance Procedure been completed?	☐	☐	☐	
Are underground installations protected from damage?	☐	☐	☐	
Has a Competent Person been identified?	☐	☐	☐	
Are adequate means of entry / exit available in the excavation – at least every 25 feet?	☐	☐	☐	
If exposed to traffic, are personnel wearing reflective vests and adequate barriers/traffic controls installed?	☐	☐	☐	
Do barriers exist to prevent equipment from rolling into the excavation?	☐	☐	☐	
Was air monitoring conducted prior to and during excavation entry?	☐	☐	☐	
Was the stability of adjacent structures reviewed by a registered P.E.?	☐	☐	☐	
Are spoil piles at least 2 feet from the excavation edge?	☐	☐	☐	
Is the excavation(s) readily visible ? If no, employees must be protected from falling by guardrail systems, fences, or barricades?	☐	☐	☐	
If the well, pit, shaft, or similar excavation is 6 feet (1.8m) or more in depth, are employees protected from falling by guardrail systems, fences, barricades?	☐	☐	☐	
Are work tasks completed remotely if feasible?	☐	☐	☐	
Is a protective system in place and in good repair?	☐	☐	☐	
Is excavation isolated from the effects of vibration?	☐	☐	☐	
Are employees protected from falling / elevated material?	☐	☐	☐	
Is soil classification adequate for current environmental / weather conditions?	☐	☐	☐	
Do portable ladders extend at least 3 feet above the excavation?	☐	☐	☐	
Are portable ladders or ramps secured in place?	☐	☐	☐	
Have all personnel attended safety meeting on excavation hazards?	☐	☐	☐	
Are support systems for adjacent structures in place?	☐	☐	☐	
Is the excavation free from standing water?	☐	☐	☐	
Is water control and diversion of surface run-off adequate?	☐	☐	☐	
Are employees wearing required protective equipment?	☐	☐	☐	
Excavation Competent Person:				Date/Time:

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

Name of Employee:_____Job Title:_____

Department: _____Office Location: _____

Experience with Excavations/Trenching:

_____

_____

_____

_____

_____

_____

Relevant Training:

_____

_____

_____

_____

_____

_____

_____

Other Relevant Qualifications:

_____

_____

_____

_____

_____

_____

_____

*Include documentation from employee's Supervisor that acknowledges their capacity to work as a designated competent person.

Based on the information listed above and an evaluation of this employee's knowledge and experience, I consider them to be a Competent Person for Excavation and Trenching.

Evaluation By: _____ Job Title: _____

Signature: _____ Date: _____

Exhibit 1 – Definitions

Attendant is a trained qualified individual stationed outside the excavation whose duty is to monitor authorized entrants inside the excavation or trench and have a means of communication with the designated rescue services.

Benching/Benching system means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury or otherwise injure and immobilize a person.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sides, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Competent person means one who, through education, training, and/or experience, is capable of identifying existing and predictable hazards or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Dry soil means soil that does not exhibit visible signs of moisture content.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal into which a person can bodily enter.

Entry constitutes the act by which an employee proceeds into an excavation or trench. Consideration of hazards, especially cave-ins and fall protection must still be considered and accounted for when equipment or personnel are near an excavation or trench, even if personnel will not be entering.

Entrants are employee's who are trained and authorized to enter a trench or excavation. Entrants must have attended a Qualified Excavation Training course offered or approved by Corporate Health and Safety.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Hazardous Atmosphere is an atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following:

- An atmospheric concentration of any substance in excess of 50% of its established permissible exposure limit (PEL); or its assigned threshold limit value (TLV) or other value listed on the Material Safety Data Sheet (MSDS) for the chemical constituent, whichever is lower.
- A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL).
- An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric oxygen concentration below 19.5% (oxygen-deficient atmosphere) or above 23.5% (oxygen-enriched atmosphere).
- An atmosphere which is immediately dangerous to life and health.

Immediately Danger to Life and Health (IDLH) means any condition which poses an immediate threat to loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage, irritation, or other conditions which could impair escape from the space.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems and other systems that provide protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce. To oversee an excavation/trench activity the PE must have experience with and expertise in excavation, soil and stability considerations.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shield can be either pre-manufactured or job-built in accordance with 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Soil classification system means, for the purpose of this procedure, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Submerged soil means soil which is underwater or is free seeping.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench means a narrow excavation (in relation to its length) made below the surface of the ground to which a person can bodily enter. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 meters) or less (measured at the bottom of the excavation), the excavation is considered to be a trench.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Exhibit 2 – Daily / Periodic Excavation Inspection Checklist

Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

EXECUTIVE SUMMARY

ARCADIS employs a wide range of heavy and mechanized equipment in various operations. ARCADIS staff operating heavy equipment requires, at minimum, compliance with the policies set forth in this Health and Safety Standard (HSS). In addition to federally mandated requirements, each state may enforce more stringent standards related to training, licensure, inspection and documentation.

The requirements set forth in this policy provide direction in heavy equipment operations:

- Specific training for Powered Industrial Trucks (forklifts) will be in compliance with OSHA 29CFR 1910.178. Refer to ARCADIS Forklifts HS Procedure ARC HSSP006 for additional details and requirements.

- All employees involved in Heavy Equipment Operations shall read and understand documented hazard identification and risk assessments conducted using the Hazard Assessment and Risk Control (HARC) Process. Understand and actively use TRACK and Stop Work Authority during heavy equipment operations.

- ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.

- Preventative maintenance and pre-operation checks shall be conducted in accordance with the manufacturer's requirements and documented daily prior to equipment usage.

- All prospective ARCADIS Heavy and Mechanized Equipment Operators and Heavy and Mechanized Equipment Site Supervisors (Site Supervisors) must complete Online Heavy Equipment General Awareness Training, and review & understand this HSS. Prospective ARCADIS Heavy and Mechanized Equipment Operators and Site Supervisors will be evaluated by the Heavy and Mechanized Equipment Review Board and designated as Heavy and Mechanized Equipment Operator Awareness Trained, requires additional training or designate as Heavy and Mechanized Equipment Site Supervisor.

- Only authorized personnel will operate heavy and mechanized equipment.

- Site Supervisors will complete the ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) prior to authorizing any ARCADIS employee to operate heavy equipment. A copy of this form must be maintained onsite and kept in project files for review. Authorization is only valid for the project, operational task, and piece of heavy or mechanized equipment listed on the ARCADIS Heavy Equipment Operator Authorization Form. The required Task Specific Hazard Review, Operator Evaluation and Operator Authorization form for Heavy Equipment Operators can be found in Exhibit 2.

- Authorized Operators must maintain all current & applicable licensing, ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators), and project documentation as required by federal and state regulations.

- PICs, PMs and TMs will be responsible for verifying operator training, operator authorization and maintenance documentation, identifying all operations which use heavy equipment in the work plan and researching and adhering to any additional policies required by the state in which the project operates.

1. POLICY

It is ARCADIS-US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, it is ARCADIS' policy that ARCADIS staff will be adequately trained and experienced before authorized to operate heavy and mechanized equipment. If it becomes necessary for ARCADIS employees to operate heavy or mechanized equipment, this HSS, at a minimum, will be strictly followed.

2. PURPOSE AND SCOPE

2.1 Purpose

ARCADIS developed this HSS to effectively mitigate or eliminate the hazards presented by working with or around heavy or mechanized equipment (i.e., back-hoes, track-hoes, bobcats, concrete crushers, etc.).

2.2 Scope

This HSS includes an Equipment Inspection Checklist (Exhibit 3) and an ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) (Exhibit 2) that applies to employees of ARCADIS that operate heavy or mechanized equipment. Only trained and authorized personnel are permitted to operate heavy or mechanized equipment. For work with Powered Industrial Trucks (Forklifts) refer to ARCADIS Standard ARC HSSP006 for details.

3. DEFINITIONS

Definitions related to Heavy Equipment Operations can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Corporate H&S with Business Line and Practice Experts

- Review and update, as necessary, this standard, associated attachments and training requirements.
- Audit Project, Business Line, and Training Team documentation files of Authorized Operators and Site Supervisors.
- A Heavy and Mechanized Equipment Review Board (Review Board) consisting of Corporate H&S with Business Line and Practice Experts will conduct heavy and mechanized equipment operator general awareness reviews for nominated individuals. The Review Board will approve and designate staff as heavy and mechanized equipment operator general awareness trained, requires further training or designate as a Site Supervisor using the Review Board Evaluation Form for Heavy and Mechanized Operations & Site Supervisor (Exhibit 5).
- Provide technical assistance regarding proper heavy and mechanized equipment for excavations, trenching, grading, PPE, hazard assessment and research information on unusual hazards.

4.2 Principal in Charge (PIC), Project Manager (PM) and Task Manager (TM):

- Verify that all activities that require use of heavy or mechanized equipment are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Investigate the State and Local licensure and/or certification requirements for mechanized equipment operation and verify ARCADIS operators or subcontractors have required licenses and certifications.
- Verify that their divisional or project team employees have received the proper training and have the required experience and skills to operate heavy or mechanized equipment.
- Verify that copies of the completed ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) are maintained on site and in project files.
- Verify that copies of the completed Heavy Equipment Inspection Checklists are maintained on site and in project files

4.3 Health and Safety Plan Writers and Reviewers

Use this procedure as guidance to ensure the appropriate identification, assessment and control of heavy and mechanical equipment operations are covered in the HASP.

Investigate the State and Local licensure and permit requirements for mechanized equipment operation and verify all ARCADIS operators or subcontractors have required licenses and certifications. A summary of state specific requirements is provided in Exhibit 4. However, the current regulations should be consulted.

4.4 Heavy and Mechanized Equipment Site Supervisors

Heavy and Mechanized Equipment Site Supervisors (Site Supervisors) must complete the Online Heavy and Mechanized Equipment General Awareness Training and have been designated by the Review Board as a Site Supervisor. Site Supervisors are responsible for evaluating, authorizing, monitoring and coaching/mentoring of heavy equipment operators.

Site Supervisors will have a minimum of 5 years construction management and/or hands-on operating experience and demonstrated proficiency with the skills required for heavy and mechanized equipment. Site Supervisors will have completed the 10-hour or 30-hour OSHA Construction Training. If working on an environmental project where HAZWOPER training is required by ARCADIS, the Site Supervisor must also have completed the 40-hour HAZWOPER training, be current on their annual 8-hour HAZWOPER refresher and complete the 8-hour Hazwoper Supervisor Training. A list of qualified Site Supervisors will be maintained by the Corporate Training Team.

Specific job responsibilities include:

- Interface with the client representative to identify hazards associated with the client's project site.

- Review the client's equipment operating procedures and permit requirements, as applicable.

- ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.

- Above grade utilities in proximity to a heavy equipment work area must be marked with warning signs, shields or other protective measures, if the minimum required clearance distances cannot be maintained.

- Ensure Authorized Operators have completed the Online Heavy and Mechanized Equipment General Awareness Training and have been designated as heavy and mechanized equipment operator general awareness trained.

- Ensure Authorized Operators are certified or licensed if required by state/local regulations.

- Evaluate prospective Authorized Operators using the attached ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) and determine if an adequate level of hands-on skill has been demonstrated to safely operate the equipment.

- Upon completing the ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators), the Site Supervisors will either authorize the Operator to operate the equipment or require additional training prior to authorizing the Operator to operate the equipment. Operator Authorization will be documented on the ARCADIS Heavy Equipment Operator Authorization form and must be available on the project site for review and retained in project files.

- Ensure Daily Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor is completed and maintained at the project site and retained with the project files.

- Conduct Task Improvement Process (TIP's) Observations on Authorized Operators and provide coaching and feedback as necessary. All TIP's will be recorded in the 4-Sight Database.

- Revoke operating privileges as necessary, if required skill level is not maintained. Outline a specific Corrective Action Plan and discuss with employee and supervisor.

4.5 Authorized Operators

Authorized Operators must complete the Online Heavy and Mechanized Equipment General Awareness Training and have been designated by the Review Board as Heavy and Mechanized Equipment Operator awareness Trained. Additionally Authorized Operators must have adequate training and instruction in their duties and responsibilities regarding equipment operation, as documented in the ARCADIS Heavy Equipment

Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators).

Responsibilities include:

- Complete required daily preventive maintenance and pre-operation checks in accordance with the manufacturer's requirements and the attached Equipment Inspection Checklist (Equipment/Manufacturer Specific Checklists may be used in lieu of this form where appropriate to cover all required items).
- Conduct TRACK Assessment in order to identify, assess and control the hazards which may be faced during equipment operation as well as the signs and symptoms of exposure to the hazard(s) of the work environment.
- Above grade utilities in proximity to a heavy equipment work area must be marked with warning signs, shields or other protective measures, if the minimum required clearance distances cannot be maintained.
- ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.
- Maintain visual contact and/or verbal communications with the spotters and other personnel in the area at all times.
- Use the PPE, air monitoring and testing equipment as specified in the HASP.
- Maintain an awareness of all barriers, operating limits and other warning devices required to protect from external hazards (e.g., traffic, pedestrians) and the proper use of those barriers.
- Obey "Stop Work" orders given by personnel in the area automatic alarm activation, or when self-perceived.

4.6 Affected Employees

- Complete online Heavy Equipment General Awareness Training.
- Conduct TRACK Assessment and monitor activities near areas where heavy and mechanized equipment is in operation.
- Maintain visual contact or verbal communication with all Authorized Operators and Designated Signal Person prior to approaching or when within the operating range of the equipment.
- Order evacuation of the area if a hazard develops, either within or outside the operating area.
- Warn unauthorized persons away from the operating area.
- Summon rescue and other emergency services as necessary.
- Minimum Class II High visibility vest/clothing shall be worn by Affected Employees.

4.7 All ARCADIS Employees

Use the TRACK process described below regularly and frequently. In addition, employees read and understand all documented hazard identification and risk assessments conducted using the HARC process. ARCADIS employees will:

- Participate in entry operations only if trained and authorized to do so.
- Never enter an active work area without first getting acknowledgment and approval of the operator and Designated Signal Person, as applicable.
- Use STOP WORK Authority if unsafe or unexpected conditions arise during operation and immediately notify other personnel in the area.

5. PROCEDURE

Heavy and mechanized equipment operation can present a unique set of hazards. Only trained, qualified and, authorized employees will be allowed to operate heavy or mechanized equipment in accordance with this standard (Authorized Operator). Prior to starting work with heavy or mechanized equipment all of the required permits, clearance and required project documentation will be in place. ARCADIS Utility Location Standard ARCHSFS019 shall be followed prior to beginning subsurface intrusive work which involves heavy or mechanized equipment.

For work with Powered Industrial Trucks (Forklifts) refer to ARCADIS Standard ARC HSSP006 for details.

5.1 Operator Approval

Prior to operating any heavy or mechanized equipment including but not limited to:

- Track-hoes and Wheel Mounted Excavators
- Back-hoes
- Articulating Trucks
- Street Sweepers
- Compactors
- Tractors
- Water Trucks Concrete Pulverizing Equipped Machinery
- Hydraulic Shearing Equipped Machinery
- Hydro seeding and other truck or vehicle mounted equipment
- Other Heavy Mechanized Equipment

All operators must be evaluated by a Site Supervisor and be observed on the specific equipment that will be in use. The Site Supervisor will complete the attached ARCADIS

Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) to deem the operator as an Authorized Operator. The form must be completed in full to demonstrate employees have been evaluated, deemed qualified, and have been "Authorized" by ARCADIS as Heavy Equipment operators. This form must be maintained on site and in the project files and is only valid for the project, operational task, and piece of heavy or mechanized equipment listed on the form. It should be noted that in some cases, state specific licensing or registration may be required for heavy equipment operators.

All heavy and mechanized equipment will be inspected daily prior to use, using the attached Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor to address equipment specific items.

Note: Forklifts, Gantry & Bridge Cranes and other equipment that require more formal certification or licensure are not covered by this procedure. Project Managers are required to verify that selected contractors have the required training, certification and equipment maintenance programs in place.

5.2 Heavy Equipment Requirements

All vehicles used in construction must have:

- brake lights;
- appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment;
- service, parking and emergency brakes;
- fenders on vehicles with rubber tires made after 1972;
- mud flaps on vehicles with rubber tires made before 1972;
- seats and compliant seat belts for the intended number of passengers;
- an audible warning system;
- an audible reverse alarm if the vehicle travels in reverse with an obstructed view;
- lights, if the vehicle operates in dimness or darkness;
- a defroster, if windshields fog;
- a windshield and wipers on vehicles with cabs
- *rollover protective structure* (ROPS); and
- properly secured fire extinguisher with a minimum rating of 10-B:C

5.3 General Requirements

The following Work Practices must be followed for heavy and mechanized equipment operations:

- Must be equipped with appropriate lights or reflectors.
- Controls must be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.
- Whenever the equipment is parked, the parking brake shall be set. Wheeled equipment parked on inclines shall have the wheels chocked and the parking brake set.
- All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of equipment.
- Do not move heavy or mechanized equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate the safe movement of the equipment and vehicles involved.
- Maintain 3-points of contact with the steps and hand rails while getting on/into the equipment. Do not use the controls or steering wheel as a handhold.
- Operate equipment only in well ventilated areas.
- Select a gear that will prevent excessive speed when going downhill – Do not coast downhill.
- Lower all the hydraulic equipment before shutting down or getting off the machine.
- Adequate illumination in accordance with OSHA standards and work activities must be provided for all work areas. An approved type (explosion-proof as necessary) lighting device must be used.
- Rigging and lifts will only be made when the operator judges it a safe operation.
- Personnel in the vicinity of equipment will wear hard hats, safety-toe shoes, high visibility vests and safety glasses. Personnel are also strongly encouraged to wear hearing protection in the vicinity of operating heavy equipment.
- Hoist hooks will have safety latches.
- Equipment will only be used within the maximum rated capacity.
- Personnel will remain at a distance from overhead loads.
- Test directional and speed controls prior to operation.
- Test limit switches (as applicable) and the emergency stop.
- Do not engage in practices that will divert attention while operating the equipment.
- Cellphones and other hand held electronic devices are prohibited from being used while equipping is in operation.
- Respond to signals only from the person who is directing the lift or appointed signal person.

- Do not move a load over people.
- Do not exceed the rated capacity of the equipment or rigging.
- Determine the center of gravity and balance of the equipment and the load before moving it.
- Verify the stability of the structure or area that the equipment will be used on. When working on an elevated level a Professional Engineer or qualified building inspector must determine the adequacy of the work surface prior to placing equipment.
- Initially lift the load only a few inches to test the rigging and balance.
- Check the travel path in order to avoid personnel and obstructions.
- Center the sling over the load to keep the cables from slipping, and to prevent the load from swinging when it is lifted.
- Use a tag line when loads require precise control.
- Lift the load only high enough to clear the tallest obstruction in the travel path.
- Start and stop slowly.
- Choose a safe landing.
- Land the load when the move is finished.
- Never leave suspended loads unattended.
- When Heavy or Mechanized equipment is in transit with no load and boom is lowered, the equipment clearance shall be a minimum of 4 feet for voltage less than 50kV, and 10feet for voltages over 50kV, or twice the length of the line insulator, but never less than two feet.

5.3.1 Motor Vehicle Specific Requirements

- Must be inspected at the beginning of each shift to ensure that the equipment and safety controls are in safe operating condition.
- Must have a service brake system, an emergency brake system, and a parking brake system.
- When working in areas of low visibility, motor vehicles must be equipped with at least two headlights and two taillights, which are operable.
- If motor vehicle has an obstructed rear view, it must be equipped with reverse signal alarm that must be audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.
- Dumping, lifting and hauling vehicles must have overhead protection for the operator.
- Operating levers controlling hoisting or dumping devices on haulage bodies must be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.

- Trip handles for tailgates of dump trucks shall be so arranged that, in dumping, the operator will be in the clear.
- Never exceed load capacities for the vehicle.
- Use seat belts and do not carry passengers were not intended on the vehicle.
- Use the parking brake when parking and chock the wheels when needed to prevent rolling.
- Secure loose tools in the cab with workers.
- Dumping and lifting mechanisms must be secured when not in use.
- Verify that areas are clear before lifting, loading and unloading.
- All controls shall be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise

5.3.2 Earthmoving Equipment

- Use seat belts and do not carry passengers where not intended on the vehicle. Seat belts need not be provided for equipment which is designed only for standup operation.
- All bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction.
- Use the audible reverse alarm or signals from another worker when driving in reverse with an obstructed view.

5.3.3 Working in the Vicinity of Overhead Power Lines

Unless the overhead power lines are deenergized and visibly grounded at the worksite, with confirmation from utility owner, encroachment prevention measures must be implemented to prevent the heavy equipment from breaching a minimum clearance distance. For heavy equipment work near energized electrical lines up to 350kV, the minimum clearance distance options would be:

1. Maintain 20 feet clearance distance from electrical line by maintaining encroachment prevention measures (refer to section 5.3.4); or
2. Determine the actual electric line voltage and implement encroachment prevention measures (refer to section 5.3.4) to maintain minimum clearance distance specified in Table 1 below.

Table 1: Minimum Clearance Distance

Voltage (nominal, kV, alternating current)	Minimum Clearance (feet)
Up to 50	**10**
>50 to 200	**15**
>200 to 350	**20**
>350 to 500	**25***
>500 to 750	**35***
>750 to 1,000	**45***
> 1,000	**Determined by utility/owner**

***** According to OSHA 29 CFR 1926.1409, for power lines over 350 to 1,000 kV, the minimum distance is presumed to be 50 feet. Over 1,000 kV, the utility/owner or a registered engineer, who is a qualified person with respect to electrical power transmission and distribution, must establish the minimum distance.

If any vehicle or mechanical equipment (e.g., crane or drilling rig) capable of having parts of its structure elevated near energized overhead power lines is operated in California, a durable warning sign legible at 12 feet reading: "Unlawful To Operate This Equipment Within 10 Feet Of High-Voltage Lines of 50,000 Volts Or Less" shall be posted and maintained in plain view of the operator and driver. In addition to the above wording, the following statement in small lettering shall be provided on the warning sign: "For Minimum Clearances of High-Voltage Lines In Excess of 50,000 Volts, See California Code of Regulations, Title 8, Article 37, High-Voltage Electrical Safety Orders."

5.3.4 Preventing Encroachment/Electrocution

Where encroachment precautions are required under Option (1) or Option (2) of section 5.3.3, all of the following requirements must be met:

1. Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.

2. If tag lines are used, they must be non-conductive.

3. Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option 1 of this section) or for Option 2, at the minimum approach distance listed under Table 1. If the operator is unable to see the elevated warning line, a dedicated spotter must be used.in addition to implementing one of the following measures:

    i) A proximity alarm set to give the operator sufficient warning to prevent encroachment;

    ii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment;

    iii) A device that automatically limits range of movement, set to prevent encroachment; or

iv) An insulating link/device installed at a point between the end of the load line (or below) and the load; and

4. Implement at least one of the following measures:

i. A proximity alarm set to give the operator sufficient warning to prevent encroachment;

ii. A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:

- Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
- Be positioned to effectively gauge the clearance distance.
- Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
- Give timely information to the operator so that the required clearance distance can be maintained.

iii. A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment;

iv. A device that automatically limits range of movement, set to prevent encroachment; or

v. An insulating link/device installed at a point between the end of the load line (or below) and the load; and

5.3.5 Designated Signal Person

The site will use only Designated Signal Person(s) to direct heavy equipment.

Only persons who are competent and qualified by experience and/or training with the operations being directed shall be used as signal persons.

Where manual (hand) signals are used, only one person shall be designated to give signals to the operator. This signal person shall be located to see the load and be clearly visible to the operator at all times.

Manual (hand) signals may be used when the distance between the operator and signal person is not more than 100 ft. (30.4 m). Radio, telephone, or a visual and audible electrically operated system shall be used when the distance between operator and signal person is more than 100 ft. (30.4 m) or when they cannot see each other.

Standard hand signals shall be posted onsite and/or in a job trailer, signal control points, and other points as necessary to inform those concerned.

Signal persons shall back one vehicle at a time. While under control of a signal person, the heavy equipment driver shall not back or maneuver until directed and the driver shall stop when visual contact with the signal person is lost.

The signal person shall have a warning device, clear range of vision and a penetrating sound to warn persons when the load is coming in so they have time to get in the clear.

Minimum Class II High visibility vests shall be worn by flag and signal persons.

5.3.6 Refueling

- If refueling on site, the fueling area must be clearly marked (NO SMOKING), and ignition sources eliminated.
- Turn off the engine before refueling.
- If refueling could result in gasoline/diesel coming into contact with hot engine parts, shut off and cool the engine and any electrical equipment before refueling.
- Ensure the fueling area is well ventilated.
- Do not smoke while refueling. Keep open flames and sparks away from area.
- Ground the funnel or fuel nozzle against the filler neck to avoid sparks when refueling.
- Do not use gasoline or diesel fuel for cleaning parts.
- A dry chemical or carbon dioxide fire extinguisher (rated 10:BC or larger) is in a location accessible to the fueling area.
- A 5 gallon or larger spill kit is in a location accessible to the fueling area.
- Diesel cold start systems containing ether, which is explosive, are prohibited from being used.

6. TRAINING

All affected employees must complete online Heavy Equipment General Awareness Training.

All prospective ARCADIS Heavy and Mechanized Equipment Operators and Site Supervisors must complete the following.

- Online Heavy Equipment General Awareness training.
- Review and understand this HSS prior to participating in the competency review.
- Be evaluated by the Review Board and designated as Heavy and Mechanized Equipment Operator Awareness Trained and/or Site Supervisors.

Additionally, Site Supervisors will have a minimum of 5 years construction management and/or hands-on operating experience and demonstrated proficiency with the skills required for heavy and mechanized equipment. Site Supervisors will have completed the 10-hour or 30-hour OSHA Construction Training. If working on an environmental project

where HAZWOPER training is required by ARCADIS, the Site Supervisor must also have completed the 40-hour HAZWOPER training, be current on their annual 8-hour HAZWOPER refresher and complete the 8-hour Hazwoper Supervisor Training. A list of qualified Site Supervisors will be maintained by the Corporate Training Team.

Hands on training, including on-the-job training, when required, will be provided by a qualified vendor or through supervised operation by a Site Supervisor under controlled conditions and must be document on the ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators). A copy of this form must be maintained onsite and keep in project files for review.

7. REFERENCES

ARCADIS Health and Safety Procedure ARC HSCS003 – Hoisting and Rigging (Cranes, Mobile Cranes, Pile Drivers, Derricks, and variations of such equipment)

ARCADIS Health and Safety Procedure ARC HSSP006 – Powered Industrial Trucks (Forklifts)

ARCADIS Health and Safety Procedure ARCHSFS019 – Utility Location and Clearance

ARCADIS Employee Field Health & Safety Handbook

OSHA 29 CFR 1926 Subpart O - Motor Vehicles, Mechanized Equipment and Marine Operations

US Army Corps of Engineers EM 385-1-1. 15 Sep 08 18.G Machinery and Mechanized Equipment

8. RECORDS - DATA RECORDING AND MANAGEMENT

Certification and Training records will be kept by the individual employee with copies of such certificates kept by Corporate Training Team. Training dates and times will be kept by Corporate Training Team.

Online Heavy Equipment General Awareness training, and designated as heavy and mechanized equipment operator general awareness training will be maintained by the Corporate Training Team.

A list of qualified Site Supervisors will be maintained by the Corporate Training Team.

ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) documentation will be maintained at the project site and retained with the project files.

All daily Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor documentation will be maintained at the project site and retained with the project files.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Julie Santaniello, CSP – Corporate H&S, Manager of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
22 November 2011	01	Greg Ertel	Original document
22 November 2013	02	Tony Tremblay	Section 5.3 added that it's encouraged that hearing protection be worn. Formatted History of Change table, Updated Header, and fixed links.
10 March 2015	03	Andrew McDonald/Tony Tremblay	Removal of Heavy Equipment Operator Permit and adjusted text within standard to accommodate the establishing of a single ARCADIS Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators) to evaluate equipment operators and authorize equipment operators; Header and Footer format update; History of Change Format update
2 March 2018	04	David Kobe/Julie Santaniello	Added CA-specific signage text in Section 5.3.3. Updated approver to Julie Santaniello.

EXHIBIT 1 – DEFINITIONS

Affected Employees – Employees who are trained and authorized to work on projects where heavy or mechanized equipment is in use by either ARCADIS employees or subcontractors.

Authorized Operator – A trained, authorized individual with the experience, training, license (as applicable) and demonstrated skills to safely operate heavy or mechanized equipment in accordance with this procedure and applicable regulatory requirements.

Backhoe-Loader – As the name implies, it has a loader assembly on the front and a backhoe on the back.

Bulldozer – A powerful crawler (caterpillar tracked tractor) equipped with a blade.

Crane – A machine for hoisting and moving heavy objects by means of cables attached to a movable boom. Cranes can include the following types: overhead, gantry, locomotive and truck. Requirements for cranes are covered under ARCADIS standard ARCHSCS003. Cranes are not usually operated by ARCADIS employees; the PM is responsible for verifying proper qualifications and licensure for crane operation by subcontractors.

Earthmoving Equipment – Scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

Excavator – An engineering vehicle consisting of a backhoe and cab mounted on a pivot (turntable is a more apt description) atop an undercarriage with tracks or wheels.

Heavy Equipment – includes excavators/track-hoes, back-hoes, bucket loaders, bulldozers, articulating all terrain trucks, graders, agricultural and industrial tractors, sweepers and other powered mechanical equipment.

Manlifts – includes boom lifts, scissor lifts and other powered equipment designed to provide an elevated work surface. Manlifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency that meets regulatory requirements and meets fall protection requirements. Refer to the ARCADIS Aerial Lifts Standard ARC HSFS017 for details.

Motor Vehicles (as referenced in this standard) – Vehicles that operate within an off-highway jobsite, not open to public traffic. The definition of Motor Vehicles does not include earthmoving equipment.

Powered Industrial Truck (Forklift) – includes fork trucks, tractors, platform lift trucks, motorized hand trucks and other specialized industrial trucks powered by electric motors or internal combustion engines. Forklifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency and meets the regulatory requirements. Refer to the ARCADIS Powered Industrial Truck (Forklift) Standard ARC HSSP006 for details.

Heavy and Mechanized Equipment Site Supervisor – The employee responsible for reviewing the project scope and determining if an acceptable skill level has been achieved and demonstrated by an employee, prior to being considered an Authorized Operator.

Skid Loader – Also called a skid steer, is a compact, low capacity machine used for pushing or lifting material and for digging. It is typically used for earth moving during construction and landscaping in limited spaces but is also used to move loose materials in farming and industry.

Skidder – A type of vehicle used in forestry for pulling cut down trees (timber) out of a forest (logging).

EXHIBIT 2 – Heavy Equipment Operator Authorization Form (Task Specific Hazard Review, Operator Evaluation and Operator Authorization for Heavy Equipment Operators)

EXHIBIT 3 – Heavy Equipment Inspection Checklist

EXHIBIT 4 – State by State Summary of Equipment Operations Regulations

EXHIBIT 5 – Review Board Evaluation Form for Heavy and Mechanized Equipment Operators & Site Supervisors

EXECUTIVE SUMMARY

ARCADIS employs a wide range of heavy, mechanized equipment in various operations. Operating heavy equipment requires, at minimum, the policies set forth in this Standard. In addition to federally mandated requirements, each state may enforce more stringent standards related to training, licensure, inspection and documentation.

The requirements set forth in this policy provide direction in heavy equipment operations:

- Only authorized personnel will operate heavy equipment.
- If Operator training is required, it will occur under controlled conditions.
- Specific training for Powered Industrial Trucks (forklifts) will be in compliance with OSHA 29CFR 1910.178. Refer to ARCADIS Forklifts HS Procedure ARC HSSP006 for additional details and requirements.
- All employees involved in Heavy Equipment Operations shall read and understand documented hazard identification and risk assessments conducted using the Hazard Assessment and Risk Control (HARC) Process.
- ARCADIS Utility Location Standard shall be followed prior to beginning work which involves heavy or mechanized equipment. A minimum of 3 lines of evidence is required for subsurface activities.
- Preventative maintenance and pre-operation checks in accordance with the manufacturer's requirements shall be conducted prior to equipment usage.
- Understand and actively use TRACK and Stop Work Authority during heavy equipment operations.
- Supervisors shall verify clients' operating procedures and identify site hazards.
- PICs, PMs and TMs will be responsible for verifying operator training, maintaining equipment and operator documentation, identifying all operations which use heavy equipment in the work plan and researching and adhering to any additional policies required by the state in which the project operates.
- Maintain all current and applicable licensing, permits and project documentation as required by federal and state regulations. Required operation permits and checklists can be found in Exhibit 2.
- Work Practices associated with Heavy Equipment Operations such as PPE usage, illumination, equipment testing, travel path verification and maximum capacity rating adherence shall be strictly followed at all times. A complete list of Work Practices can be found in section 5.2.

1. POLICY

It is ARCADIS-US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, it is ARCADIS' policy that our staff will be adequately trained and experienced before operating heavy and mechanized equipment. If it becomes necessary for ARCADIS employees to operate heavy or mechanized equipment, this procedure, at a minimum, will be strictly followed.

2. PURPOSE AND SCOPE

2.1 Purpose

To effectively mitigate or eliminate the hazards presented by working with or around heavy or mechanized equipment, i.e. back-hoes, track-hoes, bobcats, concrete crushers, etc.

2.2 Scope

This procedure Equipment Checklist, Operator Permit and Hazard Review apply to all employees of ARCADIS-US. Only trained and authorized personnel are permitted to operate heavy or mechanized equipment.

3. DEFINITIONS

Definitions related to Heavy Equipment Operations can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Corporate H&S with Division and Practice Experts

Review and update, as necessary, this standard and associated attachments.

Audit Business Unit documentation files of authorized equipment operators and Site Project Supervisors.

4.2 Principal in Charge (PIC), Project Manager (PM) and Task Manager (TM):

- Verify that all activities that require use of heavy or mechanized equipment are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Investigate the State and Local licensure and/or certification requirements for mechanized equipment operation and verify ARCADIS operators or subcontractors have required licenses and certifications.
- Verify that their divisional or project team employees have received the proper training and have the required experience and skills to operate heavy or mechanized equipment.

- Verify that copies of the completed Hazard Review and Evaluation for Heavy Equipment Operators form(s) are maintained in the project files and maintained in a central file managed by the Business Unit.

- Verify that copies of the completed Heavy Equipment Inspection Checklists are submitted and retained with the project files.

4.3 Health and Safety Plan Writers and Reviewers

Use this procedure as guidance to ensure the appropriate identification, assessment and control of heavy and mechanical equipment operations are covered in the HASP.

Investigate the State and Local licensure and permit requirements for mechanized equipment operation and verify all ARCADIS operators or subcontractors have required licenses and certifications. A summary of state specific requirements is provided as an attachment. However, the latest regulations should be consulted.

4.4 Site Project Supervisors

Site Project Supervisors are responsible for evaluating, qualifying, monitoring and coaching/mentoring of Heavy Equipment Operators.

Site/Project Supervisors will have a minimum of 3 years construction management and/or hands-on operating experience and demonstrated proficiency with the skills required for heavy and mechanized equipment. A list of Site/Project Supervisors will be maintained by the Business Unit Management.

Specific job responsibilities include:

- Interface with the client representative to identify hazards associated with the client's project site.

- Review the client's equipment operating procedures and permit requirements, as applicable.

- Review and ensure compliance with the ARCADIS Utility Clearance Standard ARC HSFS019 before any heavy equipment operation.

- Evaluate prospective Authorized Operators using the attached Hazard Review and Evaluation for Heavy Equipment Operators and determine if an adequate level of hands-on skill has been demonstrated to safely operate the equipment.

- Upon completion of the Hazard Review and Evaluation for Heavy Equipment Operators form, complete the Heavy Equipment Operator Permit and retain a copy in the project files and maintain central file within Business Unit to document those employees evaluated and qualified as Heavy Equipment operators. In addition, the Heavy Equipment Operator Permit must be available on the project site for review.

- Verify that copies of the Heavy Equipment Inspection Checklists are being completed and retained with the project files, as specified in Section 8.0 – Records.

- Monitor Authorized Operators and provide coaching and feedback as necessary.
- Revoke operating privileges as necessary, if required skill level is not maintained. Outline a specific Corrective Action Plan and discuss with employee and supervisor. Training Group must be notified and operator "Authorized" status revoked until necessary skill/competency is demonstrated and verified by Site Project Supervisor.

4.5 Authorized Operators

Must have adequate training and instruction in their duties and responsibilities regarding equipment operation, as documented in the Hazard Review and Evaluation for Heavy Equipment Operators form.

Responsibilities include:

- Complete required daily preventive maintenance and pre-operation checks in accordance with the manufacturer's requirements and the attached Equipment Inspection Checklist (Equipment/Manufacturer Specific Checklists may be used in lieu of this form where appropriate to cover all required items).
- Conduct TRACK Assessment in order to identify, assess and control the hazards which may be faced during equipment operation as well as the signs and symptoms of exposure to the hazard(s) of the work environment.
- Review and comply with the ARCADIS above grade and subsurface utility clearance standard ARC HSFS019 before any heavy equipment operation.
- Above grade utilities in proximity to a heavy equipment work area must be marked with warning signs, shields or other protective measures, if the minimum required clearance distances cannot be maintained.
- Maintain visual contact and/or verbal communications with the spotters and other personnel in the area at all times.
- Use the PPE, air monitoring and testing equipment as specified in the HASP.
- Maintain an awareness of all barriers, operating limits and other warning devices required to protect from external hazards (e.g., traffic, pedestrians) and the proper use of those barriers.
- Obey "Stop Work" orders given by personnel in the area automatic alarm activation, or when self-perceived.

4.6 Affected Employees

- Conduct TRACK Assessment and monitor activities near areas where heavy and mechanized equipment is in operation.
- Maintain visual contact or verbal communication with all Authorized Operators and Designated Signal Person prior to approaching or when within the operating range of the equipment.

- Order evacuation of the area if a hazard develops, either within or outside the operating area.
- Warn unauthorized persons away from the operating area.
- Summon rescue and other emergency services as necessary.
- Minimum Class II High visibility vests shall be worn by Affected Employees.

4.7 All ARCADIS Employees

Use the TRACK process described below regularly and frequently. In addition, employees read and understand all documented hazard identification and risk assessments conducted using the HARC process. ARCADIS employees will:

- Participate in entry operations only if trained and authorized to do so.
- Never enter an active work area without first getting acknowledgment and approval of the operator and Designated Signal Person, as applicable.
- Use STOP WORK Authority if unsafe or unexpected conditions arise during operation and immediately notify other personnel in the area.

5. PROCEDURE

Heavy and mechanized equipment operation can present a unique set of hazards. Only trained, qualified, authorized employees will be allowed to operate heavy or mechanized equipment in accordance with this standard. Prior to starting work with heavy or mechanized equipment all of the required permits, clearance and required project documentation will be in place. The ARCADIS Utility Location Procedure ARC HSFS 019 will be followed prior to starting work with heavy or mechanized equipment.

For work with Powered Industrial Trucks (Forklifts) refer to ARCADIS Standard ARC HSSP006 for details.

5.1 Operator Approval

Prior to operating any heavy or mechanized equipment including but not limited to:

- Track-hoes and Wheel Mounted Excavators
- Back-hoes
- Articulating Trucks
- Street Sweepers
- Compactors
- Tractors

- Water trucks
- Hydro seeding and other truck or vehicle mounted equipment
- Concrete crushers
- Other Heavy Mechanized Equipment

All operators must be evaluated by a Site Project Supervisor and be observed on the specific equipment that will be in use. The Site Project Supervisor will complete the attached Hazard Review and Evaluation for Heavy Equipment Operators form and the Heavy Equipment Operator Permit. Both documents must be maintained in the project files and copies maintained in a central file within Business Unit to document those employees evaluated and qualified as Heavy Equipment operators.

All equipment will be inspected daily prior to use using the attached Equipment Inspection Form or an equivalent inspection form provided by the manufacturer or vendor to address equipment specific items.

Note: **Gantry and Bridge Cranes and other equipment that require more formal certification or licensure are not covered by this procedure. Project managers are required to verify that selected contractors have the required training, certification and equipment maintenance programs in place.**

5.2 Heavy Equipment Requirements

All vehicles used in construction must have:

- brake lights;
- appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment;
- service, parking and emergency brakes;
- fenders on vehicles with rubber tires made after 1972;
- mud flaps on vehicles with rubber tires made before 1972;
- seats and compliant seat belts for the intended number of passengers;
- an audible warning system;
- an audible reverse alarm if the vehicle travels in reverse with an obstructed view;
- lights, if the vehicle operates in dimness or darkness;
- a defroster, if windshields fog;
- a windshield and wipers on vehicles with cabs; and
- *rollover protective structure* (ROPS)

5.3 General Requirements

The following Work Practices must be followed for Heavy and Mechanized Equipment operations:

- Must be equipped with appropriate lights or reflectors.
- Controls must be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.
- Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.
- All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of equipment.
- Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- For power lines rated 50 kV or below, minimum clearance between the lines and any part of the equipment or load shall be 10 feet.
- In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV.
- Keep the vehicle on safe roadways and inclines. Do not move or cause to be moved construction equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate safely the movement of the equipment and vehicles involved.
- Maintain 3-points of contact with the steps and hand rails while getting on/into the equipment. Do not use the controls or steering wheel as a handhold.
- Operate equipment only in well ventilated areas.
- Select a gear that will prevent excessive speed when going downhill – Do not coast downhill.
- Lower all the hydraulic equipment before shutting down or getting off the machine.
- Adequate illumination in accordance with OSHA standards and work activities must be provided for all work areas. An approved type (explosion-proof as necessary) lighting device must be used.
- Rigging and lifts will only be made when the operator judges it a safe operation.
- Personnel in the vicinity of equipment will wear hard hats, safety-toe shoes, high visibility vests and safety glasses. Personnel are also strongly encouraged to wear hearing protection in the vicincity of operating heavy equipment.

- Hoist hooks will have safety latches.
- Equipment will only be used within the maximum rated capacity.
- Personnel will remain at a distance from overhead loads.
- Test directional and speed controls prior to operation.
- Test limit switches (as applicable) and the emergency stop.
- Not engage in practices that will divert attention while operating the equipment.
- Respond to signals only from the person who is directing the lift or appointed signal person.
- Not move a load over people.
- Avoid excessive force pulls.
- Determine the center of gravity and balance of the equipment and the load before moving it.
- Verify the stability of the structure or area that the equipment will be used on. When working on an elevated level a Professional Engineer or qualified building inspector must determine the adequacy of the work surface prior to placing equipment.
- Initially lift the load only a few inches to test the rigging and balance.
- Check the travel path in order to avoid personnel and obstructions.
- Center the sling over the load to keep the cables from slipping, and to prevent the load from swinging when it is lifted.
- Use a tag line when loads require precise control.
- Lift the load only high enough to clear the tallest obstruction in the travel path.
- Start and stop slowly.
- Choose a safe landing.
- Land the load when the move is finished.
- Never leave suspended loads unattended.

5.3.1 Motor Vehicle Specific Requirements

- Must be inspected at the beginning of each shift to ensure that the equipment and safety controls are in safe operating condition.
- Must have a service brake system, an emergency brake system, and a parking brake system.

- When working in areas of low visibility, motor vehicles must be equipped with at least two headlights and two taillights, which are operable.
- If motor vehicle has an obstructed rear view, it must be equipped with reverse signal alarm that must be audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.
- Dumping, lifting and hauling vehicles must have overhead protection for the operator.
- Operating levers controlling hoisting or dumping devices on haulage bodies must be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.
- Trip handles for tailgates of dump trucks shall be so arranged that, in dumping, the operator will be in the clear.
- Never exceed load capacities for the vehicle.
- Use the parking brake when parking and chock the wheels when needed to prevent rolling.
- Secure loose tools in the cab with workers.
- Dumping and lifting mechanisms must be secured when not in use.
- Verify that areas are clear before lifting, loading and unloading.
- All controls shall be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise

5.3.2 Earthmoving Equipment

- Use seat belts and do not carry passengers where not intended on the vehicle. Seat belts need not be provided for equipment which is designed only for standup operation. Seat belts need not be provided for equipment which does not have roll-over protective structure (ROPS) or adequate canopy protection.
- All bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction.
- Use the audible reverse alarm or signals from another worker when driving in reverse with an obstructed view.

5.3.3 Designated Signal Person

The site will use only Designated Signal Person(s) to direct heavy equipment.

Only persons who are competent and qualified by experience and/or training with the operations being directed shall be used as signal persons.

Where manual (hand) signals are used, only one person shall be designated to give signals to the operator. This signal person shall be located to see the load and be clearly visible to the operator at all times.

Manual (hand) signals may be used when the distance between the operator and signal person is not more than 100 ft (30.4 m). Radio, telephone, or a visual and audible electrically operated system shall be used when the distance between operator and signal person is more than 100 ft (30.4 m) or when they cannot see each other.

Standard hand signals shall be posted at the operator's position, signal control points, and other points as necessary to inform those concerned.

Signal persons shall back one vehicle at a time. While under control of a signal person, the heavy equipment driver shall not back or maneuver until directed and the driver shall stop when visual contact with the signal person is lost.

The signal person shall have a warning device of clear range and penetrating sound to warn persons when the load is coming in so they have time to get in the clear.

Minimum Class II High visibility vests shall be worn by flag and signal persons.

5.3.4 Refueling

- If refueling on site, the fueling area must be clearly marked (NO SMOKING), ignition sources eliminated and spill kit available.
- Turn off the engine before refueling.
- If refueling could result in gasoline/diesel coming into contact with hot engine parts, shut off and cool the engine and any electrical equipment before refueling.
- Ensure the fueling area is well ventilated.
- Do not smoke while refueling. Keep open flames and sparks away from area.
- Ground the funnel or fuel nozzle against the filler neck to avoid sparks when refueling.
- Do not use gasoline or diesel fuel for cleaning parts.
- A dry chemical or carbon dioxide fire extinguisher (rated 6:BC or larger) is in a location accessible to the fueling area.

Diesel cold start systems contain ether which is explosive. Keep away from heat, sparks, and open flames. Work in a well-ventilated area.

- If swallowed, breathed or contacted on skin or eyes seek medical attention immediately. Follow recommendations on the Material Safety Data Sheets.
- Point the openings of the valve, tube or atomizer away from yourself and others while testing the diesel cold start system.

- Store replacement ether cylinders in a cool dry place away from direct sunlight. Do not keep them in the operator's compartment.

6. TRAINING

Training, when required, will be provided by a qualified vendor or through supervised operation by a Site Project Supervisor under controlled conditions.

7. REFERENCES

ARCADIS Health and Safety Procedure ARC HSFS010 – Health and Safety Planning

ARCADIS Employee Field Health & Safety Handbook

OSHA 29 CFR 1910 Subpart O - Motor Vehicles, Mechanized Equipment and Marine Operations

8. RECORDS - DATA RECORDING AND MANAGEMENT

Certification and Training records will be kept by the individual employee with copies of such certificates kept by Corporate Training. Training dates and times will be kept by Corporate Training.

Operator evaluation and certification documentation will be maintained at the project site and retained with the project files. Operator certification will be valid for 1 year after the date of initial issue.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Anthony Tremblay, CSP – Infrastructure Division Director of Health & Safety



History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
22 November 2011	**01**	**Greg Ertel**	**Original document**
03 September 2014	**02**	**Tony Tremblay**	**Section 5.3 added that it's encouraged that hearing protection be worn. Formatted History of Change table, Updated Header,and fixed links.**

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Crane – A machine for hoisting and moving heavy objects by means of cables attached to a movable boom. Cranes can include the following types: overhead, gantry, locomotive and truck. Requirements for cranes are covered under ARCADIS standard ARCHSCS003. Cranes are not usually operated by ARCADIS employees; the PM is responsible for verifying proper qualifications and licensure for crane operation by subcontractors.

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Manlifts – includes boom lifts, scissor lifts and other powered equipment designed to provide an elevated work surface. Manlifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency that meets regulatory requirements and meets fall protection requirements. Refer to the ARCADIS Aerial Lifts Standard ARC HSFS017 for details.

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Powered Industrial Truck (Forklift) – includes fork trucks, tractors, platform lift trucks, motorized hand trucks and other specialized industrial trucks powered by electric motors or internal combustion engines. Forklifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency and meets the regulatory requirements. Refer to the ARCADIS Powered Industrial Truck (Forklift) Standard ARC HSSP006 for details.

Site Project Supervisor – The employee responsible for reviewing the project scope and determining if an acceptable skill level has been achieved and demonstrated by an employee, prior to being considered an Authorized Operator.

Skid Loader – Also called a skid steer, is a compact, low capacity machine used for pushing or lifting material and for digging. It is typically used for earth moving during construction and landscaping in limited spaces but is also used to move loose materials in farming and industry.

Skidder – A type of vehicle used in forestry for pulling cut down trees (timber) out of a forest (logging).

Exhibit 2 – Permits, Operator Evaluation, Inspection Checklists and State Summary

Equipment Operator Permit

Hazard Review and Evaluation for Heavy Equipment Operators

Heavy Equipment Inspection Checklist

State by State Summary of Equipment Operations Regulations

EXECUTIVE SUMMARY

Damaging an underground or above ground utility can result in serious injury and loss of life, disrupt essential services, and create significant liability to ARCADIS, clients and subcontractors. Therefore, it is ARCADIS' policy that the following steps be completed prior to beginning any subsurface intrusive work:

- The presence of existing or known utilities will be investigated and cleared (to the extent feasible) by locating, marking, and, where appropriate, visually verifying (potholing) before the start of any subsurface intrusive work.
- A minimum of **three (3) reliable lines** of evidence are required for an acceptable utility clearance. Each location of subsurface intrusive work must have at least 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist of equivalent client provided checklist or permit. If a line of evidence is lost or not apparent, STOP WORK, and reestablish the line of evidence prior to resuming subsurface intrusive work. The Utility Structures and Checklist is valid for 15 business days from the date of completion.
- The lines of evidence used will be reasonable and appropriate for the conditions expected to be encountered (soil type, water table, etc.) and the type of utilities expected to be encountered (e.g., gas line versus an irrigation line).
- Contact the State One Call or equivalent service (Nationwide "811") as required by law. The State One Call or equivalent service (Nationwide "811") can only be used as a reliable line of evidence when working within the public right of way or easement.
- For point clearance (single intrusive point, used as 1 of the 3 required reliable lines of evidence) the borehole must be cleared to 110% of the diameter of the intrusive device (i.e. auger, drill head, etc.) or an additional 2 inches of overall diameter, whichever is greater.
- Utility clearance information will be documented on the ARCADIS Utility and Structures Checklist (USC) or equivalent client provided checklist or permit.
- Employees overseeing utility clearance activities will:
    - Be familiar with the contents of this standard & ARC HSFS-019 Supplement 2;
    - Have one year field experience in the identification of utilities; and
    - Have training and six months experience in the proper operation and results interpretation of any clearance equipment used by ARCADIS employees, including without limitation, magnetometers and ground penetrating radar.
- All utility strikes must be reported to Corporate Health and Safety and Legal within 24 hours using the Utility Line Strike Investigation Form. **Do not enter the incident into 4-Sight until approved to do so by Corporate Legal. Refer to ARC HSFS-019 Supplement 5, Utility Strike Emergency Action Plan Guidelines.**

Report Utility Incident Now

1. POLICY

It is the practice of ARCADIS and its affiliated companies to implement appropriate, reasonable and practical standards within acceptable and customary industry practices to promote the health and safety of its employees, and avoid and mitigate exposure of risk in the performance of their work. In furtherance of this policy, ARCADIS promotes and encourages compliance by all employees with this policy and standards relating to work in the vicinity of subsurface, submarine or aboveground utilities.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard directs general safety standards and best practices associated with the identification and management of subsurface, submarine and aboveground utilities on project sites. Utility location SOP for submarine utilities can found in ARC HSFS-019 Supplement 6.

2.2 Scope

This standard assigns responsibilities and expectations for proper utility clearance by both ARCADIS employees and ARCADIS subcontractors at project sites.

3. DEFINITIONS

Definitions relating to Utility Clearance can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Project Manager Responsibilities

For every project site having the potential to come into contact with utilities, Project Managers must ensure that:

- The requirements of this standard are followed.
- Local regulations governing utility clearance are followed. This includes ensuring local and or state laws defining activities or depth of intrusive work/excavation requiring utility clearance are reviewed as they vary by location. For further information refer to One-Call and State Law Directory.
- Efforts are made to work with the client, project site representatives and subcontractors to identify the nature of any utilities, and to determine what control processes need to be implemented by ARCADIS and the subcontractors to prevent damage to these utilities and to properly manage the effects in the event there is utility damage.
- Utility clearance activities are only delegated to a Task Manager or other individual meeting the requirements of section 4.2 below, as appropriate. However, even if the Project Manager delegates certain responsibilities, the Project Manager maintains primary responsibility for a complete utility clearance. For additional information on PM responsibilities and best practices refer to ARC HSFS-019 Supplement 1

- Project Managers or designee must review the Utility and Structures Checklist with staff and AUS subcontractors (including "Sub-of-Subs" when conducting subsurface intrusive work) conducting subsurface intrusive work, prior to staff beginning subsurface intrusive work. The PM or designee review must be documented on the Utility and Structures Checklist prior to starting subsurface intrusive work.

4.2 Field Personnel Responsibilities

ARCADIS field personnel conducting work on a project site having the potential to come into contact with utilities have the responsibility to:

- Read, understand, and follow this standard and ARC HSFS-019 Supplement 2 and complete the appropriate checklists during the on-site utility locate process.

- Complete a minimum of 1 year of utility clearance related experience before accepting responsibility for any utility clearance tasks.

- Complete training and have 6 months of experience in operating and interpreting the results of remote sensing technologies, including without limitation, magnetometers and ground penetrating radar, before operating such technologies. Field staff should understand the technologies being utilized by a private utility locate contractor, and how they are operating in comparison with the site conditions. Refer to ARC HSFS-019 Supplement 3 for more information.

- Prior to beginning subsurface intrusive work the Utility and Structures Checklist must be completed and signed off on by the staff member completing or overseeing the clearance. Confirm that the Utility and Structures Checklist was reviewed by the Project Manager or designee as discussed in Section 4.1 above. Review the Utility and Structures Checklist daily during subsurface intrusive activities to insure all utilities are identified and markings are present.

- Use their STOP WORK Authority to eliminate any reasonable concern if utilities cannot be reasonably located and contact the Project Manager to review the STOP WORK situation and confirm the direction of action moving forward.

- Ensure that ARCADIS subcontractors conduct their own reasonable independent utility clearance efforts as required by ARCADIS' standard subcontract, and are aware of any ARCADIS clearance standards used onsite.

- Be on site during utility locate activities, and any active subsurface intrusive activities involving contractor under contract to ARCADIS.

4.3 ARCADIS Subcontractor Responsibilities

According to ARCADIS' standard subcontract, subcontractors have agreed to take responsibility for any damages resulting from a utility impact caused by their work. Therefore, ARCADIS subcontractors are expected to take reasonable time and diligence to conduct their own independent utility clearance using reasonable standards and processes. Subcontractors have the responsibility to

stop their work if utility concerns are identified and will report those concerns to the ARCADIS employee overseeing their work activities. ARCADIS staff should reinforce these responsibilities with subcontractors during job safety briefings.

In jurisdictions where the actual contractor performing the subsurface intrusive work activity is required to perform utility clearance notifications, the contractor will perform the clearance notification and will provide evidence of the notification to ARCADIS (ticket or ticket number, etc.). Refer to ARC HSFS-019 Supplement 4 for Best Practices for State One Call procedures.

5. STANDARD

5.1 General

Protocols to be followed during utility clearance activities are outlined in:

- Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance (ARC HSFS-019 Supplement 1).
- Best Practices for Field Personnel Concerning Utility Clearance (ARC HSFS-019 Supplement 2).
- Use and Limitations of Common Underground Locating Technologies and Clearance Methods (ARC HSFS-019 Supplement 3)
- Best Practices for State One Call Procedures (ARC HSFS-019 Supplement 4)
- Emergency Action Plan guidelines for Utility Strikes (HSFS-019 Supplement 5)
- Utility Location Standard Operating Procedure for Aquatic Work Activities (ARC HSFS-019 Supplement 6)

5.2 Lines of Evidence

A minimum of 3 lines of evidence are required for an appropriate utility clearance as defined in this standard. Each location of subsurface intrusive work must have at least 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist of equivalent client provided checklist or permit. If a line of evidence is lost or not apparent, STOP WORK, and reestablish the line of evidence prior to resuming subsurface intrusive work. Generally, the following lines of evidence may be used to meet this minimum utility clearance requirement.

1. Contacting the State One Call or equivalent service (Nationwide "811") is required by law, regardless if it will be used as a line of evidence. Contacting the State One Call or equivalent service (Nationwide "811") is an acceptable reliable line of evidence when working within the public right of way or easement. Note that One Call can provide valuable information regarding locations and types of utilities entering the private property.

View the Utilities and Structures Checklist

Note: For work on private property or in areas not served by State One Call or equivalent service, consider using a reputable private utility locating company to locate and mark the utilities. Use of a private utility locator is encouraged for all projects with subsurface or submarine utilities. When working with a private locater it is best practice to pre-plan clearance areas, review required clearance equipment and the re-clearing/confirmation of any public utility mark outs (State One Call or equivalent service Nationwide "811");

2. Use detailed scaled site utility plans, preferably in the form of an "as-built" or "record" drawing, to identify and/or confirm utility locations. Document request and/or receipt of utility drawings from the property owner/client on the Utilities and Structures Checklist;

3. Interview(s) with knowledgeable site or client personal. The following questions should be asked during the interview and answers documented on the Utility and Structures Checklist:

   - Employees(s) Name and Affiliation(s) with the site
   - Types of utilities , including utility composition and location of utilities onsite
   - Depths of known utilities
   - Any other pertinent information regarding utilities on the site; or

4. Conduct a detailed visual site inspection of areas around all planned subsurface intrusive work points or areas to identify and/or confirm utility locations. For underground utilities, conduct an inspection for structures that tend to indicate the presence and general location of such utilities, including, but not limited to manholes, vaults, valve covers, valve markers, telephone pedestals, transformer housings, fire hydrants, spigots, sprinkler heads, air relief valves, backflow preventers, meters, downspouts going into the subsurface, power poles with wiring going into the subsurface and line markers. Saw cut lines and concrete /asphalt repairs often yield valuable information regarding utility locations. Always discuss the presence of utilities with the site owner, operator and/or occupant to identify any potential utilities that might not be readily identified by non-intrusive clearing methods or may be:

   - At depths > 5 ft. below ground surface; or
   - At very shallow depths (< 2ft below ground surface) such as communication lines, electrical conduits/wiring, irrigation lines, etc.

If one of the above lines of evidence cannot be utilized, or if using the above lines of evidence does not adequately identify utilities with reasonable certainty, one or more additional lines of evidence must be utilized. Commonly used lines of evidence are listed on the Utility and Structures Checklist.

A discussion of use and limitations associated with common utility location and clearance methods is provided in ARC HSFS-019 Supplement 3.

Standard operating procedures for utility location in subaquatic settings are presented in ARC HSFS-019 Supplement 6.

The lines of evidence will be recorded on the Utility and Structures Checklist or equivalent client provided checklist or permit.

Note: If a line of evidence is lost, utility markings removed / worn, or area of previous clearance not confirmed, STOP WORK and reestablish the line(s) of evidence prior to resuming subsurface intrusive work. Each location of subsurface intrusive work must have 3 reliable lines of evidence. All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist of equivalent client provided checklist or permit. If a line of evidence is lost or not apparent STOP WORK, and reestablish the line of evidence prior to resuming subsurface intrusive work. The Utility Structures and Checklist is valid for 15 business days from the date of completion.

5.3 Color Codes Used for Utility Markings

The following colors are used for marking utilities. Some government agencies or large industrial facilities may use additional colors not provided below. ARCADIS policy is to assume any paint marking or pin flag color not provided below is a subsurface utility marking until proven otherwise.

If utilities or subsurface anomalies are identified but the utility type or anomalies are not classified it is recommend that a pink (Temporary Survey Marking) marking be used. Once the type of utility is established the pink marks should be repainted / remarked to represent the correct type of utility.

COLOR	Utility Line
WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

APWA and ANSI standard Z-53.1

5.4 Locating Technologies

There are several types of locating technologies that can be used to identify and locate utilities in the subsurface. Project teams need to work closely with private utility locators (PUL) in order to best match locating technology with site conditions. To provide the best results all possible locating technologies should be available for use and implementation at the project location. Any potential

interferences should also be discussed up front and then at the project site during utility location activities. Potential interferences could be soil moisture, soil type, standing water on concrete/asphalt, rebar, fencing, and metal structures that are in the subsurface. Employees overseeing locating technology activities should have an understanding of device operation and limitations. For further information refer to ARC HSFS-019 Supplement 3, Use and Limitations of Common Utility Location Technologies and Clearance Methods.

5.5 Clearance Methods

In some cases, proposed subsurface intrusive locations may be pre-cleared using other intrusive methods. Determine the clearance or soft dig method based on site conditions and utilize the least invasive method possible. The number of subsurface intrusive locations and soil type should be taken into consideration. The following clearance methods are listed from least invasive to most:

1. Vacuum Extraction/Potholing (air or water based),
2. Air knifing,
3. Hydro knifing,
4. Probing,
5. Hand auguring
6. Hand digging, and
7. Posthole digging.

Single point clearance must be 110% of the proposed subsurface intrusive area, or the diameter plus 2", whichever is greater. 3-Point clearance must be installed in a triangular pattern around the proposed borehole and in a configuration not to allow for utilities to enter the borehole. 3-Point clearance must be 110% of the proposed intrusive area, or the diameter of the intrusive area plus 2", whichever is greater. Each method of clearance should be documented on the Utility and Structure Checklist.

Manual clearing methods such as shoveling, using pick axes, digging bars and other hand tools should be avoided completely or only used when absolutely necessary and used with caution. Excessive down force, prying or use in poor/obstructed visibility conditions is prohibited as these tools can damage utilities.

Surface cover (e.g., asphalt) removal methods within the 30-inch Tolerance Zone that pose excessive down force such as Jackhammering should be used with extreme caution. Methods that only cut the surface cover (coring or saw cutting) present less risk due to the absence of the downward force which could cause collateral damage to shallow subsurface utilities. Note that utilities are often present at the concrete or pavement/soil interface or encased within the concrete or pavement and are easily damaged during concrete coring or pavement removal. Always work slowly, methodically and frequently STOP WORK to evaluate conditions during these work activities.

For borings and excavations, if the utility is known to be at depths where hand clearing is not feasible or creates additional safety concerns, no work will be performed within the 30 inch Tolerance Zone vertically or horizontally of the utility unless manual clearing is performed under the oversight of an Excavation Competent Person as defined in ARC HSCS005 ARCADIS Excavation and Trenching.

5.5.1 Temporary Backfilling of Pre-Cleared Boreholes

In some cases, it may be necessary to temporarily backfill a pre-cleared location until the remaining subsurface activities are performed. At these locations where subsurface intrusive work does not immediately follow pre-clearance, it is important to properly backfill and mark the pre-cleared location in order to relocate the pre-cleared location. In general, wooden stakes, survey markers, whiskers, paint marking or other surficial markings alone are inadequate because these markings can be easily removed, damaged or otherwise lost leading to uncertainty regarding the pre-cleared location. Although the specific steps for backfilling a pre-cleared location will depend on site specific conditions, use the following additional steps to prevent loss of the pre-cleared location:

- Backfill a pre-cleared location with clean sand or other granular material that is significantly different than the surrounding subsurface native material. Native soil should not be used to backfill a pre-cleared location that may require further subsurface work.
- Backfill the top 2 feet of a pre-cleared location with dyed sand or gravel to facilitate re-location.
- Use hammered wooden stakes or delineators to mark locations as an additional measure, if practical.
- In the event that the pre-cleared borehole is located on asphalt or concrete and an asphalt cold patch is required, use white paint to mark the intrusive location with a circle over the asphalt cold patch.
- In some instances, such as projects potentially affected by unexploded ordinance (UXO), the pre-cleared borehole may require that a PVC of matching diameter pipe be inserted into the pre-cleared borehole, filled with clean sand and affixed with a matching cap. Contact the project manager to identify any client-specific requirements.
- Always use a physical subsurface marker such as described above to identify the pre-cleared borehole location. Never rely solely on field measurements or GPS coordinates.
- If a utility or anomaly/obstruction is encountered during the pre-clearing process, backfill the hole with the native soil and mark the location with a pink painted X and/or NO.

In the event that a previously pre-cleared location cannot be located, the location must be re-cleared prior to performing subsurface intrusive work.

5.6 Acceptable Clearance for Working in Vicinity of Subsurface Utilities

Prior to the start of subsurface intrusive activities (i.e. excavations, vertical drilling, installing grounding rod, etc.), all utilities must be located and measures instituted to avoid subsurface utility hazards. Do not conduct subsurface work within 30 inches of a line marking in all directions. If the centerline of the utility is marked, the diameter of the utility or utility bank must be incorporated into the 30 inch Tolerance Zone, See Figure 1 located in Exhibit 2. If subsurface work must take place within the 30 inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig / clearance methods prior to starting subsurface intrusive work (see Section 5.5 for options); **no mechanized equipment is permitted for the exposing of the utility**. Once the utility has been exposed, if mechanized equipment is planned for use within the 30 inch

Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

For horizontal borings, to avoid striking a utility, damage from vibration, damage by pressure of the advancing boring, do not drill within 30 inches in all directions (3D cylinder) a of a line marking. Make sure to factor the diameter of the line or utility bank when computing 30 inch Tolerance Zone. When crossing a utility during horizontal drilling it is recommend that the utility be exposed 30 inches in a 360° direction. When exposing utilities for horizontal borings the utility must be exposed (potholed) by soft dig / clearance methods. This recommendation applies even if the operating contractor has technology that places the location to within a few inches. Make sure to factor the diameter of the utility when determining the 30 inch Tolerance Zone. If subsurface work must take place within the 30 inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig / clearance methods prior to starting subsurface intrusive work (see Section 5.5 for options); **no mechanized equipment is permitted for the exposing of the utility**. Once the utility has been exposed, if mechanized equipment is planned for use within the 30 inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

Additional cautions for horizontal borings include gravity utilities such as sewers and storm drains as the depth of these utilities will change (sometimes significantly) as they run across the project site. Always obtain the utility depth at the location where the boring will actually cross the line by collecting sewer depth inverts from identified manholes and interpolating those depths to the area of the subsurface intrusive work.

During well installations and well abandonment via mechanical equipment, the 30 inch Tolerance Zone rule applies outward from the outside edge of the largest diameter auger or tool to be used for installation and abandonment (over drilling). In cases where wells have been previously installed and the 30 inch rule has not been followed, work proposed using mechanized equipment to work within the 30 inch Tolerance Zone will require approval from Corporate H&S.

5.7 Acceptable Clearance for Working in Vicinity of Overhead Power Lines

No work will be performed by ARCADIS or our subcontractor near overhead power lines where any Unqualified Person or equipment is within the limits specified below, unless the power line has been properly covered or de-energized by the owner or operator of the power line. Qualified Person approach distances are defined in Exhibit 5 of ARC HSFS0006 Electrical Safety Standard.

Power Line Voltage Phase to phase (kV)	Minimum Safe Clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

ANSI standard B30.5-1994, 5-3.4.5

5.7.1 Reducing Vehicle and Mechanical Equipment Clearance Requirements

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. (305 cm) is maintained. If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 cm). If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10 kV over that voltage.

- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

- If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in OSHA 1910.333(c)(3)(ii)(C) Table S-5. Reference information from OSHA 1910.333 Table S-5 and NFPA 70E Table 130.4(C)(a) for alternating-current systems and 130.4(C)(b) for the distances associated with direct-current voltage Systems is included as Exhibit 5 of ARC HSFS0006 Electrical Safety Standard.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless:

- The employee is using protective equipment rated for the voltage; or

- The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section of this standard.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

When a machine is in contact with an overhead power line, do not allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance.

5.8 Reporting Utility Incidents

ARCADIS field personnel involved with any subsurface, submarine, and above-ground utility strikes should immediately STOP WORK and contact the Project Manager to discuss the incident. The utility strike must be reported to Corporate Health and Safety and Legal Departments immediately, and no later than 24 hours. Use the Utility Line Strike Investigation Form as part of the notification process.

Selected utility strike incidents may also utilize a conference call with operations management to review findings and lessons learned. The Divisional Health and Safety Director will make the determination concerning the need to have the incident review call, and will arrange the call, if deemed necessary.

5.9 Relationship of this standard to the Project Specific HASP

With the exception of the Utility and Structures Checklist, this standard, including most supplements, are not designed to be printed off and attached to project HASPs. During project health and safety planning, this standard will be reviewed and applicable clearance technologies and methods will be documented on the Utility and Structures Checklist.

Additionally, emergency action standards specific to utility strikes should be addressed. ARC HSFS-019 Supplement 5 provides general guidelines for emergency response to utility strikes. Applicable information may be attached to the Utility and Structures Checklist to facilitate communication of response expectations.

5.10 Required Contract Terms and Conditions

ARCADIS' standard client and subcontractor contracts contain required terms and conditions defining responsibility for utility clearance and the allocation of risk associated with an impacted utility. These terms and conditions have prescribed language concerning subsurface work that is presented in ARCADIS client contracts and ARCADIS subcontractor contracts. If such provisions cannot be agreed upon, the reasons are documented and other risk-management actions should be identified, such as limits of liability, add additional physical investigations, additional lines of evidence or utility location, assignment of risk to subcontractors, etc. In addition, any changes to these terms and conditions require approval by Legal Services.

6. TRAINING

Employees responsible for coordinating or conducting utility clearance activities will be familiar with the requirements of this standard. ARCADIS in-house 8-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) refresher provides awareness-level training regarding this utility location and clearance standard.

7. REFERENCES

- Utility and Structures Checklist
- Utility Line Strike Investigation Form
- ARC HSFS-019 Supplement 1, Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance
- ARC HSFS-019 Supplement 2, Best Practices for Field Personnel Concerning Utility Clearance
- ARC HSFS-019 Supplement 3, Use and Limitations Associated with Location Technologies and Common Utility Clearance Methods
- ARC HSFS-019 Supplement 4, Best Practices for State One Call Procedures and Notifications
- ARC HSFS-019 Supplement 5, Emergency Action Plan guidelines for Utility Strikes
- ARC HSFS-019 Supplement 6, Utility Location SOP for Aquatic Work Activities
- Figure 1 - 30 inch Tolerance Zone
- ARC HSCS005 Excavation and Trenching
- One-Call and State Law Directory
- Required client contract language concerning subsurface work
- Required subcontractor language concerning subsurface work

8. RECORDS

8.1 Utility Clearance Records

All records (maps, checklists and documentation of communications) used to determine the location of utilities should be retained and kept in the project file.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs



History of Change

Revision Date	Revision Number	Standard Developer or Revised By / Approver	Reason for change
13 December 2006	01	Mike Thomas/Pat Vollertsen	Original document
26 March 2007	02	Mike Thomas/Pat Vollertsen	Put in new company format
15 May 2007	03	Mike Thomas/Pat Vollertsen	Added nation-wide 811 number
6 September 2007	04	Mike Thomas/Pat Vollertsen	Changing over to new template format
22 February 2008	05	Mija Coppola	Changing over to new template format
13 January 2009	06	Mija Coppola	Define lines of evidence
4 October 2010	07	Sam Moyers/Mija Coppola	Reformatting and addition of utility clearance information
13 February 2012	08	Sam Moyers/Mija Coppola	Modified link information for utility strike reporting, clarified local/state requirements in section 4.1 and 4.3
28 January 2013	09	Tony Tremblay	Utility and Structures Checklist revised; hyperlink updated
12 February 2013	10	Amanda Tine/Tony Tremblay	Clarified clearance boundaries for Unqualified staff in Section 5.7 and added information about vehicles and equipment being used near power lines in Section 5.7.1
15 March 2013	11	Kurt Merkle, Rebecca Lindeman / Tony Tremblay	Added additional text to standard for recent lessons learned, added section 5.4 (Locating Technologies) and 5.5 (Clearance Methodologies), added additional details to section 5.6 when working in close proximity to subsurface utilities, and added Supplement 6 - Utility Location SOP for Aquatic Work Activities.

Revision Date	Revision Number	Standard Developer or Revised By / Approver	Reason for change
07 July 2013	12	Andrew McDonald/ Tony Tremblay	Removed HSFS-019 Supplement 1, Utility Definitions. Added hyperlink for One-Call and State Law Directory. Segregated evidence of sewer or storm drains in USC list. Removed Sam Moyers and added Andrew McDonald as author.
26 September 2014	13	Andrew McDonald/Tony Tremblay	Added Exhibit 1. Definitions and 30 inch tolerance zone. Clarified use of 811 or state one call as a reliable line of evidence. Added best practice to cover backfilling of pre-cleared boreholes. Updated USC list to cover soft dig termination depths and PM review.

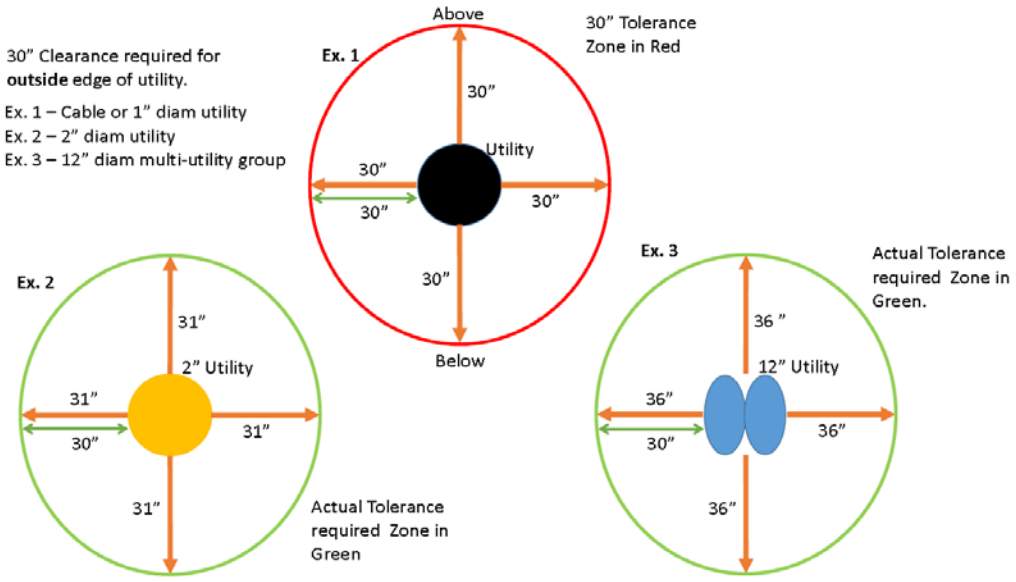
EXHIBIT 1 – DEFINITIONS

Above Ground Utilities - For the purpose of this procedure, above ground utilities include, but are not limited to: any above ground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, sanitary sewage, storm water, or other materials, liquids, or gases.

Subsurface Utilities - For the purposes of this procedure, subsurface utilities include, but are not limited to: any underground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, storm water, or sanitary sewage; underground storage tanks; tunnels and cisterns; and septic tanks and lines.

Tolerance Zone – The area within 30 inches in all directions from the outside diameter of a located/marked utility in which special care is to be taken. If the centerline of the utility is marked, the diameter of the utility or utility bank must be incorporated into the 30 inches. This area must be hand cleared with non-mechanized equipment. Once the utility has been exposed, if mechanized equipment is planned for use within the 30 inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, to mitigate or accept the risk associated with the planned work. See Figure 1 – 30” Tolerance Zone.

EXHIBIT 2 – TOLERANCE ZONE (Figure 1)



Excavation

OE Required Standard

Chevron Environmental Management Company

Version	Date	Originator
Rev. 1	Feb-15-2013	

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Introduction

Excavation (including trenching) procedures are designed to help prevent injuries to personnel, property damage, and adverse environmental impact as a result of potential hazards associated with excavation work, including encountering underground utilities, potential overhead hazards, subsurface installations, hazardous atmospheres, falls, cave-ins or collapses.

An Excavation is defined as any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

This standard defines corporate requirements for Excavation activities.

Requirements

A written program for Excavation procedures shall be in place and include the following elements at a minimum:

A. If Excavations are exempt from the requirements of this standard, the reasons for the exemption shall be documented.

B. Potential hazards and/or surface encumbrances (e.g., trees, utility poles, rocks, proximity of structures, excavated material, vehicles/equipment) shall be removed or secured prior to beginning Excavation work, including as applicable:

   1. Underground utilities or subsurface installations (e.g., electric, fuel, water, compressed air, sewer and telecommunication lines) shall be identified.
   2. Notifications of planned Excavations shall be made to the appropriate entities prior to beginning work.
   3. Arrangements shall be made with the appropriate utility company or agency for the protection, support, removal, shutdown, isolation or relocation of utilities or subsurface installations.
   4. Utilities left in place shall be protected (e.g., barricades, shoring, supports).
   5. Underground conduits, electrical cables, and product lines or sewers within the limits of the Excavation shall be isolated in accordance with the OE Corporate Required Isolation of Hazardous Energy Standard.

C. The exact position of utilities shall be located when excavating approaches the estimated location by a safe and acceptable means (e.g., day-lighting).

D. Excavations in close proximity to buildings, roads, retaining walls, and other structures or deeper than 20 feet (6.1 m) shall be reviewed and approved by a civil engineer or other qualified professional (e.g., Registered Professional Engineer).

E. The Excavation area shall be isolated and barriers erected to prevent unauthorized access by vehicles and personnel not involved in the Excavation work.

F. Personnel exposed to or directing vehicular traffic shall wear suitable garments made of reflective or high visibility material.

G. Excavations with a depth greater than 4 feet (1.22 m) shall be provided with safe means of access and egress (e.g., ladders, stairways, ramps), requiring no more than 25 feet (7.5 m) of lateral travel.

H. Personnel shall not enter an Excavation while heavy equipment is in use, mechanical digging is in progress, nor permitted underneath loads handled by Excavation or lifting equipment.

I. A Hazard Analysis shall be performed in accordance with the OE Corporate Required Hazard Analysis Standard when planning Excavation activities to:

1. Identify significant, potential hazards.
2. Identify the need for special processes such as gas testing.
3. Identify if work will require permits (e.g., Permit to Work, Isolation of Hazardous Energy, Confined Space and Excavation).
4. Assess the need for Simultaneous Operations (SimOps), and if so, to evaluate potential hazards associated with the SimOps.
5. Identify and evaluate precautions to ensure that work may be conducted safely.

J. A Job Safety Analysis (JSA) or equivalent shall be conducted at the work site in accordance with the OE Corporate Required Hazard Analysis Standard prior to Excavation activities.

K. An Excavation Permit shall be required prior to breaking the surface, including but not limited to the following:
   1. Power tools.
   2. Excavating 5 feet (1.52 m) or deeper (using either power tools or hand tools).
   3. When specialized work permits (e.g., Isolation of Hazardous Energy, Confined Space Entry) are required to manage the risks of the Excavation.
   4. Gas testing is required.

L. An Excavation Permit shall be used in conjunction with a Permit to Work in accordance with the OE Corporate Required Permit to Work Standard.

M. The Excavation permitting process shall indicate roles, responsibilities, and protocols as described in the OE Corporate Required Permit to Work Standard.

N. Excavations classified as Confined Space shall be in accordance with the OE Corporate Required Confined Space Standard and OE Corporate Required Portable Gas Detection Standard.

O. Personnel shall not work on the faces of sloped or benched Excavations at levels above other personnel without adequate protection for personnel at lower levels.

P. Personnel shall be protected from loose rock, soil, excavated or other materials and/or equipment (including vehicles) that could enter the Excavation including, but not limited to:
   1. Scaling to remove loose material.
   2. Installation of protective barricades or retaining devices.
   3. Use of warning system (e.g., barricades, hand or mechanical signals, stop logs) to alert mobile equipment operators of an Excavation edge.
   4. Placing, storing and/or retaining no closer than 2 feet (0.61 m) from the edge of the face unless otherwise designed and approved by a qualified engineer.

Q. While work is proceeding or an Excavation is otherwise open, a competent person shall conduct and document inspections of the Excavation, adjacent areas, and protective systems including, but not limited to:
   1. Daily, before the start of work each shift.
   2. As dictated by the work performed.
   3. After every rainstorm.
   4. When fissures, tension cracks, sloughing, underground cutting, water seepage, bulging at the bottom, or other similar conditions occur.
   5. When there is a change in the size, location, or placement of the soil pile.
   6. When there is an indication of change or movement in adjacent structures.

7. After any event that may damage protective equipment.
8. After other events that could increase potential hazards (e.g., windstorm, earthquake, dramatic change in weather).

R. Steps shall be taken to protect workers from cave-ins for Excavations including, but not limited to the following:
   1. When Excavations are 5 feet (1.52 m) or greater.
   2. When an inspection by a competent person in an Excavation less than 5 feet (1.52 m) concludes that there is a potential for a cave-in.

S. Personnel entering Excavations shall be protected by protective systems including support systems (e.g., underpinning, bracing, shoring), sloping, benching, and/or shield systems designed by a civil engineer or other qualified professional (e.g., Registered Professional Engineer).
   1. Materials and equipment used for protective systems are free from damage or defects and installed and maintained in a manner consistent with manufacturer recommendations.
   2. Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.
   3. Designs of protective systems shall meet applicable legal requirements, as well as Chevron standards and/or accepted best practices.

T. A civil engineer, other qualified professional (e.g., Registered Professional Engineer) or competent person shall determine soil conditions and identify soil type in accordance with applicable legal requirements, as well as Chevron standards and/or accepted best practices.

U. Soils with the least stability shall be used to determine methods to prevent cave-in or collapse, when multiple soil types are present.

V. Personnel shall be protected from water accumulation in Excavations including, but not limited to the following:
   1. Surface water and drainage shall be controlled through suitable means (e.g., cut-off drains, diversion ditches, berms, bunds, dikes) to collect water and discharge it clear of the working area.
   2. A competent person shall monitor surface water and drainage controlled or prevented by water removal equipment to ensure proper operation.

W. Procedures and requirements for the following circumstances shall be described including, but not limited to:
   1. Depending on the size of the Excavation, type of soil, and local air requirements, dust suppression may be required during Excavation.
   2. If the soil, groundwater or other material excavated appears contaminated, work shall be stopped and an environmental specialist’s advice sought on the precautions and disposal requirements.
   3. Excavations cut through a firewall or containment berm/bund shall provide alternate means of containment while the job is progressing.
   4. Excavating in archeological sites requires special consideration and compliance with local legal requirements and shall be avoided wherever possible.

X. Protection to the public shall be provided, including, as appropriate, barricades (e.g., guardrails, fences, covers), walkways, lighting, and posted signage.

Y. An emergency rescue plan and equipment shall be available as determined by the Hazard Analysis. Trained personnel shall be on-site and available during Excavation work as specified in the emergency rescue plan.

Z. Stop Work Authority shall be exercised and immediate notifications (e.g., supervisor, emergency response personnel, utility company) shall be made upon discovery of damage (e.g., breaks, leaks, dents, gouges) to any subsurface installation.

AA. The reporting unit/business unit/facility shall maintain documentation of employees and contractors authorized to perform Excavation activities.

BB. Personnel assigned responsibilities in Excavation roles shall be trained and competent.

CC. Training requirements and competency assessments for personnel authorized in Excavation activities shall be documented.

DD. The Excavation Standard shall define the policy for record retention that meets applicable legal, corporate and operating company requirements (or at least six months, whichever is more).

Key Terms and Definitions

Barricade – An obstruction, such as tape, rope netting, flasher units, or traffic cones, placed in such a way as to prohibit personnel and/or equipment from passing into an area where potential hazards may be present. A barricade must present an easily recognizable warning against entry.

Benching (Terracing or Stepping) – Method of protecting workers from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Day-lighting – In the context of excavation, the process of safely exposing an underground utility to precisely locate and identify it. Day-lighting is done with hand tools, vacuum excavation, or other means that cannot damage the utility.

Excavation – Any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Excavation Permit – A separate document attached to a Permit to Work specifying the control measures necessary to carry out the excavation work safely.

Hazardous Atmosphere – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from the following:

- Flammable gas, vapor or mist in excess of 10% of the lower flammable limit
- Airborne combustible dust at concentrations that meets or exceeds its lower flammable limit
- Atmospheric oxygen concentrations less than 19.5% or greater than 23.5%
- Atmospheric concentrations of any substance in excess of the permissible limit
- Atmospheric conditions immediately dangerous to life or health

Protective System – Method of protecting workers from cave-in, from material that could fall into an excavation, or from collapse of an adjacent structure. Protective systems include support systems, sloping, benching systems, and shields systems, and other systems that provide the necessary protection.

Shield (Shield System) – A structure capable of withstanding the forces of a cave-in. The structures, also called “trench boxes”, are designed to protect employees within the structure and can be permanent or can be designed to be portable and moved as the work progresses.

Shoring – Hydraulic, mechanical, or timber reinforcement used to support the sides of an excavation to prevent cave-in.

Sloping (Battered) – Removing soil from the sides of an excavation, so they are inclined away from the excavation sufficiently to prevent cave-ins. The angle of the incline required varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Support system – A system, such as underpinning, bracing or shoring, trench box, that provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench – A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m).

Utilities – Any piping, wiring, conduit, or other equipment that serves as a conduit for electricity, fuel, water, compressed air, sewer, and telecommunication, to or from a facility.

Roles and Responsibilities

Registered Professional Engineer – A person can be registered as a professional engineer in the state or other jurisdiction where the work is to be performed. A professional engineer, registered in any state or other jurisdiction is deemed to be a “registered professional engineer” within the meaning of this standard when approving designs for “manufactured protective systems” or “tabulated data” to be used in interstate commerce.

Competent Person – One who is capable of identifying potential hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees; and who has authorization to take prompt corrective measures to eliminate them.

Manual Handling

Required Standard

Chevron Environmental Management Company

Version	Date	Originator
Final Rev. 0	June 3, 2013	Triana Fleming, Scott Wible

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Portable Gas Detection

OE Required Standard

Chevron Environmental Management Company

Version	Date	Originator
Rev. 1	Feb- 15-2013	

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Introduction

Portable Gas Detection procedures are designed to help prevent personnel from potential exposure or injury, property damage, or adverse environmental impact from hazardous atmospheres that may exist in the workplace.

This standard defines corporate requirements for atmospheric testing using Portable Gas Detection instruments and equipment.

Requirements

A written program for Portable Gas Detection procedures, including personal gas monitors, shall be in place and include the following elements at a minimum:

A. The conditions under which Portable Gas Detection and personal gas monitors are to be used shall be described.

B. Gas testing shall be required when there is a potential for any hazardous working atmosphere including oxygen deficient or enriched environments, flammable, explosive conditions and toxics above permissible exposure limits.

C. Gas testing shall be performed and/or personal gas monitors shall be worn where there is a risk of a potentially hazardous atmosphere including, but not limited to the following activities:

1. Hot work.
2. Confined Space Entry.
3. Isolation of Hazardous Energy.
4. Excavation and trenching.
5. Emergency response (e.g., leaks, spills).
6. Process and production operations, handling or storage of hazardous materials or cargo (e.g., manufacturing facilities, drilling and productions facilities, storage tanks, ships/shipyards, tank cars, hazardous waste sites).
7. Other activities or conditions as defined by the reporting unit/strategic business unit /facility.

D. Gases shall be tested in the following order:

1. Oxygen content.
2. Flammable or explosive gases and vapors.
3. Toxic gases and vapors (e.g., hydrogen sulfide (H_2S), benzene).

E. Acceptable criteria for gas testing results (e.g., %LEL, %oxygen, and permissible exposure limits of other gases) shall be described and conform to applicable legal requirements, as well as Chevron standards and/or accepted best practices.

F. Work shall not commence until gas testing results are within acceptable criteria defined in requirement E.

G. Procedures required if gas testing results indicate a hazardous condition (e.g., exceed the acceptable criteria for %oxygen, %LEL, permissible limits) shall be described including but not limited to:

1. Stopping work (SWA).
2. Review work conditions.
3. Evacuation of personnel.
4. Mitigation.

5. Re-testing of gases.
6. Re-validating permits.

H. Portable Gas Testing instruments and equipment (including sensors and detectors) shall meet applicable legal requirements, as well as Chevron standards and/or accepted best practices including but not limited to the following:

1. Approved for use in potentially hazardous atmospheres (e.g., intrinsically safe) by a recognized testing organization (**exception**: no intrinsically safe instrument and equipment exists).
2. Appropriateness for the monitored environment (e.g., sensitivity, specificity, temperature, moisture, inert environments and susceptibility of sensor to poisoning or inhibition by other gases present).
3. Capability of measuring oxygen content, combustible/flammable limits and toxic gases and vapors accurately to the lowest concentration at which the material becomes hazardous.
4. Having both audible and visual functioning alarms.
5. Having established alarm set points.
6. Having personnel placement criteria for personal gas monitors.

I. Gas testing shall be permitted and managed in accordance with the OE Corporate Required Permit to Work Standard and/or other applicable Managing Safe Work standard requirements (e.g., Hot Work, Confined Space Entry, and Excavation).

J. The following requirements for gas detection instruments and equipment shall be described in accordance with manufacturer instructions including but not limited to:

1. Maintenance and inspection (e.g., leak tests, connections, batteries).
2. Storage conditions (e.g., temperate environments, dust-free, away from chemical vapors).
3. Field verification of instrument accuracy (e.g., function/bump test, full calibration):
    i. At a minimum daily, or first use.
    ii. At a minimum monthly (not to exceed 30 days).
    iii. Additional intervals based on environmental conditions (e.g., exposure to environmental conditions such as sensor poisons).
4. Manufacturer calibration:
    i. When an instrument does not pass a field full calibration.
    ii. More frequently, as recommended by the manufacturer (e.g., exposure to environmental conditions such as sensor poisons).
5. Compatible or manufacturer approved accessories and supplies (e.g., tubes, filters and probes).

K. Gas detection equipment shall be calibrated with certified calibration gases of known concentrations.

L. Gas testing equipment, supplies and media (e.g., colorimetric tubes, calibration gases) shall not be altered, used if damaged, or used after expiration of the designated service life.

M. Portable Gas testing shall be evaluated and performed by a qualified gas tester.

N. Additional requirements for initial gas testing in confined spaces and/or environments in which potentially hazardous atmospheres may be present that cannot be sampled remotely shall be described including but not limited to the following:

1. Appropriate personal protective equipment [e.g., supplied air respiratory protection or self-contained breathing apparatus (SCBA)].
2. Additional procedures (e.g., confined space rescue).

O. The conditions and frequency with which follow-up testing is required shall be described including but not limited to:
    1. Period of time between follow-up testing.
    2. Work-breaks.
    3. Shift changes.
    4. Changes in operating conditions change (e.g., disruption, emergencies, ambient temperature changes, other work activities).
    5. At any other time that the facility specifies follow-up testing.

P. Conditions for which continuous gas testing is required shall be described, including but not limited to:
    1. Hot work performed inside a confined space.
    2. At any time required by the work permit and/or Hazard Analysis.
    3. Whenever hazardous atmospheric conditions may occur.

Q. Gas testing results shall be documented and associated to all appropriate permits (e.g., Hot Work, Confined Space Entry, and Excavation).

R. Personnel involved in activities requiring gas testing (e.g., Authorized Entrants, their authorized representatives or other affected personnel) shall be able to observe initial and all subsequent gas testing.

S. Atmospheres that are potentially stratified shall be tested according to applicable legal requirements, as well as Chevron standards and/or accepted best practices.

T. When an area is suspected to be contaminated, readings shall be taken on the approach to the area requiring testing considering instrument response time (e.g., hazardous material spill or release).

U. Personnel assigned responsibilities in gas detection roles shall be trained and competent.

V. Personnel using personal gas monitors shall be trained and competent.

W. Training requirements and competency assessments for personnel authorized in gas detection and personal gas monitors shall be documented.

X. The Gas Detection Standard shall define the policy for record retention (e.g., calibration results) that meets applicable legal, corporate, and operating company requirements (or at least six months, whichever is more).

Key Terms and Definitions

Alarm Set Point – Fixed or adjustable setting of the apparatus that is intended to preset the level of concentration at which the apparatus will automatically initiate an indication, alarm, or other output function.

Calibration – An instrument's measuring accuracy relative to a known concentration of gas.

Explosive Atmosphere – A mixture of flammable gases, vapors, liquids, or dusts with air. There is a potential for explosive atmospheres to develop from improper cleaning or preparation of tanks, vessels, pipes, or equipment that previously contained such materials or from the accumulation of combustible dusts.

Hazardous Atmosphere – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from the following:

- Flammable gas, vapor or mist in excess of 10% of the lower flammable limit.
- Airborne combustible dust at concentrations that meets or exceeds its lower flammable limit.
- Atmospheric oxygen concentrations less than 19.5% or greater than 23.5%.
- Atmospheric concentrations of any substance in excess of the permissible limit.
- Atmospheric conditions immediately dangerous to life or health.

Lower Explosive Limit (LEL) – Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash of fire in the presence of an ignition source (arc, flame, heat). Also called lower flammable limit (LFL).

Oxygen Deficient – An atmosphere containing less than 19.5% oxygen by volume.

Oxygen Enriched – An atmosphere containing more than 23.5 % oxygen by volume.

Portable Gas Detector – A spot-reading or continuous-duty gas-detection apparatus that has been designed to be readily carried from place to place and to be used while it is being carried. A portable device that is battery operated and includes but is not limited to:

- A hand-held apparatus, suitable for single-handed operations.
- Personal monitors, similar in size and mass to the hand-help apparatus, which are continuously operating while they are attached to the user.
- A larger apparatus that can be operated by the user while it is suspended by hand or by a shoulder strap or by a carrying harness; it may or may not have a hand-directed probe.

Poisons (of sensors) – Substances that lead to temporary or permanent loss of sensitivity of the sensors.

Roles and Responsibilities

Authorized Entrant – An employee who is authorized by the employer to enter a confined space.

Qualified Gas Tester – A competent person who has received training and has been tested in the use of portable gas-testing equipment and has successfully demonstrated use of the equipment in the field. This person must also be trained to recognize potential hazards for work requiring gas testing.

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Introduction

The purpose of the Manual Handling Standard is to improve the identification, assessment, and mitigation or elimination of the risks associated with manual handling of materials. This document outlines CEMCs requirements for pre-job planning/analysis of manual handling, including using the hierarchy of controls in the development of the hazard mitigation. This standard also contains limits for manual lifting, carrying, and pushing/pulling of materials. Additionally, this standard describes principles of safe lifting techniques along with guidance on the manual handling of specific material types.

Note: Manual handling and lifting should only be used when all other possible alternatives have been evaluated and deemed not fit for purpose.

In Scope

This standard applies to CEMC employees and Business Partners working on all CEMC project sites. It is the responsibility of Business Partners to have a procedure that meets or exceeds this standard while performing work at any CEMC location and/or any work within CEMC operational control.

The scope of the *Manual Handling Standard* applies to CEMC's sites or projects and satisfies OEMS Element 3.2 - Safe Operations; a comprehensive safety program is in place for each location. Core elements of the program shall include:

- *Written safe work practices. Safe work practices may include: permit to work, hot work, confined space entry, equipment isolation (lockout/tag-out), opening equipment, excavation, working at heights, electrical work, simultaneous operations (SIMOPS), bypassing critical protections, lifting and rigging, and other applicable practices identified through risk assessment of local operations.*

Out of Scope

This standard does not apply to material handling that utilizes Hoists, Cranes, and Forklifts - for information on these activities refer to the CEMC OE Required Lifting and Rigging Standard.

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Section I: Project Planning & Pre-Job Analyses

Manual handling concerns shall be addressed during work planning and pre-job planning meetings including selection of equipment and materials, and planning work layouts and processes.

Note: Manual handling and lifting should only be used when all other possible alternatives have been evaluated and deemed not fit for purpose.

Manual Handling Hazard Analyses

A Job Hazard Analysis (JHA) and/or Job Safety Analysis (JSA) shall be developed or reviewed and, if appropriate, revised onsite for defined activities by the crew prior to beginning work and include, but not limited to:

1. Describe the manual handling task or job to be performed.
2. List the critical steps required to accomplish the task(s).
3. Define the potential hazards associated with each step. Risk factors to address before permitting manual material handling as part of the job scope include:
   - Nature of loads (weight, weight distribution, shape, size, sharp edges or points, ease of grip)
   - Actions, posture and movements of the worker(s) (coordinate handling by more than one person), lifting heights, reach, twisting and bending, steps, and carrying distance.
   - Layout of work area and worksite conditions (proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).
   - Duration and frequency of task.
   - Necessary skills and physical capabilities of the worker.
   - Plan for load release (intended and unexpected).
   - Long term risks.
4. Record the controls or mitigations for each listed hazard:
   - Control measures that eliminate manual handling or significantly reduce the risk of injury shall be considered, including the use of specific tools, devices or mechanical equipment.
   - Preference shall be given to re-designing the work to eliminate manual handling steps.
5. Review and communicate the contents of the analyses to the work team and other affected parties immediately prior to beginning work.
6. Discuss the use of Stop-Work Authority by anyone present at the job site.
7. Utilize the Hazard Identification Tool and the Serious Injury and Fatality Prevention Handbook in conjunction with the JHA/JSA.
   - At a minimum each hazard should consider the interactions with people, equipment, environment, and property and the probability and severity of its occurrence.
   - This review should conclude with safeguards and controls in place, whether through elimination, substitution, engineering, administrative, work practices, or PPE, to prevent the discussed potential incidents.
8. Discuss any prior incidents with similar tasks that have occurred and review the lessons learned of those incident.
9. Appropriate PPE must be considered for each task and in alignment with the CEMC Personal Protective Equipment (PPE) Standard.

NOTE: Braces, slings, etc. for back, arms, hands, etc. are not considered to be personal protective equipment PPE because they do not protect employees from injury while performing lifting, lowering, or handling tasks. These devices are for medical use and should only be worn under the direction of a health care provider.

Hierarchy of Controls

The hierarchy of controls is used as a means of selecting preventative or protective measures. When determining the best controls, systematically start with the controls that will be most effective at eliminating the hazard or significantly reducing the potential for an injury or incident. A representation of this hierarchy and the preferred selection order is summarized as follows:

1. **Elimination:** The **first step is to eliminate the hazard or manual lift.** Is the work or job step necessary?
2. **Substitution:** The **second step is to substitute** manually handling tasks by using equipment i.e., crane, forklift, etc.
3. **Engineering Controls:** The **third step is to engineer out the hazard** by physically containing or isolating the hazard from the worker, i.e., specialty tools, wrapping or smoothing out sharp edges on an object, reducing traveling distance, sealing pinch point openings, placing object inside secure container, etc.
4. **Administrative Controls:** The **fourth step is to use administrative controls** to reduce worker exposure**.** Is there a safer way to do the job? Can equipment be shut down during times of potential exposure? Can the time or frequency of worker exposure be reduced? Increase worker awareness of potential hazards and understanding of how to do the job safely. Improve or add work procedures, signs, instructions and training**.**
5. **Personal Protective Equipment (PPE):** The **fifth and final step is the use of PPE as a last resort** for reducing potential exposure. PPE is most effective when used as an additional safeguard, supplementing one or more other controls.

Use the hierarchy of controls to select and test each safeguard or control for its potential effectiveness. Some controls are most effective when used in combination with other controls, and in these cases, the combination should be considered together.

Section II: Manual Handling Requirements

Where manual handling and lifting has been determined as the most appropriate method, *Manual Lifting, Manual Carrying, and Manual Pushing/Pulling Limits* shall be followed. Lifting of heavy or awkward objects must only be performed by competent personnel using proper equipment, tools, and methods. Utilize the Hand Safety Guideline to ensure that hand hazards are addressed and eliminated and appropriate PPE is worn.

Stop Work Authority (SWA) must be used in circumstances where unsafe conditions or acts could result in undesirable events.

Manual Lifting Limits

The amount of weight an individual can safely lift will depend on the individuals' physical condition, fatigue, perceived stress, layout of the work area, and worksite conditions. Individuals in good physical condition must not exceed the following limits:

1. For **non-ideal lifting** circumstances (bent over or when reaching out beyond elbow length from the front of the body), the maximum weight to be lifted and carried shall not exceed **25 lbs.** For weights over 25 lbs, seek use of mechanical devices.

2. For **ideal lifting** circumstances, the maximum weight to be lifted or carried by one person in good physical condition using two hands and standing erect with item held close to the body shall not exceed **50lbs.**

When performing a **team manual lift** with individuals in good physical condition the maximum weight to be lifted and carried shall not exceed **100 lbs**. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analyses, including updating any JSAs, before proceeding with a team lift of 2 or more persons.***

Table 1

Type of Lift	Number of Persons	Max. Weight
Non-ideal	1	**25 lbs(11kg)**
Ideal	1	**50 lbs (22kg)**
Ideal Team	2 or more	**100 lbs (45kg)**

**Information in Table 1 is derived from NIOSH. Numbers do vary according to Functional Leadership Team recommendations.*

Manual Carrying Limits

Individuals in good physical condition must not exceed the following limits:

1. Carts and other assisting devices shall be used when moving items, especially for those items that are not ideal, bulky, have poor handles, shift from side to side, uneven loads, and place high stress and force on the hands.

2. Where manual carrying cannot be eliminated by using a handling/assisting device alone, refer to **Table 2** for carrying limits:

Table 2

Position	# of Persons	Hand Contact	Max. Weight	Max. Travel Distance
Front of Body	1	2	**50 lbs (22kg)**	**10 yds/m**
Front of Body	1	2	**40 lbs (18 kg)**	**20 yds/m**
Front or Side of Body	1	2 or top handle	**30 lbs (13kg)**	**30 yds/m**

**Information in Table 2 is derived from Chevron's Safety in Design Standard. Numbers do vary according to Functional Leadership Team recommendations.*

3. When carrying items with hand contact (good to poor gripping around edges of the load) or use of handles the following shall apply:

    - Items that are designed with handles shall have a minimum of two handles to perform carrying task.
    - As an exception to the above statement, items that are regularly made with single handles shall be located relative to the center of gravity of the unit to be lifted to preclude swinging or tilting when lifted.
    - All handles provided shall be located to provide at least 2 ½ inches of clearance between the handle and adjacent obstructions during handling.
    - Hand contact with good gripping is when an item is provided with handles or handhold cut-outs of optimal design. Where load designs can be modified within design limits, handles or cut-outs must be added. For those items that are irregular or loose pieces, good gripping is referred to as two hands securely and comfortably wrapped around the load.
    - Hand contact with fair gripping is any item provided with less than optimal handles or handhold cut-outs. For those items that are irregular or loose pieces, fair gripping is when two hands can be bent at 90° around the load.
    - Hand contact with poor gripping is any item that is less than optimal in design, irregular and/or bulky, or has loose pieces that is difficult to handle, is rigid, or have sharp edges. If applicable, these hazards should be eliminated or engineered out before handling.

4. Avoid slopes, stairs, and slippery surfaces when possible while carrying loads.

5. Prior to carrying, layout of work area and worksite conditions shall be taken into consideration (e.g. proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).

Manual Pushing/Pulling Limits

Individuals in good physical condition must not exceed the following limits:

1. Ensure all pushing/pulling tasks are two-handed and that these tasks are extended to entire body not just the arms.
2. While performing pulling task, do not extend arms behind the body.
3. When using cart, ensure the right type of cart (size, weight, loading capacity, wheel type, number, etc.) is used for pushing/pulling task.
4. Prior to pushing/pulling tasks, layout of work area and worksite conditions shall be taken into consideration (e.g. proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).

NOTE: For CEMC employees, the weight limit for an individual must not exceed the levels defined in GO-308 job descriptions for their job classification. Contact the Fitness for Duty Process Advisor or OE/HES Team Lead for this information.

Section III: Appendices

Appendix 1 - Principles of Safe Lifting

1. Eliminate manual lifting injuries by planning ahead to eliminate the need to perform the lift or by utilizing mechanical lifting devices.

2. If manual handling and lifting has been determined to be the most appropriate method, use correct lifting techniques and keep the weight of the load close to the body and the number of repetitions at safe levels. The distance of the load to the body and the frequency of the lift are the single greatest risk factors.

3. Personnel shall use care and proper lifting techniques when handling objects, i.e. lift with knees and not the back by bending knees and pushing up with the legs. Use team lift of two or more employees for those items weighing up to 100 lbs. or more awkward and bulky in design, or when employee cannot handle the load alone. Items weighing over 100 lbs shall be moved by mechanical or handling/assisting device. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analyses, including updating any JSAs, before proceeding with a team lift of 2 or more persons.***

4. Minimize loads being lifted or lowered from floor level.

5. The vertical range within which lifts can be most efficiently and safely performed is roughly between the knees and the shoulders. Mechanical assists may be used to place object in this range for improved lifting.

6. If the task requires lifts below the knees or above the shoulders, consideration must be given to the redesign of the workstation, the task, or both.

7. Use adequate step stools or ladders when reaching for any item above shoulder height or lifting items up to shelves or levels above 50 inches. These items must be kept in good repair and stored in proper place and away from weather when not in use.

8. Jobs requiring asymmetrical and one hand lifts must be redesigned, where possible, so that loads are equally distributed and lifting tasks are performed with two hands.

9. The recommended method to manually lift an object is to lift the load smoothly:

    - Stretch for a few seconds before performing the lift.
    - Ensure pathway is clear.
    - Test the weight of the object by safely using the tilt test (slightly tilting object to feel if object weight may be too heavy for a stand-alone lift).
        - If load weight is too heavy for stand-alone lift, proceed with team lift or use of cart or mechanical lifting assist.
    - Position body close to the load.
    - Get a firm footing with your feet apart.
    - Ensure back and waist is straight. Avoid the twisting, stooping, extended reaching (out and over) body positions.
    - Ensure the knees are slightly bent with the load as close to the body as possible.
    - Lift with your legs and not your back. Do not attempt to bend at the waist.

- Do not “jerk-lift” which can cause strain to the lower back.
- Ensure steady breathing and avoid holding your breath while lifting the load.
- Keep head straight up and do not bend (this avoids placing strain on neck and helps back stay aligned with the body).
- Keep your shoulders aligned with your feet.
- Do not twist the torso from side to side when lifting or carrying objects.
- Ensure view is not obstructed by object.
- Use same techniques for lowering object.
- Safely stretch again after the lifting or carrying task.

10. For loads that are bulky, heavy, and/or unstable, tag the load so that the employees will be aware of limitations.
11. Construct or select containers of lighter materials or split the load between two or more containers to reduce the overall weight. Or, increase load size and weight to allow movement of the load to be strictly performed by mechanical lifting assist.
12. Alter the task by using handles or hooks to secure a firm grip. If coupling objects are bulky, have pointy or sharp edges, loose-fitting parts, or are just hard to handle, hold, or grip, provide handles, hooks, or handheld cutouts to improve and secure firmness of grip.
13. Use large rather than small wheels on carts.
14. Look for uneven elevations and floor levels and other tripping hazards and eliminate where possible.
15. Balance loads within containers for stability.
16. Treat or alter the work surface so that the load moves more easily.
17. Change the nature of the job where possible.
18. Remember that:
    - Pulling or pushing is better than carrying
    - Pushing is better than pulling
19. Store loads so that they will be easy to retrieve but always above floor level.
20. Make sure the load is low enough to see over and that walking surfaces are properly maintained.
21. Ensure proper PPE is worn, i.e. high visibility impact resistant work gloves, steel or composite-toe shoes (non-slip), etc.

Appendix 2 – Material Types

Pipe, Fittings, Scrap (Metal/Wood/Conduits), Wood, Steel Bar/Rod

For loads and objects that are long and carried upon the shoulder:

1. The item should be carried on the shoulders with the front end held high above the body and working heights of other workers from ground level. This is done to avoid incidents of striking other occupied workers.

   - Shoulder pads should be worn for protection.
   - Strap the material together in bundles to avoid loss of control.
   - Extra caution should be taken when going around corners.

2. Consider and look for the following during the hazard assessment:

   - Plan the lift and movement of materials, including locating the storage location – minimize distance to storage location by selecting the shortest route free of hazards; eliminate transfers from one location to others, place bins as close as possible to the location of the material.
   - Look for and identify sharp edge, protrusions, potential pinch points, etc.
   - Understand size and weight and what the limits to manual handling are (always seek another way to move or handle the object – manually handling is the last resort).
   - Always consider weight limitations, length of material, and balance of material/center of gravity before lifting and moving the material.
   - Consider whether material has an unusual shape, is heavier on one end or the other or has protuberances that will cause the material to shift while in the hands or while being placed in a bin or other container.
   - Nature of what you are lifting and movement placing in storage bin – as a general rule don't "throw" instead cautiously place material into bins or buckets.
   - If placing material into a scrap bin, disposal bin, etc., pre-plan the task by evaluating the bin to be used.
     - Can you see into the bin?
     - How full is the bin?
     - If the bin is almost full, what is the chance for the material to bounce back or shift as you put your material in the bin?
     - Is there a chance for stored energy in the material already in the bin to cause bounce back of the material?

- Nature of what we are lifting and movement placing in storage bin?
- Could there be something unexpected in the bin, i.e. animal?

- Buddy system should be used to lift when appropriate – when in doubt use Stop Work Authority and seek assistance.
- Look for the potential of *Stored Energy.*
- Consider the use of strapping tools to minimize hazards and provide a safer way to handle material.
- Seek equipment or handling/assisting device on site that can be used to lift verses manually handling the object or load.

Lifting Bags

1. Bags should be moved by mechanical device instead of lifted, where necessary.
2. Bags weighing more than 50 lbs. shall not be manually ifted by a single individual. Avoid twisting back and use proper lifting techniques. Distribute weight to whole body.
3. Other methods for lifting are to use a team-lift or handling/lifting assist.
4. Prior to lifting, layout of work area and worksite conditions shall be taken into consideration (e.g. proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).

Valve Handling

1. The use of certified lifting devices should be used when possible.
2. Valves that weigh less than 50 lbs. may be lifted by one person with proper consideration and planning for ergonomically correct lifting (i.e., not bent over or reaching out beyond elbow length from the front of the body).
3. Valves weighing 50-100 lbs. may be lifted by two persons provided the valves are located so that each person can lift without having to reach over or around items between the person and the valve.
4. Assisted lifting devices shall be used for valves weighing greater than 50 lbs for 1 person and greater than 100 lbs for 2 or more persons. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analysis, including updating any JSAs, before proceeding to team lift of 2 or more persons.***
5. The maximum weight to be lifted and carried for non-ideal lifting circumstances (bent over or when reaching out beyond elbow length from the front of the body) shall be 25 lbs.

6. Valves mounted in overhead piping, or other difficult-to-access locations, weighing in excess of 25 lbs., shall be provided with a means of assisted lifting so that the weight of the valve is supported by lifting aids, and not a person, during valve removal or replacement.

Manual Pallet Handling

1. When possible, use forklift to move (stacking or un-stacking) pallets to desired location.

2. Alternatives to using forklifts are stackers, pallet dispensers, etc., and as an absolute last resort, two-or-more person handling.

3. Before handling wooden pallets, ensure it is not damaged through inspection thus reducing potential movement (fall or shifting) of loads on pallet.

4. Wear proper gloves to reduce risk of receiving splinters, slivers, or any other type of hand injury from wood pallet.

5. When manually handling, slide the pallets on and off horizontal stacks. This is done by sliding the pallet on the floor by controlling the fall along the stack.

6. Stack pallets by titling upon horizontal stacks.

7. By using steps 5 and 6, the employee does not feel full weight of pallet when moving manually. Suitable alternatives upon proper training of its use are the following: plastic pallets (may be lighter in weight), slip sheets, triwall corrugated containers, shrink-wrap packaging, breakdown plastic boxes, bulk box or bin, hoppers, and metal skids.

Drum Handling

1. Where applicable drum trucks or forklifts with drum clamps can be used, especially when traveling longer distances.
2. Drums can also be moved with drum or hand carts, dollies**,** powered tools or equipment, or other assists.
3. Where manual handling is required, take precautions when moving the drums, especially when rotating them on the edge of their base or ring. Consider type of drum and its contents before rotation on its base.
4. Use appropriate equipment and take advantage of leverage, not strength.
5. Use proper techniques and body mechanics – do not bend at the waist, instead bend knees, keep back straight, and use legs to move drums.
6. Slow work process down; make sure you have control of the situation.
7. Always be aware of where your feet are placed; keep them well outside the area where the drum may land in case an unsafe condition is presented.
8. If you lose control of the drum, step away, let the drum go where it may, and do not attempt to regain control by using your strength.

Sheet Handling

1. Large sheets of metal, wood, plastic, glass, or cardboard are often handled without handhold cutouts and result in poor gripping techniques, i.e. pinch grips.

2. In non-windy conditions, sheets weighing 29 lbs or less and has dimensions less than 3 feet can be transported across short distances even though hand grips may be spaced apart and pinch grips used.

3. In windy conditions, never lift and move sheet by oneself. If the task must be performed during windy conditions, use team lift of two or more persons or mechanical/handling device.

4. A suggestion when transporting materials across these short distances are to use an assist such as a J-handle or D-handle. Although useful in many cases, assists may not be practical for handling very long sheet.

5. While verifying acceptable weight limits before actual lift, very long sheet should be lifted by a two-man team or by a suitable assist.

6. For sheets traveling longer distances and weighing more than 29 lbs, they should be moved by cart, truck, or other transportation method.

6. Sheets weighing between 29 and 50 lbs. can be transported over short distances using a two-man lift. Sheets weighing more than 50 lbs. should be moved by a handling/assisting device.

Reference List

This is a list of the references in this standard.

Table 1: Reference List

Title	Link
NIOSH	http://www.cdc.gov/niosh/docs/94-110/pdfs/94-110.pdf
OSHA	*http://www.osha.gov/*
Cal OSHA	*http://www.dir.ca.gov/dosh/etools/08-004/index.htm*
Chevron Safety In Design (check with Tim)	*http://www.ric841.chevron.net/hq/ErgoRSIP/SID-SU-5006-A%20(2).pdf*

Groundwater/Vapor Well Sampling WRP Example Does not include:

- Site Specific JSAs – go to JSA Library
- Site Specific Traffic Control Plan
- SOPs (if applicable)

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Portable Gas Detection

OE Required Standard

Chevron Environmental Management Company

Version	Date	Originator
Rev. 1	Feb- 15-2013	

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Introduction

Portable Gas Detection procedures are designed to help prevent personnel from potential exposure or injury, property damage, or adverse environmental impact from hazardous atmospheres that may exist in the workplace.

This standard defines corporate requirements for atmospheric testing using Portable Gas Detection instruments and equipment.

Requirements

A written program for Portable Gas Detection procedures, including personal gas monitors, shall be in place and include the following elements at a minimum:

A. The conditions under which Portable Gas Detection and personal gas monitors are to be used shall be described.

B. Gas testing shall be required when there is a potential for any hazardous working atmosphere including oxygen deficient or enriched environments, flammable, explosive conditions and toxics above permissible exposure limits.

C. Gas testing shall be performed and/or personal gas monitors shall be worn where there is a risk of a potentially hazardous atmosphere including, but not limited to the following activities:

1. Hot work.
2. Confined Space Entry.
3. Isolation of Hazardous Energy.
4. Excavation and trenching.
5. Emergency response (e.g., leaks, spills).
6. Process and production operations, handling or storage of hazardous materials or cargo (e.g., manufacturing facilities, drilling and productions facilities, storage tanks, ships/shipyards, tank cars, hazardous waste sites).
7. Other activities or conditions as defined by the reporting unit/strategic business unit /facility.

D. Gases shall be tested in the following order:

1. Oxygen content.
2. Flammable or explosive gases and vapors.
3. Toxic gases and vapors (e.g., hydrogen sulfide (H_2S), benzene).

E. Acceptable criteria for gas testing results (e.g., %LEL, %oxygen, and permissible exposure limits of other gases) shall be described and conform to applicable legal requirements, as well as Chevron standards and/or accepted best practices.

F. Work shall not commence until gas testing results are within acceptable criteria defined in requirement E.

G. Procedures required if gas testing results indicate a hazardous condition (e.g., exceed the acceptable criteria for %oxygen, %LEL, permissible limits) shall be described including but not limited to:

1. Stopping work (SWA).
2. Review work conditions.
3. Evacuation of personnel.
4. Mitigation.

5. Re-testing of gases.
6. Re-validating permits.

H. Portable Gas Testing instruments and equipment (including sensors and detectors) shall meet applicable legal requirements, as well as Chevron standards and/or accepted best practices including but not limited to the following:

1. Approved for use in potentially hazardous atmospheres (e.g., intrinsically safe) by a recognized testing organization (**exception**: no intrinsically safe instrument and equipment exists).
2. Appropriateness for the monitored environment (e.g., sensitivity, specificity, temperature, moisture, inert environments and susceptibility of sensor to poisoning or inhibition by other gases present).
3. Capability of measuring oxygen content, combustible/flammable limits and toxic gases and vapors accurately to the lowest concentration at which the material becomes hazardous.
4. Having both audible and visual functioning alarms.
5. Having established alarm set points.
6. Having personnel placement criteria for personal gas monitors.

I. Gas testing shall be permitted and managed in accordance with the OE Corporate Required Permit to Work Standard and/or other applicable Managing Safe Work standard requirements (e.g., Hot Work, Confined Space Entry, and Excavation).

J. The following requirements for gas detection instruments and equipment shall be described in accordance with manufacturer instructions including but not limited to:

1. Maintenance and inspection (e.g., leak tests, connections, batteries).
2. Storage conditions (e.g., temperate environments, dust-free, away from chemical vapors).
3. Field verification of instrument accuracy (e.g., function/bump test, full calibration):
    i. At a minimum daily, or first use.
    ii. At a minimum monthly (not to exceed 30 days).
    iii. Additional intervals based on environmental conditions (e.g., exposure to environmental conditions such as sensor poisons).
4. Manufacturer calibration:
    i. When an instrument does not pass a field full calibration.
    ii. More frequently, as recommended by the manufacturer (e.g., exposure to environmental conditions such as sensor poisons).
5. Compatible or manufacturer approved accessories and supplies (e.g., tubes, filters and probes).

K. Gas detection equipment shall be calibrated with certified calibration gases of known concentrations.

L. Gas testing equipment, supplies and media (e.g., colorimetric tubes, calibration gases) shall not be altered, used if damaged, or used after expiration of the designated service life.

M. Portable Gas testing shall be evaluated and performed by a qualified gas tester.

N. Additional requirements for initial gas testing in confined spaces and/or environments in which potentially hazardous atmospheres may be present that cannot be sampled remotely shall be described including but not limited to the following:

1. Appropriate personal protective equipment [e.g., supplied air respiratory protection or self-contained breathing apparatus (SCBA)].
2. Additional procedures (e.g., confined space rescue).

O. The conditions and frequency with which follow-up testing is required shall be described including but not limited to:
    1. Period of time between follow-up testing.
    2. Work-breaks.
    3. Shift changes.
    4. Changes in operating conditions change (e.g., disruption, emergencies, ambient temperature changes, other work activities).
    5. At any other time that the facility specifies follow-up testing.

P. Conditions for which continuous gas testing is required shall be described, including but not limited to:
    1. Hot work performed inside a confined space.
    2. At any time required by the work permit and/or Hazard Analysis.
    3. Whenever hazardous atmospheric conditions may occur.

Q. Gas testing results shall be documented and associated to all appropriate permits (e.g., Hot Work, Confined Space Entry, and Excavation).

R. Personnel involved in activities requiring gas testing (e.g., Authorized Entrants, their authorized representatives or other affected personnel) shall be able to observe initial and all subsequent gas testing.

S. Atmospheres that are potentially stratified shall be tested according to applicable legal requirements, as well as Chevron standards and/or accepted best practices.

T. When an area is suspected to be contaminated, readings shall be taken on the approach to the area requiring testing considering instrument response time (e.g., hazardous material spill or release).

U. Personnel assigned responsibilities in gas detection roles shall be trained and competent.

V. Personnel using personal gas monitors shall be trained and competent.

W. Training requirements and competency assessments for personnel authorized in gas detection and personal gas monitors shall be documented.

X. The Gas Detection Standard shall define the policy for record retention (e.g., calibration results) that meets applicable legal, corporate, and operating company requirements (or at least six months, whichever is more).

Key Terms and Definitions

Alarm Set Point – Fixed or adjustable setting of the apparatus that is intended to preset the level of concentration at which the apparatus will automatically initiate an indication, alarm, or other output function.

Calibration – An instrument's measuring accuracy relative to a known concentration of gas.

Explosive Atmosphere – A mixture of flammable gases, vapors, liquids, or dusts with air. There is a potential for explosive atmospheres to develop from improper cleaning or preparation of tanks, vessels, pipes, or equipment that previously contained such materials or from the accumulation of combustible dusts.

Hazardous Atmosphere – An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from the following:

- Flammable gas, vapor or mist in excess of 10% of the lower flammable limit.
- Airborne combustible dust at concentrations that meets or exceeds its lower flammable limit.
- Atmospheric oxygen concentrations less than 19.5% or greater than 23.5%.
- Atmospheric concentrations of any substance in excess of the permissible limit.
- Atmospheric conditions immediately dangerous to life or health.

Lower Explosive Limit (LEL) – Lowest concentration (percentage) of a gas or vapor in air capable of producing a flash of fire in the presence of an ignition source (arc, flame, heat). Also called lower flammable limit (LFL).

Oxygen Deficient – An atmosphere containing less than 19.5% oxygen by volume.

Oxygen Enriched – An atmosphere containing more than 23.5 % oxygen by volume.

Portable Gas Detector – A spot-reading or continuous-duty gas-detection apparatus that has been designed to be readily carried from place to place and to be used while it is being carried. A portable device that is battery operated and includes but is not limited to:

- A hand-held apparatus, suitable for single-handed operations.
- Personal monitors, similar in size and mass to the hand-help apparatus, which are continuously operating while they are attached to the user.
- A larger apparatus that can be operated by the user while it is suspended by hand or by a shoulder strap or by a carrying harness; it may or may not have a hand-directed probe.

Poisons (of sensors) – Substances that lead to temporary or permanent loss of sensitivity of the sensors.

Roles and Responsibilities

Authorized Entrant – An employee who is authorized by the employer to enter a confined space.

Qualified Gas Tester – A competent person who has received training and has been tested in the use of portable gas-testing equipment and has successfully demonstrated use of the equipment in the field. This person must also be trained to recognize potential hazards for work requiring gas testing.

Manual Handling

Required Standard

Chevron Environmental Management Company

Version	Date	Originator
Final Rev. 0	June 3, 2013	Triana Fleming, Scott Wible

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Introduction

The purpose of the Manual Handling Standard is to improve the identification, assessment, and mitigation or elimination of the risks associated with manual handling of materials. This document outlines CEMCs requirements for pre-job planning/analysis of manual handling, including using the hierarchy of controls in the development of the hazard mitigation. This standard also contains limits for manual lifting, carrying, and pushing/pulling of materials. Additionally, this standard describes principles of safe lifting techniques along with guidance on the manual handling of specific material types.

Note: Manual handling and lifting should only be used when all other possible alternatives have been evaluated and deemed not fit for purpose.

In Scope

This standard applies to CEMC employees and Business Partners working on all CEMC project sites. It is the responsibility of Business Partners to have a procedure that meets or exceeds this standard while performing work at any CEMC location and/or any work within CEMC operational control.

The scope of the *Manual Handling Standard* applies to CEMC's sites or projects and satisfies OEMS Element 3.2 - Safe Operations; a comprehensive safety program is in place for each location. Core elements of the program shall include:

- *Written safe work practices. Safe work practices may include: permit to work, hot work, confined space entry, equipment isolation (lockout/tag-out), opening equipment, excavation, working at heights, electrical work, simultaneous operations (SIMOPS), bypassing critical protections, lifting and rigging, and other applicable practices identified through risk assessment of local operations.*

Out of Scope

This standard does not apply to material handling that utilizes Hoists, Cranes, and Forklifts - for information on these activities refer to the CEMC OE Required Lifting and Rigging Standard.

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Section I: Project Planning & Pre-Job Analyses

Manual handling concerns shall be addressed during work planning and pre-job planning meetings including selection of equipment and materials, and planning work layouts and processes.

Note: Manual handling and lifting should only be used when all other possible alternatives have been evaluated and deemed not fit for purpose.

Manual Handling Hazard Analyses

A Job Hazard Analysis (JHA) and/or Job Safety Analysis (JSA) shall be developed or reviewed and, if appropriate, revised onsite for defined activities by the crew prior to beginning work and include, but not limited to:

1. Describe the manual handling task or job to be performed.
2. List the critical steps required to accomplish the task(s).
3. Define the potential hazards associated with each step. Risk factors to address before permitting manual material handling as part of the job scope include:
   - Nature of loads (weight, weight distribution, shape, size, sharp edges or points, ease of grip)
   - Actions, posture and movements of the worker(s) (coordinate handling by more than one person), lifting heights, reach, twisting and bending, steps, and carrying distance.
   - Layout of work area and worksite conditions (proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).
   - Duration and frequency of task.
   - Necessary skills and physical capabilities of the worker.
   - Plan for load release (intended and unexpected).
   - Long term risks.
4. Record the controls or mitigations for each listed hazard:
   - Control measures that eliminate manual handling or significantly reduce the risk of injury shall be considered, including the use of specific tools, devices or mechanical equipment.
   - Preference shall be given to re-designing the work to eliminate manual handling steps.
5. Review and communicate the contents of the analyses to the work team and other affected parties immediately prior to beginning work.
6. Discuss the use of Stop-Work Authority by anyone present at the job site.
7. Utilize the Hazard Identification Tool and the Serious Injury and Fatality Prevention Handbook in conjunction with the JHA/JSA.
   - At a minimum each hazard should consider the interactions with people, equipment, environment, and property and the probability and severity of its occurrence.
   - This review should conclude with safeguards and controls in place, whether through elimination, substitution, engineering, administrative, work practices, or PPE, to prevent the discussed potential incidents.
8. Discuss any prior incidents with similar tasks that have occurred and review the lessons learned of those incident.
9. Appropriate PPE must be considered for each task and in alignment with the CEMC Personal Protective Equipment (PPE) Standard.

NOTE: Braces, slings, etc. for back, arms, hands, etc. are not considered to be personal protective equipment PPE because they do not protect employees from injury while performing lifting, lowering, or handling tasks. These devices are for medical use and should only be worn under the direction of a health care provider.

Hierarchy of Controls

The hierarchy of controls is used as a means of selecting preventative or protective measures. When determining the best controls, systematically start with the controls that will be most effective at eliminating the hazard or significantly reducing the potential for an injury or incident. A representation of this hierarchy and the preferred selection order is summarized as follows:

1. **Elimination:** The **first step is to eliminate the hazard or manual lift.** Is the work or job step necessary?
2. **Substitution:** The **second step is to substitute** manually handling tasks by using equipment i.e., crane, forklift, etc.
3. **Engineering Controls:** The **third step is to engineer out the hazard** by physically containing or isolating the hazard from the worker, i.e., specialty tools, wrapping or smoothing out sharp edges on an object, reducing traveling distance, sealing pinch point openings, placing object inside secure container, etc.
4. **Administrative Controls:** The **fourth step is to use administrative controls** to reduce worker exposure**.** Is there a safer way to do the job? Can equipment be shut down during times of potential exposure? Can the time or frequency of worker exposure be reduced? Increase worker awareness of potential hazards and understanding of how to do the job safely. Improve or add work procedures, signs, instructions and training**.**
5. **Personal Protective Equipment (PPE):** The **fifth and final step is the use of PPE as a last resort** for reducing potential exposure. PPE is most effective when used as an additional safeguard, supplementing one or more other controls.

Use the hierarchy of controls to select and test each safeguard or control for its potential effectiveness. Some controls are most effective when used in combination with other controls, and in these cases, the combination should be considered together.

Section II: Manual Handling Requirements

Where manual handling and lifting has been determined as the most appropriate method, *Manual Lifting, Manual Carrying, and Manual Pushing/Pulling Limits* shall be followed. Lifting of heavy or awkward objects must only be performed by competent personnel using proper equipment, tools, and methods. Utilize the Hand Safety Guideline to ensure that hand hazards are addressed and eliminated and appropriate PPE is worn.

Stop Work Authority (SWA) must be used in circumstances where unsafe conditions or acts could result in undesirable events.

Manual Lifting Limits

The amount of weight an individual can safely lift will depend on the individuals' physical condition, fatigue, perceived stress, layout of the work area, and worksite conditions. Individuals in good physical condition must not exceed the following limits:

1. For **non-ideal lifting** circumstances (bent over or when reaching out beyond elbow length from the front of the body), the maximum weight to be lifted and carried shall not exceed **25 lbs.** For weights over 25 lbs, seek use of mechanical devices.

2. For **ideal lifting** circumstances, the maximum weight to be lifted or carried by one person in good physical condition using two hands and standing erect with item held close to the body shall not exceed **50lbs.**

When performing a **team manual lift** with individuals in good physical condition the maximum weight to be lifted and carried shall not exceed **100 lbs**. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analyses, including updating any JSAs, before proceeding with a team lift of 2 or more persons.***

Table 1

Type of Lift	Number of Persons	Max. Weight
Non-ideal	1	**25 lbs(11kg)**
Ideal	1	**50 lbs (22kg)**
Ideal Team	2 or more	**100 lbs (45kg)**

**Information in Table 1 is derived from NIOSH. Numbers do vary according to Functional Leadership Team recommendations.*

Manual Carrying Limits

Individuals in good physical condition must not exceed the following limits:

1. Carts and other assisting devices shall be used when moving items, especially for those items that are not ideal, bulky, have poor handles, shift from side to side, uneven loads, and place high stress and force on the hands.

2. Where manual carrying cannot be eliminated by using a handling/assisting device alone, refer to **Table 2** for carrying limits:

Table 2

Position	# of Persons	Hand Contact	Max. Weight	Max. Travel Distance
Front of Body	1	2	**50 lbs (22kg)**	**10 yds/m**
Front of Body	1	2	**40 lbs (18 kg)**	**20 yds/m**
Front or Side of Body	1	2 or top handle	**30 lbs (13kg)**	**30 yds/m**

**Information in Table 2 is derived from Chevron's Safety in Design Standard. Numbers do vary according to Functional Leadership Team recommendations.*

3. When carrying items with hand contact (good to poor gripping around edges of the load) or use of handles the following shall apply:

    - Items that are designed with handles shall have a minimum of two handles to perform carrying task.
    - As an exception to the above statement, items that are regularly made with single handles shall be located relative to the center of gravity of the unit to be lifted to preclude swinging or tilting when lifted.
    - All handles provided shall be located to provide at least 2 ½ inches of clearance between the handle and adjacent obstructions during handling.
    - Hand contact with good gripping is when an item is provided with handles or handhold cut-outs of optimal design. Where load designs can be modified within design limits, handles or cut-outs must be added. For those items that are irregular or loose pieces, good gripping is referred to as two hands securely and comfortably wrapped around the load.
    - Hand contact with fair gripping is any item provided with less than optimal handles or handhold cut-outs. For those items that are irregular or loose pieces, fair gripping is when two hands can be bent at 90° around the load.
    - Hand contact with poor gripping is any item that is less than optimal in design, irregular and/or bulky, or has loose pieces that is difficult to handle, is rigid, or have sharp edges. If applicable, these hazards should be eliminated or engineered out before handling.

4. Avoid slopes, stairs, and slippery surfaces when possible while carrying loads.

5. Prior to carrying, layout of work area and worksite conditions shall be taken into consideration (e.g. proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).

Manual Pushing/Pulling Limits

Individuals in good physical condition must not exceed the following limits:

1. Ensure all pushing/pulling tasks are two-handed and that these tasks are extended to entire body not just the arms.
2. While performing pulling task, do not extend arms behind the body.
3. When using cart, ensure the right type of cart (size, weight, loading capacity, wheel type, number, etc.) is used for pushing/pulling task.
4. Prior to pushing/pulling tasks, layout of work area and worksite conditions shall be taken into consideration (e.g. proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).

NOTE: For CEMC employees, the weight limit for an individual must not exceed the levels defined in GO-308 job descriptions for their job classification. Contact the Fitness for Duty Process Advisor or OE/HES Team Lead for this information.

Section III: Appendices

Appendix 1 - Principles of Safe Lifting

1. Eliminate manual lifting injuries by planning ahead to eliminate the need to perform the lift or by utilizing mechanical lifting devices.

2. If manual handling and lifting has been determined to be the most appropriate method, use correct lifting techniques and keep the weight of the load close to the body and the number of repetitions at safe levels. The distance of the load to the body and the frequency of the lift are the single greatest risk factors.

3. Personnel shall use care and proper lifting techniques when handling objects, i.e. lift with knees and not the back by bending knees and pushing up with the legs. Use team lift of two or more employees for those items weighing up to 100 lbs. or more awkward and bulky in design, or when employee cannot handle the load alone. Items weighing over 100 lbs shall be moved by mechanical or handling/assisting device. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analyses, including updating any JSAs, before proceeding with a team lift of 2 or more persons.***

4. Minimize loads being lifted or lowered from floor level.

5. The vertical range within which lifts can be most efficiently and safely performed is roughly between the knees and the shoulders. Mechanical assists may be used to place object in this range for improved lifting.

6. If the task requires lifts below the knees or above the shoulders, consideration must be given to the redesign of the workstation, the task, or both.

7. Use adequate step stools or ladders when reaching for any item above shoulder height or lifting items up to shelves or levels above 50 inches. These items must be kept in good repair and stored in proper place and away from weather when not in use.

8. Jobs requiring asymmetrical and one hand lifts must be redesigned, where possible, so that loads are equally distributed and lifting tasks are performed with two hands.

9. The recommended method to manually lift an object is to lift the load smoothly:

    - Stretch for a few seconds before performing the lift.
    - Ensure pathway is clear.
    - Test the weight of the object by safely using the tilt test (slightly tilting object to feel if object weight may be too heavy for a stand-alone lift).
        - If load weight is too heavy for stand-alone lift, proceed with team lift or use of cart or mechanical lifting assist.
    - Position body close to the load.
    - Get a firm footing with your feet apart.
    - Ensure back and waist is straight. Avoid the twisting, stooping, extended reaching (out and over) body positions.
    - Ensure the knees are slightly bent with the load as close to the body as possible.
    - Lift with your legs and not your back. Do not attempt to bend at the waist.

- Do not “jerk-lift” which can cause strain to the lower back.
- Ensure steady breathing and avoid holding your breath while lifting the load.
- Keep head straight up and do not bend (this avoids placing strain on neck and helps back stay aligned with the body).
- Keep your shoulders aligned with your feet.
- Do not twist the torso from side to side when lifting or carrying objects.
- Ensure view is not obstructed by object.
- Use same techniques for lowering object.
- Safely stretch again after the lifting or carrying task.

10. For loads that are bulky, heavy, and/or unstable, tag the load so that the employees will be aware of limitations.
11. Construct or select containers of lighter materials or split the load between two or more containers to reduce the overall weight. Or, increase load size and weight to allow movement of the load to be strictly performed by mechanical lifting assist.
12. Alter the task by using handles or hooks to secure a firm grip. If coupling objects are bulky, have pointy or sharp edges, loose-fitting parts, or are just hard to handle, hold, or grip, provide handles, hooks, or handheld cutouts to improve and secure firmness of grip.
13. Use large rather than small wheels on carts.
14. Look for uneven elevations and floor levels and other tripping hazards and eliminate where possible.
15. Balance loads within containers for stability.
16. Treat or alter the work surface so that the load moves more easily.
17. Change the nature of the job where possible.
18. Remember that:
    - Pulling or pushing is better than carrying
    - Pushing is better than pulling
19. Store loads so that they will be easy to retrieve but always above floor level.
20. Make sure the load is low enough to see over and that walking surfaces are properly maintained.
21. Ensure proper PPE is worn, i.e. high visibility impact resistant work gloves, steel or composite-toe shoes (non-slip), etc.

Appendix 2 – Material Types

Pipe, Fittings, Scrap (Metal/Wood/Conduits), Wood, Steel Bar/Rod

For loads and objects that are long and carried upon the shoulder:

1. The item should be carried on the shoulders with the front end held high above the body and working heights of other workers from ground level. This is done to avoid incidents of striking other occupied workers.

   - Shoulder pads should be worn for protection.
   - Strap the material together in bundles to avoid loss of control.
   - Extra caution should be taken when going around corners.

2. Consider and look for the following during the hazard assessment:

   - Plan the lift and movement of materials, including locating the storage location – minimize distance to storage location by selecting the shortest route free of hazards; eliminate transfers from one location to others, place bins as close as possible to the location of the material.
   - Look for and identify sharp edge, protrusions, potential pinch points, etc.
   - Understand size and weight and what the limits to manual handling are (always seek another way to move or handle the object – manually handling is the last resort).
   - Always consider weight limitations, length of material, and balance of material/center of gravity before lifting and moving the material.
   - Consider whether material has an unusual shape, is heavier on one end or the other or has protuberances that will cause the material to shift while in the hands or while being placed in a bin or other container.
   - Nature of what you are lifting and movement placing in storage bin – as a general rule don't "throw" instead cautiously place material into bins or buckets.
   - If placing material into a scrap bin, disposal bin, etc., pre-plan the task by evaluating the bin to be used.
     - Can you see into the bin?
     - How full is the bin?
     - If the bin is almost full, what is the chance for the material to bounce back or shift as you put your material in the bin?
     - Is there a chance for stored energy in the material already in the bin to cause bounce back of the material?

- Nature of what we are lifting and movement placing in storage bin?
- Could there be something unexpected in the bin, i.e. animal?

- Buddy system should be used to lift when appropriate – when in doubt use Stop Work Authority and seek assistance.
- Look for the potential of *Stored Energy.*
- Consider the use of strapping tools to minimize hazards and provide a safer way to handle material.
- Seek equipment or handling/assisting device on site that can be used to lift verses manually handling the object or load.

Lifting Bags

1. Bags should be moved by mechanical device instead of lifted, where necessary.
2. Bags weighing more than 50 lbs. shall not be manually ifted by a single individual. Avoid twisting back and use proper lifting techniques. Distribute weight to whole body.
3. Other methods for lifting are to use a team-lift or handling/lifting assist.
4. Prior to lifting, layout of work area and worksite conditions shall be taken into consideration (e.g. proximity to other work or equipment, space for movement, walking and standing surfaces, lighting and climate).

Valve Handling

1. The use of certified lifting devices should be used when possible.
2. Valves that weigh less than 50 lbs. may be lifted by one person with proper consideration and planning for ergonomically correct lifting (i.e., not bent over or reaching out beyond elbow length from the front of the body).
3. Valves weighing 50-100 lbs. may be lifted by two persons provided the valves are located so that each person can lift without having to reach over or around items between the person and the valve.
4. Assisted lifting devices shall be used for valves weighing greater than 50 lbs for 1 person and greater than 100 lbs for 2 or more persons. ***In cases where manual handling is required for items over 100 lbs, employees must reassess all 9 steps of the Manual Handling Hazard Analysis, including updating any JSAs, before proceeding to team lift of 2 or more persons.***
5. The maximum weight to be lifted and carried for non-ideal lifting circumstances (bent over or when reaching out beyond elbow length from the front of the body) shall be 25 lbs.

6. Valves mounted in overhead piping, or other difficult-to-access locations, weighing in excess of 25 lbs., shall be provided with a means of assisted lifting so that the weight of the valve is supported by lifting aids, and not a person, during valve removal or replacement.

Manual Pallet Handling

1. When possible, use forklift to move (stacking or un-stacking) pallets to desired location.

2. Alternatives to using forklifts are stackers, pallet dispensers, etc., and as an absolute last resort, two-or-more person handling.

3. Before handling wooden pallets, ensure it is not damaged through inspection thus reducing potential movement (fall or shifting) of loads on pallet.

4. Wear proper gloves to reduce risk of receiving splinters, slivers, or any other type of hand injury from wood pallet.

5. When manually handling, slide the pallets on and off horizontal stacks. This is done by sliding the pallet on the floor by controlling the fall along the stack.

6. Stack pallets by titling upon horizontal stacks.

7. By using steps 5 and 6, the employee does not feel full weight of pallet when moving manually. Suitable alternatives upon proper training of its use are the following: plastic pallets (may be lighter in weight), slip sheets, triwall corrugated containers, shrink-wrap packaging, breakdown plastic boxes, bulk box or bin, hoppers, and metal skids.

Drum Handling

1. Where applicable drum trucks or forklifts with drum clamps can be used, especially when traveling longer distances.
2. Drums can also be moved with drum or hand carts, dollies**,** powered tools or equipment, or other assists.
3. Where manual handling is required, take precautions when moving the drums, especially when rotating them on the edge of their base or ring. Consider type of drum and its contents before rotation on its base.
4. Use appropriate equipment and take advantage of leverage, not strength.
5. Use proper techniques and body mechanics – do not bend at the waist, instead bend knees, keep back straight, and use legs to move drums.
6. Slow work process down; make sure you have control of the situation.
7. Always be aware of where your feet are placed; keep them well outside the area where the drum may land in case an unsafe condition is presented.
8. If you lose control of the drum, step away, let the drum go where it may, and do not attempt to regain control by using your strength.

Sheet Handling

1. Large sheets of metal, wood, plastic, glass, or cardboard are often handled without handhold cutouts and result in poor gripping techniques, i.e. pinch grips.

2. In non-windy conditions, sheets weighing 29 lbs or less and has dimensions less than 3 feet can be transported across short distances even though hand grips may be spaced apart and pinch grips used.

3. In windy conditions, never lift and move sheet by oneself. If the task must be performed during windy conditions, use team lift of two or more persons or mechanical/handling device.

4. A suggestion when transporting materials across these short distances are to use an assist such as a J-handle or D-handle. Although useful in many cases, assists may not be practical for handling very long sheet.

5. While verifying acceptable weight limits before actual lift, very long sheet should be lifted by a two-man team or by a suitable assist.

6. For sheets traveling longer distances and weighing more than 29 lbs, they should be moved by cart, truck, or other transportation method.

6. Sheets weighing between 29 and 50 lbs. can be transported over short distances using a two-man lift. Sheets weighing more than 50 lbs. should be moved by a handling/assisting device.

Reference List

This is a list of the references in this standard.

Table 1: Reference List

Title	Link
NIOSH	http://www.cdc.gov/niosh/docs/94-110/pdfs/94-110.pdf
OSHA	*http://www.osha.gov/*
Cal OSHA	*http://www.dir.ca.gov/dosh/etools/08-004/index.htm*
Chevron Safety In Design (check with Tim)	*http://www.ric841.chevron.net/hq/ErgoRSIP/SID-SU-5006-A%20(2).pdf*

GOAL
Get Out And Look

3 FEET of CUSHION for SAFETY

ARCADIS Design & Consultancy for natural and built assets

Smith System® Five Keys (Forward Driving)

1. ***Aim High in Steering*** ® - *Avoid Collisions by seeing, evaluating, and acting upon all information available.*
2. ***Get the Big Picture*** ® - *Fewer mistakes are made when you have the complete traffic picture.*
3. ***Keep Your Eyes Moving*** ® - *Proper scanning techniques separate safe drivers from people who make costly errors.*
4. ***Leave Yourself an Out*** ® - *All that separates drivers from a collision is space. Use it to your advantage. This also applies to parking—to ensure safe and easy exit in case of emergency, choose pull through spaces or back into parking spaces when possible.*
5. ***Make Sure They See You*** ® - *Seek eye contact and use your warning devices at the same time*

Smith System® Five Keys (Backing-Up Driving)

AVOID BACKING WHENEVER POSSIBLE - But When It's Unavoidable:

1. *Check The Backing Area First*
2. *Back Slowly And Carefully – Use A Spotter If Necessary*
3. *Remain Aware Of The Blind Areas*
4. *Look Front, Sides, And Rear As You Back*
5. *Back No Further Than You Must*

PRE-TRIP VEHICLE INSPECTION CHECKLIST

Date: **Beginning Mileage:** **Ending Mileage:**

Unit:
Operator:

NR = Needs Repair

CHECK BEFORE OPERATING	OK	NR	COMMENTS
Driver's License on Hand			
ARCADIS Insurance Card in Vehicle			
Back-up Alarm Operational (if installed)			
Tires (tread, pressure, cracking)			
Taillights Operational			
Turn Signals Operational			
Brake Lights Operational			
Back-Up Lights Operational			
Headlights Operational			
Parking Lights Operational			
Mirrors Adjusted to Minimize Blind Spots			
Under the Vehicle (nothing hanging or leaking)			
Windshield Wipers and Fluid all Functional			
Cargo Secured or in Trunk			
Doors are Fully Closed and Locked			
Seat Adjusted, Head Restraint to Match Height of Head			
Driver and All Passengers Must Fasten Safety Belt			
Scan the Gauges to Make Sure Everything is Normal			
Adjust the Vents, Windows, and Heater or Air Conditioner for Comfort			
Review Driving JSA			
Driver is Mentally and Physically Prepared to Drive			
DOT Materials of Trade are Properly Stowed (ie. Compressed gas)			
Perform a Driving-Related Safety Moment (record in comments)			



2/32" remaining **4/32" remaining** **6/32" remaining**

Tread guide: If a tread gauge is not available coins may be used to determine remaining tread. 2/32" is the minimum by law in most states (top of Lincoln's head on penny), 4/32" is minimum recommended for wet surfaces (top of Washington's head on quarter), 6/32" is minimum recommended for snowy surfaces (top of Lincoln Memorial on penny). Our vehicle tires must be replaced if the tread depth is less than 6/32"

ARCADIS Insurance Card:

ARCADIS Design & Consultancy for natural and built assets

If renting from Enterprise or National be sure the Enterprise/National ID (XZ12140) is on the rental agreement.

Coverage:
Auto Physical Damage – ACV or 250K,
whichever is less

Comprehensive	$2,000 Deductible
Collision:	$2,000 Deductible
Liability:	$10,000 Deductible

XL Speciality Insurance Company

Policy No:	AEC0010758-18 (AOS)
Policy Period:	10/01/2019 to 10/01/2020

In the event of a claim, contact:

XL Speciality Insurance Company
(800) 823-7351

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Driving – Passenger Vehicle	**Date of JSA Development: 6/19/2019**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Stephanie Hesselbarth	Staff Geologist	2/12/2018

Permits/Plans Required (general, Specialized, etc.):	General PTW
Specialized tools/equipment:	Field Vehicle

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☑ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☑ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☑ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☑ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☑ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Driving – Passenger Vehicle	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Inspect vehicle	MOTION - Being struck by primary or passing vehicle resulting in broken bones, lacerations, abrasions, sprains, or death	1. Set parking brake before inspecting vehicle 2. Watch for approaching vehicle traffic. If conditions are unsafe, move vehicle to safe location before proceeding with inspection. Use cones or barricades to communicate activity with pedestrians and drivers 3. Wear level II traffic vest to make personnel more visible to on and off site traffic	
	MECHANICAL - Lacerations or abrasions to hands and arms due to contact with moving engine parts	1. Do not reach in to engine compartment while engine is operating or key is in ignition 2. Wear leather/Kevlar level 2 cut resistant gloves with nitrile liners when inspecting hoses and fluid levels to prevent	
	CHEMICAL - Dermal exposure to residual oils/lubricants in engine compartment	1. Clean off any residual oils/lubricants in engine compartment	
	TEMPERATURE - Burns to hands from contact with hot engine parts	1. Allow engine to cool a minimum of 30 minutes prior to inspection	
	CHEMICAL - Dermal abrasions associated with dust, debris, engine fluids contact	1. Inspect the vehicle upwind or behind a wind barricade (ex. building, wall, etc.) 2. Wear safety glasses to protect eyes from dust, debris and pressurized fluid lines during inspection	
2. Drive to Destination	MECHANICAL - Mechanical failure of vehicle leading to collision resulting in broken bones, lacerations, abrasions, sprains, or death	1. Document vehicle inspection. When possible, check previous inspection records 2. Fasten seatbelt prior to ignition. ALWAYS wear seatbelt when operating vehicle 3. Check up-to-the-minute road conditions and traffic alerts prior to departing at http://www.fhwa.dot.gov/Trafficinfo/ 4. Familiarize yourself with vehicle controls (windshield wiper, locks, horn, hazard lights, etc.) prior to departing 5. Remain at least 4 seconds behind lead vehicles	

		6. Allow vehicles a 2 second head start at traffic lights and stop signs 7. Stop before pedestrian walkways	
	MOTION - Distractions, fatigue or falling asleep while driving associated with vehicle crash resulting in broken bones, lacerations, abrasions, sprains, or death	1. Obey all postings and traffic laws 2. DO NOT USE CELL PHONE WHILE DRIVING 3. Do not drive while tired or not alert 4. Do not drive while under the influence of alcohol or drugs that affects mental alertness. Do not allow illegal drugs or alcohol in company vehicle	
	MOTION - Slippery / wet / icy roads leading to vehicle collision resulting in broken bones, lacerations, abrasions, sprains, or death	1. Inspect current and forecasted weather and road conditions that will be encountered during driving. 2. Use STOP WORK if road or weather conditions become dangerous 	
3. Park vehicle at destination	MOTION - Vehicle collision with stationary object, pedestrian or other vehicle resulting in broken bones, lacerations, abrasions, sprains, or death	1. Park away from other vehicles when possible. 2. Pulling forward to adjacent parking space is preferred to backing; however, this maneuver should be avoided when visibility is restricted by parking spaces next to vehicle being occupied. 3. Back in to parking space if adjacent spaces are unoccupied and it is safe to do so. 4. Maintain a cushion of 3-feet between vehicle and stationary objects 5. Drive at low speed (5 mph) to slowly observe surrounding site objects and pedestrians 6. Use headlights to increase visibility of truck in parking lots	
	MECHANICAL - Vehicle coming out of gear and rolling hitting workers, pedestrians, or other vehicles resulting in broken bones, lacerations, abrasions, sprains, or death	1. Set parking brake when parked	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Groundwater Gauging and Sampling	**Date of JSA Development: 2/12/2018**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064362**

Development Team (Include employer & email if not employed by Arcadis.)		
Derek Roy		
Stephanie Hesselbarth		
Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Stephanie Hesselbarth	Staff Geologist	2/12/2018

Permits/Plans Required (general, Specialized, etc.):	General PTW
Specialized tools/equipment:	Interface probe (IP), Well Key, Bailer

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☑ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☑ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☑ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☑ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Groundwater Gauging and Sampling	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Establish work zone with cones and/or barricades at predetermined sampling location	MOTION - Broken bones, sprains, lacerations, or death from being struck by motor vehicle	1. Observe vehicle traffic and pedestrian traffic in or around potential work zones. When setting up cones and barricades scan work zone and surrounding area for traffic. Make eye contact with drivers and give right-of-way to all motor vehicles present. 2. Wear DOT Class II or higher hi-visibility traffic vests to make personnel more visible to on and off-site traffic.	
	MECHANICAL - Lacerations, abrasions to hands when carrying A-frame barricades	1. Identify pinch points with tape or highly visible marking ink to increase awareness. 2. Wear Level 2 cut-resistant gloves prevent soft tissue injuries.	
	MOTION – Muscle strain from lifting sampling equipment.	3. Unload as close to work area as safely possible. Use a buddy to lift loads greater than 50 pounds. Lift using legs and straight back. Limit twisting motions during lifting procedures. 4. Do not carry more weight than you can handle. 5. Plan route before lift, keep route clear.	
	MOTION - Nails or other sharp objects piercing the bottoms of boot and feet	1. Perform a site walks to clear area of nails and other sharp objects on the ground using broom to push the objects out of the work area 2. Wearing puncture resistant boots or steel sole inserts to prevent sharp objects from piercing the bottom of boots.	
2. Open wells for monitoring	GRAVITY - Slip/Trips/Falls over sampling equipment resulting in broken bones, sprains, or lacerations	1. Visually check and remove trip hazards in the work area prior to starting work at each well. Mark all identified fix hazards with cones or high-visibility tape. 2. Stage equipment in one central location to minimize trip hazards.	
	MOTION - Pinch points from leading edge of well housing and well cap resulting in lacerations, abrasions to hands	1. Do not grab well cap around edge to prevent entering line of fire of well cap and well housing and contact with sharp edges.	

		2. Use well/vault key to open wells to keep hands out of line of fire of well cap and well housing. 3. Use socket wrench to remove bolts and pry bar to remove lid to prevent having to touch sharp edges. 4. Keep hands free of lid when removing well cap to keep hands out of line of fire of well lid and well housing. 5. Wear Level 2 resistant gloves to prevent lacerations to hands from sharp well caps or pinched hands.	
	BIOLOGICAL - Bites/stings from insects or snakes inside or near well housing resulting in allergic reactions or skin irritation	1. Visually check for insects and snakes prior to opening the well. Do not open well if evidence of insects. 2. Have insect spray available to kill wasps/bees. Spray bug spray multiple times as needed with humidity and sweat. 3. Inspect work area for insects and avoid if observed. 4. Inspect clothing for ticks while onsite. Help inspect buddy. 3. Wear gloves, long sleeves, and pants to prevent insect bites. 4. Wear light colored clothing to prevent attracting insects. 5. Avoid walking/working in brushy areas whenever possible	
	PRESSURE - Lacerations or abrasions by flying well cap due to pressurized well	1. Open well cap slowly to depressurize well.	

		2. Stay out of the line of fire above well cap. Keep face clear of well head while opening. 3. Keep face away from well head, never place face over well opening. 4. Wear hard hat to prevent head injury from a well cap that becomes airborne. Wear safety glasses to prevent debris from inside well contacting eyes.	
	CHEMICAL - Chemical exposure from vapor/gas inhalation resulting in irritation or asphyxiation	1. Work upwind of well head. 2. STOP WORK and report any noticeable vapors to supervisor. 3. Air monitoring with a calibrated photo-ionization (PID) detector (fitted with a 10.6 eV bulb) must be utilized to determine concentrations of petroleum vapors in breathing zone. If PID reading exceeds 0.5 ppm, benzene-specific monitoring must take place with a colorimetric tube or real-time monitoring device.	
	MOTION - Being struck by motor vehicle resulting in broken bones, lacerations, abrasions, sprains, or death	1. Scan work zone and surrounding area for vehicle and pedestrian traffic. If vehicle parks directly beside work zone STOP WORK and observe vehicle and driver for movement, make eye contact with driver. 2. Wear DOT Class II or higher hi-visibility traffic vest to increase visibility to on and off-site traffic.	
6. Set up of sampling equipment	MOTION - Lacerations from sharp edges of well head resulting in hand lacerations or abrasions	1. Do not grab edge of well head. Visually identify and verbalize sharp edges and pinch points with site workers. 2. Wear Level 2 cut resistant gloves while handling equipment/debris to prevent hand lacerations.	
	GRAVITY - Slip/Trips/Falls over sampling equipment resulting in broken bones, sprains, or lacerations	1. Visually check for and remove trip hazards prior to setup of sampling equipment. 2. Stage equipment in one central location to minimize trip hazards.	
	MOTION - Struck by vehicle resulting in broken bones, lacerations, abrasions, sprains or death	1. Scan work zone and surrounding area for vehicle traffic. If vehicle approaches work zone or parks beside work zone STOP WORK, make eye contact with driver and wait for vehicle to stop and driver to exit vehicle leaving work zone prior to resuming activities. 2. Wear DOT Class II or higher hi-visibility traffic vests to make personnel more visible to on and off site traffic.	

	MOTION - Nails or other sharp objects piercing the bottoms of boot and feet	1. Perform a site walks to clear area of nails and other sharp objects on the ground using broom to push the objects out of the work area. 2. Wearing puncture resistant boots or steel sole inserts to prevent sharp objects from piercing the bottom of boots.	
7. Purge groundwater monitoring well	GRAVITY - Slip, trip and fall hazard over loose bailer twine, twine bucket, bailers, pump cables or associated tubing resulting in broken bones, sprains, or lacerations	1. Keep loose twine, tubing, and pump cables off of ground. When pulling twine or tubing from bucket or spool determine amount needed to match depth of well to be purged and wind twine into a loop which can be easily carried. Do not place twine buckets, tubing, or pump controllers in walking path in or around work zone. 2. Keep bailers in bailer box on support truck when not in use.	
	MOTION - Cutting twine or pump tubing resulting in hand lacerations	1. Do not use fixed open blades to cut twine or tubing. Use scissors or tubing cutters to cut twine or tubing. 2. Wear Level 2 cut-resistant gloves when using scissors or tube cutters to prevent cuts to hands and fingers.	
	MOTION - Sprains and strains to arms and back while deploying and retrieving bailer or pump in groundwater monitoring well	1. Do not bend over at waist when deploying or retrieving bailers or pumps in wells. Stand upright with back straight. Do not lift arms over head when retrieving bailer or pump from well. Use both hands when dropping or pulling twine attached to bailer or tubing attached to pumps. Deploy and retrieve bailers and pumps slowly. 2. Use pump to purge wells with high purge volumes to reduce sprains and strains.	
	GRAVITY - Slips and falls due to wet surfaces created by discharging purge water into bucket resulting in broken bones, sprains, or lacerations	1. Pour contents of bailer into purge buckets slowly keeping spout of bailer directly over top of bucket. Keep effluent end of tubing inside bucket opening and fixed to the side of the bucket using clips or ties to mitigate splash hazards. 2. When pouring purge water from bailer into bucket keep effluent end of bailer approximately 1 foot or less from opening of bucket to avoid spilling purge water onto ground creating slippery surface. Pour slowly to mitigate splashing.	
	TEMPERATURE - Dermal burns or abrasions to hands while deploying bailer or pump to well	1. Do not allow twine, cables or tubing to slide though hands or fingers. Use hand-over-hand technique to deploy and retrieve twine, cables, or tubing. 2. Wear Level 2 cut-resistant glove with nitrile liners or nitriles over Level 2 cut-resistant gloves when handling twine, bailers, pumps, tubing and cables to prevent abrasions and lacerations to hands from bailer twine.	

	MOTION - Abrasions and lacerations to hands by entangled bailer twine or pump cable	1. Do not allow twine or pump cables to entangle hands or fingers creating loops which can potential cause pinches, abrasions and lacerations to hands. 2. Wear Level 2 cut-resistant glove with nitrile liners or nitriles over Level 2 cut-resistant gloves when handling twine, bailers, pumps, tubing and cables to prevent abrasions and lacerations to hands from bailer twine.	
8. Collection of sample	MOTION - Back strain from opening well/bailing water/collecting sample/lifting and carrying 5-gallon bucket of water to remediation system	1. Only fill buckets ½ - ¾ full to prevent heavy weights to carrying over 50 lbs. 2. Kneel instead of bending over at the waist or squatting when working at low levels. Lift at knees/with legs not back or shoulders. Do not twist at waist to avoid back strains/sprains. 3. Use knee pads to prevent knee lacerations from kneeling on ground.	
	CHEMICAL - Dermal exposure to groundwater and/or sample preservation fluids while filling VOA/sampling media resulting in allergic reactions, skin irritation, or dermal burns	1. Fill sample bottles slowly to avoid splashing/spillage. 2. Wear nitrile gloves over Level 2 cut-resistant gloves and safety glasses with side shields to prevent chemical exposure to skin.	
	MOTION - Lacerations to hands from glass sample bottle breakage	1. Never over tighten caps on glass VOA vials to avoid possible breakage. 2. Place VOA/sampling media in bubble wrap as soon as possible once sample has been taken. 3. Wear Level 2 cut-resistant gloves to prevent hand lacerations due to bottle breakage.	
	CHEMICAL - Chemical exposure from vapor/gas inhalation resulting in irritation or asphyxiation	1. Keep face a minimum of 1 ft. away from top of well head and work upwind of well head to prevent chemical exposure. 2. Conduct air monitoring with a calibrated photo-ionization (PID) detector (fitted with a 10.6 eV bulb) must be utilized to determine concentrations of petroleum vapors in breathing zone. If PID reading exceeds 0.5 ppm, benzene-specific monitoring must take place with a colorimetric tube or real-time monitoring device. 3. STOP WORK and report any noticeable vapors to supervisor.	
9. Close Well	MOTION - Strain to back and arms when closing well	1. Do not bend at waist to replace well cap and lid. Do not over extend arms or back when reaching for cap, lid or tools. Keep cap, lid and tools within arm's reach when closing well.	

	MOTION - Lacerations or bruises to knees while kneeling	1. Avoid placing knee on ground or hard surface when replacing cap and lid. 2. Use knee pads if necessary to place knee on ground to avoid lacerations, abrasions, and busies	
	MOTION - Lacerations or abrasions to fingers or hands when handling and placing well lid	1. Keep hands away from leading edges on well lids. Do not place fingers between rim of well and edge of well lid. 2. Use Level 2 cut-resistant gloves when handling well lids to prevent lacerations or abrasions to hands and fingers.	
10. Take down sampling equipment	MOTION - Back/muscle strain from loading equipment	1. Do not lift weight >50 lbs, lift with legs and not the back and keep all loads close to your body. Reposition body using feet, do not twist at waist.	
	MOTION - Lacerations to hands from sharp edges of equipment	1. Use handles on equipment to avoid grabbing sharp edges. 2. Avoid grabbing/holding sharp edges/points and wear Level 2 cut-resistant gloves while handling equipment.	
	GRAVITY - Slip/Trips/Falls on equipment resulting in broken bones, sprains, or lacerations	1. Visually check for and remove trip hazards in work area. 2. Stage equipment in one central location to minimize trip hazards.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Monitoring Well Development	**Date of JSA Development: 3/23/2015**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064362**

Development Team (Include employer & email if not employed by Arcadis.)		
Julianne Hagarty		

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Stephanie Hesselbarth	Geologist 2	10/30/2017

Permits/Plans Required (general, Specialized, etc.):	Chevron Tailgate Form
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☑ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☐ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Monitoring Well Repair	Site ID: 211123


BIOLOGICAL

CHEMICAL

ELECTRICAL

GRAVITY

HUMAN PERFORMANCE

MECHANICAL

MOTION

PRESSURE

RADIATION

SOUND

TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Setup work zone	MOTION – Broken bones, sprains, lacerations, or death resulting by being struck by vehicle	1. Observe vehicle traffic and pedestrian traffic in or around potential work zones. When setting up cones and barricades scan work zone and surrounding area for traffic. Make eye contact with drivers and give right-of-way to all motor vehicles present. 2. Use Traffic Control Plan to position work vehicle and cones or barricades.	
	MOTION – Nails or other sharp objects piercing the bottoms of boot and feet	1. Perform a site walk to visually confirm that area is clear of nails and other sharp objects on the ground. Use a broom to push any debris or sharp objects out of the work area. 2. Wearing puncture resistant boots or steel sole inserts to prevent sharp objects from piercing the bottom of boots.	
	GRAVITY – Slip, Trip and Fall hazard resulting in broken bones, sprains, abrasions or lacerations.	1. Check work zone for potential slip, trip and fall hazards including uneven surfaces, pot holes, wet or slick surfaces. Move work zone if possible to avoid these hazards.	
	MECHANICAL – Lacerations or abrasions associated with handling A-Frame barricades	1. Inspect Cones with flag poles for potential pinch point when inserting pole. Do not place finger in line of fire. 2. Wear Level 2 cut resistant gloves to protect hands from lacerations or abrasions.	
2. Open and gauge wells	GRAVITY – Slip/Trips/Falls over equipment resulting in broken bones, sprains, or lacerations	1. Visually check and remove trip hazards in the work area prior to starting work at each well. Mark all identified fix hazards with cones or high-visibility tape. 2. Stage equipment in one central location to minimize trip hazards.	
	MOTION – Pinch points from leading edge of well housing and well cap resulting in lacerations, abrasions to hands	1. Do not grab well cap around edge to prevent entering line of fire of well cap and well housing and contact with sharp edges. 2. Use well/vault key to open wells to keep hands out of line of fire of well cap and well housing. 3. Use socket wrench to remove bolts and pry bar to remove lid to prevent having to touch sharp edges.	

		4. Keep hands free of lid when removing well cap to keep hands out of line of fire of well lid and well housing. 5. Wear Level 2 resistant gloves to prevent lacerations to hands from sharp well caps or pinched hands.	
	BIOLOGICAL – Bites/stings from insects or snakes inside or near well housing resulting in allergic reactions or skin irritation	1. Visually check for insects and snakes prior to opening the well. Do not open well if evidence of insects. 2. Wear gloves, long sleeves and full-length pants to prevent insect bites to skin.	
	PRESSURE – Lacerations or abrasions by flying well cap due to pressurized well	1. Open well cap slowly to depressurize well. 2. Stay out of the line of fire above well cap. Keep face clear of well head while opening. 3. Keep face away from well head, never place face over well opening. 4. Wear hard hat to prevent head injury from a well cap that becomes airborne. Wear safety glasses to prevent debris from inside well contacting eyes.	
	CHEMICAL – Chemical exposure from vapor/gas inhalation resulting in irritation or asphyxiation	1. Work upwind of well head. 2. **STOP WORK** and report any noticeable vapors to supervisor. 3. Air monitoring with a calibrated photo-ionization (PID) detector (fitted with a 10.6 eV bulb) must be utilized to determine concentrations of petroleum vapors in breathing zone. If PID reading exceeds 0.5 ppm, benzene-specific monitoring must take place with a colorimetric tube or real-time monitoring device.	
	MOTION – Being struck by motor vehicle resulting in broken bones, lacerations, abrasions, sprains, or death	1. Scan work zone and surrounding area for vehicle and pedestrian traffic. If vehicle parks directly beside work zone **STOP WORK** and observe vehicle and driver for movement, make eye contact with driver. 2. Wear DOT Class II or higher hi-visibility traffic vest to increase visibility to on and off site traffic.	
3. Airlift/Surge/Purge Well	MOTION – Body strains from repetitive motion when surging well	1. Lift with legs and arms, not the back. 2. Alternate tasks; take breaks as needed.	
	CHEMICAL – Skin irritation from contact with groundwater	1. Wear Nitrile gloves over cut-resistant gloves to prevent hand injury and skin irritation.	
	CHEMICAL – Environmental releases of well fluid.	1. Make sure tubing is secure in buckets, do not overfill containers; pour water slowly into buckets/drums to minimize splashing. 2. If leakage is observed, stop purging activities immediately, stop leakage. Block any drainage grate with sorbent pads. Call PM to notify of any reportable spill.	

	MECHANICAL – Lacerations from cutting materials, such as plastic tubing.	1. When cutting tubing, use tubing safety cutter tool. No open fixed blades permitted. 2. Keep hands 6 inches away from cutting edge of tools.	
4. Decon equipment	CHEMICAL – Cross contamination	1. Decontaminate equipment between wells in accordance with SOPs.	
4. Store purge water, sediments and decon water	MOTION – Back strain from lifting heavy buckets of water or moving drums, pinch points on drum ring and lid	1. Stage drums in a way to minimize distance to travel for storage (if possible). Do not overfill buckets if using to transport water to drums. 2. Use drum dolly, lift gate, or fork lift to help with drum movement and do not overfill drums. 3. Wear work gloves when sealing drums and keep fingers out of pinch point area of drum ring.	
	CHEMICAL – Release of decon water, misidentification of drum contents	1. Inspect drum before filling. Only use new drums, not reconditioned drums. Use overpack for drums containing water. 2. Verify drum is sealed before moving. 3. Label drum as soon as contents are added.	
	CHEMICAL – Chemical exposure from skin contact with groundwater	1. Lower and retract tape slowly to reduce the potential for splashing. 2. Wear nitrile gloves while using measuring tape over Level 2 cut resistant gloves to prevent chemical exposure to skin.	
	MOTION – Lacerations or bruises to knees while gauging well volume	1. Inspect ground surface for sharp objects or stones which may cause lacerations of bruising. Removed objects from around well head. 2. Kneel on soft surfaces or pads to prevent knee injuries.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Environmental Drilling	**Date of JSA Development: 2/12/2018**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064362**

Development Team (Include employer & email if not employed by Arcadis.)

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Stephanie Hesselbarth	Staff Geologist	2/12/2018

Permits/Plans Required (general, Specialized, etc.):	General PTW
Specialized tools/equipment:	Coolers, Sample Bottles

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☑ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☑ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☑ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
- ☐ Welding gloves
- ☑ Leather gloves, insulated
- ☑ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☑ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Sample Packing and Cooler Handling	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1 Stage at pre-determined sampling location and set up work zone and sampling equipment	Motion - Broken bones/ death from being hit by vehicular traffic.	Establish traffic control for exclusion zone per requirements; use high-visibility cones; and park vehicle as barrier, if feasible.	
	Gravity - Broken bones/lacerations from tripping over sampling equipment and tools.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Biological - Biological hazards (flying insects, ticks, poisonous snakes, raccoons and wild turkeys).	1. Look for wasp and bee nests in work areas. If observed, Stop Work immediately until the issue is addressed. 2. Survey the vegetation and identify poison ivy, oak or sumac and avoid these areas. Survey walking areas for snakes or varmints. 3. Keep insect repellent available for use in the field. Check thoroughly for ticks at the end of shift/day.	
	Motion - Muscle strain from lifting sampling equipment.	1. Unload as close to work area as safely possible. Use a buddy to lift loads greater than 50 pounds. Lift using legs and straight back. Limit twisting motions during lifting procedures.  2. Do not carry more weight than you can handle.	

		Plan route before lift, keep route clear.	
	Chemical – Potential release of fluids to the ground surface (i.e. hydraulic, fuel, etc.).	Place visqueen or other impermeable/ fluid absorbing sheeting underneath the rig location prior to rig positioning to prevent potential fluid contact with the ground surface.	
2 Hand clear boring locations	Electrical/Pressure – Electrocution from contact with electrical utility/Bodily harm from rupture of water, product or gas line.	1. Review and verify that the ARCADIS Utility Clearance Checklist and CEMC Ground Disturbance Review Checklist have been completed. 2. Confirm that Borehole Clearance Memo has been submitted, as applicable. 3. Review proposed locations against available site map, One Call markings and private locate markings. 4. DO NOT rely on GPS to locate previously cleared locations. 5. All boring locations will be cleared to a depth of 6 ft 6 in. 6. Inspect that rig and rig pathways are clear of overhead hazards (e.g. utilities, canopy). Stop Work immediately and contact PM/TM before proceeding if utility clearance procedures cannot be verified or if previously cleared locations are not adequately marked.	
	Motion – Back strain from repetitive motion of hand clearing and lifting cuttings.	1. Use job rotation every 3 feet to prevent fatigue. 2. Change out extension rods to prevent bending over to twist hand auger. Use team lifts to remove hand auger from boring deeper than 5 ft.	
	Motion – Death, serious injury or damage caused by direct-push rig while accessing set-up location.	Verify clear pathway to boring/sampling location and clearance for raising mast/securing equipment. Provide as-needed hand signals and guidance to driver to place direct-push rig. Stay at least 3' feet from fixed objects during mobilization to boring location.	
3. Backfill soil boring with cuttings (or appropriate material)	Gravity – Slips trips and falls on open soil boring.	1. Place a safety cone over the soil boring until the boring can be backfilled.	
	Motion – Shearing/bending of drill rods due to lack of support in tow 8 ft.	1. Backfill soil boring with soil cuttings from the same hole to provide lateral and vertical support	

4. Commence direct-push borehole.	Chemical - Dermal irritation or inhalation hazard from contact with potentially contaminated soil, groundwater or vapors.	1. Air monitoring with a calibrated photo-ionization (PID) detector (fitted with a 10.6 eV bulb) must be utilized to determine concentrations of petroleum vapors in breathing zone. If PID reading exceeds 0.5 ppm, benzene-specific monitoring must take place with a colorimetric tube or real-time monitoring device. 2. Do not touch contaminated water/sludge/soil with ungloved hands. 3. Wear Nitrile gloves over Type II cut-resistant gloves to prevent soils/liquids from contacting hands and causing irritation. 4. When dual tube or macro core sampling, make sure plastic tube is completely cut prior to opening to prevent soils/liquids from spraying into face and eyes	
	Mechanical – Caught or pinched by parts of rig.	1. Discuss the location of the emergency shut off switches with the entire field crew. Emergency stops should be tested daily. 2. Call out and mark locations of pinch point. Discuss how to avoid pinch points and mitigate that hazard. 3. Refrain from wearing hoods, loose clothing and jewelry while in the exclusion zone. 4. Keep non-essential personnel outside of the exclusion zone to eliminate risk.	
	Chemical – Cross contamination on DPT rods or hydro-punch sampler from previous borehole.	1. Decontaminate sampling equipment after collecting a sample and decontaminate hydro-punch accessories after sample collection at each boring location.	
	Temperature - Heat exhaustion or heat stress from weather conditions and dehydration.	1. Hydrate prior to working and take frequent breaks as needed. Mix water and sports drinks to hydrate and avoid caffeinated beverages. 2. If conditions are very hot and humid, forced breaks may be necessary. Anyone on the crew can recommend a forced break requirement.	
	Sound - Hearing damage or loss due from exposure to DPT noise.	1. Maintain 25 ft exclusion zone to prevent non-essential personnel away from high noise exposure. 2. Wear hearing protection during DPT macro-core/hydro-punch sampler advancement and rig operation per the PPE Determination section of this JSA and OSHA regulations. 3. When using ear plugs, reach around the back of the head, pulling outward and upward on the ear while inserting the ear plug until it seals. Note that most ear plugs are disposable and should not be used repeatedly.	

			
5. Clean site; Remove traffic control.	Motion - Death or serious injury resulting from being struck traffic and other vehicles entering and exiting the site.	1. Always use spotter and buddy system while cleaning up site. 2. Seek to make eye contact with vehicle drivers on site.	
	Gravity - Broken bones, lacerations and bruises from slipping and falling over drilling equipment or hand tools.	1. Visually inspect the work area or exclusion zone and check and remove trip hazards in the work area prior to breaking down the exclusion zone. 2. Organize tools and supplies in one central location and keep these items out of travel paths. 3. Use correct travel paths and 3-points of contact for loading equipment and supplies. 	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Air Monitoring	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)

Jackson Domenech	

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☐ Sunscreen lotion >= SPF30
- ☐ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☐ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☐ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☐ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:


BIOLOGICAL

CHEMICAL

ELECTRICAL

GRAVITY

HUMAN PERFORMANCE

MECHANICAL

MOTION

PRESSURE

RADIATION

SOUND

TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	**Potential Hazard(s)** (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	**Critical Action(s)** (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	**Responsible Person(s) – Initials**
1. Calibration of air monitoring equipment	MECHANICAL - Pinch Points to hand and fingers from equipment cases	1.Keep fingers 6 inches from opening and closing edges on equipment cases.	
	GRAVITY - Broken bones, lacerations or sprains from slip, trip, and falls due to site hazards or equipment on the ground	1. Maintain good housekeeping practices in instrument room. 2. Visually check for hazards on ground. Identify and remove trip hazards if possible. If hazard cannot be removed, mark with high-visibility paint or flagging, and notify others. 3. Designate equipment storage area within work area to prevent clutter and reduce trip hazards. 4. Wear steel toe boots with puncture resistant soles to mitigate any debris puncturing the foot and to prevent from any tools being dropped	
	CHEMICAL - Hazardous atmosphere and respiratory irritation from calibration gas	1. Remove nozzle from calibration gas after done calibration to prevent accidental release 2. Keep MSDS onsite for calibration gases	
	MOTION - Laceration to hands from equipment lamps	1. Do not remove PID lamps that are stuck in the lamp housing. Reference equipment manuals for PID maintenance. 2. Wear type II cut resistant gloves to protect hands from lacerations	
	CHEMICAL - Chemical skin irritation from equipment cleaning material	1. Slowly pour cleaning chemicals on areas of the equipment that require regular cleaning. 2. Pour the cleaning materials over a containment pan or bucket to prevent spreading the chemicals over a large area. 3. Wear nitrile gloves and safety glasses to prevent exposure to cleaning chemicals, review and understand MSDS.	
2. Cleaning sensors	CHEMICAL – Skin irritation from splash hazard from cleaners	1. If pouring cleaners, pour slow so no splash occurs 2. Wear safety glasses to protect eyes from splashes and use prongs when placing and removing sensors from cleaning solution.	

<table>
<tr><td></td><td></td><td>3. Wear long sleeve shirts to protect against any splashes that may occur</td><td></td></tr>
<tr><td></td><td>MOTION - Lacerations from equipment sensors</td><td>1. Do not grasp sensor tightly to prevent breaking glass when removing sensors from cleaning solution.</td><td></td></tr>
<tr><td></td><td>MOTION - Struck by or Against vehicles resulting in serious injury or death</td><td>1. Look both ways for truck exiting and entering the jobsite. Yield to all truck traffic.
2. Don a high visibility reflective vest to be more visible to other traffic in the area and to mitigate any struck by hazards
3. Don a hard hat to prevent against any overhead hazards and any struck by hazards</td><td></td></tr>
<tr><td>3. Transport instrument to vehicle</td><td>GRAVITY - Broken bones, lacerations or sprains from slips, trips and falls from uneven terrain</td><td>2. Maintain three points of contact up and down steps.
3. Maintain solid footing when walking the site.
4. Place ice melt on steps during winter conditions.</td><td></td></tr>
<tr><td></td><td>MOTION - Personal injury or death from being struck by or against vehicles or equipment</td><td>1. Plan work to stay out of active traffic areas and complete during low-traffic times, if possible.
2. Park support vehicle between active traffic and workers to protect workers from traffic.
3. Use traffic control measures (barricades and/or cones) to direct traffic around a designated work area.
4. Wear reflective vest/shirt to increase visibility to drivers.</td><td></td></tr>
<tr><td>4. Mobilizing and demobilizing instruments at field sampling locations</td><td>GRAVITY - Broken bones, lacerations, or sprains from slips, trips and falls from uneven terrain</td><td>1. Select even and stable travel routes when walking to the instrument locations. Avoid iced over areas.</td><td></td></tr>
<tr><td></td><td>BIOLOGICAL - Biological hazards (flying insects, ticks, poisonous snakes)</td><td>1. Observe for wasps and bees nest in the instrument stands before placing instruments on the stand.
2. Survey the vegetation and identify poison ivy, oak or sumac and avoid these areas. Survey walking areas for snakes or varmints.
3. Avoid wild animal encounter by staying out of wooded or hidden areas.</td><td></td></tr>
<tr><td></td><td>BIOLOGICAL - Heat and Cold Stress</td><td>1. Cover exposed skin during cold weather conditions to prevent frost bite.
2. Drink fluids to hydrate body during hot weather.
3. Use of sunscreen is recommended to prevent sunburn.
<table><tr><th>Temperature (°F)</th><th>Maximum Allowable Work Time</th><th>Minimum Mandatory Rest Time</th></tr><tr><td>95+</td><td>8 minutes</td><td>15 minutes</td></tr><tr><td>85-95</td><td>13 minutes</td><td>10 minutes</td></tr><tr><td>75-85</td><td>20 minutes</td><td>10 minutes</td></tr></table></td><td></td></tr>
<tr><td></td><td>ELECTRICAL - Serious injury or death from electrical shock from lightning</td><td>1. If lightening is observed, stop work immediately and discontinue work for 30 minutes after the last lightning strike.
2. Do not pick up instruments during lightning storms.</td><td></td></tr>
</table>

		3. Pick up instruments 30 minutes after last lightning strike is observed.	
	CHEMICAL - Skin and respiratory exposure and irritation to contaminants	1. Use open air environments to allow exposure levels to dissipate prior to sampling. 2. Communicate overexposures in a timely manner to site Health and Safety Manager. 3. Follow proper employee decon JSA when donning/doffing PPE. 4. Don air purifying respirator if exposure level merits Level C protection. 5. Don Tyvek and nitrile gloves in addition to the PPE listed above when entering the exclusion zone to complete air monitoring. Inspect that the coveralls are taped at the cuffs and legs with tape if required.	
	MOTION - Laceration from tools used to retrieve sample media	1. Inspect hand tools prior to grabbing them. 2. Only place hand in designed location on tools 3. Wear cut resistant gloves underneath nitrile to prevent injury from tools.	
5. Post Calibration	CHEMICAL - Chemical exposure to skin and respiratory system	1. Work upwind of vapors. 2. See MSDS. 3. Don Nitrile Gloves Required when handling chemicals to prevent skin irritation.	

Notes:

1 – Verifier may be any ARCADIS employee or Subcontractor under direct contract by ARCADIS. The Verifier may be the Responsible Person, Site H&S Officer, Construction Manager, Project Manager, Subcontractor, etc.

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
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This JSA must be acknowledged by affected workers every shift.

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PMCoW:					

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Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Drilling – Soil Vaapor Survey	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)		
Jackson Domenech		
Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	General PTW, ground Disturbance, Excavation/Trenching/Overhead Clearance/Drilling HRPTW
Specialized tools/equipment:	Geoprobe, PID

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☒ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☒ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☒ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☒ Sunscreen lotion >= SPF30
- ☒ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

e Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☒ Leather/Work gloves
- ☐ Welding gloves
- ☒ Leather gloves, insulated
- ☒ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☒ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE

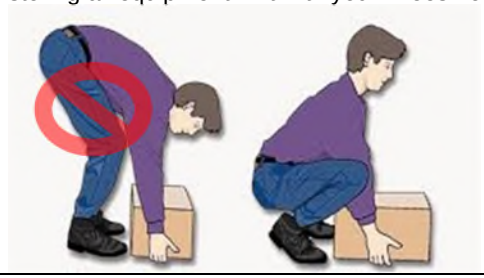

RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Unloading soil vapor sampling equipment and setting up exclusion zone	Motion - Broken bones/ death from being hit by vehicular traffic.	1. Establish traffic control for exclusion zone per requirements; use 42.0" high-visibility delineator post with flags; and park vehicle as barrier, if feasible. 2. Use a spotter and maintain 3ft cushion between vehicles and other objects. 3. Wear Type II or III hi-vis vest at all times. Yield right of way to all vehicles and pedestrians.	GM, SS, GC,
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Motion - Muscle strain from lifting sampling equipment.	1. Unload as close to work area as safely possible. Use a buddy to lift loads greater than 50 pounds. Lift using legs and straight back. Limit twisting motions during lifting procedures. 2. Do not carry more weight than you can handle. 3. Plan route before lift, keep route clear. Type of Lift / Minimum Number of Persons / Max. Weight **Non-ideal** / 1 / **25 lbs(11kg)** **Ideal** / 1 / **50 lbs (22kg)** **Ideal Team** / 2 or more / **100 lbs (45kg)**	
2. Opening and closing well vaults at soil vapor sample points	Mechanical - Pinching or lacerating fingers on well vault.	1. Identify pinch points associated with well lid, do not place hands in these areas; wear protective gloves. 2. Use the right tools for the job (e.g., use a socket wrench that matches bolt size and a small pry bar to open well vault.	

	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Motion - Knee injuries from kneeling techniques.	1. Clear and inspect area that kneeling will occur of sharp objects or gravel. Kneel on a soft surface when possible. 2. When kneeling, wear knee pads or place pad on ground to prevent injuries to knees.	
	Biological - Insect bites, skin irritation, or allergic reaction from bites/stings from insects inside well housing.	1. Visually check for insects prior to opening the well. 2. Have insect spray available to kill wasps/bees. 3. Wear gloves, long sleeves, and pants to prevent insect bites.	
	Motion – Back injuries from awkward twisting and bending.	1. Position body close to well vault openings to limit lifting area while opening well vaults.	
	Chemical - Respiratory irritation from vapor/gas inhalation.	1. Keep face clear of wellhead and work upwind of wellhead, if feasible. 2. Air monitoring with a calibrated flame-ionization (FID) detector must be utilized to determine concentrations of petroleum vapors in breathing zone. If FID reading exceeds 0.5 ppm for 2 minutes, benzene-specific monitoring must take place with a colorimetric tube or real-time monitoring device.	
3. Setting up equipment and collecting soil vapor samples i.e., calibration gas, leak tracer, purge pump, and summa canisters.	Mechanical - Pinch points from hand tools.	1. Inspect equipment for hinges or pinch points and identify them with stickers or high visibility paint. 2. Wear leather gloves and use proper tools to fasten tubing and fittings so fingers are not in the line of fire. 3. Wear Nitrile gloves over cut-resistant gloves to prevent hand injury and skin irritation when setting up helium tank leak tracer.	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Electrical – Electric-shock burns from electrical cord use.	2. Inspect all electrical cords and utilize a GFCI, test before use. Avoid use in the rain and do not run electrical cords through wet or muddy areas.	

	Motion – Back strain from awkward twisting and bending.	1. Use correct body positioning (bend at the knees) when sampling. 2. Wear knee pads if kneeling for long time periods.	
	Pressure – Injuries from compressed gas.	1. Use a gas cylinder stand to prevent injuries due to uncontrolled energy from calibration gas and helium tank.	
	Chemical - Respiratory irritation from vapor/gas inhalation.	1. Use multi gas meter to continuously monitor breathing zone air during purging. 2. **STOP WORK** IMMEDIATELY and contact site supervisor if vapors/gas are noticed in breathing zone or conditions change. 3. Keep face clear of wellhead and work upwind of wellhead, if feasible.	
	Chemical - Dermal irritation from contact with potentially contaminated media.	1. Do not touch contaminated media with ungloved hands. 1. Wear Nitrile gloves over Type II cut-resistant gloves to prevent particulates/liquids from contacting hands and causing irritation.	
4. Loading soil vapor sampling and exclusion zone equipment	Motion - Back strain from lifting, awkward twisting and improper bending.	1. Utilize the buddy system when loading samples and storing all equipment. Lift with your knees not your back. 2. 	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and caution tape.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Keep all debris i.e., trash, loose caution tape, properly stored in trash bags. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Pressure – Injuries from compressed gas.	1. Release pressure from all pressurized equipment slowly when disassembling.	
	Mechanical – Pinch points and lacerations from handling equipment.	1. Inspect equipment for hinges or pinch points and identify them with stickers or high visibility paint. 2. Wear leather gloves when loading sampling and exclusion zone equipment.	

	Chemical - Dermal irritation from contact with potentially contaminated media.	1. Do not touch contaminated media with ungloved hands. 2. Wear Nitrile gloves over Type II cut-resistant gloves to prevent particulates/liquids from contacting hands and causing irritation.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
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PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date
7/11/2019 – Poison ivy observed near well MW-15	GM	7/11/2019

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Drum Handling	**Date of JSA Development: 06/19/2019**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Jay White	H&S Administrator	01/06/2014

Permits/Plans Required (general, Specialized, etc.):	General PTW and/or Tailgate Form
Specialized tools/equipment:	Drum(s), Drum Dolly

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☑ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☐ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Drum Handling	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Establish work zone with cones and/or barricades at proposed drum location	MOTION - Injury or death from being struck by motor vehicle	1. Utilize buddy system. One person must focus on establishing work zone while the second person must focus on establishing eye contact with approaching motor vehicle drivers and alerting other workers to potential imminent hazards. 2. Wear DOT Class II or higher hi-visibility traffic vests to make personnel more visible to on and off site traffic.	
	MECHANICAL - Pinch and cuts to hands when carrying A-frame barricades	1. Identify pinch points with tape or highly visible marking ink to increase awareness. 2. Wear minimum class II cut-resistant gloves to reduce potential for soft tissue injuries	
	MOTION - Nails or other sharp objects piercing the bottoms of boot and feet	1. Perform a site walk to visually confirm that area is clear of nails and other sharp objects on the ground. Use a broom to push any debris or sharp objects out of the work area. 2. Wear puncture resistant boots or steel sole inserts to prevent sharp objects from piercing the bottom of boots	
2. Moving of Drums from work area to staging area and staging area to load out area	GRAVITY - Injury due to slips trips and falls from blocked vision while moving drums	1. Plan path of travel and visually inspect ground for trip hazards, choose path to avoid uneven, wet or slippery surfaces 2. Do not step over objects, Maintain a clear pathway before transporting or moving drums	
	MECHANICAL - Personal injury associated with pinch points and potential lacerations or amputations of fingers.	1. Identify potential pinch points and avoid hand placement in these locations. 2. Wear leather / cut resistant gloves while opening and closing drum lids and working with drum rings	
	CHEMICAL - Leaks and spills as a result of drums tipping over, incorrectly sealed drum, punctures, pinholes, impacted sides, top or bottom, rust, weathered conditions, knock drum over resulting in a release or exposure to worker.	1. Verify MSDS and review MSDS for chemicals contained in drums. Review hazards and emergency procedures for all chemicals contained in drums on site prior to handling 2. Verify drums and drum lids are completely sealed around all edges by inspecting rim and ring of drum and lid. 3. Wear nitrile chemical resistant gloves or glove liners while handling drums containing product	

3. Load out of Drums for disposal (onto Box Truck)	MOTION - Back strain from lifting and pushing/pulling drums to staging and load out areas, contact with chemical resulting in exposure	1. Stage drums on hard, level and clean surface. 2. Bend at knees. Do not over assert back, legs or arms 3. Use drum dolly or mechanical means to lift or move drums. When possible use Buddy System 	
	MECHANICAL - Personal injury, lacerations or amputations associated with Pinch points identified on lift gates, tailgates, between drum rims and stationary objects	1. Visually identify all pinch points on equipment and vehicles prior to beginning work 2. Use SPSA to determine body position in order to be able to move freely around drum and do not place body in-between drum and stationary objects 3. Do not place fingers between rim of drum and stationary objects when moving drum 4. Wear leather and/or cut resistant gloves when handling or moving drums.	
	MOTION - Back, arm and shoulder strains from lifting drums for disposal	1. Lift with knees. Do not apply pressure to the arms, legs or back when moving drums to the extent that you feel discomfort or pain in muscles. Have a personal understanding of your own capabilities and limitations. 2. Use Buddy System to move drums when additional workers are available 3. Use Drum Dolly or other mechanical means to lift/move drums when available 4. Use Drum Dolly or mechanical means to place drums directly into Box Truck or onto Lift Gate	
	GRAVITY - Slips, Trips and fall while walking, moving drums, operating a drum dolly or moving drum onto lift gate resulting in personal injury.	1. Identify a path clear of obstacles, uneven surface, slippery surfaces and debris prior to moving drum. Remove any obstacles or debris when possible. 2. Visually observe surrounding including vehicle and pedestrian traffic in order to better understand potential traffic and pedestrian hazards in and around work area.	
	MOTION - Struck by vehicle resulting in personal injury or death.	1. Use eye contact and established hand signals with operators to signal intent 2. Keep body out of line of fire when working with swinging lift arms attached to trucks when used to move drums and lift drums into storage area of truck	

		3. Do not walk directly behind Skid Steers or loading equipment without making contact with operator prior to moving. 4. Wear DOT Class II or higher hi-visibility traffic vests to make personnel more visible to on and off site traffic.	

JSA Acknowledgement

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If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

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Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Fueling Equipment	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30043615**

Development Team (Include employer & email if not employed by Arcadis.)		
Jackson Domenech		
Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☒ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☒ Sunscreen lotion >= SPF30
- ☒ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

e Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☒ Cut-resistant gloves or liners
- ☒ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☒ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☒ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

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TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Inspect work area, determine method of fueling	MOTION - Uncontrolled access to active work zones by fuel truck drivers	1. All fuel truck drivers must receive site specific orientation before fueling equipment. 2. An escort must stay with fuel truck drivers throughout the visit.	GM, SS, GC,
	CHEMICAL - Spills from fuel containers or overflow	1. Identify a level area to conduct fueling activities. 2. Identify amount of fuel needed to choose method of fueling (use 1 gallon metal safety can for small portable tools, larger portable tank or fuel truck for large heavy equipment – do not use fuel truck to fill small portable hand tools like demo saw).	
	GRAVITY - Slips/trips/falls due to construction debris and uneven terrain	1. Keep work area free of equipment and debris when not in use. 2. Remove all travel path hazards by keeping materials/objects organized and out of walkways. 3. Keep work surfaces dry; clean up spills, if any, before and during work. 4. Wear puncture resistant steel toe boots with non-slip rubber soles if working on wet or slick surfaces. 5. Do not run. 6. Note areas of slick or uneven ground modify or seek alternate travel paths to complete work.	
3. Set up fuel transfer equipment	MOTION - Punctures to feet from sharp objects on the ground	1. Keep work area free of equipment and debris when not in use. 2. Remove travel path hazards by keeping materials/objects organized and out of walkways. 3. Keep work surfaces dry; clean up spills, if any, before and during work. 4. Wear puncture resistant steel toe boots to help prevent punctures to the feet.	
	GRAVITY - Falls from fuel truck and/or equipment	1. Maintain 3 points of contact during fueling, when getting in / out of cab and when accessing fuel tank on equipment.	

		2. Clean excess mud from boots before entering or exiting cab and before accessing fuel tank. 3. Do not stretch transfer hoses through walking paths.	
	CHEMICAL - Spills/releases to environment from fuel container and/or skin exposure to fuel during spills	1. Do not fuel within 35 ft of storm drains – if not possible to move fueling task away from storm drains, cover drains with drain blocker cover. 2. Above ground portable fuel tanks 120 gallons + must be double walled w/ secondary containment that has a capacity equal to or greater than tank capacity. 3. Inspect hoses for damage before starting transfer. 4. Have spill kit within 10 ft during fueling. 5. Wear nitrile gloves underneath cut resistant type II cut resistant gloves and long sleeves when cleaning up spilled fuel. 6. Don safety glasses to prevent splashes to eyes	
3.	MOTION - Collisions / vehicle accidents with traffic or equipment onsite	1. Follow site Traffic Control Plan for travel paths 2. An escort / spotter must be used to lead the fuel truck in / out of the site and during backing 3. Never approach equipment until the operator gives the visual ok (wave) or verbal ok (by radio) 4. Wear a high visibility safety vest and hard hat to increase visibility of yourself to others	
	TEMPERATURE - Fuel fire / explosion from ignition sources	1. NO SMOKING or ignition sources (hot work) within 50 ft of fueling activities 2. Bond fuel nozzle to equipment before fuel transfer by verifying static wire is in transfer hose or use bonding cables to connect the fuel container with the equipment being fueled 3. Shut down equipment before fuel transfer and let the engine cool before refueling (wait at least 5 minutes). 4. Have available fire extinguisher (20 lb ABC in fueling area/5 lb ABC in machines) 5. Wear a flame retardant (FRC) jacket during fueling activities	
	ELECTRICAL - Electric shock while using a fuel transfer pump	1. Inspect power leads from fuel transfer pump for damage before use and replace if damaged. 2. Connect negative lead to negative battery terminal first 3. Inspect that leads are secured to the battery terminals by making sure the grip is firm.	
Transfer fuel to equipment	CHEMICAL - Spills/releases to environment	1. Fueling operator is to remain at the fueling operation while fueling activities are occurring. 2. If using a push cart or mechanical means to transport a fuel container make certain that the container is secured (tied or strapped down).	

		3. Do not overfill equipment – monitor progress. 4. Keep spill kit within 10 ft of fueling operation. 5. After fueling is complete, elevate hose to drain excess into equipment tank, drain excess back into transfer tank or keep nozzle turned up to prevent residual in hose from leaking out.	
	CHEMICAL - Exposure to fuel vapors during transfer	1. Do not place head directly over fuel tank opening to prevent breathing fuel vapors. 2. Position body upwind of fueling nozzle.	
	TEMPERATURE - Fuel fire / explosion from ignition sources	1. NO SMOKING or ignition sources (hot work) within 50 ft of fueling activities. 2. Have available fire extinguisher (20 lb ABC in fueling area/5 lb ABC in machines). 	
Demobilize	MOTION - Equipment damage	1. Roll up and secure hoses and leads to tanks and pumps before moving vehicles or equipment.	

JSA Acknowledgement

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Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Ground Penetrating Radar (GPR)	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)		
Jackson Domenech		
Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
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TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

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- ☐ Flexible goggles
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Head Protection

- ☐ Type E Hardhat (Electrical)
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Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
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- ☒ Insect repellant (DEET: flying insects)
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Hand Protection

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Foot Protection

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TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


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SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Set up survey grid with white paint and control	GRAVITY - Broken bones, lacerations or sprains from slips, trips, and falls from uneven ground or over vegetation	1. Make multiple trips with loads to eliminate obstructed view of ground 2. Plan route of travel prior to performing survey of area marking grid to identify all tripping hazards	GM, SS, GC,
	MOTION - Hand stress/strain from inserting pins and stakes	1. Use ergonomically designed hammer to prevent stress to hands when putting stakes or pins in ground to mark grid 2. Take breaks if employee becomes fatigued from hammering 3. Wear level 2 cut resistant gloves when handling and inserting pins and stakes	
	MOTION - Injury or death from being struck by vehicles in survey area	1. Use buddy system when marking survey grid 2. One person apply paint while the other watches for motor vehicles 3. Wear clean Class II traffic vest to increase visibility	
	MECHANICAL - Pinch and cuts to hands when carrying A-frame barricades	1. Identify pinch points with tape or other material to increase awareness. 2. Wear minimum class II cut-resistant gloves to reduce potential for soft tissue injuries	
	MOTION - Back and leg stress/strain from repetitive bending or squatting during marking survey grid with white paint	1. Utilize a marking pistol wand to keep paint can as far from breathing zone as possible	
	MOTION - Nails or other sharp objects piercing the bottoms of boot and feet	1. Perform a site walk to visually confirm that area is clear of nails and other sharp objects on the ground. Use a broom to push any debris or sharp objects out of the work area. 2. Wear puncture resistant boots or steel sole inserts to prevent sharp objects from piercing the bottom of boots	
	CHEMICAL - Chemical exposure to marking paint	2. Stand up wind of paint spraying activities to prevent chemical exposure	

3. Locate underground utilities while performing site survey with Ground Penetrating Radar (GPR)	GRAVITY - Injury from slips, trips, and falls on wet, uneven, or steep sloped surfaces	1. Make multiple trips with loads to eliminate obstructed view of ground 2. Plan route prior to performing survey of area marking grid to identify all tripping hazards	
	BIOLOGICAL - Scrapes or cuts to hands, arms, or legs from vegetation in survey grid area	Use lawn mower decrease height of vegetation of survey area to increase visibility of tripping hazards	
	BIOLOGICAL - Bites/stings from insects inside or near tall vegetation	1. Remove utility vault lid with a screwdriver and inspect interior of manhole for biting/stinging insects. 2. Wear insect repellant to protect against bites/stings from insects 3. Wear level 2 cut resistant gloves and long sleeve shirts to prevent skin and hand exposure to vegetation and insects	
	ELECTRICAL - Electrical shock from connecting to electrical conduits during utility location	1. Inspect electrical conduits to confirm that the outer casing is not damaged and the inner wires are not exposed. 2. Use a volt meter to determine if an electrical hazard exists before connecting the locate equipment to the electrical conduit. 3. Stop work if the volt meter indicates that the conduit is energized	
	MOTION - Back and leg stress/strain from prolonged use or over-extending survey tools	Use job rotation to reduce prolonged exposure to back and leg stress from operating GPR survey tools	
4. Site Clean Up	MECHANICAL - Pinch hazards to fingers from closing equipment cases	Visually identify pinching hazards from equipment cases around edges and locking mechanisms	
	GRAVITY - Slip, trips, and falls from carrying equipment that obstructs view or on wet/ uneven surfaces	1. Pack equipment so no wires or cables protrude from casing to eliminate fingers being used to push into the case when closing 2. Plan route of travel prior to loading equipment to identify all tripping hazards	
	MOTION - Back and leg stress/strain from lifting and loading equipment into truck	1. Utilize buddy system to lift weight >50 lbs, lift knees not the legs and keep all loads close to your body 	

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This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date
7/11/2019 – Poison ivy observed near well MW-15	GM	7/11/2019

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Indoor Air Sampling	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)

Jackson Domenech	

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☒ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☐ Sunscreen lotion >= SPF30
- ☐ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

e Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☒ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☒ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☒ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:

 BIOLOGICAL
 CHEMICAL
 ELECTRICAL
 GRAVITY
 HUMAN PERFORMANCE
 MECHANICAL
 MOTION
 PRESSURE
 RADIATION
 SOUND
 TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Entering Building to Conduct Sampling Activities	Hostile/Agitated Occupants – potential violence, weapons	1. Use Stop Work Authority. Never Approach a building alone; always use the buddy system. Always have a cell phone. 2. Do not attempt to communicate with any occupants. If you feel threatened in any way, leave the property and Call 911 if there is clear and present danger. Call PM after alerting authorities. 3. Do not interact with occupants, leave area and wait for authorities. Communicate Regularly with PM.	
	Hygiene issues in the Building – Animal fecees, insect infestation	1. Use stop Work Authority. Call PM To reevaluate hazards. 2. Consult with HR, Legal Department, H&S, project management team, supervisor and client as necessary to determine the safest approach. Re-entry may require additional PPE.	
2. Sample Canister – Sample Prep, Collection, and Shipping	Motion - Muscle strain from lifting sampling equipment.	1. Unload as close to work area as safely possible. Use a buddy to lift loads greater than 50 pounds. Lift using legs and straight back. Limit twisting motions during lifting procedures. 2. Do not carry more weight than you can handle. 3. Plan route before lift, keep route clear.	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	

Type of Lift	Minimum Number of Persons	Max. Weight
Non-ideal	1	**25 lbs(11kg)**
Ideal	1	**50 lbs (22kg)**
Ideal Team	2 or more	**100 lbs (45kg)**

	Gravity – Unsound building structure. Slips trips and falls from debris.	1. Pre-walk paths to ensure no obstructions. 2. Clear Area of Debris before beginning work 3. Watch for hanging or falling construction material. Use Stop Work Authority. Call PM to Reevaluate Hazards if found.	
3. Sub-Slab Soil Vapor Sampling	Slips, trips, falls. Pinch points. Eye injury from debris. Injury from lifting and carrying equipment.	1. Wear work gloves when handling equipment/materials. Practice good housekeeping. 2. Unload equipment as close to work area as possible. Keep equipment and supplies organized. Wear work gloves when handling equipment/materials. Use correct size wrenches when assembling sampling train. Use safety goggles. Practice good lifting techniques and keep your back straight. Avoid twisting or awkward movements/positions. Use two people to lift items heavier than 50 pounds.	
	Electrical – Shock form improper use of power tools (electric Hammer Drill)	1. Wear appropriate gloves. Do not remove any safety guards from power tools. 2. Inspectpower cords for damage/wear. Be aware of potential for hidden electric sources. Make sure your power source is rated appropriately for the equipment being used. Always unplug equipment before performing any repairs. 3. Do not use any self-fashioned tools	
	Mechanical – Lacerations from Cutting Sample Tubing	1. Use appropriate cutting device and wear gloves when handling blades. 2. Collect purged soil vapor in a Tedlar bag. Discharge purged soil vapor outside of building.	
	Chemical – Exposure to constituents in soil vapor	1. Collect Purged Vapor in Tedlar Bag. Discharge purged soil vapor outside of building. 2. Continuously perform air monitoring to monitor exposure.	
	Pressure – Ear Injuries from Excessive noise generated by Hammer Drill	1. Use appropriate hearing protection.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date
7/11/2019 – Poison ivy observed near well MW-15	GM	7/11/2019

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Sub-Slab Vapor Pin Install	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)		
Jackson Domenech		
Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☐ Sunscreen lotion >= SPF30
- ☐ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

e Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☒ Cut-resistant gloves or liners
- ☒ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☒ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☒ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

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TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:


BIOLOGICAL

CHEMICAL

ELECTRICAL

GRAVITY

HUMAN PERFORMANCE

MECHANICAL

MOTION

PRESSURE

RADIATION

SOUND

TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Set up work area and equipment	Struck by operating equipment in the area resulting in personal injury/death	• Communicate with the Property Owner about work activities in the Warehouse and drilling locations so that they are aware of the work and communicate this with their workers. • Use safety cones and barricades to demarcate the work area. • Have one person be aware of site traffic (forklift activity). Wear a high visibility vest to be more visible to forklift operators.	
	Slip/trip/falls from slick surfaces or objects in travel path resulting in broken bones, sprains and cuts/lacerations	• Keep walkway clear of any tripping object, i.e. tool(s) and materials lying on ground, etc. Mark with high visibility tape or cones or spray paint any trip hazards that cannot be removed (uneven surfaces, rocks, roots, etc). when feasible. Fill in/flatten uneven ground when feasible. • NO TOOLS ON THE GROUND. Do not leave tools on the ground in the walking path. If staging tools on the ground is necessary, use high-visibility yellow tool mats. • Wear a hard hat at all times to protect head during a fall. • Wear safety toed boots with unworn tread to ensure adequate traction on walking surface. Wear Level 2 cut resistant gloves at all times outside of the vehicle to protect hands from scrapes or punctures during a fall.	
	Sprains/strains from lifting/ carrying equipment to the work area	• Lightly stretch out legs, back and arms for approximately two minutes before starting task. • Do not lift objects > 50 lbs. or awkwardly shaped objects without assistance or use of mechanical means (e.g. carts, dolly, forklift). • Bend and lift with legs and arms, not with back. No AWKWARD LEGS, no OVER REACHING, elbows out, butts up, shoulders too high/low. • Avoid twisting at waist, move feet instead. Do not TWIST AND SHOUT (refer to EMES Hit List). • Do not OVER REACH, position your ELBOWS OUT or SHOULDERS TOO HIGH/LOW or position your BUTT UP to place equipment/supplies down (refer to EMES Hit List). • Maintain the load as close to the body as practical and between shoulder and waist level. Rotate lifting/carrying tasks between workers every 20-30 minutes.	
2. Clear Drilling Locations	Contact with Underground Installations resulting in product releases, or property damage	• Follow the Chevron subsurface utility clearance protocol.	

		Call 811 or NJ One Call and have all underground utilitied marked out before start of the installation of te vapor pins. Verify an official utility markout has been completed before starting work.	
3. Hammer Drill Operation	Malfunction of the hammer drill resulting in injury or contact with underground installations resulting in product release or property damage	• Inspect the hammer drill prior to use. Inspect the hammer drill cord for any damage. Ensure that equipment is in good operating conditions and if there are any defective parts that are identified make sure to replace them or remove them from service. • Adhere to the manufacturer's user instructions. • Only use drill bits designed for the type of hammer drill being used. Properly engage in drill chuck and confirm the bit is held in the chuck. • Drill slowly and monitor the drill depth. • Do not continue drilling if refusal is encountered. • Stop work if you suspect or discover that an underground utility has been struck. Wear safety gloves to protect hands from pinch points.	
	Slip/trip/fall hazards from cords lying on the ground resulting in strain/sprains	• Avoid stretching out the drill cord such that it becomes a tripping or entanglement hazard. • Secure extension cords to prevent them from posing as a tripping hazard. • When possible, reroute electrical cords away from the walking path. • Demarcate electrical cords with safety cones. Keep cords away from feet while drilling.	
	Laceration from sharp metal surfaces or shavings	• Clean up shavings with a brush to avoid or minimize contact with the hands. Wear safety gloves when handling the shavings.	
	Exposure to noise from hammer drill resulting in hearing loss	• Turn off the drill when not in use. • Rotate workers every 20 minutes to prevent long exposure to drill noise. Use of ear plugs over 85 dBA (difficult to hear normal conversation) and use of ear plugs and ear muffs over 95 dBA.	
	Electrocution/shock hazard or unitended start up of the hammer drill resulting in injury	• When the hammer drill is not in use, unplug it from the energy source. • Unplug drill while changing between bits to avoid potential injury. Confirm extension cords equipped with ground fault circuit interrupted (GFCI).	
	Struck by flying debris from broken or loose drill bit	• Verify drill bit has been properly placed/seated in the chuck. • Verify that the chuck is tight and that the key was removed from the chuck. Use lubricant to avoid overheating the bit which might cause failure.	
	Dust entering into the eyes resulting in eye irritation or exposure to silica	• When creating dust from drilling concrete, run the shop vacuum during drilling to avoid excessive dust. • Use a HEPA-filtered vacuum when cleaning drill holes. • Have emergency eye wash available in the work area. • Wear safety glasses to protect eyes from dust/foreign debris from entering.	

		Wear a dust mask to prevent any inhalation of silica.	
	Caught by rotating bit	• Secure or remove loose clothing or other items/articles hanging free which could get caught in rotating equipment. • Keep all limbs away from rotating components. Have buddy in drilling area in case of emergency.	
	Sprains/strains from repetitive motions, awkward body positioning	• Maintain a firm grip on drill handles. • Avoid twisting or hunching too far. • Reevaluate position as needed. Use buddy or cart when moving equipment in between locations.	
4. Insert Sub Slab Port and Assemble Sampling Train	Pinch points while inserting ports resulting in a hand injury	• Adere to manufacturer's assembly instructions. • Use the appropriate sized wrenches when connecting components. • Make sure the area is clear when hammering the pin into place. • Use tubing cutters to avoid injury when cutting sample tubing. • Wear leather gloves to prevent a hand injury. Use a kneeling pad to protect knees while working on the ground.	
	Metal shards entering into eye resulting in eye irritation	• Swagelok fitting and ferrules can produce tiny metal shards in threads if re-adjusted. Be wary of potential metal shard and procect eyes. • Ensure emergency eyewash bottle is available in the work area. Wear safety glasses to protect eyes from metal shards.	
5. Purge Sample Tubing	Exposure to contaminated vapors resulting in respiratory illness or injury	• Monitor the breathing zone with a 5-gas meter. • Perform ambient air monitoring for VOC/O2/CO conditions. • Stop work and call supervisor if any of the following conditions occur: • Sustained (greater than 2 minutes) LEL reading above 0% • Sustained (greater than 2 minutes) H2S reading above 5 ppm • Sustained (greater than 2 minutes) VOC reading above 0.5 ppm • Ensure personnel using meter have been trained on its' use. DO NOT use meter if you are untrained to do so, contact your Supervisor immediately. • Collect purge gas in Tedlar bags. • Discharge purge gas outside of the building. 1. Wear nitrile gloves over cut 2 resistant gloves to protect hands.	
6. Collect Soil Vapor Sample	Lacerations from opening/closing canisters or hand strain from collecting samples	• Large channel locks may also be used for opening the valve to reduce hand strain. • Terminate sampling with 5 inches Hg vacuum remaining. • Wear gloves to prevent hand injury when opening canister valve. 2. Use a kneeling pad while working with the canister on the ground.	
7. Handling/Shipping Summa Canisters	Sprains/strains from lifting/ carrying equipment to the work area	• Lightly stretch out legs, back and arms for approximately two minutes before starting task. • Do not lift objects > 50 lbs. or awkwardly shaped objects without assistance or use of mechanical means (e.g. carts, dolly, forklift). • Bend and lift with legs and arms, not with back. No AWKWARD LEGS, no OVER REACHING, elbows out, butts up, shoulders too high/low.	

		• Avoid twisting at waist, move feet instead. Do not TWIST AND SHOUT (refer to EMES Hit List). • Do not OVER REACH, position your ELBOWS OUT or SHOULDERS TOO HIGH/LOW or position your BUTT UP to place equipment/supplies down (refer to EMES Hit List). • Maintain the load as close to the body as practical and between shoulder and waist level. 3. Rotate lifting/carrying tasks between workers every 20-30 minutes.	
	Mislabeling of canisters	• Use care in properly labeling each canister with the appropriate sampling point and regulator prior to shipping. 4. Shipping determination is required.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

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Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

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Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Manual Handling	**Date of JSA Development: 06/19/2019**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)	
Zachary Rakebrand	AFS Task Manager

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	General PTW
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
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TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

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- ☐ Flexible goggles
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Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
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- ☑ Leather gloves, insulated
- ☑ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
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- ☐ Rubber-sole boots or grips
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TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Manual Handling	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


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TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	**Potential Hazard(s)** (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	**Critical Action(s)** (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	**Responsible Person(s) – Initials**
1. Loading and unloading equipment and materials	MOTION – Muscle strain or injury from lifting or lowering items	1. Load and unload as close to work area as safely possible. 2. Only unload items that are required to complete task. If possible, keep large items like sample coolers on the vehicles. 3. If task requires a lot of equipment/supplies to be loaded and unloaded, use a dolly or cart to reduce the effort. 4. When lifting, assume a safe lifting position – stand close to the object and keep a wide stance; keep feet turned out and heels down; squat by bending at the hips and knees while keeping butt over heels. 5. Lift with your legs – maintain straight back and rise up slowly from a squatting position; don't bend at neck, shoulders, or waist while lifting. Avoid all twisting until fully upright and then lead with foot. 6. Follow manual lifting guidelines: 1. For **non-ideal lifting** circumstances (bent over or when reaching out beyond elbow length from the front of the body), the maximum weight to be lifted and carried shall not exceed **25 lbs.** For weights over 25 lbs, seek use of mechanical devices (i.e. fork lift, loader, drum dolly, cart, etc.). 2. For **ideal lifting** circumstances, the maximum weight to be lifted or carried by one person in good physical condition using two hands and standing erect with item held close to the body shall not exceed **50lbs.**	

<table>
<tr><td></td><td></td><td><table>
<tr><th>Type of Lift</th><th>Minimum Number of Persons</th><th>Max. Weight</th></tr>
<tr><td>Non-ideal</td><td>1</td><td>25 lbs(11kg)</td></tr>
<tr><td>Ideal</td><td>1</td><td>50 lbs (22kg)</td></tr>
<tr><td>Ideal Team</td><td>2 or more</td><td>100 lbs (45kg)</td></tr>
</table></td><td></td></tr>
<tr><td></td><td>MOTION – Cuts, abrasions, contusions, broken bones, and/or death from contact with moving vehicle; or property damage.</td><td>1. Always inspect and wear seat belt when driving.
2. Be aware of other vehicles and/or stationary objects onsite. Maintain a minimum 3-foot cushion around vehicle and between stationary objects. Use spotter if closer than 3 feet from vehicles or stationary objects.
3. Wear all minimum PPE listed above (i.e., high-visibility traffic vest)
4. Secure all cargo before starting journey</td><td></td></tr>
<tr><td></td><td>MOTION - Nails or other sharp objects piercing the bottoms of boot and feet</td><td>1. Perform a site walk to visually confirm that area is clear of nails and other sharp objects on the ground. Use a broom to push any debris or sharp objects out of the work area.
2. Wear puncture resistant boots or steel sole inserts to prevent sharp objects from piercing the bottom of boots</td><td></td></tr>
<tr><td>2. Carrying equipment to/from destination</td><td>MOTION – Cuts, abrasion, contusions, and broken bones, finger amputation from handling or dropping items.</td><td>1. If available, inspect and use handles to lift items (i.e., coolers).
2. Tilt items to test weight. Ask for assistance if weight is excessive; or object is bulky, long or irregularly shaped or over the ideal lifting weight limit (50lb).
3. Test for firm grip before lifting.
4. Mark sure path is clear before lifting.
5. Wear high-visibility gloves to protect hands.</td><td></td></tr>
<tr><td></td><td>MOTION – Cuts, abrasions, contusions, broken bones from a slip, trip, or fall.</td><td>1. Select and inspect path free of debris before departing with load. Survey work area for sharp or jagged edges such as fences, barbed wire, and razor wire, rebar, debris and avoid. Avoid areas where view of ground surface is obstructed, surface may be slippery or unstable due to mud or rocks.
2. Stay focused on task and minimize potential distractions.
3. Do not use cell phone when walking. Find safe stationary location for all cell phone use.
4. Wear sturdy, supportive laced up work boots.</td><td></td></tr>
</table>

		5. Inspect the sole of the work boot to ensure sufficient tread to provide traction. If worn, replace before beginning work. 6. Wear high-visibility work gloves to protect hands.	
	GRAVITY - Abrasion, laceration or puncture to hand/feet	1. Be aware of pinch points associated with gates and vehicle doors and between boxes, materials being packed/un-packed. 2. Wear all minimum PPE listed above (i.e., high-visibility work gloves) when onsite. 3. Wear puncture resistant insoles when puncture hazard is present.	
	MOTION – Injury or property damage from wind/weather conditions getting control of item	1. Never attempt to move sheets of metal, plastic, etc. by ones self during adverse weather. 2. Consider final destination prior to moving and verify secure if conditions worsen. 3. Select items having handhold cut outs or griping points for ease for use 4. Use two person lift for bulky or large items not meeting the ideal/non-ideal limit.	
3. Pushing, pulling, rolling, twisting or turning materials to open, close, or relocate	MOTION – injury from overexerting while moving materials	1. Stay in control and know limits, do not overexert. 2. Use right tool for the job. Consider alternate approach with less manual efforts. 3. Wear appropriate hand protection for the job task (i.e., leather or mechanics gloves).	
	CHEMICAL – Environmental spill, leak of material when tilted or if lost control	1. Confirm integrity of material, box, lid and seal prior to moving. 2. Use cart/dolly instead of rolling material. 3. Test to confirm material is securely on dolly/cart before committing to move. 4. Operate slow and steady.	
	GRAVITY – Injury to hands or feet from tipped material	1. If control is lost, do not attempt to regain control through use of strength, step away and let material go where it may. Stop work and involve the right people to establish new plan. 2. Think leverage and not strength 3. Keep hands legs and feet out of pinch points and potential lines of fire.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Operating Generator	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)

Jackson Domenech	

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☒ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☐ Sunscreen lotion >= SPF30
- ☐ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

e Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☐ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☐ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☐ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

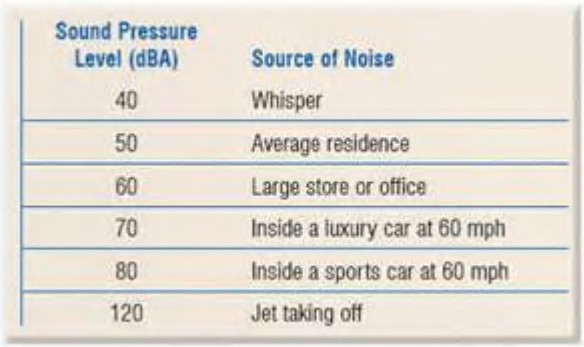
ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:

BIOLOGICAL | CHEMICAL | ELECTRICAL | GRAVITY | HUMAN PERFORMANCE | MECHANICAL | MOTION | PRESSURE | RADIATION | SOUND | TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Establish work zone with generator	TEMPERATURE - Fire / melting from placing a generator in an area with combustibles	1. Remove combustibles, flammables and obstructions at least 10 ft away from area where generator will be placed. 2. Have at least a 10 lb ABC fire extinguisher within 10 ft.  Keep generator on flat, level surface.	
	MOTION - Struck by/or against moving vehicles on site while positioning generator	1. Do not place generator in an active travel path of foot, vehicle or equipment traffic. 2. Employee must don a reflective vest to increase their visibility to others traveling/driving through the site. 3. Wear hard hat to protect against overhead hazards (building canopies, signs, etc.) that may be in the work area that cannot be removed (remove if possible).	

		Wear steel toe boots with puncture resistant soles (or inserts) to help protect feet from possible crushing from generator while positioning it.	
	PRESSURE - Flying dust while starting the generator (from exhaust)	1. Do not place your face in front of the generator exhaust at any time. Wear safety glasses to help keep dust from entering the eyes.	
2. Unloading Generator from truck or trailer	MOTION - Strains from manually positioning generator	1. Use two man system when loading and unloading generator if it weighs 50 lbs or more. 2. Do not twist at the waist. Lift by bending the knees and not with back. Use a machine (skid steer, excavator w/ bucket, etc.) or pickup truck to transport when possible.	
	MOTION - Lacerations from sharp metal edges	1. Do not place hands on edges of the muffler or underneath the generator when setting it down. 2. Wear type II cut resistant gloves and long sleeves to help protect against sharp edges (muffler and metal edges) when lifting/moving the generator.	
	CHEMICAL - Leaks and spills as a result of generator tipping over in a release or exposure to worker.	1. Verify MSDS and review MSDS in drums. 2. Verify gas caps/lids are completely sealed. 3. Wear nitrile chemical resistant gloves or glove liners while handling drums containing product.	
3. Before starting generator	CHEMICAL - Equipment malfunction resulting a spill/ fuel release to the environment	1. Check oil and gas levels before starting (do not overfill). 2. Perform a visual equipment inspection to ensure the equipment is working as intended. 3. Have a spill kit on site and easily accessible. 4. Place generator in a secondary containment capable of holding at least the amount of fuel and oil inside the generator.	
	ELECTRICAL - Electrocution from internal electrical components	1. Maintenance to be performed by a certified mechanic only. 2. Make certain all electrical components plugged into the generator are operating on a GFCI. 3. Test the GFCI before each shift to make sure that it is working as designed. 4. Do not place generator in standing water.	
4. Starting/Operating Generator	TEMPERATURE - Fire from hot internal engine components	1. Follow manufacturer's recommendations for refueling. Generally, wait at least 5 minutes after shutting off generator before refueling to allow engine to cool. Engine should be cool to touch before adding fuel. 2. Use approved metal safety gas cans to transfer fuel. Gas can must have flame arrestor screen in spout.	

	SOUND - Hearing damage due to high noise produced by generator	1. When the work area allows, position the generator at least 10 ft. away from the working area to eliminate employees working within the elevated noise area. 2. Wear ear plugs when working within 10 ft of a generator to help prevent hearing damage. 	
	TEMPERATURE - Burns from hot engine and exhaust components	1. Do not touch muffler and engine parts during normal operation. 2. Do not disassemble engine parts until engine has cooled for 30 minutes. 3. Wear long sleeve shirts to help protect skin from exposure to hot engine components.	
5. Loading generator	MOTION - Strains from manually positioning generator	1. Use two man system when loading and unloading generator if it weighs 50 lbs or more. 2. Do not twist at the waist. Lift by bending the knees and not with back. 3. Use a machine (skid steer, excavator w/ bucket, etc.) or pickup truck to transport when possible.	
	MECHANICAL - Lacerations from sharp metal edges	1. Do not place hands on edges of the muffler or underneath the generator when setting it down. 2. Wear type II cut resistant gloves and long sleeves to help protect against sharp edges (muffler and metal edges) when lifting/moving the generator.	

Sound Pressure Level (dBA)	Source of Noise
40	Whisper
50	Average residence
60	Large store or office
70	Inside a luxury car at 60 mph
80	Inside a sports car at 60 mph
120	Jet taking off

JSA Acknowledgement

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This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

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Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Sample Packing and Cooler Handling	**Date of JSA Development: 6/19/2019**
Project Name: Former Texaco Research Center	**PMCoW: TBD**
Site Address: 45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)	
Zachary Rakebrand	AFS Task Manager

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Stephanie Hesselbarth	Staff Geologist	2/12/2018

Permits/Plans Required (general, Specialized, etc.):	General PTW
Specialized tools/equipment:	Coolers, Sample Bottles

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☑ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☑ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☑ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Sunscreen lotion >= SPF30
- ☑ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☑ Leather/Work gloves
- ☐ Welding gloves
- ☑ Leather gloves, insulated
- ☑ Nitrile gloves
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Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☑ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☑ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Sample Packing and Cooler Handling	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Setup processing area and unpack equipment	Motion - Struck by other vehicles due to lack of traffic controls or poor visibility	1. Locate non-traffic or low traffic areas to setup work station. 2. Park support vehicle away from active traffic or between work area and active traffic to protect workers from traffic. 3. Scan area for moving vehicles and hazards before opening door 4. Place cones around vehicle to alert drivers of upcoming work and to demarcate work area. 5. Wear reflective vest to increase visibility to drivers and reduce struck by hazard.	
	Motion/Gravity – Tripping over site debris/trip hazards or equipment on the ground	1. Visually check area to identify and remove trip hazards (equipment, debris). If hazards cannot be removed (uneven ground, roots, rocks) mark with cones, high visibility tape or flagging and notify others working in area. 2. Designate equipment storage area within work area to prevent clutter and reduce trip hazards. 3. Do not place any equipment in walking path.	
	Motion - Back strain from lifting coolers using improper lifting techniques	1. Do not lift loads heavier than 50 pounds without assistance from another person. 2. Get a firm grip, lift using legs and keep back straight, do not bend or twist at waist. 3. If possible, use portable field table, or secure work surface at table height to prepare packages. 4. Stage field vehicle as close as possible to cooler packing/staging area to minimize distance that coolers must be carried during loading.	
	Gravity - Dropping equipment on self or others causing injury	1. Lift coolers using designated handles and confirm they are securely attached prior to lifting. 2. Plan route and verify clear before starting lift.	

	Lacerations/pinch points on equipment when setting up work area	1. Identify pinch points on equipment and cases such as hinges, and keep hands 6 inches from identified pinch areas. 2. Use only closed-blade or self-retracting cutting tools to cut tape when opening taped coolers and wear cut resistant gloves. 3. Maintain a 4-foot radius from others when using cutting tools and always cut away from body.	
	Chemical - Chemical burns from broken/leaking sample bottles containing preservatives	1. Use wet paper towel to carefully remove leaking preservative from the outside of other sample containers and the cooler. 2. Do not touch broken sample bottles; discard bottles in accordance with Site waste disposal practices. 3. Do not touch glass or preservatives with bare hands. 4. If chemicals contact clothes, removed soiled clothing and wash contacted area on body. 5. Wear nitrile gloves over cut-resistant gloves to prevent dermal contact with leaking preservative when unpacking cooler from lab. 6. Wear safety glasses at all times to protect eyes from contact with chemicals.	
2. Packaging Samples	Chemical - Contact with contaminated soils on outside of sample bottles	1. Visually inspect bottles and wipe off any soil observed on outside of container before placing into bubble wrap and cooler. 2. Wear nitrile gloves when handling sample containers to avoid contact with soils.	
	Motion - Lacerations from broken sample containers or when taping coolers for shipment	1. Place glass containers in bubble wrap before placing in cooler. 2. Handle full bottles (liter) with 2 hands and dry outside with paper towels to avoid dropping. 3. Use minimal hand pressure necessary to remove or tighten bottle lids/caps. 4. Once lids/caps on VOA vials are placed on containers and tightened to where there is no leakage, do not over-tighten to prevent breakage of glass and potential lacerations to hands. 5. Pack sample bottles tightly in cooler and use bubble wrap to reduce excess space/potential for breakage. 6. Use only closed-blade cutting tools to cut tape when preparing coolers for shipment to prevent potential lacerations to hands.	

	Gravity/Motion -Exertion/muscle strain from lifting heavy coolers to place in vehicle	1. Bend at knees and keep back straight, do not twist or bend at waist. 2. Limit weight of each cooler when packing and use two-man lift if carrying loads heavier than 50 pounds. 3. Use countdown of 3 and keep continuous conversation if using 2 people to lift and carry coolers. 4. Use cooler handles when lifting coolers, verify that handles are not broken prior to lifting. 5. Plan route and have clear path of travel, secure equipment in vehicle once loaded. 	

JSA Acknowledgement

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Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Soil Vapor Sampling	**Date of JSA Development:6/19/2019**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)	
Zachary Rakebrand	AFS Task Manager

Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)
Jackson Domenech	Environmental Engineer I	2/11/2020

Permits/Plans Required (general, Specialized, etc.):	General PTW
Specialized tools/equipment:	PID

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☑ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☑ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
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- ☐ Sunscreen lotion >= SPF30
- ☐ Insect repellant (DEET: flying insects)
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- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Face Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
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- ☑ Leather/Work gloves
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Foot Protection

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- ☐ Chemical resistant boot covers
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TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Soil Vapor Sampling	Site ID: Former Texaco Research Center Beacon Facility


BIOLOGICAL


CHEMICAL


ELECTRICAL


GRAVITY


HUMAN PERFORMANCE


MECHANICAL


MOTION


PRESSURE


RADIATION


SOUND


TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	Potential Hazard(s) (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	Critical Action(s) (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	Responsible Person(s) – Initials
1. Unloading soil vapor sampling equipment and setting up exclusion zone	Motion - Broken bones/ death from being hit by vehicular traffic.	1. Establish traffic control for exclusion zone per requirements; use 42.0" high-visibility delineator post with flags; and park vehicle as barrier, if feasible. 2. Use a spotter and maintain 3ft cushion between vehicles and other objects. 3. Wear Type II or III hi-vis vest at all times. Yield right of way to all vehicles and pedestrians.	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Motion - Muscle strain from lifting sampling equipment.	1. Unload as close to work area as safely possible. Use a buddy to lift loads greater than 50 pounds. Lift using legs and straight back. Limit twisting motions during lifting procedures. 2. Do not carry more weight than you can handle. 3. Plan route before lift, keep route clear.	
1. Opening and closing well vaults at soil vapor sample points	Mechanical - Pinching or lacerating fingers on well vault.	1. Identify pinch points associated with well lid, do not place hands in these areas; wear protective gloves. 2. Use the right tools for the job (e.g., use a socket wrench that matches bolt size and a small pry bar to open well vault.	

Type of Lift	Minimum Number of Persons	Max. Weight
Non-ideal	1	**25 lbs(11kg)**
Ideal	1	**50 lbs (22kg)**
Ideal Team	2 or more	**100 lbs (45kg)**

	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Motion - Knee injuries from kneeling techniques.	1. Clear and inspect area that kneeling will occur of sharp objects or gravel. Kneel on a soft surface when possible. 2. When kneeling, wear knee pads or place pad on ground to prevent injuries to knees.	
	Biological - Insect bites, skin irritation, or allergic reaction from bites/stings from insects inside well housing.	1. Visually check for insects prior to opening the well. 2. Have insect spray available to kill wasps/bees. 3. Wear gloves, long sleeves, and pants to prevent insect bites.	
	Motion – Back injuries from awkward twisting and bending.	1. Position body close to well vault openings to limit lifting area while opening well vaults.	
	Chemical - Respiratory irritation from vapor/gas inhalation.	1. Keep face clear of wellhead and work upwind of wellhead, if feasible. 2. Air monitoring with a calibrated flame-ionization (FID) detector must be utilized to determine concentrations of petroleum vapors in breathing zone. If FID reading exceeds 0.5 ppm for 2 minutes, benzene-specific monitoring must take place with a colorimetric tube or real-time monitoring device.	
3. Setting up equipment and collecting soil vapor samples i.e., calibration gas, leak tracer, purge pump, and summa canisters.	Mechanical - Pinch points from hand tools.	1. Inspect equipment for hinges or pinch points and identify them with stickers or high visibility paint. 2. Wear leather gloves and use proper tools to fasten tubing and fittings so fingers are not in the line of fire 3. Wear Nitrile gloves over cut-resistant gloves to prevent hand injury and skin irritation when setting up helium tank leak tracer.	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Electrical – Electric-shock burns from electrical cord use.	1. Inspect all electrical cords and utilize a GFCI, test before use. Avoid use in the rain and do not run electrical cords through wet or muddy areas.	

	Motion – Back strain from awkward twisting and bending.	1. Use correct body positioning (bend at the knees) when sampling. 2. Wear knee pads if kneeling for long time periods.	
	Pressure – Injuries from compressed gas.	1. Use a gas cylinder stand to prevent injuries due to uncontrolled energy from calibration gas and helium tank.	
	Chemical - Respiratory irritation from vapor/gas inhalation.	1. Use multi gas meter to continuously monitor breathing zone air during purging. 2. **STOP WORK** IMMEDIATELY and contact site supervisor if vapors/gas are noticed in breathing zone or conditions change. 3. Keep face clear of wellhead and work upwind of wellhead, if feasible.	
	Chemical - Dermal irritation from contact with potentially contaminated media.	1. Do not touch contaminated media with ungloved hands. 2. Wear Nitrile gloves over Type II cut-resistant gloves to prevent particulates/liquids from contacting hands and causing irritation.	
4. Loading soil vapor sampling and exclusion zone equipment	Motion - Back strain from lifting, awkward twisting and improper bending.	1. Utilize the buddy system when loading samples and storing all equipment. Lift with your knees not your back. 	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and caution tape.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Keep all debris i.e., trash, loose caution tape, properly stored in trash bags. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Pressure – Injuries from compressed gas.	1. Release pressure from all pressurized equipment slowly when disassembling.	
	Mechanical – Pinch points and lacerations from handling equipment.	1. Inspect equipment for hinges or pinch points and identify them with stickers or high visibility paint. 2. Wear leather gloves when loading sampling and exclusion zone equipment.	

	Chemical - Dermal irritation from contact with potentially contaminated media.	1. Do not touch contaminated media with ungloved hands. 2. Wear Nitrile gloves over Type II cut-resistant gloves to prevent particulates/liquids from contacting hands and causing irritation.	

JSA Acknowledgement

"I have read this JSA, and I understand the hazards and safe work practices associated with the task.
If conditions change or an additional hazard is recognized, I will Stop Work and notify the Site H&S Officer immediately:"

This JSA must be acknowledged by affected workers every shift.

Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron - Job Safety Analysis

ARCADIS Design & Consultancy for natural and built assets

JSA Description: Subslab Soil Vapor Sampling	**Date of JSA Development: 2/11/2020**
Project Name: Former Texaco Research Center	**PMCoW:**
Site Address:45 Old Glenham Road, Fishkill (Beacon), New York	**Project No: 30064262**

Development Team (Include employer & email if not employed by Arcadis.)		
Jackson Domenech		
Reviewed By (Include employer & email if not employed by Arcadis.)	**Position/Title:**	**Review Date** (MM/DD/YYYY)

Permits/Plans Required (general, Specialized, etc.):	
Specialized tools/equipment:	

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

- ☑ ANSI/ISEA 107-2010 Class 2 or 3 vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☑ Long pants
- ☑ Long-sleeved shirts
- ☑ Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames
- ☑ Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles
- ☑ High visibility work gloves (when high visibility glove options exist for a particular glove type)
- ☑ Hard hat that complies with ANSI Z89.1

TASK SPECIFIC: Personal Protective Equipment (PPE) Determination*

Eye Protection

Must comply with ANSI Z87.1

- ☐ Impact Goggles
- ☐ Flexible goggles
- ☐ Welding goggles/helmet or face shield. Tinted lenses required
- ☐ Laser safety glasses

Head Protection

- ☐ Type E Hardhat (Electrical)
- ☐ Hardhat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Hazardous Atmosphere

- ☐ Photoionization Detector (PID)
- ☐ Flame Ionization Detector (FID)
- ☐ Dust Monitor
- ☐ LEL / O_2 Meter
- ☐ H_2S Meter

Hearing Protection

- ☐ Ear Plugs (noise 80 db)
- ☐ Ear Muffs with Ear Plugs (noise 105 db)

Body Protection

- ☐ Chemical resistant cloting recommended on SDS
- ☐ Chain saw chaps
- ☐ Snake chaps or boots marketed as "snake proof"[3]
- ☐ ANSI/ISEA 107-2010 Class 3 vest or ANSI/ISEA 107-2015 Type R, Class 2 vest if low light conditions or traffic flow at 50 mph or more
- ☐ ANSI/ISEA 107-2010 Class 2 or 3 *BREAKAWAY* vest or ANSI/ISEA 107-2015 Type R, Class 1 or 2 vest
- ☐ Sunscreen lotion >= SPF30
- ☐ Insect repellant (DEET: flying insects)
- ☐ Insecticide (Permethrin: ticks)
- ☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

e Protection

- ☐ Chemical protective goggles that comply with ANSI Z87.1
- ☐ Face Shield over safety glasses

Respiratory Protection

- ☐ Half-face Air Purifying Respirator
- ☐ Full-face Air Purifying respirator
- ☐ SCBA or Supplied Air

Fall Protection

- ☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Hand Protection

- ☐ Chemical resistant gloves per SDS
- ☐ Cut-resistant gloves or liners
- ☐ Leather/Work gloves
- ☐ Welding gloves
- ☐ Leather gloves, insulated
- ☐ Nitrile gloves
- ☐ Impact resistant gloves

Foot Protection

- ☐ Safety shoes or boots with metatarsal guards
- ☐ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)
- ☐ Safety boots with electric hazard (EH) protection (standard in most footwear)
- ☐ Rubber-sole boots or grips
- ☐ Chemical resistant boot covers
- ☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Heat, Flame, Flash Fire or Arc Hazard

- ☐ Cooling vest
- ☐ Fire retardant clothing (FRC)

***If an item is checked, it is relevant for all job steps. If an item is specific to a particular job step it must be noted in the Critical Action(s) column in the JSA.**

TEAM Chevron - Job Safety Analysis

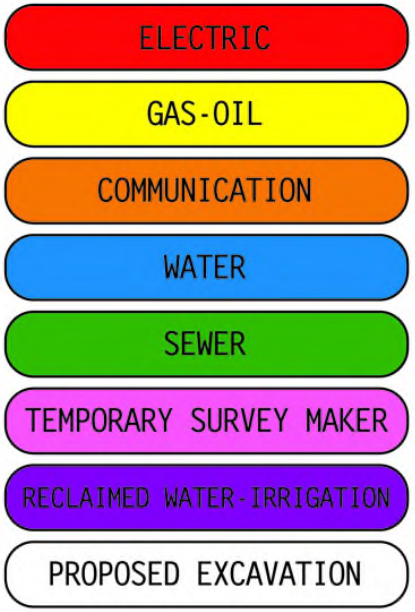
ARCADIS Design & Consultancy for natural and built assets

JSA Description:	Site ID:

 BIOLOGICAL
 CHEMICAL
 ELECTRICAL
 GRAVITY
 HUMAN PERFORMANCE
 MECHANICAL
 MOTION
 PRESSURE
 RADIATION
 SOUND
 TEMPERATURE

Job Steps (Avoid listing too many job steps for a task. Consider multiple JSAs instead.)	**Potential Hazard(s)** (Avoid being too general- i.e. "slip, trip, fall" or "fire". Example of better wording: "tripping on silt fence" or "fire due to static discharge in hose".)	**Critical Action(s)** (Avoid using generic words (i.e. use "proper" PPE or "proper" lifting techniques). Consider "wear Level A2 cut resistant gloves under nitrile gloves" or "lift with the legs and not the back, get assistance when carrying over 50 pounds or bulky loads".)	**Responsible Person(s) – Initials**
1. Unloading soil vapor sampling equipment and setting up exclusion zone	Motion - Broken bones/ death from being hit by vehicular traffic.	1. Establish traffic control for exclusion zone per requirements; use 42.0" high-visibility delineator post with flags; and park vehicle as barrier, if feasible. 2. Use a spotter and maintain 3ft cushion between vehicles and other objects. 3. Wear Type II or III hi-vis vest at all times. Yield right of way to all vehicles and pedestrians.	GM, SS, GC,
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and monitoring well covers.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. 3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Motion - Muscle strain from lifting sampling equipment.	1. Unload as close to work area as safely possible. Use a buddy to lift loads greater than 50 pounds. Lift using legs and straight back. Limit twisting motions during lifting procedures. 2. Do not carry more weight than you can handle. 3. Plan route before lift, keep route clear.	
2. Clear Drilling Locations	ELECTRICAL - Shock or injury from subsurface utilities	1. Complete subsurface clearance checklist. STOP WORK IMMEDIATELY if conditions change or if subsurface utilities are suspected.	

Type of Lift	Minimum Number of Persons	Max. Weight
Non-ideal	1	**25 lbs(11kg)**
Ideal	1	**50 lbs (22kg)**
Ideal Team	2 or more	**100 lbs (45kg)**

			
3. Calibrate, Assemble, and Check Equipment	Mechanical – Pinch point, Hand injuries, damaged equipment	1. Adhere to manufacturer's use instructions and confirm that equipment s properly assembled and working correctly. 2. Wear Leather gloves to prevent hand injury	
4. Begin Drilling through Slab	Mechanical – pinch points, hand injuries, entanglement, slips trips and falls due to equipment use	1. Plan routes to work location. Review available drawings, confirm utility identification. 2. Wear proper face shield if flying debris hazard exists 3. Maintain firm grip on equipment. Keep cords away from feet while drilling. 4. Do not continue to drill if refusal is encountered. 5. Use Stop Work Authority if necessary and do not hurry through tasks	
5. Setting up equipment and collecting soil vapor samples, Closing Sampling Point	Mechanical - Pinch points from hand tools.	1. Inspect equipment for hinges or pinch points and identify them with stickers or high visibility paint. 2. Adhere to manufacturer's assembly instruction. Use correct size equipment for connecting components 3. Wear leather gloves and use proper tools to fasten tubing and fittings so fingers are not in the line of fire Wear Nitrile gloves over cut-resistant gloves to prevent hand injury and skin irritation when setting up helium tank leak tracer.	

	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Store equipment with sharp edges protected. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Electrical – Electric-shock burns from electrical cord use.	Inspect all electrical cords and utilize a GFCI, test before use. Avoid use in the rain and do not run electrical cords through wet or muddy areas.	
	Motion – Back strain from awkward twisting and bending.	1. Use correct body positioning (bend at the knees) when sampling. 2. Wear knee pads if kneeling for long time periods.	
	Pressure – Injuries from compressed gas.	Use a gas cylinder stand to prevent injuries due to uncontrolled energy from calibration gas and helium tank.	
	Chemical - Respiratory irritation from vapor/gas inhalation.	1. Use multi gas meter to continuously monitor breathing zone air during purging. 2. **STOP WORK** IMMEDIATELY and contact site supervisor if vapors/gas are noticed in breathing zone or conditions change. 3. Keep face clear of wellhead and work upwind of wellhead, if feasible.	
	Chemical - Dermal irritation from contact with potentially contaminated media.	1. Do not touch contaminated media with ungloved hands. 2. Wear Nitrile gloves over Type II cut-resistant gloves to prevent particulates/liquids from contacting hands and causing irritation.	
4. Handling and shipping soil vapor sampling canisters and exclusion zone equipment	Motion - Back strain from lifting, awkward twisting and improper bending.	1. Utilize the buddy system when loading samples and storing all equipment. Lift with your knees not your back. 	
	Gravity - Broken bones/lacerations from tripping over sampling equipment, tools, and caution tape.	1. Keep sampling equipment organized and staged in one central location to prevent tripping hazards. 2. Keep all debris i.e., trash, loose caution tape, properly stored in trash bags.	

		3. Wear Type II cut-resistant gloves to protect hands from lacerations from potential fall.	
	Pressure – Injuries from compressed gas.	1. Release pressure from all pressurized equipment slowly when disassembling.	
	Mechanical – Pinch points and lacerations from handling equipment.	1. Inspect equipment for hinges or pinch points and identify them with stickers or high visibility paint. 2. Wear leather gloves when loading sampling and exclusion zone equipment.	
	Chemical - Dermal irritation from contact with potentially contaminated media.	1. Do not touch contaminated media with ungloved hands. 2. Wear Nitrile gloves over Type II cut-resistant gloves to prevent particulates/liquids from contacting hands and causing irritation.	

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Name	Signature	Initials Used on Form	Date	Date	Date
PMCoW:					

Verification of Critical Actions – Undersigned verifies that critical actions are in place, or have been evaluated based on availability, effectiveness and understood by the crew prior to work starting.

Name of Verifier	Signature	Date	Date	Date

End of Day Lookback – Use this section to log changes made to the JSA throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Lookback Leader Name	Date

TEAM Chevron

Job Safety Analysis

JSA Description: Land Surveying		
Project Name:	**Site Address:**	**Field Leader:**
Date of JSA Development: 1/7/2015	**Project No:**	
Development Team Please include the team members employer and email if not employed by ARCADIS:	**Position/Title:**	**Phone Number**
Reviewed By Please include the reviewers employer and email if not employed by ARCADIS:	**Position/Title:**	**Review Date (MM/DD/YYYY)**
Jay White	H&S Administrator	01/07/2014

Permits Required (general, hi-risk, etc.):	General PTW
Specialized tools/equipment:	Surveying Equipment

MINIMUM REQUIRED PERSONAL PROTECTIVE EQUIPMENT

☑ **(Class II) High-visibility vest or appropriate high-visibility clothing.** ☑ **Long pants/Long shirt** ☑ **Safety glasses, wraparound or with side shields labeled with ANSI Z87.1 rating, or a certification card for lenses and frames** ☑ **Safety footwear meeting ASTM F2413-05 standard with chemical or oil resistant soles** ☑ **Long-sleeved shirts** ☑ **High visibility work gloves (when high visibility glove options exist for a particular glove type)** ☑ **Hard hat that complies with ANSI Z89.1**

Personal Protective Equipment (PPE) Determination

Check all that app ☑ **and follow requirements associated with selection in PPE Hazard Assessment (App. H in HASP)**

Eye Protection

☐ Chemical protective goggles that comply with ANSI Z87.1

☐ Impact goggles that comply with ANSI Z87.1

☐ Flexible goggles that comply with ANSI Z87.1

☐ Welding goggles /helmet or face shield. Tinted lenses required. PPE must comply with Z87.1

☐ Laser safety glasses that comply with ANSI

Hazardous Atmosphere

☐ Photoionization detector (PID)

☐ Flame Ionization Detector (FID)

☐ Dust monitor

☐ LEL / O_2 meter

☐ H_2S meter

Head Protection

☐ Type E Hardhat (Electrical)

☐ Hard hat with chin strap, miner's helmet with chin strap or mountaineering helmet with chin strap

Body Protection

☐ Chemical resistant clothing recommended on SDS

☐ Chain saw chaps

☐ Snake chaps OR boots marketed as "snake proof"[3]

☐ DOT Class III vest (low light conditions or traffic flow at 50 mph or more)

☐ DOT Class II or III tear away vest when working around rotating or moving parts

☒ Sunscreen lotion >/= SPF 30

☒ Insect repellant

☐ US Coast Guard approved personal flotation device (PFD) – Type I, II or III

Foot Protection

☐ Safety shoes or boots with metatarsal guards

☒ Safety boots with puncture-resistant midsoles or that have built-in puncture resistance (PR rated)

☐ Safety boots with electric hazard (EH) protection (standard in most footwear)

☒ Rubber-sole boots or grips

☐ Chemical resistant boot covers

☐ Lace-up safety boots conforming to ASTM F2413-05 or equivalent in non-US jurisdictions

Face Protection

☐ chemical protective goggles that comply with ANSI Z87.1 ☐ Face Shield

Hearing Protection

☐ Ear Plugs (noise 80 db)

☐ Ear Muffs with Ear Plugs (noise 105 db)

Respiratory Protection

☐ Half-face respirator ☐ Full-face respirator

☐ SCBA

Fall Protection

☐ Personal fall arrest system designed or approved by a qualified person OR other means of fall protection determined by qualified person

Heat, Flame, Flash Fire or Arc Hazard

☐ cooling vest

☐ Fire retardant clothing (FRC)

Hand Protection

☐ chemical resistant gloves per SDS

☐ cut-resistant gloves or liners

☒ Leather/work gloves ☐ welding gloves

☒ leather gloves, insulated ☐ nitrile gloves

☐ Impact Resistant Gloves

Job Safety Analysis

JSA Description: Land Surveying	Site ID:	Date: 1/7/2015


Biological


Chemical


Electrical


Gravity


Mechanical


Motion


Pressure


Radiation


Sound


Temperature

Job Steps	Potential Hazard(s)	Critical Action(s)	Responsible Person(s) - Initials	Mitigation Steps Verified [1]
1. Locate work area	Motion - Broken bones, head trauma, cuts/scrapes/bruises or death resulting from being struck by motor vehicle or equipment	1. Plan work to stay out of active traffic areas and complete during low-traffic times, if possible. 2. Park support vehicle between active traffic and workers to protect workers from traffic. 3. Use traffic control measures (barricades and/or cones) to direct traffic around a designated work area. 4. Wear reflective vest/shirt to increase visibility to drivers.		
	Motion - Ankle knee or wrist injury from slips, trips, and falls over equipment or fixed hazards on site	1. Remove slip/trip/fall hazards or Demarcate fixed hazards using marking paint, traffic cones. 2. Travel on established walking paths. 3. Scan the walking path ahead for potential slip, trip, or fall hazards. Alert others in group and use an alternate route around these impediments. 4. Keep work area clear of hazards at all times. Do not walk in hazardous areas, or discontinue site walk if hazards cannot be safely mitigated. 5. Wear steel safety shoes with puncture resistant soles at all times when onsite to protect feet from crush and puncture type injuries and good traction when walking. Inspect shoes before each use to ensure soles have good tread and are not worn. 6. Wear cut 2 resistant gloves and long-sleeved shirt to prevent lacerations in the event of a fall.		
	Biological - Bite/sting from insects, snakes, wildlife, contact with poisonous vegetation causing injury	1. Where possible, cut grass to increase visibility and remove hazardous flora. 2. Identify and avoid vegetation that may be at eye level when walking, and for lower vegetation if squatting or bending over.		

		3. Use hand clippers/shears to remove vegetation that may pose a risk of eye injury near work area before starting work. 4. If moving through vegetated areas, use a long-handled tool to disturb vegetation prior to stepping through. 5. Use insect repellant with DEET when in areas with grass higher than 6 inches or where insects are observed. 6. Mark with high-visibility tape or cones and stay at least 5 feet away from hazardous flora (See HASP for poisonous plant identification) and ant mounds. 7. If dangerous wildlife is observed (dogs, etc.) do not approach, find the closest safe area, and call supervisor for instructions. 8. Wear long sleeve shirt to protect against biological concerns. 9. Wear safety glasses at all times, and upgrade to spoggles if vegetation cannot be cleared from work area or if winds exceed 25mph on site.		
	Biological - Cuts from equipment or reaction to poisonous flora while removing brush and trees	1. Find a clear path, if available, to avoid cutting brush. 2. Maintain 10-foot radius of clearance from personnel cutting brush and 5-foot radius of clearance from personnel carrying cutting tools. 3. Use loppers, shears, or brush ax; use of machete is not allowed. 4. If cutting brush or trees, remove brush to ground level to avoid leaving sharp stumps. 5. Disclose any plant allergies to site manager and site personnel; have TecNu available if poison ivy in area. 6. Wear long-sleeved shirts to protect against cuts and scrapes. 7. Wear level 2 cut-resistant gloves when using cutting tools to reduce risk of being cut.		
2. Setup Equipment	Motion - Back, arm or shoulder strain from unpacking equipment	1. Determine travel path and staging area before lifting materials. 2. Use mechanical means to move items >100 pounds (machine instead of manpower). 3. Do not lift or move loads heavier than 50 pounds without assistance. 4. Bend and lift with legs and arms, do not bend or twist at waist. 		
	Gravity - Broken or bruised feet/legs from dropping equipment on feet or lower body	1. Cover equipment when not in use in wet conditions to keep dry. Wipe off wet equipment prior to use. 2. Use handles, when available, to provide best grip. 3. Carry small loads. Do not lift loads heavier than 50 pounds without assistance from another person.		

		4. Get a firm grip, lift using legs and keep back straight, do not bend or twist at waist. 5. Wear steel-toed boots to prevent foot injury from dropped equipment.		
	Gravity - Ankle, knee, or wrist injury from slips, trips, and falls over fixed hazards or equipment.	1. Move equipment to a level stable ground to perform inspection if slip, trip, fall hazards such as uneven/soft/wet ground are present. 2. Remove slip/trip/fall hazards or Demarcate fixed hazards using marking paint, traffic cones. 3. Travel on established walking paths. 4. Scan the walking path ahead for potential slip, trip, or fall hazards. Alert others in group and use an alternate route around these impediments. 5. Keep work area clear of hazards at all times. Do not walk in hazardous areas, or discontinue site walk if hazards cannot be safely mitigated. 6. Wear safety shoes at all times when onsite to protect feet from crush type injuries and ensure good traction when walking. Inspect shoes before each use to ensure soles have good tread and are not worn. 7. Wear cut 2 resistant gloves and long-sleeved shirt to prevent lacerations in the event of a fall.		
	Motion - Damage to equipment while setting up or carrying to work area	1. Setup equipment away from traffic and put cones around equipment to increase visibility. 2. Do not carry equipment loads that exceed 50 pounds, when possible. 3. Use 2-man lift when carrying loads heavier than 50 pounds to reduce risk of dropping equipment.		
	Mechanical - Lacerations/pinch points with equipment and equipment cases	1. Identify pinch points such as tripod and equipment case hinges, and keep hands/fingers away from these areas. 2. Wear leather gloves to protect hands from a pinch.		
3. Utility Locating and Surveying	Electrical - Electrocution or electric shock from State One Call Markouts Marked Improperly	1. **STOP WORK** 2. Call individual utilities to notify of mismarked lines. 3. Have utility companies re-mark utilities correctly. 4. Photograph to document discrepancy. 5. Follow ARCADIS and Chevron clearance protocols and complete forms.		
	Motion - Strains, sprains and lacerations to the hands from slip, trip, and falls due to equipment or obstacles on site	1. Visually check for hazards on ground. Identify and remove trip hazards if possible. If hazards cannot be removed, mark with paint or flagging and notify others.		
	Motion - Striking hand with mallet during placement of survey stakes/pins	1. Utilize hammer stake tool for advancement of survey stakes to keep hand out of line of fire. 2. Make sure that the hand that is holding the hammer stake tool is out of the line-of-fire before hammering stake/pin into ground to reduce the potential for hand injury. 3. Wear cut-resistant or heavy work gloves while advancing stakes/pins to reduce severity of lacerations or bruises.		

4. Break Down and Load Equipment	Motion - Head injury from hitting head on tailgate/hatchback when loading equipment	1. Keep tailgate/hatchback closed when not loading equipment. 2. Wear hard hat to prevent struck-against head injuries when the tailgate/hatchback is open.		
	Motion - Exertion/muscle strain from packing equipment	1. Do not lift loads heavier than 50 pounds without assistance from another person. 2. Lift using legs and keep back straight, do not bend at waist or twist.		

Notes:

1 – Verifier may be any ARCADIS employee or Subcontractor under direct contract by ARCADIS. The Verifier may be the Responsible Person, Site H&S Officer, Construction Manager, Project Manager, Subcontractor, etc.

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This JSA must be acknowledged by affected workers every time there is a modification to the form

Name	Signature	Initials Used on Form	Date	Name	Signature	Initials Used on Form	Date

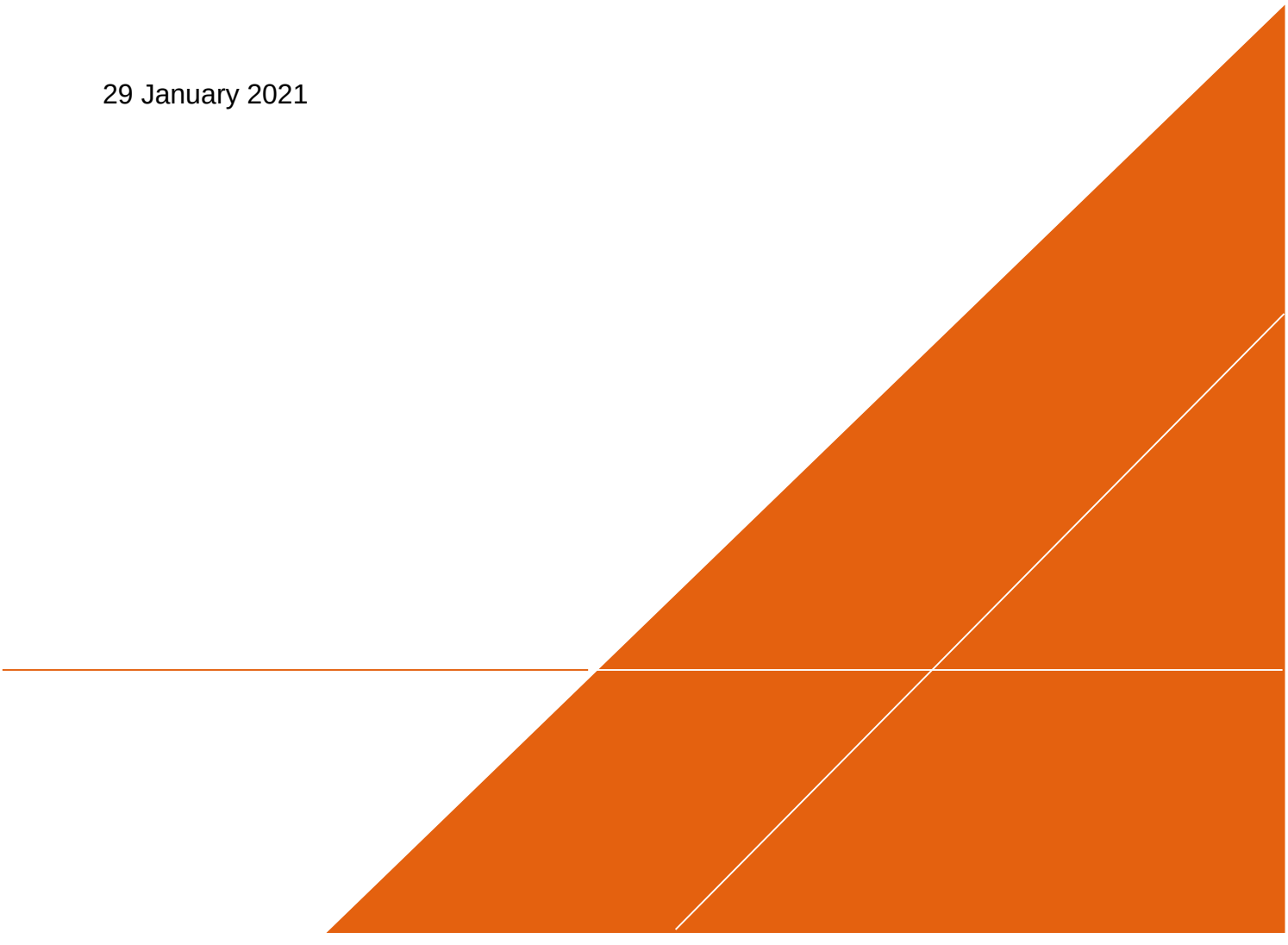
End of Day Lookback – Utilize this section to log changes made to the JSA content throughout the day and note any recommendations for Task JSA.

Brief description Lookback	Name Lookback Leader	Date

ARCADIS Design & Consultancy for natural and built assets

ARCADIS FIELD AND EMBEDDED STAFF COVID-19 GUIDANCE

29 January 2021



VERSION CONTROL

Revision No.	Date Issued	Description
1	3/17/20	Original document.
2	3/20/20	Added guidance for multiple occupants traveling in the same vehicle.
3	3/24/20	Updated introduction to include links to Orange Line information; added requirement of Arcadis COVID-19 Health Screening Self-Assessment Questionnaires; moved client questionnaire section forward in the document; and made minor updates to the social distancing, vehicle/transportation, lodging and equipment sections.
4	3/30/20	Updated social distancing section to include CDC “close contact” definition; added section for work in team settings; added AirBnB to lodging discussion.
5	4/2/20	Document template updated and sections rearranged; updated Hand Hygiene section; updated Cleaning of Frequently Touched Surfaces section; updated close contact definition; added section on PPE; added section for Traveling Between States, Provinces and Territories; added section for Construction/Construction Management; added section on Post-Shift Work
6	4/3/20	Added Appendix D – Interim Guidance for the Use of Face Coverings; Updated links, Section 2.3 added bullet to avoid sharing tools and equipment unless cleaned; Section 4.7.2 updated with a bullet for maintaining social distancing at choke points; Section 4.8 added section for Face Coverings and guidance in Appendix D.
7	4/10/20	Added Section 2.8 Other Considerations for journey and emergency action planning; Section 4.6 updated with current information regarding COVID-19 in sewage; Section 4.8 and Appendix D updated to include CDC’s recommends of wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain.
8	4/13/20	Revised Section 2.6 by adding information about gloves being required in some jurisdictions; revised Section 4.8 and Appendix D with latest CDC and Health Canada guidance information.
9	4/20/20	Revised Section 2.1 to discuss both digital and hardcopy COVID-19 Health Screening Self-Assessment Questionnaires; revised Section 2.3.1 to include instructions on alcohol-based hand sanitizer use.
10	4/26/20	Revised Section 2.1 by adding the definition of fever and process for elevated temperature; revised section 2.4 by adding a reminder to understand the appropriate uses and limitations of the disinfectant; revised Section 2.6 by adding link to PPE request form and email address; Section 3.1 added link to “Locations with Travel Restrictions” dashboard; revised Section 3.2 to consider face coverings when multiple occupants are riding in a single vehicle; revised Section 4.2

		adding critical infrastructure/essential worker language; updated hyperlinks
11	5/1/20	Section 1 revised with latest symptoms of COVID-19; Section 2.5 reinforced Stop Work Authority and reporting where social distancing is not being practiced; inserted Interim Guidelines for Cardiopulmonary Resuscitation as Section 2.8 and moved “Other Considerations” to Section 2.9; added a bullet referencing Continuity Plan in Section 2.9
12	5/4/20	Revised Appendix C per jurisdictional updates.
13	6/16/20	Updated symptom list per CDC guidance; revised CDC close contact definition notes (Section 2.4); added plan for breaks bullets in Section 4.2; added Section 4.9 KN95; updated CDC’s face covering laundering recommendations in Appendix D.
14	8/14/20	Updated footnotes for “close contact” definition (Section 2.5); updated Sections 3.1 and 3.3 to reflect current travel recommendations; updated Section 4.8 and Appendix D to indicate exhalation valves or vents should NOT be worn; added links to the Face Covering Guide in Section 4.8.
15	10/23/20	Added Appendix E with additional signage that may be used; added reference to signage (Section 2.3.1); updated social distancing and close contact definitions (Section 2.5); added Yellow Guidance sub bullet (Section 2.7); updated order hyperlink (Section 3.1); added airline and other transportation (Section 3.2); added reporting requirement documentation (Section 4.3); updated Section 4.7.1 to clarify occupancy and documentation of visitors for contact tracing; added guidance to hold meetings outside (Section 4.7.2); minor edits to Section 4.8 and Appendix D.
16	11/13/20	Section 3.2 updated protocol to only one person in a vehicle; Section 3.3 updated protocol regarding room sharing and dining; Sections 4.2 through 4.7 added a face covering bullet; Section 4.8 and Appendix D added information from recent study that face coverings provide protection to the wearer.
17	12/4/20	Revised the reporting process in Section 2.7 to contact WorkCare instead of Brian Kundert. Added Section 2.7.1 describing WorkCare’s risk stratification and return to work process.
18	1/29/21	Updated all hyperlinks to new Intranet; added COVID-19 vaccine to Section 2.3; moved the Face Covering and KN95 section from 4.8 and 4.9, respectively, to Section 2.5; renumbered all sections; Section 2.9 clarified the continuity plan is required by the jurisdiction or client and is recommended for all projects; revised poster in Appendix B; Appendix D updated with current CDC language and added CDC graphics.

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APPENDICES

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1 INTRODUCTION

Currently Arcadis is following CDC and Health Canada guidelines, as well as applicable government directives. The health and safety of our people is of utmost importance to us. Arcadians are empowered to use TRACK to evaluate individual situations and Stop Work Authority anytime safety is at risk. Employees will not come to work if exhibiting any respiratory illness symptoms, including but not limited to COVID-19.

It is recommended that all field and embedded staff review and have access to the current version of this document. The most current version can be viewed and downloaded from the linked Orange Line article. COVID-19 symptoms may appear 2-14 days after exposure to the virus. People with these symptoms or combinations of symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

This list is not all inclusive. Please consult your medical professional for any other symptoms that are severe or concerning to you.

2 GUIDANCE FOR PROJECT ACTIVITIES

Employees should complete the following for all project activities.

2.1 Arcadis COVID-19 Health Screening Self-Assessment Questionnaires

Arcadis staff visiting offices and project sites must complete the COVID-19 Health Screening Self-Assessment Questionnaire prior to each visit. Individuals should continuously monitor for signs and symptoms of COVID-19 and, if not feeling well, complete the COVID-19 Health Screening Self-Assessment Questionnaire again.

When individuals take their own temperature to evaluate whether they have a fever, the temperature measurements will be completed without the use of fever-reducing medicines that contains ibuprofen or acetaminophen and not within 30 minutes of exercise. The CDC defines a fever as a temperature of 100.4°F (38°C) or greater. If the individual's temperature is between 99°F (37.2°C) and 100.3°F (37.9°C) it is recommended the individual pay close attention for signs and symptoms of COVID-19 and complete

the COVID-19 Health Screening Self-Assessment Questionnaire more frequently. You may also contact WorkCare's COVID-19 services if you are experiencing symptoms consistent with COVID-19 and are concerned it may be COVID-19.

2.1.1 COVID-19 Digital Health Screening Self-Assessment Questionnaire

Arcadis staff can use the H&S App to complete their daily (or multiple times a day, if appropriate) COVID-19 Health Screening Self-Assessment.

Upon completion of the COVID-19 Health Screening Self-Assessment in the H&S App, the user will receive a green, yellow or red completion message:

- Green – proceed to the office or project site
- Yellow (Caution) – critical infrastructure/essential worker must contact the Project Manager and review the "COVID-19 Flow Chart - H&S App Yellow Caution Status Guidance" located on the "ANA H&S COVID-19 Resources" Intranet page.
- Red – do not proceed to the office or project site and contact WorkCare (888-449-7787, press 9)

Screenshot the completion message and be prepared to show the screenshot prior to entering project sites and offices.

2.1.2 COVID-19 Health Screening Self-Assessment Questionnaire (Hardcopy)

The COVID-19 Health Screening Self-Assessment Questionnaire must be:

- Distributed to scheduled visitors, clients, and contractors before visiting Arcadis offices or sites.
- Post the self-assessment questionnaire and post Appendix A at entrances and/or field trailers.

Minimize visitors on site. All visitors (staff, subcontractors, clients, anticipated guests, unanticipated guests) to the site must be asked to review the applicable questionnaire from the following list.

Canada COVID-19 Health Screening Self-Assessment Questionnaire for Staff (English)

Canada COVID-19 Health Screening Self-Assessment Questionnaire for Staff (French)

Canada COVID-19 Health Screening Self-Assessment Questionnaire for Visitors (English)

Canada COVID-19 Health Screening Self-Assessment Questionnaire for Visitors (French)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Staff, Contractors and Scheduled Visitors (English)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Staff, Contractors and Scheduled Visitors (Spanish)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Unscheduled Visitors/Guests (English)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Unscheduled Visitors/Guests (Spanish)

If a client has a similar questionnaire that Arcadis staff are required to complete, the client questionnaire may be substituted for Arcadis questionnaire.

2.2 Client COVID-19 Health Screening Forms

Some clients are requiring our employees to complete individual COVID-19 health screening forms.

These forms may include questions pertaining to your travel to certain countries, your contact with people diagnosed with COVID-19, and whether you have experienced flu-like symptoms in the last 14 days.

- You are not required to share personal medical information with clients; therefore, Arcadis is not requiring you to complete any form requesting medical information. Your disclosure of personal medical information to clients is completely voluntary.
- Please understand, if you do not complete the form, you will not be allowed on the client's sites and facilities, per the client's directive.
- Also, if you complete the form, you have an ongoing duty to provide prompt notice of any changes to any of your responses. (Some clients may require periodically signing updated forms).
- If you are restricted from a client site as a result of your answers to the COVID-19 health screening form, or because you have chosen not to complete the form, Arcadis will attempt to find you alternative work that does not involve access to the client's site or facility; although, Arcadis cannot guarantee that other work will be available.

If your Project Manager is not already aware of the client COVID-19 health screening form, please alert them when you receive one from a client.

2.3 Practice Good Hygiene

The best way to prevent illness is to avoid exposure to the virus. CDC and Health Canada recommend common flu and cold season preventative measures, including:

-
- Wash hands often with soap and water for at least 20 seconds. If soap and water are not readily available, use a hand sanitizer with at least 60% alcohol.
    - If hand sanitizer or soap & water are not available on site, bring your own source of water and hand soap to accommodate hand washing.
- Avoid touching your eyes, nose and mouth.
- Cover your nose and mouth with a tissue when sneezing or coughing.
- Monitor your health daily by completing a self-assessment.
- Do not share Personal Protective Equipment (PPE).
- Maintain and thoroughly clean PPE in accordance with manufacturer's instructions.
- Avoid sharing phones, offices, tools and equipment. If sharing is necessary, clean and disinfect prior to use.
- Get a vaccine (flu to reduce the risk of flu illness and COVID-19, when available).

2.3.1 Hand Hygiene

Hand hygiene for infection prevention is an important part of the U.S. and Canada response to COVID-19. Washing hands with soap and water has been and will continue to be our primary method for good hand hygiene. Both CDC and HC recommend that you wash hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing. Hand washing mechanically removes pathogens.

Alcohol based hand sanitizer is a flammable liquid and vapor. However, there is no evidence to suggest hand sanitizer poses a fire hazard when used according to package directions and warnings. To use hand sanitizer:

- Follow manufacturer instructions for use.
- Rub your hands together, covering all surfaces of both hands, including between your fingers and up around your fingertips and nails.
- Rub hands together for 30 seconds to allow your hands to completely absorb the product.
- Allow the hand sanitizer to completely dry.
- Do not touch food or anything until your hands are dry.
- Refer to the Safety Data Sheet (SDS) for hazards information.

If hand sanitizer is not available, Arcadis requires that project teams assess and address the need for hand washing (e.g., access to water and soap) while working on site. This can be achieved by having access to a functioning restroom, a portable hand washing station or as simple as having hand soap, bottled water and paper towels to clean hands as necessary. A handwashing sign that may be posted near handwashing stations is provided in Appendix E.

2.4 Clean Frequently Touched Surfaces

Arcadis recommends that project teams identify who is responsible for cleaning frequently touched surfaces in our workplaces (field trailers, client facilities, etc.). CDC and HC recommend that these surfaces are disinfected daily. This includes tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, and sinks. Before using a disinfectant product, understand the appropriate uses and limitations of the disinfectant, and refer to equipment/tool manufacturer care instructions to determine whether the disinfectant is compatible (e.g. using isopropyl alcohol to disinfect an iPhone).

> CDC cleaning and disinfecting facilities: https://www.cdc.gov/coronavirus/2019-ncov/prepare/disinfecting-building-facility.html
>
> Health Canada cleaning and disinfecting public spaces: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/cleaning-disinfecting-public-spaces.html
>
> Health Canada hard surface disinfectants: https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19.html

If surfaces are dirty, clean them using detergent or soap and water prior to disinfection. To disinfect, most common EPA-registered or HC-approved household disinfectants will work. Use disinfectants appropriate for the surface.

In the current situation, the sourcing of disinfectant products is limited and as the supply of these individually packaged products are depleted, CDC and HC have outlined an option to use a diluted household bleach solution (at least 1,000 ppm sodium hypochlorite) as a disinfectant.

Standard household bleach is typically 5.25% sodium hypochlorite (52,500 ppm), whereas ultra-strength household bleach is typically 6% sodium hypochlorite (60,000 ppm). In accordance with Hazard Communication requirements, always refer to and have a copy of the Safety Data Sheet (SDS) available and on site with you. To **make a daily bleach solution** for use as a disinfectant:

- Mix 5 tablespoons (1/3rd cup) of standard bleach per gallon of water or for a smaller spray bottle size dilution, mix 4 teaspoons bleach per quart of water.
  OR
- 1 teaspoon (5 mL) per cup (250 mL) OR 4 teaspoons (20 mL) per litre (1000mL).
  Note: Solution must be mixed daily, because the solution will lose effectiveness as a disinfectant after 24-hours.

Follow manufacturer's instructions (e.g., Clorox) for application and proper ventilation, ensuring a contact time of at least 1 minute (for specific products and contact time information, refer to the CDC and HC links above). Check to ensure the product is not past its expiration date. Never mix household bleach with ammonia or any other cleanser. According to the HC, CDC and U.S. EPA, unexpired household bleach will be effective against coronaviruses when properly diluted.

A second alternative is to use an alcohol solution. The solution must have at least 70% isopropanol.

If supplies cannot be sourced locally, complete the PPE Request Form and submit to PPErequests@arcadis.com.

2.5 Practice Social (Physical) Distancing

The CDC definition of **social distancing**, also called "physical distancing," means keeping a safe space (approximately 6 feet, 2 metres or about two arm lengths) between yourself and other people who are not from your household in both indoor and outdoor spaces. Situations where social/physical distancing should be practiced include but are not limited to tailgate and safety briefing meetings, breaks in field trailers, entering stores and workstations. Plan and re-plan work activities to maximize social distancing and minimize close contact with others. If there are instances where social distancing is not being practiced, Stop Work and remove yourself from the situation. Contact the Project Manager or your Supervisor and document in the H&S App as an "Close Call" or "Unsafe Behavior."

Additional information when working in teams is required is discussed in the "work specific situations" section below.

> **Note:** The CDC defines **close contact** as: a person who was within 6 feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated.[1]

[1] Individual exposures added together over a 24-hour period (e.g., three 5-minute exposures for a total of 15 minutes). Data are limited, making it difficult to precisely define "close contact;" however, 15 cumulative minutes of exposure at a distance of 6 feet or less can be used as an operational definition for contact investigation. Factors to consider when defining close contact include proximity (closer distance likely increases exposure risk), the duration of exposure (longer exposure time likely increases exposure risk), whether the infected individual has symptoms (the period around onset of symptoms is associated with the highest levels of viral shedding), if the infected person was likely to generate respiratory aerosols (e.g., was coughing, singing, shouting), and other environmental factors (crowding, adequacy of ventilation, whether exposure was indoors or outdoors). Because the general public has not received training on proper selection and use of respiratory PPE, such as an N95, the determination of close contact should generally be made irrespective of whether the contact was wearing respiratory PPE. At this time, differential determination of close contact for those using fabric face coverings is not recommended.

2.6 Face Coverings

Health Canada and CDC recommends wearing cloth face coverings in public settings, like on public and mass transportation, at events and anywhere you will be around other people. Cloth face are a simple barrier to help prevent your respiratory droplets from reaching others. Studies show that masks reduce the spray of droplets when worn over the nose and mouth. Studies also show cloth face coverings can reduce wearers' exposure to infectious droplets through filtration. How well the face covering protects the wearer depends on the fabrics used and how it is made (e.g. the type of fabric, the number of layers of fabric, how well the mask fits). Health Canada and CDC still recommends that you stay at least 6 feet away from other people (social distancing), frequent hand cleaning, avoid contact with people who are sick and other everyday preventive actions. Face coverings are not a substitute for social/physical distancing. Face coverings with exhalation valves or vents should NOT be worn to help prevent the person wearing the mask from spreading COVID-19 to others. Face shields and goggles are not a substitute for face coverings.

Face coverings offering various features appropriate for different work environments, including moisture wicking and FR, are now in stock at Airgas (U.S.). The Face Covering Guide outlines several options to facilitate selection of the face covering that is appropriate for your work. Cloth face coverings may also be fashioned from household items or made at home from common materials at low cost can be used as an additional, voluntary public health measure.

The cloth face coverings recommended are not surgical masks or N-95 respirators. Those are critical supplies that must continue to be reserved for healthcare workers and other medical first responders, as recommended by current Health Canada and CDC guidance.

Some jurisdictional entities and clients require the use of cloth face coverings based on Health Canada and CDC guidance. CDC guidance on selection, use and care of face coverings is included in Appendix D.

2.6.1 KN95

During periods of shortages of N95 FFRs, the federal government advises that FFRs, air-purifying elastomeric respirators, and compatible filters certified under other countries or jurisdictions (e.g., KN95 made in China) will provide greater protection than surgical masks (i.e., facemasks, other than surgical N95s), homemade masks, or improvised mouth and nose covers, such as bandanas and scarves. Certification in accordance with country or jurisdiction standards ensures that devices provide similar filtration as NIOSH-certified equipment and have an assigned protection factor greater than or equal to 10.

If the KN95 is not required PPE as part of a regulatory requirement, the KN95 can be used voluntarily. Voluntary users must review Appendix D of 1910.134. If the KN95 is required PPE as part of a regulatory requirement, the Arcadis country-specific Respiratory Protection H&S Standard applies.

2.7 Personal Protective Equipment

Be prudent with PPE use (PPE with a purpose). The supply of certain PPE items is limited. Continue to work with our vendors on your PPE ordering needs and consider alternatives (e.g. N95 dust masks may

not be available, but half face elastomeric respirators with P100 cartridges are available in limited supplies). If PPE and supplies cannot be sourced locally, complete the PPE Request Form and submit to PPErequests@arcadis.com.

Some jurisdictions are requiring gloves be worn while completing essential activities. Select the appropriate glove for the task and include in the HASP, JSA and/or COVID-19 Preparedness, Response and Continuity Plan.

Before using nitrile gloves as personal protective equipment (PPE), make sure to:

- Wash and dry your hands before and immediately after using gloves.
- Understand how to put nitrile gloves on and take them off (refer to The Orange Line article).
- Nitrile gloves offer protection against common consumer cleaning supplies, chlorinated solvents, and offer good dexterity and sensitivity.
- Change gloves between tasks or wash gloved hands with soap and water between tasks.
- Do not touch your face.
- Inspect gloves frequently for rips, tears, etc. and replace as necessary.
- Understand limitations of nitrile gloves.

2.8 Reporting a COVID-19 Exposure

Contact WorkCare (888-449-7787, press 9) to initiate the COVID-19 Screening and Return to Work Process flow chart if you have tested positive for COVID-19, have been asked to be tested for COVID-19 by a medical professional or have received a red “Stop” screen during the COVID-19 self-assessment instructing you to call WorkCare.

If you learn you have been in **close contact** with a worker, client or member of the public who is COVID-19 positive:

- Stop work.
- Notify your Supervisor and Project Manager.
- Self-quarantine and contact your personal physician for additional direction.
    - If work is being completed under the critical infrastructure guidance and you are not experiencing symptoms consistent with COVID-19 following close contact with a COVID-19 positive individual, refer to the “Yellow Caution Status Guidance” flow chart (Canada and U.S.) to determine whether you may continue to work.
- If you’ve been tested or asked to be tested for COVID-19 by a medical professional, please contact WorkCare (888-449-7787, press 9) to initiate the COVID-19 Screening and Return to Work Process flow chart.

2.8.1 WorkCare COVID-19 Screening & Return to Work Process

Contact WorkCare (888-449-7787, press 9) for access to doctors and nurses who will discuss your symptoms, complete a risk stratification process, and advise on return to work process. When you contact WorkCare’s COVID-19 services you can expect to:

- Speak with a WorkCare nurse or physician who will complete a risk stratification process with you placing you into a low, moderate or high risk category

    - Low Risk – you may be cleared to return to work at an office or project site
    - Moderate and High Risk – you will not be cleared to return to work at an office or project site and instructed to remain at home
    - An email will be sent to you, Corporate H&S, HR and your Supervisor indicating whether you can proceed to an office or project site (cleared) or whether you must work remotely (not cleared). If you are not cleared, this will initiate Arcadis' internal contact tracing process.
- Moderate and High Risk individuals will be required to register in the "WorkMatters Portal" and complete the "Daily Symptom Tracker." WorkCare will send a registration email directly to you following the risk stratification discussion.
- At the end of your self-isolation period, you will complete a Return to Work Survey in the WorkMatters Portal. The survey and daily symptom tracker will be reviewed by a WorkCare physician.
- You will receive a written notice from WorkCare indicating whether you are cleared or not cleared.
    - If you are not cleared, you will receive additional instruction, which may include continuing daily assessments and completing another return to work survey at a later date.

2.9 Interim Guidelines for Cardiopulmonary Resuscitation

The American Heart Association and Hearth & Stroke Foundation of Canada have issued interim Hands-only cardiopulmonary resuscitation (CPR) guidelines to reduce the risk when helping victims of cardiac arrest with suspected or confirmed COVID-19.

CPR and the use of automated external defibrillators (AED) significantly improve the chance of survival of patients experiencing cardiac arrest. During the COVID-19 pandemic, first aid trained folks and bystanders may feel uncomfortable performing lifesaving CPR and increasing their own risk of contracting the virus.

Hands-only CPR involves performing chest compressions only at a rate of 100 to 120 compressions per minute until an ambulance arrives.

When administering CPR, consider:

- Wearing a face covering
- Laying a cloth, towel, or clothing over the person's mouth and nose
- Perform hands-only CPR
- Use an AED, if available

2.10 Other Considerations

When planning field work, consider the following:

- Plan your journey to and from the site to manage social distancing and hand hygiene when you need to stop for gas or at a store for supplies
- Reevaluate the current field work situation as it relates to lone worker protocols
- Verify travel routes to the local emergency room have not changed, and as a best practice, verify whether the selected hospital has screening policy before entering due to the COVID-19 situation

- A COVID-19 Preparation, Response and Continuity Plan template is available for use when required by the jurisdiction or client and is recommended for all projects.

3 TRAVEL GUIDANCE

3.1 Traveling Between States, Provinces or Territories

Some states, provinces and territories have issued executive orders requiring self-quarantine, travel health screening questionnaires and/or COVID-19 testing for people traveling into or from certain locations. While some jurisdictions exempt essential workers, self-quarantine requirements may apply during off-work hours, confining the employee to their lodging location. Check local requirements before you travel to determine whether you can travel or if there is a need to self-quarantine at the destination. Project teams should consider using local staff to complete project work.

3.2 Field Vehicles and Transportation

When using shared vehicles (fleet, rental, ride sharing services) follow the cleaning guidance above for frequently touched surfaces. Check with your rental agency before vehicle pick-up to understand their cleaning procedures, and supplement with your own cleaning, as necessary. Note: if using wipes, make sure the wipe is compatible with the surface being cleaned.

Individuals will be assigned their own vehicle. Ride sharing and carpooling is not permitted.

When traveling by air for business critical travel, check with the airline to obtain their latest COVID-19 requirements. A summary of current airline COVID-19 policies can be found in the “Airline COVID-19 Policy Summary” file located on the COVID-19 FAQ page. Additional safety information on airlines, airport security and rail is available from World Travel.

3.3 Lodging Considerations

Most hotel chains have implemented additional cleaning, disinfection and face covering in common area procedures. Check with your hotel before check-in to understand their procedures. Consider bringing a surface cleaner or disinfecting wipes to clean frequently touched surfaces such as doorknobs, tv remote, etc.

On long term assignments, discuss with Project Manager whether it is feasible to not check out of a hotel room over the weekend or brief project breaks.

In instances where AirBnB has been authorized and approved in writing by the Project Manager and Supervisor, consider the following:

- The entire team should not stay at the same residential facility.
- Understand the AirBnB may need additional cleaning and disinfection of commonly touched surfaces upon arrival.

Lodging together is not permitted. An exception is if the lodging configuration allows each individual to have a dedicated living space (e.g., own bedroom). Use of the common space will alternate among

shared individuals allowing only one person in the space at a time. Wear face coverings in common spaces.

Always maintain good personal hygiene and avoid crowded places such as restaurants or bars. Consider using take out or outdoor seating. Dining together during work hours is not allowed and is discouraged during non-working hours. If self-quarantine is required by the jurisdiction during off-work hours, plan ahead and evaluate local food and/or grocery delivery options.

3.4 Rental Equipment and Sample Cooler Handling

Clean the exterior of rental equipment and sample coolers upon arrival at the job site using a cleaning product that will not impact data quality. Wear gloves and safety glasses when handling sample coolers to prevent contact with acid preservation of the bottles in coolers. Where possible, order separate sets of equipment and "assign" equipment to individuals for use through the duration of the event.

4 WORK-SPECIFIC SITUATIONS

4.1 Working with Little or No Contact with Others

Follow procedures listed in Section 2.0 and Section 3.0.

4.2 Working in Project Teams

When working in project teams (paired Arcadians, embedded staff, contractors, clients, etc.):

- If feasible, prior to visiting the site, have a H&S check in to confirm all attendees are complying with CDC or Health Canada guidelines, including:
    - Confirm understanding that workers or clients should not go to the job site if they have personally tested positive for COVID-19, have been in close contact to anyone else who has tested positive for COVID-19 or are exhibiting symptoms. If a worker discloses close contact with someone COVID-19 positive and the worker is asymptomatic, contact the Project Manager and review the "COVID-19 Flow Chart - H&S App Yellow Caution Status Guidance" located on the "ANA H&S COVID-19 Resources" Intranet page.
- Out of respect for all, ask everyone to self-disclose if they are not feeling well (exhibiting flu-like symptoms), and request that they should go home.
- Observe person(s) for symptoms, and use Stop Work, as necessary, and contact Project Manager.
- Set visual or physical barriers to keep the public away (caution tape and cones).
- Consider if "split shifts" can be used to limit contact, or if work can be scheduled during hours of low to no facility operations.
- Arcadis staff plan work activities, continuously use TRACK and re-plan work activities to maximize social distancing and minimize "close contact"
    - Practice good hygiene and clean commonly touched surfaces
        - Clean clipboard and pen prior to use
        - Bring your own pen
        - Disinfect shared equipment (water level meters, pumps, etc.)

        - Coordinate with sanitation vendor for portable hand wash station (soap & water or hand sanitizer)
    - Use work practices and tools to minimize close contact when feasible, such as:
        - Single person operating a winch instead of a two-person manual lift
        - Tools to maximize distance
    - Use PPE in accordance with the Job Safety Analysis (face shield, safety glasses, gloves, etc.)
    - Plan for breaks to allow for hydration, nutrition and rest/prevention of heat related illness
        - Select locations where social distancing can be maintained
        - Allow time for safe doffing/donning of personal safety items
        - Communicate individual needs for breaks before beginning work.
- If social distancing or other controls are not feasible discuss this with your supervisor and PM, discuss “Is the work necessary?” or “Can the work be rescheduled for a later date?”
    - Refer to Section 2.5 for the definition of close contact. CDC has indicated short periods of time in close contact may not increase risk of exposure.
- Wear face coverings when working indoors or in enclosed spaces.
- Subcontractors need to develop and implement their own procedures to protect their workers.

4.3 Embedded Employee Working at a Client Facility

Embedded employee at a client facility should:

- Inquire whether working remotely is an option.
- If not, and Arcadis must work at the client facility:
    - Ask if arrangements can be made to practice social distancing (e.g. split shift, separate workstation, etc.)
    - Practice good hygiene, and if you do not feel the situation is safe, you can execute your stop work authority by having discussions with your Supervisor and Project Manager.
- Wear face coverings when working indoors or in enclosed spaces.
- If client facility cleanliness is a concern discuss concerns with Project Manager. The Project Manager will discuss with the client. If the client will not increase cleaning, Arcadis employees will be provided with the supplies to clean and disinfect frequently touched surfaces as well as supplies to clean hands.
- Discuss and document Arcadis, client and jurisdictional protocol for reporting a COVID-19 case using the template in the Arcadis COVID-19 Preparedness, Response and Continuity Plan or similar form.

4.4 Working in Contact with the Public

When working in contact with the public (mall areas, parks, outdoor residential settings):

- Set visual or physical barriers (caution tape and cones) to keep the public away and maintain social distancing.
- Wear face coverings when working indoors or in enclosed spaces.
- Consider posting signs reminding the public of CDC social distancing guidance (example in Appendix B).
    - Example sign may say:

Practice Social Distancing

No groups larger than 10

Maintain 6 feet (2 metres) distance to others

4.5 Working at Indoor Residential Settings

When working at indoor residential settings, please consider whether the work can be rescheduled for a later date, and if not, then consider the following guidelines:

- Call ahead to ask if the resident(s) is experiencing flu-like symptoms or if anyone in the house is in mandatory or precautionary self-quarantine. Also share Arcadis work procedures and explain that Arcadis will be practicing social distancing during the work.
- Upon arrival, assess the residents for signs of flu-like symptoms. If observed, use Stop Work, exercise social distancing and contact the Project Manager.
- Where feasible, wear gloves, wipe down surfaces prior to touching them and thoroughly wash hands after completing the work (do not touch face).
- Ask if arrangements can be made to practice social distancing (meaning stay 6 feet [2 metres] away).
- Schedule your work when resident is not home, if your work area allows for access (e.g. a basement crawl space the doesn't require entry to the main living area of the home).
- Wear face coverings when working indoors or in enclosed spaces.

4.6 Projects Involving Drinking Water Systems, Recreational Water and/or Wastewater

According to the CDC, at this time, the risk of transmission of the virus that causes COVID-19 through sewerage systems is thought to be low. Although transmission of the virus that causes COVID-19 through sewage may be possible, there is no evidence to date that this has occurred.

Wastewater and sewage workers should use standard practices, practice basic hygiene precautions, and wear personal protective equipment (PPE) as prescribed for current work tasks.

When working on projects involving drinking water systems, recreational water and/or wastewater:

- The COVID-19 virus has not been detected in drinking water.
- Conventional water treatment methods that use filtration and disinfection, such as those in most municipal drinking water systems, should remove or inactivate the virus that causes COVID-19.
- At this time, the risk of transmission of the virus that causes COVID-19 through sewage systems is thought to be low.
- Review the project Health & Safety Plan and task-specific Job Safety Analysis for required personal protective equipment and other controls.
- Wear face coverings when working indoors or in enclosed spaces.

4.7 Construction Management/Construction

4.7.1 Field Trailers

Field trailers may present unique challenges for social distancing. Consider the following:

- Designate “enter only” and “exit only” for trailers with more than one door.
- Restrict access by posting site signage (Appendix E) requesting all visitors, including site workers, to not enter and instead utilize telephone or radio for communication.
    - The project team will determine the maximum occupancy based on the ability to maintain social distancing.
- Wear face coverings.
- Prior to entering a trailer, assess the current occupancy.
- Maintain a log of visitors entering the trailer use the “Arcadis Contact Tracing Log” in Appendix F. Assign a person responsible for signing visitors in and out.
- Clean surfaces regularly. In the absence of professional cleaning services, occupants will develop a schedule for site personnel to complete cleaning of commonly touched surfaces.
    - When using common surfaces, each individual is responsible for wiping down the shared surface before and after use.
- Assess and address the need for the availability of hand washing (e.g., access to water and soap) while working on site. This can be achieved by:
    - Having access to a functioning restroom
    - Portable hand washing station
    - Hand soap and bottled water to clean hands as necessary.
- Plan seating arrangement so that personnel inside the trailer maintain social distancing, at least 6-feet (2 m) of separation.
- Consider the use of physical barriers to separate the field trailer from the public and/or site activities.

4.7.2 Other Construction Guidance

Additional guidance related to construction and construction management activities include:

- Consider use of technology (e.g., digital sign in using QR codes, virtual tailgate or construction meetings, video camera systems to minimize the number of people on site).
- For tailgate or other meetings that are not virtual, consider:
    - Have the person leading the meeting sign everyone in.
    - If signature is required, everyone should have their own pen.
    - Maintain social distancing with at least 6-feet (2 m) of separation.
    - Hold meetings in outdoor spaces.
- Simultaneous operations coordination to separate contractors:
    - Coordinate movements around the site
    - Set up work zones with visual barriers for specific activities with transition areas in common spaces
    - Post social distancing signage (refer to Section 4.4)
    - Maintain social distancing with at least 6-feet (2 m) of separation.
    - Consider the following administrative controls:
        - Activity rotation - schedule work when the fewest number of people are present
        - “Split shifts” can be used to limit contact, or if work can be scheduled during hours of low to no facility operations.
- Work in teams/pairs:

    - Plan work activities, continuously use TRACK and re-plan work activities to maximize social distancing and minimize “close contact”
    - Use equipment or tools to increase distance between personnel to greater than 6-feet (2m) or eliminate the need for a second person.
- Identify “choke points” and “high-risk areas” where workers may stand together (e.g., such as hallways, hoists and elevators, break areas, and buses) and use controls and signage to maintain social distancing. Examples may include:
    - Limiting the number of occupants in an elevator to two
    - One-way traffic pattern
    - Ground markings at 6-foot (2 m) intervals
- Coordinate with contractors to make sure they are following the same social distancing, hand hygiene and cleaning guidance to reduce the risk to other project personnel.
- Jurisdiction-mandated social distancing protocol may be required. An example is included in Appendix C.

5 POST SHIFT CONSIDERATIONS

At the end of the work shift, clean the vehicle, if used throughout the day. Wash hands prior to leaving the site and after the commute.

Upon arriving home or at lodging, shower and launder clothing.

APPENDIX A

Site Signage – Self-Assessment Required

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Arcadis Employees

Have you done your self-assessment today?

Before each day, you must complete the online **self-assessment**.

QR Code for daily self-assessment.

SAFE Return

APPENDIX B

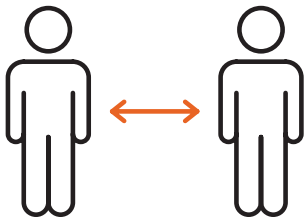
Site Signage – Social Distancing

ARCADIS

Project Sites

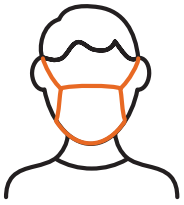
Keep Yourself and Others Working Safely

100% compliance is required by you and our subcontractors.



Maintain physical (social) distance of six feet, about two arms' length.

Need to talk? Shut equipment down if noise is interfering, use hand signals, radios, or move to another area of the site where distance can be maintained.



Face coverings must be worn when six feet of physical distance cannot be maintained.

***Stop Work** if procedures are not followed. It's mandatory!*

SAFE Return

APPENDIX C

Jurisdiction-mandated Social Distancing Protocol Example

Jurisdiction-Mandated Social Distancing Protocol

Arcadis employees and visitors will adhere to social distancing guidelines. This Social Distancing Protocol is a supplement to meet the requirements of specific jurisdictions requiring a written plan.

The following signs will be posted at the entrance to each active office and project site:

- Stop: Complete the Arcadis COVID-19 Health Screening Self-Assessment Questionnaire
- Stop: Social Distancing
- Novel Coronavirus Prevention Measures
- Arcadis COVID-19 Health Screening Self-Assessment Questionnaire for unscheduled visitors and guests (English and Spanish)
- This protocol once completed by the office or project site.

Protecting Employee Health

Arcadis has directed all employees who can complete their work duties from home to not come into the office. Through Location Leader communications and the COVID-19 Guidance for Field and Embedded Staff, Arcadis has reinforced social distancing by maintaining separation of at least 6 feet (2 metres).

All employees have been instructed to not come to work if they do not feel well. Prior to leaving for an office or project site, Arcadis employees and scheduled visitors are requested to complete the COVID-19 Health Screening Self-Assessment Questionnaire (English and Spanish). Arcadis staff may use the H&S App to complete their daily (or multiple times a day, if appropriate) COVID-19 Health Screening Self-Assessment. Unscheduled visitors will be asked to complete the self-assessment prior to entering the office or project site (English and Spanish).

Face coverings will be worn, as appropriate. Refer to Appendix D of the COVID-19 Guidance for Field and Embedded Staff.

Facility Information

(Complete the questions listed below then delete this comment)

Cleaning and disinfection of frequently touched surfaces will be completed at Arcadis office and project locations.

Office/Project Location Address:

Cleaning is the responsibility of:

Cleaning is being completed on the following schedule:

Restrooms:
Breakrooms:
Other:

Cleaning and disinfectant related supplies are located:

Hand washing stations with soap and water are located:

Hand sanitizer stations are located: *If this does not apply, say "NA, see hand washing station"*

Copies of this protocol will be posted and distributed to office or project site Arcadis employees.

You may contact the following person with any questions or comments about this protocol.

Name: Phone #: Email:

APPENDIX D

Interim Guidance for the Use of Face Coverings

Guidance for the Use of Face Coverings

Health Canada and CDC recommends wearing cloth face coverings in public settings, like on public and mass transportation, at events and anywhere you will be around other people. Health Canada and CDC still recommend that you stay at least 6 feet, 2 meters or about two arm lengths away from other people (social/physical distancing), frequent hand cleaning, avoid contact with people who are sick and other everyday preventive actions.

According to the CDC, recent studies show that a significant portion of individuals with COVID-19 lack symptoms ("asymptomatic") and that even those who eventually develop symptoms ("pre-symptomatic") can transmit the virus to others before showing symptoms. This means that the virus can spread between people interacting in close proximity - for example, speaking, coughing, or sneezing—even if those people are not exhibiting symptoms. Face coverings are a simple barrier to help prevent your respiratory droplets from reaching others. Studies show that masks reduce the spray of droplets when worn over the nose and mouth. You should wear a mask, even if you do not feel sick. It is especially important to wear a mask when you are indoors with people you do not live with and when you are unable to stay at least 6 feet apart. How well the face covering protects the wearer depends on the fabrics used and how it is made (e.g., the type of fabric, the number of layers of fabric, how well the mask fits).

Considerations for cloth face coverings:

- Some jurisdictional entities and clients require the use of cloth face coverings based on Health Canada and CDC guidance.
- The face coverings are not surgical masks or N-95 respirators.
- These do not replace other evidence-based measures such as social/physical distancing, frequent hand washing practices, avoid crowds and avoid poorly ventilated spaces. Face coverings are not a substitute for social/physical distancing.
- Face coverings can become contaminated on the outside or when touched by unwashed hands.
- Avoid touching the face covering.
- Have an extra face covering to replace one that becomes wet.
- Face coverings should not be shared with others.
- Face coverings with exhalation valves or vents should NOT be worn to help prevent the person wearing the mask from spreading COVID-19 to others (source control).

What is a Cloth Face Covering?

A cloth face covering is a material that covers the nose and mouth. It can be secured to the head with ties or straps or simply wrapped around the lower face. A cloth face covering may be disposable; factory-made; homemade or hand-sewn; or can be improvised from household items such as bandana, scarfs, T-shirts, sweatshirts, or towels. The most effective fabrics for cloth face coverings are tightly woven fabrics, such as cotton and cotton blends; breathable; and two or three layers.

Scarves, ski masks or balaclava are usually made of loose knit fabrics and are not suitable as a face covering. Wear these items over your face coverings.

Cloth face coverings should have two or more layers of breathable fabric, completely cover your nose & mouth, and fit snugly against the sides of your face and don't have gaps. When wearing

a gaiter ensure it has two layers or fold it to make two layers. If you wear glasses, find a mask that fits closely over your nose or one that has a nose wire to limit fogging.

Face Covering Use & Care

Wash hands prior to touching your cloth face covering (i.e. putting it on, adjusting, removing). The cloth face covering should cover the nose, mouth and secure under the chin. It should fit snugly against the sides of the face. When removing the mask, avoid touching the front of the mask and your face with your hands. Upon removing a face covering, you also need to wash your hands.

Disposable face coverings will be discarded after each use.

Reusable cloth face coverings must be washed daily after use. Place face coverings in a sealed bag or bin until it can be laundered. Wash face coverings as soon as possible to prevent them from becoming moldy.

Cleaning cloth face coverings using a washing machine:

- Face coverings can be washed with regular laundry
- Use regular laundry detergent and the appropriate setting according to the fabric label.

Washing cloth face coverings by hand:

- Wash face coverings with tap water and laundry detergent or soap.
- Rinse thoroughly with clean water to remove detergent or soap.

Dry face coverings by:

- Machine until completely dry using the warm or hot.
- Air dry by hanging or lying flat and allow to completely dry. If possible, hang it in direct sunlight.

Discard cloth face coverings that:

- No longer cover the nose and mouth.
- Have stretched out or damaged ties or straps.
- Will not stay on the face or requires continual adjustment.
- Have holes or tears in the fabric.

The following graphics are from the U.S. CDC:

DO choose masks that



Have two or more layers of washable, breathable fabric



Completely cover your nose and mouth



Fit snugly against the sides of your face and don't have gaps

DO NOT choose Masks that



Are made of fabric that makes it hard to breathe, for example, vinyl



Have exhalation valves or vents which allow virus particles to escape



Are intended for healthcare workers, including N95 respirators or surgical masks

Special Considerations

Gaiters & face shields



Wear a gaiter with two layers, or fold it to make two layers



Not recommended: Evaluation of face shields is ongoing, but effectiveness is unknown at this time.

Glasses



If you wear glasses, find a mask that fits closely over your nose or one that has a nose wire to limit fogging.

Cold weather gear



Wear your scarf, ski mask or balaclava over your mask



Scarves, ski masks and balaclavas are not substitutes for masks

How to Wear

Wear a mask **correctly** and **consistently** for the best protection.

- Be sure to wash your hands or use hand sanitizer before putting on a mask.
- Do **NOT** touch the mask when wearing it. If you have to often touch/adjust your mask, it doesn't fit you properly, and you may need to find a different mask or make adjustments.

For more information, visit our How to Wear Masks web page.

Do wear a mask that



- Covers your nose and mouth and secure it under your chin.
- Fits snugly against the sides of your face.

How NOT to wear a mask



Around your neck



On Your forehead



Under your nose



Only on your nose



On your chin



Dangling from one ear



On your arm

How to Take off a Mask



1

Carefully, untie the strings behind your head or stretch the ear loops



2

Handle only by the earloops or ties



3

Fold the outside corners together



4

Be careful not to touch your eyes, nose, and mouth when removing and wash hands immediately after removing

APPENDIX E

Additional Signage

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Best Practices

Wash your hands.

Wash in hot water for 40 seconds: 20 seconds with soap, 20 seconds to rinse.

Wipe surfaces with disinfectant wipes after you are finished.

Maintain proper social distancing.

Stand back 6 feet from others who may be washing their hands, or waiting in line to wash.

SAFE Return

ARCADIS

Best Practices

You touch it, you clean it.



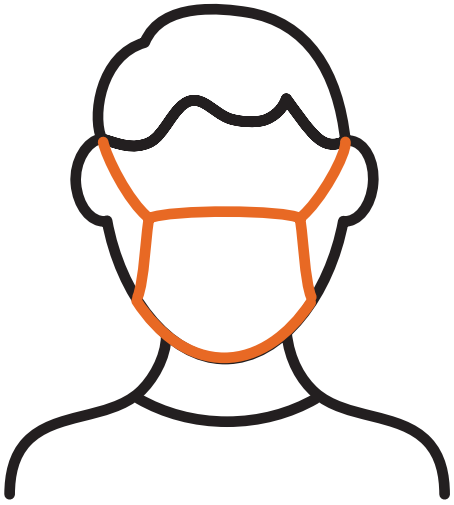
Remember to clean any surface you touch with the provided disinfectant spray.

SAFE Return

ARCADIS

Arcadis Staff, Visitors & Deliveries

Wear face cover.



Face covering must be worn at
all times.

SAFE Return

ARCADIS

Visitors & Deliveries

In order to maintain proper social distancing, we are not admitting visitors at this time.

If you have an appointment with a staff member, please contact them directly.

If this is a delivery, please leave the package here or contact the office manager to gain access. **Face covering is required!**

Firstname Lastname: 123 555 1212
Firstname Lastname: 123 555 1212

SAFE Return

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Visitors & Deliveries

All staff, visitors or deliveries must use the main entrance.

Located: Main lobby front door

Firstname Lastname: 123 555 1212
Firstname Lastname: 123 555 1212

SAFE Return

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Restricted

Limited Use

In order to maintain proper social distancing, this area is open for hand washing only. Do not use microwaves, refrigerators, coffee makers or any other equipment.

SAFE Return

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Restricted

Authorized Staff Only

In order to maintain proper social distancing, this area is restricted to authorized staff.

Need something?

Contact: Firstname Lastname 123 555 1218

SAFE Return

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Restricted

Maximum Occupancy

2

In order to maintain proper social distancing, the number of people allowed in this area is limited.

SAFE Return

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Closure

Room Closed

In order to maintain proper social distancing guidelines, this room is temporarily closed.

SAFE Return

Off limits

CUT

Do not use

CUT

Restricted

ARCADIS

Arcadis Employees

Have you done your mid-day self- assessment?

During your visit each day, you must complete the additional mid-day online **self-assessment**.

QR Code for daily self-assessment.

SAFE Return

APPENDIX F

Arcadis Contact Tracing Log

ARCADIS Design & Consultancy for natural and built assets

Arcadis Contact Tracing Log

Printed Name	Company	Cell phone or email	Date/Time On Site	Date/Time Off Site

ARCADIS Design & Consultancy for natural and built assets

Appendix E

Pace Analytical Method Standard Operating Procedures



Document Information

Document Number: ENV-SOP-MTJL-0100 **Revision:** 03

Document Title: Volatile Organic Compounds by GC/MS (EPA 8260B, 8260C, 624, 624.1 and SM 6200B)

Department(s): VOA

Date Information

Effective Date: 20 Sep 2019

Notes

Document Notes:

All Dates and Times are listed in: Central Time Zone

Signature Manifest

Document Number: ENV-SOP-MTJL-0100 **Revision:** 03

Title: Volatile Organic Compounds by GC/MS (EPA 8260B, 8260C, 624, 624.1 and SM 6200B)

All dates and times are in Central Time Zone.

ENV-SOP-MTJL-0100

QM Approval

Name/Signature	Title	Date	Meaning/Reason
Steven Miller (006597)	QA Director	19 Sep 2019, 02:49:02 PM	Approved

Management Approval

Name/Signature	Title	Date	Meaning/Reason
Heidi Ferrell (006481)	Volatiles Supervisor	20 Sep 2019, 08:22:33 AM	Approved

Pace Analytical®
National Center for Testing & Innovation

STANDARD OPERATING PROCEDURE
TITLE: ENV-SOP-MTJL-0100 Volatile Organic Compounds by GC/MS (EPA 8260B, 8260C, 624, 624.1, and SM6200 B)
ISSUER: Pace National – Mt. Juliet, Tennessee

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1.0 SCOPE AND APPLICATION

STATE NOTE: For samples analyzed in conjunction with the Ohio Voluntary Action Program (VAP) please utilize ENV-SOP-MTJL-0099.

CLIENT NOTE: For clients, whose environment laboratory quality program is administered by Environmental Standards Inc. (ESI), see controlled document QUA-30 VOA. \\FAP\NovDiskH\QAQC\Controlled Docs

1.1 This standard operating procedure is used to determine volatile organic compounds in a variety of matrices. This SOP is designed for EPA methods 8260B, 8260C, 8260D, 624.1, Standard Method 6200B, GRO, or similar volatile GC/MS analyses. This procedure is applicable to nearly all kinds of samples, regardless of water content, including ground water, aqueous sludge, caustic liquors, acid liquors, waste solvents, oily wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments. The compounds that can be determined using this SOP are listed in Attachment III, which contains a list of the typical primary and secondary ions used in determining these compounds.

1.2 Reporting Limits (RLs) are listed in the Attachment II. Compounds routinely analyzed by this method and their typical reporting limits are included in the following table (subject to change).

1.3 An MDL study must be completed at least annually or more frequently if major instrumentation changes occur. Method Detection Limits (MDLs) are performed based on ENV-SOP-MTJL-0016. Updated MDL records are filed and stored in a central location within the department.

1.3.1 Limit of Detection (LOD) and Limit of Quantitation (LOQ) studies are completed at the frequency required by the TNI standard per the procedure identified in ENV-SOP-MTJL-0016, *Method Detection Limits (MDL), Limits of Detection (LOD) and Limits of Quantitation (LOQ).* Should the procedure be utilized for DOD support; then the frequency of these studies must meet the requirements of the current DOD QSM.

1.3.2 Lower Limit of Quantitation (LOQ) – For analyses performed per the requirements of Method 8000D, the LLOQ is established at concentrations where both quantitative and qualitative requirements can consistently be met (see Sections 2.3 and 10.15).

1.4 Specific instructions for employees of the Pace Analytical National Center for Testing & Innovation (Pace National) Sacramento, California laboratory are included in this document as “SAC Notes”.

2.0 METHOD SUMMARY AND DEFINITIONS

2.1 Volatile organic compounds (VOCs) are determined from a 5mL sample withdrawn from a sealed 40mL vial. For water samples analyzed for low levels of analytes using Method 5030 (ENV-SOP-MTJL-0131), the entire vial is placed into the instrument autosampler. The autosampler purges 5mL of sample and adds 1µL of surrogate standards and internal standards. An inert gas is bubbled through a sparger needle inserted into the sample. The purged volatile components then travel via a transfer line to a sorbent trap. When purging is complete, the trap is rapidly heated. The trap is backflushed with a helium carrier gas, to transport the desorbed sample components into a gas chromatographic (GC) column. The GC column separates and carries the components

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to a mass spectrometer (MS) or a specific detector, depending on the determinative method selected.

METHOD NOTE: For Method 624.1, different sample sizes in the range of 5–25mL are allowed in order to meet differing sensitivity requirements. Calibration and QC samples must have the same volume as field samples.

2.2 For other samples, Method 5035 (ENV-SOP-MTJL-0129), volatile organic compounds are determined from a 5g sample combined with 5mL reagent water.

2.3 Lower Limit of Quantitation (LLOQ) – For analyses performed according to the requirements of Method 8000D, the lowest concentration at which the laboratory has demonstrated target analytes can be reliably measured and reported with a certain degree of confidence, which must be greater than or equal to the lowest point in the calibration curve.

2.4 See the current Quality Assurance Manual for definitions associated with terms found in this document.

3.0 HEALTH AND SAFETY

3.1 The toxicity or carcinogenicity of each reagent used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable. A reference file of safety data sheets (SDSs) are made available on Pace National's intranet to all personnel. Use hazardous reagents in a fume hood whenever possible and if eye or skin contact occurs, flush with large volumes of water. Always wear safety glasses or a shield for eye protection, protective clothing and observe proper mixing protocols.

3.2 Glycol ethers are suspected carcinogens. All solvent handling should be performed in a hood while using proper protective equipment to minimize exposure to liquid and vapor. Minimum personal protection includes the use of laboratory safety glasses, a lab coat or apron, and protective gloves.

4.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

4.1 All samples must have been collected using a sampling plan that addresses the considerations of this method.

4.2 Volatile analysis for water and methanol preserved soil samples must be completed within 14 days from the time of sample collection. Water samples that are not chemically preserved must be analyzed within seven (7) days. It is also a Pace National requirement that water samples with 2-Chloroethyl vinyl ether (2-CEVE), as a compound of interest, be collected unpreserved and analyzed within 7 days of collection. It has been shown that the acid preservative reacts with the 2-CEVE, which could result in false negative reporting of 2-CEVE in samples. Unpreserved soil samples must be analyzed within 48 hours from the time of collection, added to preservative or otherwise frozen at $\leq$-7°C. High-level soil samples collected in Encore™ or equivalent type sampling devices must be placed in vials of methanol according to Method 5035 (ENV-SOP-MTJL-0129).

STATE NOTE: The State of South Carolina requires that all soil samples must be collected and analyzed using Method 5035. Samples must be preserved within 48 hours from the time of collection, if collected in Encore™ type sampling devices. The holding time for soil samples preserved with

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methanol or sodium bisulfate is 14 days from the time of collection. Non-Preserved South Carolina VOC's require 7-day holding time.

4.3 Aqueous samples must be collected in at least duplicate in 40mL vials with minimal or no headspace to minimize the loss of highly volatile analytes. Sample kits can be configured to request additional vials per client request. Typically the pH is adjusted to <2 with HCl, but the preservation requirements may vary by EPA program and may be specified in a regulation or project planning document that requires compliance monitoring for a given contaminant. An example of this is some samples from Missouri or Kansas may be preserved with tri-sodium phosphate and will have a resulting pH>12.

4.4 Soil samples may be collected by one of the following: 1) A 4oz. soil jar filled with soil with zero headspace, 2) Two 5g samples preserved in the field with 5mL $NaHS0_4$ to a pH<2 and one 5g sample preserved in the field with methanol (for high level analysis or data generated on Agilent™ 5977A or 5977B instruments [with an extractor ion or high efficiency source] may be reported to low-level MDL/RL values due to the enhanced sensitivity associated with these instruments) or 3) A 5g or 25g sample collected in an Encore or equivalent type sampling device and frozen in the laboratory within 48 hours from the time of collection.

For all soil samples, a 4oz. soil jar should also be collected to determine percent solids and for screening purposes. All samples and extracts must be shipped and stored at <6°C.

STATE NOTE: Soil and Water samples received from the states of Missouri or Kansas may be preserved with tri-sodium phosphate and will have a resulting pH>12.

STATE NOTE: For Alaska samples, when using a water miscible solvent (e.g. methanol) to extract soil volatile organic compounds (VOC), the adjustment of solvent volume for soil moisture content must be performed. Significant soil moisture can add to a pronounced dilution when performing methanol extractions. The potential under reporting of volatile concentrations is more pronounced as the percent moisture content increases. See section 9.9 for the calculation.

4.5 Method 624.1 Considerations

4.5.1 If acrolein is to be determined, analyze the sample within three (3) days. To extend the holding time to 14 days, acidify a separate sample to pH 4–5 with HCl.

4.5.2 Experimental evidence indicates that some aromatic compounds, notably benzene, toluene, and ethyl benzene are susceptible to rapid biological degradation under certain environmental conditions. Refrigeration alone may not be adequate to preserve these compounds in wastewaters for more than seven days. To extend the holding time for aromatic compounds to 14 days, acidify the sample to approximately pH 2.

4.5.3 If halocarbons are to be determined, use an acidified sample.

4.5.4 Ethers are prone to hydrolysis at pH 2 when a heated purge is used. Aqueous samples should not be acid preserved if ethers are of interest or if the alcohols they would form upon hydrolysis are of interest and the ethers are anticipated to present.

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4.5.5 2-Chloroethyl vinyl ether is subject to hydrolysis at low pH; therefore, determine 2-Chloroethyl vinyl ether from the un-acidified sample.

5.0 INTERFERENCES

5.1 Major sources of contamination are volatile materials in the laboratory and impurities in the inert purging gas and in the sorbent trap. The use of non-polytetrafluoroethylene (PTFE) thread sealants, plastic tubing, or flow controllers with rubber components must be avoided since such materials out-gas organic compounds which will be concentrated in the trap during the purge operation.

5.2 Analyses of reagent blanks provide information about the presence of contaminants. When potential interfering peaks are noted in blanks, the analyst should change the purge gas source and regenerate the molecular sieve purge gas filter. Subtracting blank values from sample results is not permitted.

5.3 Interfering contamination may occur when a sample containing low concentrations of volatile organic compounds is analyzed immediately after a sample containing high concentrations of volatile organic compounds. After analysis of a sample containing high concentrations, one or more instrument blanks may be analyzed to check for cross contamination. Alternatively, when analysis of a blank is not possible prior to the next sample, such as when an unattended autosampler is employed, the analyst should review the results for at least the next sample after the high-concentration sample. If analytes in the high-concentration sample are not present in the subsequent field sample, then the lack of carryover has been demonstrated.

5.3.1 This interference may be prevented by rinsing the purging apparatus and sample syringes with portions of organic-free reagent water between samples.

5.3.2 For samples containing large amounts of water soluble materials, suspended solids, high boiling compounds or high concentrations of compounds being determined, it may be necessary to wash the purging device with a soap solution, rinse it with organic-free reagent water, and then dry the purging device in an oven at 105°C.

5.3.3 In extreme situations, the whole purge and trap device may require dismantling and cleaning.

5.3.4 Screening of the samples prior to purge and trap GC/MS analysis is highly recommended to prevent contamination of the system. This is especially true for soil and waste samples. Screening may be accomplished by using a portable PID or equivalent.

5.4 Choice of quantitative ions and qualifier ions: Some compounds may co-elute, so the selection of quantitation ions and qualifier ions must be made carefully so these ions are specific to each of the compounds that co-elute. Qualifier ions that are most commonly used are listed in Attachment III and are recommended from the published 8260 methods.

5.5 Special precautions must be taken to avoid contamination when analyzing for methylene chloride. The analytical and sample storage area must be isolated from all atmospheric sources of methylene chloride. Otherwise, random background levels will result. Since methylene chloride will permeate through PTFE tubing, all gas chromatography carrier gas lines and purge gas plumbing must be constructed from stainless steel or copper tubing. Laboratory clothing worn by the analyst must be clean since clothing previously

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exposed to methylene chloride fumes during liquid/liquid extraction procedures can contribute to sample contamination.

5.6 Samples can be contaminated by diffusion of volatile organics (particularly methylene chloride and fluorocarbons) through the septum seal into the sample during shipment and storage. A trip blank prepared from organic-free reagent water and carried through the sampling and handling protocol can serve as a check on such contamination. A storage blank must be analyzed every two weeks to check for cross contamination of samples while samples are stored in the volatiles laboratory walk-in cooler. The storage blanks are purchased from a vendor and must matrix match the contents of the cold room or refrigerator and is placed in the cooler for a period of two weeks. Every two weeks, the applicable storage blanks are analyzed to verify that no contamination of client samples has taken place due to contamination in the storage unit.

5.7 This procedure can be used to quantitate most volatile organic compounds that have boiling points below 200°C and that are insoluble or slightly soluble in water. Volatile water-soluble compounds can be included in this analytical technique. However, for the more soluble compounds, quantitation limits are approximately 50 times higher due to poor purging efficiency. Such compounds include low-molecular-weight halogenated hydrocarbons, aromatics, ketones, nitriles, acetates, acrylates, ethers, and sulfides.

5.8 Soil samples that contain carbonate minerals (either from natural sources or applied as an amendment) may effervesce upon contact with the acidic preservative solution in the low concentration sample vial. If a large amount of effervescent gas is generated, the sample may lose a significant amount of volatile analytes. If a sample effervesces, an unpreserved sample will be collected to eliminate volatiles loss whenever possible. The holding time for unpreserved VOC samples is seven days, rather than 14 days.

5.9 An analyst may re-analyze any sample if instrumentation or human error is suspected. This includes all QC samples, which can only be re-analyzed twice. If failure continues, instrument maintenance must be performed and/or the instrument must be re-calibrated.

6.0 EQUIPMENT AND SUPPLIES

The operation, cleaning, and scheduled maintenance procedures, as prescribed by the equipment manufacturer, are followed as provided in the Operator's Manuals. Documentation of maintenance or system modifications is recorded in a maintenance logbook which accompanies each analytical system.

6.1 Instrumentation: All instrumentation meets or exceeds EPA method requirements. There are a total of 36 instruments; GCs include models 6890, 7890, Intuvo or equivalent and MSs include 5973, 5975, 5977b, HES (High efficiency source) or equivalent. Specific information for each instrument is included in the associated maintenance logbook.

Sample introduction system: Archon Autosampler, EST Centurion, OI 4760, Encon P & T, EST Evolution, OI 4660 or equivalent

6.2 Glassware: volumetric glassware equipped with penny head ground glass stopper. The volumetric flasks are cleaned by rinsing with methanol and laboratory reagent water. The volumetric flasks can be dried in a low temperature oven at less than 120°C and are never cleaned with a brush or strong alkali solution.

6.3 The carrier gas used for volatiles analysis is Helium-5.0 grade.

6.4 Syringes used for preparing the calibration curve and preparing samples and sample dilutions are Hamilton brand (or equivalent). Syringe sizes used are 0.50µL, 10µL, 25µL, 50µL, 100µL, 250µL, 500µL, 1mL, and 5mL.

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6.5 Glass Sample (VOA) and Standard Vials

6.5.1 40mL VOA vials with a Teflon™/silicone septa and polypropylene open-top cap.

6.5.2 8mL vials with Teflon™/silicone/Teflon™ septa and polypropylene open-top cap. (Used to store unused standards)

6.5.3 2mL amber vial with Teflon™/silicone/Teflon™ septa (used to store unused standards)

6.6 Miscellaneous

6.6.1 Stainless Steel Spatula or wooden tongue depressor

6.6.2 Teflon™-coated stir bars, 8mm x 16mm

6.6.3 Glass beads –VWR™ #EM1.04015.0500, or equivalent

6.7 Oven: Fisher IsoTemp Forced-Air Oven with capabilities of 100°C, or equivalent

6.8 Analytical Balance, capable of weighing to 0.01g, or equivalent

7.0 REAGENTS AND STANDARDS

7.1 All reagents and standards must be recorded in the appropriate preparation log and assigned a unique number. See ENV-SOP-MTJL-0041, *Standards Logger – Tree Operation*. Additional information regarding reagent preparation can be found in the Standards Logger (Tree) digital archive system. All spiking solutions and surrogate standard solutions should be replaced at least every six months or sooner if a problem is detected unless otherwise noted. Working standards for most compounds should be replaced after four weeks unless the integrity of the standard is suspected to of being compromised prior to that time. Working standards for gases should be replaced after one week unless the acceptability of the standard can be documented.

7.2 Nanopure water or equivalent: Nanopure water is used in all blanks to ensure it contains less than the method detection limit (MDL) of all compounds of interest. If volatile compounds are detected in the blank above MDL all samples associated with this blank must be flagged (see Section 11.5).

NOTE: For all DoD samples the laboratory water is used in all blanks to assure that it contains less than 1/2 LOQ of all compounds of interest. The blank must be assessed to ensure that the water does not show any detection of any VOC compounds. If volatile compounds are detected in the blank above 1/2 LOQ, then those samples must be flagged.

7.3 Methanol, CH_3OH – purge-and-trap grade, demonstrated to be free of analytes. Store apart from other solvents.

7.4 Sodium Bisulfate, Na2S2O3 - QEC Level 3 Certified, or equivalent

7.5 STOCK SOLUTIONS – Primary and Secondary Sources

- Stock calibration solutions must be purchased as certified solutions.
- Certificates must be kept on file.
- All Stock standards must be stored ≤ 6 °C or as recommended by the standard manufacturer.
- All non-gas stock standards must be replaced after six months, or sooner, if check standards indicate a problem.

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- Both gas and liquid standards must be monitored closely by comparison to the initial calibration curve and by comparison to a second source ICV, or Secondary Source Verification Standard (SSCV).
- Gas intermediate/secondary standards must be replaced weekly, or sooner, if comparison to check standards indicates a problem.
- Non-gas intermediate/secondary standards must be replaced after six months, or sooner, if comparison to check standards indicates a problem.

7.5.1 Primary Source - Primary source standards are used to prepare the initial 5-point calibration curve (additional levels may be used as needed), the continuing calibration verification (CCV) standard, LCS and matrix spikes. The CCV is analyzed to verify the initial calibration and is prepared using the primary source standard used to produce the calibration curve. See Section 8.2.6 through 8.2.8 for the instrument preparation of the calibration standards. When primary standards are consumed, new standards must meet the same QC criteria as the consumed standards. Stock standards must be stored below -10 °C and have a six-month holding time once opened. The expiration date of the diluted standards must not exceed the expiration date of the stock standards from which they are prepared. Once diluted, the standard must be replaced weekly. The standard list of target LCS compounds are those compounds listed in Attachment VIII. The LCS must be prepared in the appropriate matrix (organic-free reagent water, or purified solid) depending upon the matrix within the analytical batch; and contain all of the method target analytes. A subset of the method target analytes could be used based on the project specific requirements."

STATE NOTE: South Carolina DHEC and the USACE require that all target analytes are present and evaluated in the LCS

Calibration Mix

The calibration mix is prepared in methanol in a 25mL volumetric flask by adding:

Manufacturer	Product	Cat. #	Amount added (mL)	Final Conc. (ppm)
Phenomenex	Custom 8260 Calibration Mix	AL0-130113	1	100
Phenomenex	Custom Ketones Mix	AL0-130115	1	500
Phenomenex	Acrolein	AL0-130159	1	500
Phenomenex	Custom 8260 Additions Mix	AL0-130114	2	100
Phenomenex	Vinyl Acetate	AL0-130117	1	500
Phenomenex	2-Chloroethyl vinyl ether	AL0-130116	1	500

7.5.1.1 The calibration standard mix is prepared by making a 1:1 ratio of the gas standard (Agilent, ULTRAgold™ Custom Standard CUS-27747 or equivalent at 100µg/mL) and the calibration mix standard.

7.5.1.2 For soil autosamplers (5mL), a dilution of 10x is required for the ICV mix. The solution is stored in 3mL aliquots in zero headspace vials. The storage temperature is below ≤6° C.

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AP9/Oxygenates Calibration Mix

The AP9/Oxygenate ICV solution is prepared in methanol in a 25mL volumetric flask by adding:

Manufacturer	Product	Cat. #	Amount added (mL)	Final Conc. (ppm)
NSI	Ethyl Acetate	681	0.125	50
NSI	Custom AP9 Standard	Q-6603-O	3.125	5
Absolute	Isopropanol	70941	0.625	25

7.5.2 Secondary Source - Secondary source standards must be used to prepare the secondary source verification standard (SSCV) or initial calibration verification (ICV).These standards are purchased from a different vendor or the primary vendor can supply different lot numbers, if a separate vendor is not available. The standard is at a concentration near the mid-level calibration standard. Stock standards must be stored at or below ≤6°C and have a six month holding time once opened, except the ICV gases which have 1 week holding time. Once diluted, the standard must be replaced weekly.

SSCV

Prepare the SSCV mix in methanol in a 25mL volumetric flask as follows. A separate source or separate lot number is used for standard verification. The standard list of target LCS compounds are those compounds listed in Attachment VIII.

Manufacturer	Product	Cat. #	Amount added (mL)	Final Conc. (ppm)
NSI	8260 Custom Mix 2	Q-4147	1	500
Restek	Acrolein	30645	2.5	500
SPEX CertiPrep	AZ fuel additive 4 comps.	VO-ESCTN9	2	100
Ultra	Custom Standard	CUS-18354	1	100

7.5.2.1 The working second source (SSCV) or Initial Calibration Verification (ICV) is prepared by making a 1:1 ratio of the gas standard (Phenova, VOA Gas Calibration Mix AL0-130108 or equivalent at 200µg/mL) and the second source standard.

7.5.2.2 For soil autosamplers (5mL), a dilution of 10x is required. The solution is stored in 3mL aliquots in zero headspace vials. The storage temperature is at or below -10° C.

AP9/Oxygenates SSCV

The AP9/Oxygenates SSCV is prepared in methanol in a 25mL volumetric flask by adding:

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Manufacturer	Product	Cat. #	Amount added (mL)	Final Conc. (ppm)
NSI	Custom AP9 Standard	Q-6603-O	3.125	5
NSI	Ethyl Acetate	681	.125	50
Absolute	Isopropanol	70941	.625	25

7.6 Surrogate standard stock solutions must be purchased as certified solutions. Certificates must be kept on file. Stock standards must be stored at or below ≤6°C and have a six month holding time, once opened. Surrogate spiking solutions are purchased from Phenova, Part# AL0-130491, or equivalent, at 20,000ug/mL, which contains both internal standards and surrogate compounds. This solution is then diluted by 100X to obtain a 200ug/mL working solution.

7.6.1 The following are Pace National designated volatiles' analysis surrogates:

- Toluene-d8
- 4-Bromofluorobenzene
- 1,2-Dichloroethane-d4

7.7 Internal standard stock solutions must be purchased as certified solutions. Certificates must be kept on file. Stock standards must be stored at or below ≤6° C and have a six month holding time, once opened. [Internal standard and surrogate standard – Phenova, Part# AL0-130491, or equivalent]

7.7.1 The following are Pace National designated volatiles' analysis internal standards:

- 1,4-Dichlorobenzene-d4
- Fluorobenzene
- Chlorobenzene-d5

SAC NOTE: Internal Standard/Surrogate Mix – o2si 8260 Internal Surrogate Solution Catalog No.: 121722-08-20PAK. This mix is diluted 250x to produce a 50 µg/mL internal standard and surrogate mix. During analysis, 5µL of this solution is added to 5mL of sample, resulting in a concentration of 50 µg/L. The internal standards and surrogates are the same as listed in 7.6.1 and 7.7.1 with the addition of Tert-butyl Alcohol-d10 as an internal standard.

7.8 4-Bromofluorobenzene (BFB) standard - The BFB in the custom internal standard mix is used to verify mass spectrometer tuning. Since internal standards and surrogates are added to all samples and standards, BFB is included as part of our initial calibration and calibration verification standards. Certificates of analysis must be kept on file. Stock standards must be stored at or below ≤6°C and have a six month holding time, once opened.

7.9 Matrix spike (MS) standard - Stock standards must be stored at or below ≤6°C and have a six month holding time, once opened. Once diluted, the standard must be replaced weekly.

7.9.1 The matrix spike standard is prepared from the stock standard in Section 7.5.

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7.9.2 The spike should be at a mid-level of the calibration range. Some contracts may require a site-specific concentration.

7.9.3 Standard spiking practice requires the use of ALL TARGET ANALYTES as specified in Attachment VIII and must be evaluated against the current control limits presented in the LIMS.

All compounds in the spike solution must be evaluated for acceptable recovery. In the absence of established control limits, default recovery limits are 70 - 130%.

8.0 PROCEDURE

Analysis Summary**:** Volatile compounds are introduced into the gas chromatograph by purge and trap, via the Archon autosampler, as described on Section 2. Soils require method 5035 for sample preparation, See ENV-SOP-MTJL-0129.

8.1 Chromatographic conditions: All changes in analytical conditions are listed in the Maintenance Log.

8.1.1 Typical conditions for each instrument and column are listed below:

Inlet	off
Detector	200°C
Oven Equib. Time:	0.50 minutes
Oven Max	240°C
Init Temp	45°C hold 1.0 minute
Ramp	20°C/min to 240 hold 1.0 minute

8.1.2 Typical conditions for each autosampler are listed below:

Heating sample	1 minute at 40°C
Purge	11 minutes at 40°C
Desorb	1 minutes at 250°C
Bake	2 minutes at 260°C

8.1.3 Typical condition for each MS detector are listed below:

Electron energy – 70 volts (nominal)
Mass range – 35 to 300 amu
Scan time – 1.2 sec/scan
Manifold vacuum – 3 x 10^{-6} torr

8.2 **Initial calibration**

8.2.1 TUNING - Each GC/MS system must be hardware-tuned (1µL ≤ 50ng) with BFB to meet the criteria listed below. The mass-spectrometer must meet acceptable BFB sensitivity criteria before analysis can begin. The instrument must be tuned every 12 hours for 624.1, 8260B, 8260C, and 6200B. BFB tuning for method 8260D is prior to each calibration.

BFB Key Ions and Ion Abundance Criteria for 8260B, 8260C, 8260D, 624.1	
Mass	**Ion Abundance Criteria**
95	50 - 200% of mass 174
96	5 - 9% of mass 95
173	< 2% of mass 174
174	50 - 200% of mass 95

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BFB Key Ions and Ion Abundance Criteria for 8260B, 8260C, 8260D, 624.1	
175	5 - 9% of mass 174
176	95 - 105% of mass 174
177	5 - 10% of mass 176

BFB Key Ions and Ion Abundance Criteria for 6200	
Mass	**Ion Abundance Criteria**
50	15.0-40.0% of mass 95
75	30.0-60.0% of mass 95
95	base peak, 100% relative abundance
96	5.0-9.0% of mass 95
173	< 2.0% of mass 174
174	> 50.0% of mass 95
175	5.0-9.0% of mass 174
176	> 95.0%, but less than 101% of mass 174
177	5.0-9.0% of mass 176

EPA 624.1 NOTE: The 12-hour tune clock begins after analysis of the BFB, the LCS, and the BLANK and ends 12 hours later. BFB, the LCS, and BLANK are outside of the 12-hour tune clock. The MS and MSD are treated as samples are analyzed within the 12-hour clock.

8.2.2 Calibration Curve – General Criteria

- A minimum of 5-point calibration is performed using the primary standards listed in Section 7.5.1. Additional levels may be included to better meet project or client requirements. Regardless of the specific number, the calibration levels analyzed should correspond to a range of concentrations expected to be found in samples, without exceeding the working range of the GC/MS system.
- A calibration point must be analyzed at or below the reporting limit. The concentration of the lowest calibration standard analyzed should be at least 3-5 times the MDL. The instrument response must be distinguishable from the instrument background noise. The signal to noise ratio is the magnitude of the signal strength detected by the mass spectrometer relative to the magnitude of the background noise of the instrument. Instrument conditions must be optimized before the analysis of a calibration curve to minimize background effects.

  STATE NOTE: The reporting level standard must be refit after calibration is complete. This standard is required by the state of North Carolina and is used to verify the low end of the calibration curve.

  STATE NOTE: When analyzing samples from Minnesota, the reporting limit must be verified with each calibration or at least monthly. Verification can be performed by re-quantitation of the low calibration standards using the newly updated calibration curve or by analyzing a

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separate reporting level standard following calibration curve update. This standard must recover ±40% of the expected concentration. If the criterion is not met, a higher level standard may be re-quantitated or analyzed; however the reporting limit must be amended to reflect the increased concentration of the standard utilized. Analytes known to be poor performers are dealt with on a case-by-case basis.

- The highest standard must not exceed the linear range of the detector. The concentration of the highest standard must produce a response, which does not cause the MS detector to become saturated. The highest concentration used in the calibration curve must allow the analyte to meet the calibration requirements outlined in Sections 8.2.6 through 8.2.8.
- When using Method 5035, ENV-SOP-MTJL-0129, the calibration curve must be prepared in the same solutions used to preserve the field samples.
- **EPA 8260C NOTE:** The method of linear regression analysis has the potential for a significant bias to the lower portion of a calibration curve, while the relative percent difference and quadratic methods of calibration do not have this potential bias. When calculating the calibration curves using the linear regression model, a minimum quantitation check on the viability of the lowest calibration point should be performed by re-fitting the response from the low concentration calibration standard back into the curve. It is not necessary to reanalyze a low concentration standard; rather the data system can recalculate the concentrations as if it were an unknown sample. The recalculated concentration of the low calibration point should be within ±30% of the standard's true concentration.
- **EPA 8260D NOTE:** The method of linear regression analysis has the potential for a significant bias to the lower portion of a calibration curve, while the relative percent difference and quadratic methods of calibration do not have this potential bias. A minimum quantitation check on the viability of all calibration points should be performed by re-fitting the response from each calibration standard back into the curve. The recalculated concentration of the reporting level point should be within ±50% of the standard's true concentration. All other recalculated concentration calibration points should be within ±30% of the standard's true concentration. If a failure occurs in the low point and it is equivalent to the LLOQ, the analyte should be reported as estimated near that concentration or the LLOQ should be reestablished at a higher concentration.

  STATE NOTE: South Carolina does not allow the use of quadratic regression for compounds that have previously demonstrated linearity.
- The method reference spectra must be updated from the mid-point of each calibration.

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8.2.3 Calibration Levels for single analytes

8.2.3.1 Soil Samples - Soil samples are analyzed with a heated purge in the soil chamber of the Archon, or equivalent autosampler. The calibration curve is generated by injecting the following volumes of Calibration Mix (See Section 7.5.1) into 5mL of reagent water. Surrogate standard is prepared by diluting the surrogate by1:10 using (NSI lab solutions, 8260 Surrogate Mix Q-4392 or equivalent at1000µg/mL).

8260 Calibration Curve - GC/MS Soil (into 5mL water)			
Intermediate solution volume (µL)	Concentration of standard (ppb)	Surrogate Added (µL)	Concentration of Surrogate (ppb)
0.025	0.25 (LOD Point)	0	n/a
0.05	0.5	0	n/a
0.1	1	1	1
0.2	2	2	2
0.5	5	3	3
2.5	25	4	4
7.5	75	5	5
10	100	6	6
20	200	7	7

8260 Calibration Curve - GC/MS Soil (into 50mL water) for use with Agilent 5977A or 5977B Only			
Intermediate solution volume (µL)	Concentration of standard (ppb)	Surrogate Added (µL)	Concentration of Surrogate (ppb)
0.25	0.25 (LOD Point)	0	n/a
0.5	0.5	0	n/a
1	1	1	1
2	2	2	2
5	5	3	3
25	25	4	4
75	75	5	5
100	100	6	6
200	200	7	7

AP9/Oxygenates Calibration Curve - GC/MS Soil (into 5mL of water)	
Intermediate solution volume (µL)	Concentration of standard (ppb)
1	1.0
5	5
10	10
15	15
20	20

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AP9/Oxygenates Calibration Curve - GC/MS Soil (into 50mL of water)	
Intermediate solution volume (µL)	Concentration of standard (ppb)
10	1.0
50	5
10	10
150	15
200	20

Note 1: When analyzing soil samples by the low-concentration method (Section 8.7.1), the calibration standards must be heated to 40°C ± 1°C prior to purging.

Note 2: Injections should be performed from the lowest to the highest standards with a cleanup injected after the highest standard and followed by the secondary source standard to verify the initial calibration curve.

8.2.3.2 Water Samples - Water samples are run with a heated purge using the Archon, or equivalent autosampler. The calibration curve is generated by injecting the following volumes of Calibration Mix (See Section 7.5.1.) into 50mL of water. Surrogate standard is added to the curve points, (Phenova, Custom IS-SURR Mix AL0-130574 or equivalent at1000µg/mL).

8260 Calibration Curve - GC/MS Water (into 50mL water)			
Intermediate solution volume (µL)	Concentration of standard (ppb)	Surrogate Added (µL)	Concentration of Surrogate (ppb)
0.25	0.25 (LOD Point)	0	n/a
0.5	0.5	0	n/a
1	1	1	1
2	2	2	2
5	5	3	3
25	25	4	4
75	75	5	5
100	100	6	6
200	200	7	7

AP9/Oxygenates Calibration Curve - GC/MS Water (into 50mL of water)	
Intermediate solution volume (µL)	Concentration of standard (ppb)
10	1.0
50	5
10	10
150	15

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AP9/Oxygenates Calibration Curve - GC/MS Water (into 50mL of water)	
Intermediate solution volume (µL)	Concentration of standard (ppb)
200	20

SAC NOTE: See Controlled Document DAV-03 VOA ICAL Reference for calibration table.

8.2.4 Internal Standards and Surrogates – Soil/Water

The autosampler adds 1µL of the IS/surrogate mix to each sample. The addition of 1µL of the surrogate spiking/internal standard solution is equivalent of 16µg/L of each surrogate/internal standard. Internal standard and surrogate standard are contained within the same spiking mix. Internal Standards are listed Section 7.7.1 and Surrogates are listed in Section 7.6.1.

SAC NOTE: During analysis, 5µL of this solution is added to 5mL of sample, resulting in a concentration of 50 µg/L

Tabulation of the Internal Standards

Tabulate the area response of the characteristic ions (see Attachment III) against each compound's concentration and each internal standard concentration. Then calculate the response factor (RF) for the quantifying ion of each compound relative to the appropriate internal standard according to the calculation provided in Section 9.1. The internal standards used should permit most of the compounds of interest in a chromatogram to have retention times of 0.80 to 1.20, relative to one of the internal standards. The average RF must be calculated and recorded for each compound.

8.2.5 System Performance Check Compounds (SPCCs) – Soil/Water

A system performance check must be made before the calibration curve can be used. The minimum relative response factor for volatile SPCCs are as follows:

Chloromethane	0.10
1,1-Dichlorethane	0.10
Bromoform	0.10
Chlorobenzene	0.30
1,1,2,2-Tetrachloroethane	0.30

These compounds are typically used to check compound instability and to check for degradation caused by contaminated lines or active sites in the system. Examples of these occurrences are:

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Compound	Effect on stability
Chloromethane	This compound is the most likely compound to be lost if the purge flow is too fast.
Bromoform	This compound is one of the compounds most likely to be purged very poorly if the purge flow is too slow. Cold spots and/or active sites in the transfer lines may adversely affect response. Response of the quantitation ion (m/z 173) is directly affected by the tuning of BFB at ions m/z 174/176. Increasing the m/z 174/176 ratio relative to m/z 95 may improve bromoform response.
1,1,2,2-Tetrachlorethane and 1,1-Dichloroethane	Contaminated transfer lines degrade these compounds in purge-and-trap systems. Active sites in trapping materials also can cause problems.

Adjust the purge gas (Helium or Argon) flow rate to 25-40mL/min on the purge-and-trap device. Optimize the flow rate to provide the best response for chloromethane and bromoform. Excessive flow rate reduces chloromethane response, whereas insufficient flow reduces bromoform response.

8.2.6 **EPA 8260B:** Response Factors (RF's) & Calibration Check Compounds (CCC's) - Soil/Water

Using the RF's for the initial calibration curve from Section 8.2.2, calculate and record the percent relative standard deviation (%RSD) for all compounds. Calculate the percent RSD as in Section 9.2. Linearity can be assumed if the RSD criteria is met, thus allowing quantitation calculations to be performed using RF.

8.2.6.1 CCC Criteria - The %RSD for each individual CCC must be less than 30%. The CCCs are:

1,1-Dichloroethene	Toluene
Chloroform	Ethylbenzene
1,2-Dichloropropane	Vinyl chloride

8.2.6.2 Target Analytes and other Non-CCC's - The RSD must meet the following criteria -

<15% RSD for all 8260B Target Analytes
<20% RSD for all 8260C/D Target Analytes
<35% RSD for all 624.1 Target Analytes
<20% RSD for all KSGRO Samples
<15% RSD for n-Hexane
<20% RSD for 6200 Analytes
<15% appendix 9 Analytes
<10% RSD for all 601/602 Target Analytes

Compounds not meeting the RSD requirement may be considered for linear regression as stated in 8.2.7.3

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8.2.6.3 Linear Regression - Criteria

When any compound does not meet the calibration criteria for RF, the most appropriate curve fitting model is used. If linear regression is used, it must be noted on the data (preferably on the CCV RF report), next to the affected compound. It must also meet correlation coefficient (r) criteria of 0.995 or better. SM 6200 requires a linear regression correlation coefficient of >0.994.

Linear regression is achieved by plotting the instrument response versus the concentration of the standards. The resulting regression line must not be forced through the origin and the origin must not be included as a calibration point.

STATE NOTE: For all Wisconsin sample analyses, analysts must evaluate the %RSD of calibrations to ensure that they do not have unacceptable curvature. The %RSD limit criteria, as found in the specific methods listed above, applies to calibrations using average RF calibrations. For linear and quadratic curve fits, a limit of 40% RSD is used for normal target analytes and 50% RSD is utilized for known poor performing compounds.

The most appropriate curve fitting model from among the following choices must be utilized (given in the order of preference): Average Response Factor

- Linear – No Weighting
- Linear – 1/x Weighting
- Linear – $1/x^2$ Weighting
- Quadratic

STATE NOTE: South Carolina does not allow the use of quadratic regression for compounds that have previously demonstrated linearity.8.2.6.4 Calibration Corrective Action

When the RSD exceeds 15% or linear regression criteria could not be met, plot and inspect the calibration data for abnormal chromatographic responses. The inspection may indicate analytical problems, including errors in standard preparation, the presence of active sites in the chromatographic system, analytes that exhibit poor chromatographic behavior, etc.

If calibration criteria are not met, then one of the following options must be applied to the GC/MS initial calibration:

8.2.6.4.1 Adjust the instrument and/or perform instrument maintenance and re-analyze the calibration standards until the RSD of the calibration meets criteria.

8.2.6.4.2 Narrow the calibration range until the response is linear. If the low standard is below the estimated quantitation limit (i.e., for the poor purgers in a commercially available prepared standard mix), then this standard may be dropped. Re-calculate the RSD without the low standard to determine if the

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RSD meets the QC limit. If the lowest standard is dropped, the reporting limit could require a change. Check with the supervisor to determine if a point can be removed and not affect reporting limits requirements.

Compounds that are very soluble in water generally are poor purgers. The ketones, vinyl acetate, acrolein, and acrylonitrilie fall into this category.

8.2.7 **EPA 8260C:** Response Factors (RF's)

8.2.7.1 Calibration Curve Criteria - Calculate the mean response factor and the relative standard deviation (RSD) of the response factors for each target analyte using the following equations. The RSD should be less than or equal to 20% for each target analyte. It is also recommended that a minimum response factor for the most common target analytes as noted in Attachment VII, be demonstrated for each individual calibration level as a means to ensure that these compounds are behaving as expected. In addition, meeting the minimum response factor criteria for the lowest calibration standard is critical in establishing and demonstrating the desired sensitivity. Due to the large number of compounds that may be analyzed by this method, some compounds will fail to meet these criteria. For these occasions, it is acknowledged that the failing compounds may not be critical to the specific project and therefore they may be used as qualified data or estimated values for screening purposes.

8.2.7.2 When the RSD exceeds 20% or linear regression criteria could not be met, plot and inspect the calibration data for abnormal chromatographic responses. The inspection may indicate analytical problems, including errors in standard preparation, the presence of active sites in the chromatographic system, analytes that exhibit poor chromatographic behavior, etc.

NOTE: To maximize batches calibration RSDs are held to the strictest method reported, the RSD used for all methods is 15%.

8.2.8 **EPA 8260D**: Response Factors (RF's)

8.2.8.1 Calibration Curve Criteria – Calculate the mean RF and the relative standard deviation (RSD) of the RFs for each target analyte. The RSD should be ≤20% for each target analyte. Attachment IX contains minimum RFs that may be used as guidance in determining whether the system is behaving properly and as a check to see if calibration standards are prepared correctly. It is neither expected nor required that all analytes meet these minimum RFs in the guidance table, however target analytes must not have an RF <0.01. Due to the large number of compounds that may be analyzed by this method, some compounds will fail to meet these criteria. For these occasions, it is acknowledged that the failing compounds may not be critical to the specific project and therefore they may be used as qualified data or estimated values for screening purposes.

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8.2.8.2 When the RSD exceeds 20% or linear regression criteria could not be met, plot and inspect the calibration data for abnormal chromatographic responses as the inspection can be a useful diagnostic tool.

NOTE: To maximize batches calibration RSDs are held to the strictest method reported, the RSD used for all methods is 15%

8.2.9 **EPA 624.1**

Calculate the mean (average) and relative standard deviation (RSD) of the response factors. If the RSD is less than 35%, the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to fit a linear or quadratic regression of response ratios vs. concentration ratios. If used the regression must be weighted inversely proportional to concentration. The coefficient of determination (R2) of the weighted regression must be greater than 0.920 (this value roughly corresponds to the RSD limit of 35%). Alternatively, the relative standard error may be used as an acceptance criterion. As with the RSD, the RSE must be less than 35%. If an RSE less than 35% cannot be achieved for a quadratic regression, system performance is unacceptable, and the system must be adjusted and re-calibrated.

NOTE: Using capillary columns and current instrumentation, it is quite likely that a laboratory can calibrate the target analytes in this method and achieve a linearity metric (either RSD or RSE) well below 35%. Therefore, laboratories are permitted to use more stringent acceptance criteria for calibration than described here (e.g., to harmonize their application of this method with those from other sources).

STATE NOTE: South Carolina does not allow the use of quadratic regression for compounds that have previously demonstrated linearity.

8.3 Calibration Verification

8.3.1 Calibration Verification for EPA Methods 8260B, 624.1 and SM 6200B:

8.3.1.1 SSCV's

After a successful calibration, a Second Source Calibration Verification (SSCV) or Initial Calibration Verification (ICV) must be analyzed to verify the calibration. This standard must be made from a second source, preferable from a different vendor than the calibration standards. The second source calibration standard must perform within following criteria:

CCC and SPCC compounds	± 30%
Other compounds (non-poor performers)	± 40%
Poor Performers (8.3.2)	in-house LCS limits

8.3.1.2 CCC's

The curve must be verified daily by a calibration standard known as the Continuing Calibration Verification standard (CCV) and is analyzed every 12 hours. This standard is prepared at or near the mid-point of the calibration curve. A maximum of 20% criteria would be expected for

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CCC analytes (Listed in Section 8.2.7.1) and n-Hexane when requested as a target analyte.

Compounds on average response factor use % difference,

$$\% \text{ Difference} = (RF_v - Rf_{ave}) / Rf_{ave} \times 100\%$$

Compounds on regression fit model use percent drift,

% Drift = (Calculated conc - Theoretic conc) / Theoretic conc x 100%

Criteria for both is ≤20%.

8.3.1.3 SPCC's

The SPCC's must have a minimum response factor as stated in Section 8.2.6. If these criteria are exceeded, then corrective action is required.

8.3.1.4 All Target Analytes and Non-CCC's

When analyzing 8260B and 624.1 concurrently, calibration verifications are evaluated using both the 8260B criteria (sections. 8.3.1.2 through 8.3.1.3 and the 624.1 criteria (Attachment VI). For analytes not on the 624.1 list, all target analytes (except for the poor performers (8.3.3) must meet a maximum of 40% drift from the calibration curve. The analyst evaluates all analytes carefully and the experience of the analyst weighs heavily when determining the usability of the data.

Poor performers are allowed a maximum of 50% drift from the calibration curve. See section 8.3.3 for a listing of poor performing analytes.

STATE NOTE: For South Carolina 624.1 samples, the target analytes reported must agree with the compound list found in the EPA 624.1 published method.

8.3.2 Calibration Verification for EPA Method 8260C/D:

8.3.2.1 SSCV's

After a successful calibration, a Second Source Calibration Verification (SSCV) or Initial Calibration Verification (ICV) must be analyzed to verify the calibration. This standard must be made from a second source, preferable from a different vendor than the calibration standards. The second source calibration standard must perform within following criteria:

All compounds	± 30%
Poor Performers (8.3.3)	in-house LCS limits

8.3.2.2 Target Analytes

The curve must be verified initially by a calibration standard known as the Continuing Calibration Verification standard (CCV) and is analyzed every 12 hours). . This standard is prepared at or near the mid-point of the calibration curve. A maximum of 20% criteria would be expected for all target analytes and n-Hexane when requested as a target analyte.

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If the percent difference (average RSD) or percent drift (linear regression models) for a compound is less than or equal to 20%, then the initial calibration for that compound is assumed to be valid. Due to the large numbers of compounds that may be analyzed by this method, some compounds will fail to meet the criteria. If the criterion is not met (i.e., greater than 20% difference or drift) for more than 20% of the compounds included in the initial calibration, then corrective action must be taken prior to the analysis of samples. In cases where compounds fail, they may still be reported as non-detects if it can be demonstrated that there was adequate sensitivity to detect the compound at the applicable quantitation limit. For situations when the failed compound is present, a reporting level verification is analyzed. Reference QUA-12 *CCV Criteria for 8260C and 8270D* for assessing reporting level verification.

All compounds must have a minimum response factor. If these criteria are exceeded, then corrective action is required. The minimum response factors are generated in house based off of historical data.

8.3.3 Poor Performers:

The poor performers are as follows:

Propene	2-Chloroethylvinyl Ether
Dichlorodifluoromethane	Acrolein
Carbon Disulfide	Vinyl acetate
Bromomethane	trans-1, 4-dichloro-2-butene
Chloroethane	Alcohols (Ethanol, TBA, TAA, ETBA, Butanol)
1,3-Butadiene	Iodomethane
1,2-Dibromo-3-chloropropane	Naphthalene
1- Methylnaphthalene	2-Butanone
2- Methylnaphthalene	2-Hexanone
Acetone	4-Methyl-2-pentanone
Pentachloroethane	Cyclohexanone
Tert-butyl Formate	Methyl cyclohexane

8.3.4 Laboratory Control Standard (LCS): A laboratory control sample (LCS) should be included with each analytical batch. The LCS consists of an aliquot of a clean (control) matrix similar to the sample matrix and of the same weight or volume. The LCS is spiked with the same analytes at the same concentrations as the matrix spike, when appropriate. When the results of the matrix spike analysis indicate a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix. Also note the LCS for water sample matrices is typically prepared in organic-free reagent water similar to the continuing calibration verification standard. In these situations, a single analysis can be used for both the LCS and continuing calibration verification.

- QC Limits are found in the LIMS for LCS and MS/MSD.
- If the stated criteria are exceeded, then corrective action is required.
- See Section 11.6.1, on marginal exceedances.

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STATE NOTE: All **South Carolina** DHEC compliance testing, the LCS responses must be within 70 – 130% for Method 8260 and within the limits given in Attachment VI for Method 624.1. High failures are acceptable for 8260 or 624.1, as long as the sample results are below detection level. Qualifiers cannot be used therefore low failures require a batch re-analysis. See Section 10 for QC evaluation. For samples analyzed from South Carolina that are not utilized for compliance purposes, in house established acceptance limits are utilized to demonstrate controlled analyses.

STATE NOTE: For EPA Region IV only (AL, FL, GA, KY, MS, NC, SC, TN), when running Acrolein and Acrylonitrile by V624.1, the QC criteria from EPA Method 603 should be used for control demonstration. The LCS criteria from EPA Method 603 include Acrolein recovery within 88-118% and Acrylonitrile recovery within 71-135%.

8.3.5 Internal Standard Evaluation

8.3.5.1 When a calibration is performed at the beginning of an analytical run:

The internal standard areas must be evaluated against the mid-point of the curve. Samples are analyzed within a 12-hour window; the internal standards of those samples are evaluated against mid-point of the curve. Then a CCV is analyzed, this is compared to the mid-point of the initial calibration curve. Addition samples are analyzed within a 12-hour window; the internal standards of those samples are evaluated against the previous acceptable CCV.

8.3.5.2 When an analytical run is started using a passing ICV (which is compared against the initial calibration mid-point to verify the calibration curve): Samples are analyzed within a 12-hour window, the internal standards of those samples are evaluated against the daily CCV. Then a CCV is analyzed, this is compared to the mid-point of the curve. Additional samples are analyzed within a 12-hour window; the internal standards of those samples are evaluated against the previous acceptable CCV.

8.4 Gas chromatographic analysis:

8.4.1 Typical sequence order for loading the autosampler with calibration:

Sample/QC Type	Use
Cleanup Blank	Verify system is contamination free
BFB Tune	Tuning criteria
Calibration standard(s)	Initial volatiles calibration and 5-point for GRO (if analyzed)
Second Source Calibration Verification (SSCV) or Initial Calibration Verification(ICV)	Verify initial calibration with second source.
Laboratory Control Sample	Laboratory blank, spiked with known amount(s) of analyte of interest
Matrix Spike/Matrix Spike Dup.	Sample spiked with known amount(s) of analytes of interest

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Sample/QC Type	Use
Method blank	Ensure that carry over has not occurred from the calibration standard and that the analytical system does not show contamination above the established detection limits
12-hour window	Client samples
Continuing Calibration Verification (CCV)	Single-point calibration verification standard, if needed.
12-hour window	Client samples

8.4.2 Typical sequence order for loading the autosampler with calibration verification only:

Sample/QC Type	Use
Cleanup Blank	Verify system is contamination free
BFB Tune	Tuning criteria
Initial Calibration Verification (ICV)	Verify initial calibration.
Laboratory Control Sample	Laboratory blank, spiked with known amount(s) of analyte of interest
Matrix Spike/Matrix Spike Dup.	Sample spiked with known amount(s) of analytes of interest
Method blank	Ensure that carry over has not occurred from the calibration standard and that the analytical system does not show contamination above the established detection limits
12-hour window	Client samples
Continuing Calibration Verification (CCV)	Single-point calibration verification standard, if needed.
12-hour window	Client samples

8.5 GC/MS Analysis -- Water Samples

8.5.1 Screening the sample prior to purge-and-trap analysis provides guidance on whether sample dilution is necessary and prevents contamination of the purge-and-trap system by screening of 5mL of sample using an HNU or equivalent portable PID. See ENV-SOP-MTJL-0102, *Volatile Organic Compounds Screening using the RAE Systems Photoionization Gas Detector Model MiniRAE 3000.*

8.5.2 All samples and standard solutions must be allowed to warm to ambient temperature before analysis.

8.5.3 Set up the GC/MS system as outlined in Section 8.1.

8.5.4 BFB tuning criteria and GC/MS calibration criteria must be met (Section 8.2.1) before analyzing samples.

8.5.5 Load the unopened VOA vial onto the autosampler for analysis.

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After the sample has been analyzed on the instrument, check the pH of the sample using the remaining sample in the VOA vial. Use universal pH paper and record the sample pH to the nearest whole pH unit. Samples not passing the pH requirements are flagged with a "G1" qualifier. All samples that report 2-CEVE as a target analyte and have a pH < 2 are qualified with a "G2".

STATE NOTE: For West Virginia compliance samples, check for residual chlorine after sample analysis. Samples containing residual chlorine must be flagged as such.

8.5.6 Sample Dilution -- When necessary, samples can be diluted before purging. This can be performed in a clean 50mL volumetric flask. The sample is measured through the use of an appropriate microliter syringes and added to the flask which is then filled with reagent water to the meniscus.

8.5.7 Compositing samples prior to GC/MS analysis – Site or project-specific requirements may require compositing of samples, which is performed according to the instructions below. Compositing of samples is only performed at the request of the client.

8.5.7.1 All vials for the sample are combined in an appropriate sized volumetric flask that will allow for the least amount of headspace. (If 4 vials are to be composited then a 200mL volumetric flask will be used to combine the samples.). Practice special precautions to maintain zero headspace in the syringe.

8.5.7.2 The samples must be cooled to 4 °C or less during composition to minimize the loss of volatiles. Sample vials may be placed in a tray of ice to prevent volatile loss during this process.

8.5.7.3 Invert the volumetric flask three (3) times. Pour the volume out of the volumetric flask into the original 40mL VOA vial containers. The sample is now ready to be analyzed.

NOTE: Samples are not routinely composited; however, if site-specific requirements state procedures for compositing samples, the laboratory makes every effort to comply with those requirements.

8.5.8 Surrogate/Internal Standards – The autosampler adds 1µL of the IS/surrogate mix to each sample. The addition of 1µL of the surrogate spiking/internal standard solution is equivalent to 16µg/L of each surrogate standard. Internal standard and surrogate standard are contained within the same spiking mix.

SAC NOTE: During analysis, 5µL of this solution is added to 5mL of sample, resulting in a concentration of 50 µg/L of each surrogate and internal standard.

8.5.9 Refer to ENV-SOP-MTJL-0131, *Purge and Trap for Aqueous Samples* and ENV-SOP-MTJL-0129, *Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples* for additional information on sample introduction.

8.5.10 If the initial analysis of a sample or a dilution of the sample has a concentration of analytes that exceeds the initial calibration range, the sample must be re-

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analyzed at a higher dilution. All dilutions must keep the response of the major constituents (previously saturated peaks) in the upper half of the linear range of the curve. Secondary ion quantitation is allowed only when there are sample interferences with the routinely quantitated primary ion. When a sample is analyzed that has saturated the detector, the samples following must be analyzed for contamination. If any sample shows contamination, they must be re-analyzed.

8.6 GC/MS Analysis - Water-miscible liquids

8.6.1 Water-miscible liquids are analyzed as water samples after first diluting them at least 25-fold with laboratory water.

8.6.2 Initial and serial dilutions can be prepared by pipetting a known amount of the sample to a 50mL volumetric flask and diluting to volume with organic-free reagent water. Transfer immediately to a clean/baked 40mL vial using a 5mL syringe.

8.6.3 Alternatively, prepare dilutions directly in a clean 40mL vial filled with organic-free reagent water by adding at least 0.5µL, but not more than 25mLs of liquid sample. The sample is ready for addition of internal and surrogate standards. Proceed with Section 8.5.8.

8.7 GC/MS Analysis - Sediment/soil and waste samples

These samples may contain percent quantities of purgeable organics that will contaminate the purge-and-trap system, and require extensive cleanup and instrument downtime. The screening of samples is highly recommended. Screening data should be used in conjunction with site-specific DQOs, if known, to determine whether to use the low-concentration method (0.005 - 1mg/Kg) or the high-concentration method (>1mg/Kg).

8.7.1 Low-concentration method -- This is designed for samples containing individual purgeable compounds of <1mg/Kg. It is limited to sediment/soil samples and waste that is of a similar consistency (granular and porous). The low-concentration method is based on purging a heated sediment/soil sample mixed with organic-free reagent water containing the surrogate and internal standards. All QC samples and standards are to be analyzed under the same conditions as the samples, using 5g of glass beads or equivalent blank matrix.

STATE NOTE: This option cannot be used for South Carolina samples. Please refer to ENV-SOP-MTJL-0129 that addresses Method 5035 for sample preparation.

8.7.1.1 Use a 5g sample if the expected concentration is <0.1mg/Kg, or a 1g sample for expected concentrations between 0.1 and 1mg/Kg.

8.7.1.2 The GC/MS system must be set up as in Sections 8.1 and 8.2. This must be done prior to the preparation of the sample to avoid loss of volatiles from standards and samples. Both the initial and daily calibration standards (Sections 8.2 and 8.3) must be heated to 40°C purge temperature. Refer to Method 5035 (ENV-SOP-MTJL-0129) for additional instructions for 8260B soil analysis.

8.7.1.3 The sample consists of the entire contents of the sample container. Do not discard any supernatant liquids. Mix the contents (using slow but

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precise movement to limit the loss of volatiles) of the sample container with a narrow metal spatula. Weigh the amount determined in Section 8.7.1.1 into a tared purge device. Note and record the actual weight to the nearest 0.1 g.

8.7.1.4 Add nanopure water to the purging vial, which contains the weighed amount of sample, and place the vial in the purge-and-trap system.

NOTE: Prior to the placement of the vial, the procedures in Sections 8.7.1.4 must be performed rapidly and without interruption to avoid loss of volatile organics. These steps must be performed in a laboratory free of solvent fumes.

8.7.2 High-concentration method -- The method is based on extracting the sediment/soil with methanol. A waste sample is either extracted or diluted, depending on its solubility in methanol. Wastes (i.e., petroleum and coke wastes) that are soluble in methanol are diluted. An aliquot of the extract is added to organic-free reagent water containing surrogate and internal standards. This may be purged at higher temperatures than ambient temperature as long as all calibration standards, field samples, and associated QC samples are purged at the same temperature and the laboratory demonstrates acceptable method performance. All samples with an expected concentration of >1.0 mg/Kg must be analyzed by this method.

STATE NOTE: This method is not suitable for samples from South Carolina, North Carolina or Indiana. South Carolina does not recognize the practices in sections 8.7.2.1 or 8.7.2.2. 5035 must be used for all high-level soil samples, see ENV-SOP-MTJL-0129.

8.7.2.1 The sample (for volatile organics) consists of the entire contents of the sample container. Do not discard any supernatant liquids. Mix the contents (using slow but precise movement to limit the loss of volatiles) of the sample container with a narrow metal spatula. For sediment/soil and solid wastes that are insoluble in methanol, weigh 5g (wet weight) of sample into a tared 40mL vial. Use a top-loading balance. Note and record the actual weight to 0.1g. For waste that is soluble in methanol, tetraglyme, or PEG, weigh 5g (wet weight) into a 40mL vial.

8.7.2.2 Add 5mL Methanol and vortex. See ENV-SOP-MTJL-0129.

NOTE: Sections 8.7.2.1 and 8.7.2.2 must be performed rapidly and without interruption to avoid loss of volatile organics. These steps must be performed in a laboratory free from solvent fumes.

8.7.2.3 The GC/MS system must be set up as in Sections 8.1.

8.7.2.4 If a screening procedure was followed, use the estimated concentration to determine the appropriate volume. If the sample was submitted as a high-concentration sample, start with 200µL.

8.7.2.5 In a clean/baked vial filled with reagent water, inject the corresponding aliquot of methanol extract. Immediately cap and place in the autosampler. The autosampler adds 1µL of the IS/surrogate mix to all of the samples.

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8.7.2.6 Proceed with the analysis as outlined in Sections 8.5.9-8.5.10. Analyze all blanks on the same instrument as that used for the samples.

8.7.2.7 For a matrix spike in the high-concentration of sediment/soil samples, Add a 200µL aliquot of this extract to 5mL of organic-free reagent water for purging (as per Section 8.7.2.6) in a clean/baked 40mL VOA vial and add 20µL spiking solution, 1µL internal and surrogate standard solution (IS/Surr solution added by autosampler).

8.7.2.8 Data generated from soil samples prepared in methanol on Agilent™ 5977A or 5977B instruments (with an extractor ion or high efficiency source) may be reported to low-level MDL/RL values due to the enhanced sensitivity associated with these instruments.

8.8 Qualitative Identification

The qualitative identification of compounds determined by this method is based on retention time, and on comparison of the sample mass spectrum, after background correction, with characteristic ions in a reference mass spectrum. The reference mass spectrum must be generated by the laboratory using the conditions of this method. All hits must be visually compared to the reference spectrum for confirmation. The characteristic ions from the reference mass spectrum are defined to be the three ions of greatest relative intensity, or any ions over 30% relative intensity if less than three such ions occur in the reference spectrum. Compounds are identified as present when the criteria below are met.

8.8.1 The intensities of the characteristic ions of a compound maximize in the same scan or within one scan of each other. Selection of a peak by a data system target compound search routine where the search is based on the presence of a target chromatographic peak containing ions specific for the target compound at a compound-specific retention time is accepted as meeting this criterion.

8.8.2 The RRT of the sample component is within + 0.06 RRT units of the RRT of the standard component.

8.8.3 The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum. (Example: For an ion with an abundance of 50% in the reference spectrum the corresponding abundance in a sample spectrum can range between 20% and 80%.)

8.8.4 Structural isomers that produce very similar mass spectra are identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between two isomer peaks is less than 25% of the sum of the two peak heights. Otherwise, structural isomers are identified as isomeric pairs.

8.8.5 Identification is hampered when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When gas chromatographic peaks obviously represent more than one sample component (i.e., a broadened peak with shoulder(s) or a valley between two or more maxima), appropriate selection of analyte spectra and background spectra are important. Examination of extracted ion current profiles of appropriate ions can aid in the selection of spectra, and in qualitative identification of compounds. When analytes co-elute (i.e., only one chromatographic peak is apparent), the identification criteria can be met, but

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each analyte spectrum contains extraneous ions contributed by the co-eluting compound.

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8.8.6 TIC's - Tentatively Identified Compounds

Periodically, clients may request additional identification of compounds that are not normally calibrated. This identification is limited to the compounds in the current mass spectral library employed by Pace National.

For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification is determined by the type of analyses being conducted. At the client request, when serving the role of QA (or referee) laboratory, tentatively identified compounds (TICs) must always be reported. Guidelines for making tentative identification are:

(1) Relative intensities of major ions in the reference spectrum (ions >10% of the most abundant ion) should be present in the sample spectrum.

(2) The relative intensities of the major ions should agree within 15% to be consistent with target compound list identification. (Example: For an ion with an abundance of 50% in the standard spectrum the corresponding sample ion abundance must be between 20 and 80%).

(3) Molecular ions present in the reference spectrum should be present in the sample spectrum.

(4) Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of co-eluting compounds.

(5) Ions present in the reference spectrum but not in the sample spectrum must be reviewed for possible subtraction from the sample spectrum because of background contamination or co-eluting peaks. Data system library reduction programs can sometimes create these discrepancies.

Computer generated library search routines must not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Only after visual comparison of sample with the nearest library searches does the mass spectral interpretation specialist assign a tentative identification.

8.8.6.1 Routinely, Pace National employs a minimum Q value of 85% for tentative identifications and a minimum concentration of 10ppb. Peaks below a Q value of 85% but above 10ppb may be reported as “Unknown”. Any identified peaks below 10ppb are removed as these could result from baseline noise or other interferences, not necessarily attributable to the field sample or reliably quantifiable using GCMS technology. Additionally, any peaks that are attributable to instrument contamination (e.g., siloxanes) are also removed.

8.8.6.2 If multiple TICs, with same exact name, exist for a sample, the LIMS will only display the TIC with the highest quality match per sample.

8.8.6.3 TIC names assigned as “Unknown” may initially have the same name as another “Unknown” until parsed and displayed in LIMS where it is given a hyphen and incremental number which then becomes a unique TIC (e.g., Unknown-1).

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8.8.6.4 When reporting "Total TIC" for any client sample, only concentrations per above requirements will be used to sum the Total TIC concentration.

8.9 Quantitative Analysis

8.9.1 When a compound has been identified, the quantitation of that compound is based on the integrated abundance from the EICP of the primary characteristic ion. Quantitation is accomplished using the internal standard technique, as described in Section 9. The internal standard used must be the one nearest the retention time of that of a given analyte.

8.9.2 Sediment/soil samples are reported on a dry weight basis, while sludge and wastes are reported on a wet weight basis. The percent dry weight of the sample (see Section 9.7) must be reported along with the data in either instance. At Pace National, the dry weight conversion calculations for sample reporting are performed by the LIMS system. [Dry weight only when requested]. The LIMS Final Client Report represents the reporting basis as either wet weight or dry weight, depending upon the calculation used.

9.0 DATA ANALYSIS AND CALCULATIONS

9.1 Concentration of Target Analytes in Water and Water-Miscible Waste

$$\text{Concentration}(ug/L) = \frac{(A_x)(I_s)(D)}{(A_{is})(ave.RF)(V_s)}$$

where:
A_x = Area (or height) of the peak for the analyte in the sample.
A_{is} = Area (or height) of the peak for the internal standard.
I_s = Mass (amount) of the internal standard in the concentrated sample extract (ng). This is not just the mass injected into the instrument, but the total mass of internal standard in the concentrated extract.
D = Dilution factor, if the sample or extract was diluted prior to analysis. If no dilution was made, D = 1. The dilution factor is always dimensionless.
ave.RF = Mean response factor from the initial calibration.
V_s = Volume of the aqueous sample extracted or purged (mL). If units of liters are used for this term, multiply the results by 1000.

9.2 Concentration of Target Analytes in Sediment/Soil, Sludge, and Waste

9.2.1 High-concentration procedure

$$\text{Concentration}(ug/L) = \frac{(A_x)(I_s)(V_t)}{(A_{is})(ave.RF)(V_i)(W_s)}$$

where:
A_x, I_s, A_{is}, ave.RF are the same as in water and water-miscible waste above.
Vt = Volume of total extract (μL) (use 10,000μL or a factor of this when dilutions are made).
Vi = Volume of extract added (μL) for purging.
Ws = Weight of sample extracted or purged (g). The wet weight or dry weight may be used, depending upon the specific applications of the data.

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9.2.2 Low-concentration procedure

$$\text{Concentration}(ug/L) = \frac{(A_x)(I_s)(V_t)}{(A_{is})(\text{ave.RF})(V_i)(W_s)}$$

where:
A, I_s, A_{is}, RF are the same as in water and water-miscible waste above.
V_t = Volume of total extract (µL) (use 10,000µL or a factor of this when dilutions are made).
V_i = Volume of extract added (µL) for purging.
W_s = Weight of sample extracted or purged (g). The wet weight or dry weight may be used, depending upon the specific applications of the data.

9.2.3 Soil Weight determination with Methanol (samples received with MeOH).

$$\text{SoilWeight} = \text{VialTotalWeight}(\text{vial, soil, MeOH}) - \text{TareVialWeight} - \text{MeOHWeight}.$$

9.3 In order to report results for volatiles analysis of samples prepared in methanol containing significant moisture (>10%) content on an "as received" basis, the calculated concentration needs to be corrected using the total solvent/water mixture volume represented as Vt. This total solvent/water volume is calculated as follows:

$$\mu L \text{ solvent/water } V_t = \left[\frac{\text{mL of solvent} + (\%\text{ moisture} \times \text{g of sample})}{100}\right] \times 1000\ \mu L/mL$$

9.4 Percent Error (%Error)

$$\%Error = \frac{x_i - x'_i}{x_i} * 100$$

where:
x'_i = Measured amount of analyte at the calibration level *i*, in mass or concentration units
x_i = True amount of analyte at calibration level *i*, in mass or concentration units

9.5 Relative Standard Error (%RSE) – As an alternative to using the average response factor when using Method 624.1, the quality of the calibration may be evaluated using the Relative Standard Error (RSE). The acceptance criterion for the RSE is the same as the acceptance criterion for Relative Standard Deviation (RSD), in the method. RSE is calculated as:

$$\%RSE = 100 \times \frac{\sum_{i=1}^{n}\left[\frac{x'_i - x_i}{x_i}\right]^2}{(n-p)}$$

where:
x'i = Calculated concentration at level i
xi = Actual concentration of the calibration level i
n = number of calibration points
p = Number of terms in the fitting equation (average = 1; linear = 2; quadratic = 3)

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9.6 See the current Quality Assurance Manual for other equations associated with common calculations.

10.0 QUALITY CONTROL AND METHOD PERFORMANCE

10.1 All analysts must meet the qualifications specified in ENV-SOP-MTJL-0015, *Technical Training and Personnel Qualifications* before approval to perform this method. Analysts must complete an initial demonstration of proficiency before being approved to perform this method. Continuing proficiency must be demonstrated using proficiency testing, laboratory control sample analysis and/or MDL studies. Method performance is assessed per analyst. Updated method performance records are filed and stored in a central location within the department.

STATE NOTE: IDOCs for South Carolinae DHEC compliance need to meet 70-130% for all compounds except the poor purgers. Poor purgers need to recover at 60-140%. For samples analyzed from South Carolina that are not utilized for compliance purposes, in house established acceptance limits are utilized to demonstrate controlled analyses.

METHOD NOTE: IDOCs for SM 6200B should have an average recovery of 80-120% for each target analyte and the RSD of the replicates should be <20%.

10.1.1 Method 624.1 Requirements

10.1.1.1 Establish MDLs for the analytes of interest using the MDL procedure at 40 CFR part 136, appendix B. The laboratory's MDLs must be equal to or lower than those listed in Table 1 for those analytes which list MDL values, or lower than one-third the regulatory compliance limit, whichever is greater. For MDLs not listed in Table 1, the laboratory must determine the MDLs using the MDL procedure at 40 CFR part 136, appendix B under the same conditions used to determine the MDLs for the analytes listed in Table 1. All procedures used in the analysis must be included in the DOC.

624.1 Purgeable Analytes	MDL (ug/L)	Limit for s (%)	Range for $\bar{X}$ (%)
Acrolein		30	50-150
Acrylonitrile		30	50-150
Benzene	4.4	33	75-125
Bromodichloromethane	2.2		
Bromoform	4.7		
Bromomethane		90	D-242
Carbon tetrachloride	2.8	26	65-125
Chlorobenzene	6.0	29	82-137
Chloroethane		47	42-202
2-Chloroethylvinyl ether		130	D-252
Chloroform	1.6	32	68-121
Chloromethane		472	D-230
Dibromochloromethane	3.1	30	69-133
1,2-Dichlorobenzene		31	59-174
1,3-Dichlorobenzene		24	75-144
1,4-Dichlorobenzene		31	59-174
1,1-Dichloroethane	4.7	24	71-143

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624.1 Purgeable Analytes	MDL (ug/L)	Limit for s (%)	Range for $\bar{X}$ (%)
1,2-Dichloroethane	2.8	29	72-137
1,1-Dichloroethene	2.8	40	19-212
trans-1,2-Dichloroethene	1.6	27	68-143
1,2-Dichloropropane	6.0	69	19-181
cis-1,3-Dichloropropene	5.0	79	5-195
trans-1,3-Dichloropropene		52	38-162
Ethylbenzene	7.2	34	75-134
Methylene chloride	2.8	192	D-205
1,1,2,2-Tetrachloroethane	6.9	36	68-136
Tetrachloroethene	4.1	23	65-133
Toluene	6.0	22	75-134
1,1,1-Trichloroethane	3.8	21	69-151
1,1,2-Trichloroethane	5.0	27	75-136
Trichloroethene	1.9	29	75-138
Trichlorofluoromethane		50	45-158
Vinyl chloride		100	D-218

10.1.1.2 Prepare and analyze four LCSs by adding an appropriate volume of the second source standard (Section 7.5.2.1) to each of four aliquots of reagent water.

10.1.1.3 Calculate the average percent recovery ($\bar{X}$) and the standard deviation of the percent recovery (s) for each analyte using the four results.

10.1.1.4 For each analyte, compare s and $\bar{X}$ with the corresponding acceptance criteria for precision and recovery in Section 10.1.1.1. For analytes not listed, DOC QC acceptance criteria must be developed by the laboratory. Alternatively, acceptance criteria for analytes not listed may be based on laboratory control charts. If s and $\bar{X}$ for all analytes of interest meet the acceptance criteria, system performance is acceptable and analysis of blanks and samples may begin. If any individual s exceeds the precision limit or any individual $\bar{X}$ falls outside the range for recovery, system performance is unacceptable for that analyte.

NOTE: The large number of analytes present, a substantial probability that one or more will fail at least one of the acceptance criteria when many or all analytes are determined simultaneously. Therefore, the analyst is permitted to conduct a ‘‘re-test’’ as described here.

When one or more of the analytes tested fail at least one of the acceptance criteria, repeat the test for only the analytes that failed. If results for these analytes pass, system performance is acceptable and analysis of samples and blanks may proceed. If one or more of the analytes again fail, system performance is unacceptable for the analytes that failed the acceptance criteria. Correct the problem and repeat the test. To maintain the validity

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of the test and re-test, system maintenance and/or adjustment is not permitted between this pair of tests.

10.2 Batches

10.2.1 Extraction Batches:

Extraction batches are defined as sets of 1 - 20 samples. Extraction batches must include the following: 1 method blank, 1 Laboratory Control Sample (LCS)), 1 Matrix Spike/Spike Duplicate (MS/MSD) pair (if sufficient sample is available). Exceptions are made for waste dilution samples where the minimum batch QC must include a blank, and an LCS.

Additional instructions on Batch QC including required frequency and corrective actions can be found in Section 11 while acceptance criteria are found in the LIMS.

STATE NOTE: For samples from FL, AZ, MN and MA, 1 Laboratory Control Sample/Laboratory Control Sample Duplicate pair (LCS/LCSD) is required per batch.

10.2.2 Analytical Batches (sequences):

Analytical batches analysis must include the following: 1 Initial Calibration Verification (ICV) and BFB tune at the beginning of run, and/or 1 Continuing Calibration Verification (CCV) and BFB tune every 12 hours.

10.3 Perform BFB tune every 12 hours for 624.1, 8260B, 8260C, and 6200B. BFB tuning for method 8260D is prior to calibration curve. Tuning acceptance criteria are presented in Section 8.2.1. Once the data is acquired, the following options are available for acquiring the spectra for reference to meet the BFB tuning requirements. It is recommended that each initial tune verification utilize the “Autofind” function and be set up to look at three scans (the apex &±1 scan) and average the three scans then perform background subtraction. If Autofind is not utilized, select the mass spectrum at the peak apex for evaluation, or use an average mass spectrum across the entire BFB peak. Background subtraction is conducted using a single scan prior to the elution of BFB but no more than 20 scans prior. No part of the BFB peak or any other discrete peak should be subtracted. If a tune cannot be achieved that meets the criteria in Section 8.2.1 retune the mass spectrometer and run a new calibration or maintenance may be necessary.

10.3.1 Method 624.1 Requirements

10.3.1.1 Verify calibration after the criteria for BFB are met and prior to analysis of a blank or sample. After verification, analyze a blank to demonstrate freedom from contamination and carry-over at the MDL. Tests for BFB, the CCV, and the blank are outside of the 12-hour shift, and the 12-hour shift includes samples and matrix spikes and matrix spike duplicates. The total time for analysis of BFB, the CCV, the blank, and the 12-hour shift must not exceed 14 hours.

10.4 Run a minimum of a 5-point initial calibration curve (3-point can be used if 624/6200B are being run independently of 8260B), using the primary source standards each time major instrument maintenance occurs, or if the CCV does not meet acceptance criteria. Acceptance criteria for initial calibration are presented in Section 8.2. Calibration is verified by analyzing Second Source Calibration Verification (SSCV) standard; acceptance criteria for the SSCV are presented in Section 8.3.1.

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10.4.1 **Method 624.1**

If the RSD is less than 35%, the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to fit a linear or quadratic regression of response ratios vs. concentration ratios. If used, the regression must be weighted inversely proportional to concentration. The coefficient of determination (R2) of the weighted regression must be greater than 0.920 (this value roughly corresponds to the RSD limit of 35%). Alternatively, the relative standard error may be used as an acceptance criterion. As with the RSD, the RSE must be less than 35%. If an RSE less than 35% cannot be achieved for a quadratic regression, system performance is unacceptable, and the system must be adjusted and re-calibrated.

STATE NOTE: South Carolina does not allow the use of quadratic regression for compounds that have previously demonstrated linearity.

10.5 Run a mid-point Continuing Calibration Verification (CCV) using the primary source standards every 12 hours before sample analysis and every 12 hours during an analytical sequence for 8260B, 8260C, 8260D, 624.1 and 6200B. See sections 8.3.1 – 8.3.6 for acceptance criteria.

10.6 Retention Time Evaluation

10.6.1 Internal standard retention time - The retention times of the internal standards in the calibration verification standard must be evaluated immediately after or during data acquisition. If the retention time for any internal standard changes by more than 10 seconds from that in the mid-point standard level of the most recent initial calibration sequence, then the chromatographic system must be inspected for malfunctions and corrections must be made, as required. When corrections are made, reanalysis of samples analyzed while the system was malfunctioning is required.

10.6.2 Evaluation of retention times - The relative retention time (RRT) of each target analyte in each calibration standard should agree within 0.06 RRT units. Late-eluting target analytes usually have much better agreement.

10.7 Instrument maintenance must be performed routinely to optimize instrument performance and improve chromatography. Commonly performed maintenance includes baking traps and columns, polishing detector windows, changing injection port liners, changing pump oil, etc. A new calibration curve must be analyzed following any major maintenance performed on the analytical system.

10.8 METHOD BLANK - The analyst must confirm that this blank was analyzed at the required frequency of 1 per batch of 20 samples. The method blank must not exhibit any contamination of any analyte above the method detection limit for any of the method target analytes.

10.8.1 If more than one instrument blank or method blanks are analyzed, evaluate and assess the blank and field samples under the same conditions for possible mid-level standard carryover using the subsequent blank after the mid-level standard on a per analyte basis.

10.8.2 Method 624.1 – If any analyte of interest is found in the blank at a concentration greater than the MDL for the analyte, at a concentration greater than one-third the regulatory compliance limit, or at a concentration greater than one-tenth the

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concentration in a sample analyzed during the 12-hour shift, whichever is greater; analysis of samples must be halted and samples affected by the blank must be re-analyzed. If, however, continued re-testing results in repeated blank contamination, the laboratory must document and report the failures (e.g., as qualifiers on results), unless the failures are not required to be reported as determined by the regulatory/control authority. Results associated with blank contamination for an analyte regulated in a discharge cannot be used to demonstrate regulatory compliance.

10.9 LABORATORY CONTROL SAMPLES - Assess that the LCS was prepared at the required frequency of 1 per batch of 20. If the same injection is used for the LCS and the CCV, ensure that no more than 20 samples are analyzed in conjunction. Routine LCS Control limits are presented in the LIMS.

STATE NOTE: For all samples analyzed from South Carolina, the LCS/LCSD RPD must be <20%, recoveries must be 70-130% in a soil matrix, and recoveries must be within the following limits in a water matrix:

Benzene	70 – 130%
Bromodichloromethane	70 – 130%
Bromoform	70 – 130%
Bromomethane	70 – 130%
Carbon tetrachloride	70 – 130%
Chlorobenzene	70 – 130%
Chloroethane	70 – 130%
2-Chloroethyl vinyl ether	70 – 130%
Chloroform	70 – 130%
Chloromethane	70 – 130%
Dibromochloromethane	70 – 130%
Dichlorodifluoromethane	70 – 130%
1,2-Dichlorobenzene	70 – 130%
1,3-Dichlorobenzene	70 – 130%
1,4-Dichlorobenzene	70 – 130%
1,1-Dichloroethane	70 – 130%
1,2-Dichloroethane	70 – 130%
1,1-Dichloroethene	70 – 130%
Trans-1,2-Dichloroethene	70 – 130%
1,2-Dichloropropane	70 – 130%
Cis-1,3-Dichloropropene	70 – 130%
Trans-1,3-Dichloropropene	70 – 130%
Ethyl benzene	70 – 130%
Methylene chloride	70 – 130%
Methyl tert-butyl ether	70 – 130%
1,1,2,2-Tetrachloroethane	70 – 130%
Tetrachloroethene	70 – 130%
Toluene	70 – 130%
1,1,1-Trichloroethane	70 – 130%
1,1,2-Trichloroethane	70 – 130%
Trichloroethene	71 – 130%
Trichlorofluoromethane	70 – 130%
Vinyl chloride	70 – 130%
Xylenes, total	70 – 130%

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10.9.1 Method 624.1 Requirements

10.9.1.1 Compare the percent recovery (Q) for each analyte with its corresponding QC acceptance criterion in the following table. For analytes of interest not listed in the following table, use QC acceptance criteria developed for the LCS. If the recoveries for all analytes of interest fall within their respective QC acceptance criteria, analysis of blanks and field samples may proceed. If any individual Q falls outside the range, proceed according to Section 8.3.5.1.4.

624.1 Purgeable Analytes	Range for Q (%)
Acrolein	60-140
Acrylonitrile	60-140
Benzene	65-135
Bromodichloromethane	65-135
Bromoform	70-130
Bromomethane	15-185
Carbon tetrachloride	70-130
Chlorobenzene	65-135
Chloroethane	40-160
2-Chloroethylvinyl ether	D-225
Chloroform	70-135
Chloromethane	D-205
Dibromochloromethane	70-135
1,2-Dichlorobenzene	65-135
1,3-Dichlorobenzene	70-130
1,4-Dichlorobenzene	65-135
1,1-Dichloroethane	70-130
1,2-Dichloroethane	70-130
1,1-Dichloroethene	50-150
trans-1,2-Dichloroethene	70-130
1,2-Dichloropropane	35-165
cis-1,3-Dichloropropene	25-175
trans-1,3-Dichloropropene	50-150
Ethylbenzene	60-140
Methylene chloride	60-140
1,1,2,2-Tetrachloroethane	60-140
Tetrachloroethene	70-130
Toluene	70-130
1,1,1-Trichloroethane	70-130
1,1,2-Trichloroethane	70-130
Trichloroethene	65-135
Trichlorofluoromethane	50-150
Vinyl chloride	5-195

10.9.1.2 Repeat the test only for those analytes that failed to meet the acceptance criteria (Q). If these analytes now pass, system performance is acceptable and analysis of blanks and samples may proceed. Repeated

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failure, however, will confirm a general problem with the measurement system. If this occurs, repeat the test using a fresh LCS or an LCS prepared with a fresh QC check sample concentrate, or perform and document system repair. Subsequent to repair, repeat the calibration verification/LCS test. If the acceptance criteria for Q cannot be met, re-calibrate the instrument. To maintain the validity of the test and re-test, system maintenance and/or adjustment is not permitted between the pair of tests

10.10 MATRIX SPIKE/MATRIX SPIKE DUPLICATE ASSESSMENT: Assess that matrix spike/matrix spike duplicates were analyzed at required frequency of 1 per batch of 20 if volume allows.

- The analyst also verifies that the samples were spiked at the appropriate level.
- The order of preference for spiking levels is as follows:

  1) If the target analyte concentrations are known, spike to increase the background concentration by a factor of approximately two;

  2) If an action level exists, spike at this level

  3) If neither of the first two conditions applies, spike at a level that corresponds between the low and mid-level calibration standards.

  4) All RPD results must be within the indicated control limits found in the LIMS.

Acceptance criteria are that all %Recovery and/or RPD results must be within the indicated control limits on the appropriate MS control charts. See the LIMS for LCS/LCSD & MS/MSD limits and QC acceptance.

STATE NOTE: For all water samples analyzed from South Carolina, the MS/MSD recoveries must be within the most stringent limits comparing in-house derived recovery limits to those given in Table 3 of Method 608. The following are the current water limits:

Benzene	58.6 - 133%
Bromodichloromethane	69.2 – 127%
Bromoform	66.3 – 140%
Bromomethane	16.6 – 183%
Carbon tetrachloride	70 – 139%
Chlorobenzene	70.1 – 130%
Chloroethane	33.3 – 155%
2-Chloroethyl vinyl ether	5 – 149%
Chloroform	66.1 – 133%
Chloromethane	40.7 – 139%
Dibromochloromethane	69.2 – 127%
Dichlorodifluoromethane	42.2 – 146%
1,2-Dichlorobenzene	77.4 – 127%
1,3-Dichlorobenzene	67.9 – 136%
1,4-Dichlorobenzene	74.4 – 123%
1,1-Dichloroethane	64 – 134%
1,2-Dichloroethane	60.7 – 132%
1,1,-Dichloroethene	48.8 – 144%

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Trans-1,2-Dichloroethene	61 – 132%
1,2-Dichloropropane	69.7 – 132%
Cis-1,3-Dichloropropene	71.1 – 129%
Trans-1,3-Dichloropropene	66.3 – 136%
Ethyl benzene	62.7 – 136%
Methylene chloride	61.5 – 125%
Methyl tert-butyl ether	61.4 – 136%
1,1,2,2-Tetrachloroethane	64.9 – 145%
Tetrachloroethene	64 – 141%
Toluene	67.8 – 124%
1,1,1-Trichloroethane	58.7 – 134%
1,1,2-Trichloroethane	74.1 – 130%
Trichloroethene	71 – 148%
Trichlorofluoromethane	39.9 – 165%
Vinyl chloride	44.3 – 143%
Xylenes, total	65.6 – 133%

10.10.1 Method 624.1 Requirements

10.10.1.1 Spike at least 5% of the samples in duplicate from each discharge being monitored to assess accuracy (recovery and precision). If direction cannot be obtained from the data user, the laboratory must spike at least one sample in duplicate per extraction batch of up to 20 samples with the analytes in the table in Section 10.10.1.3. Spiked sample results should be reported only to the data user whose sample was spiked, or as requested or required by a regulatory/control authority, or in a permit.

10.10.1.2 If the concentration of a specific analyte will be checked against a regulatory concentration limit, the concentration of the spike should be at that limit; otherwise, the concentration of the spike should be one to five times higher than the background concentration, at or near the mid-point of the calibration range, or at the concentration in the LCS whichever concentration would be larger.

10.10.1.3 Compare the percent recoveries (P1 and P2) and the RPD for each analyte in the MS/MSD aliquots with the corresponding QC acceptance criteria in the following table. A laboratory may develop and apply QC acceptance criteria more restrictive than the presented criteria if desired.

624.1 Purgeable Analytes	Range for P1, P2 (%)	Limit for RPD
Acrolein	40-160	60
Acrylonitrile	40-160	60
Benzene	37-151	61
Bromodichloromethane	35-155	56
Bromoform	45-169	42
Bromomethane	D-206	61
Carbon tetrachloride	70-140	41
Chlorobenzene	37-160	53

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624.1 Purgeable Analytes	Range for P1, P2 (%)	Limit for RPD
Chloroethane	14-230	78
2-Chloroethylvinyl ether	D-305	71
Chloroform	51-138	54
Chloromethane	D-273	60
Dibromochloromethane	53-149	50
1,2-Dichlorobenzene	18-190	57
1,3-Dichlorobenzene	59-156	43
1,4-Dichlorobenzene	18-190	57
1,1-Dichloroethane	59-155	40
1,2-Dichloroethane	49-155	49
1,1-Dichloroethene	D-234	32
trans-1,2-Dichloroethene	54-156	45
1,2-Dichloropropane	D-210	55
cis-1,3-Dichloropropene	D-227	58
trans-1,3-Dichloropropene	17-183	86
Ethylbenzene	37-162	63
Methylene chloride	D-221	28
1,1,2,2-Tetrachloroethane	46-157	61
Tetrachloroethene	64-148	39
Toluene	47-150	41
1,1,1-Trichloroethane	52-162	36
1,1,2-Trichloroethane	52-150	45
Trichloroethene	70-157	48
Trichlorofluoromethane	17-181	84
Vinyl chloride	D-251	66

10.10.1.4 If any individual P falls outside the designated range for recovery in either aliquot, or the RPD limit is exceeded, the result for the analyte in the unspiked sample is suspect.

10.10.1.5 If in-house QC limits are developed, at least 80% of the analytes tested in the MS/MSD must have in-house QC acceptance criteria that are tighter than those in Section 10.10.1.3 and the remaining analytes (those other than the analytes included in the 80%) must meet the acceptance criteria in Section 10.10.1.3. If an in-house QC limit for the RPD is greater than the limit in Section 10.10.1.3, then the limit in the table must be used. Similarly, if an in-house lower limit for recovery is below the lower limit in Section 10.10.1.3, then the lower limit in the table must be used, and if an in-house upper limit for recovery is above the upper limit in Section 10.10.1.3, then the upper limit in the table must be used.

10.11 SURROGATE EVALUATION: Check the surrogate calculations for correctness for all samples, blanks, ICV/CCV/SSCV, LCS/LCSD, MS and MSD. Acceptance criteria can be found in the LIMS: The surrogate recoveries for all QC samples must be within established control limits.

10.11.1 Method 624.1 – Spike the surrogates into all samples, blanks, LCSs, and MS/MSDs. Compare surrogate recoveries against limits must be developed by

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the laboratory. In-house QC acceptance criteria must be updated at least every two years. If any recovery fails its criteria, attempt to find and correct the cause of the failure.

10.12 INTERNAL STANDARD AREA COUNT: When a calibration is performed at the beginning of an analytical run, the internal standard areas must be evaluated against the mid-point of the curve. Internal standard responses must be -50% to 200% to be acceptable. Samples are analyzed within a 12-hour window; the internal standards of those samples are evaluated against mid-point of the curve. Then a CCV is analyzed, this is compared to the mid-point of the initial calibration curve. Addition samples are analyzed within a 12-hour window; the internal standards of those samples are evaluated against the previous acceptable CCV. When an analytical run is started using a passing ICV (which is compared against the initial calibration mid-point to verify the calibration curve): Samples are analyzed within a 12-hour window, the internal standards of those samples are evaluated against the daily CCV. Then a CCV is analyzed, this is compared to the mid-point of the curve. Additional samples are analyzed within a 12-hour window; the internal standards of those samples are evaluated against the previous acceptable CCV.

CLIENT NOTE: For Marathon, the internal standard area counts for all calibration standards, QC samples, and samples for quantitation must not change by a factor of greater than (-50% to +130%) as per section 8.3.5

10.12.1 Method 624.1 – The responses of each internal standard in each sample, blank, and MS/MSD must be within 50% to 200% (1/2 to 2×) of its respective response in the mid-point calibration standard. If, as a group, all internal standards are not within this range, perform and document system repair, repeat the calibration verification/LCS test, and re-analyze the affected samples. If a single internal standard is not within the 50% to 200% range, use an alternative internal standard for quantitation of the analyte referenced to the affected internal standard. It may be necessary to use the data system to calculate a new response factor from calibration data for the alternative internal standard/analyte pair. If an internal standard fails the 50–200% criteria and no analytes are detected in the sample, ignore the failure or report it if required by the regulatory/control authority.

10.13 SECOND SOURCE: The second source calibration verification or initial calibration verification standard must be analyzed following each new initial calibration to verify the validity of the calibration standards. The recovery of the analytes in the SSCV (ICV) must be within 30% of the expected concentration for CCC and SPCC compounds and within 40% for non-CCC/SPCC compounds. Poor performers listed in section 8.3.4 must recover within in-house calculated LCS recovery acceptance limits.

STATE NOTE: For all samples analyzed from South Carolina, the SSCV must recover ±30% for all target analytes.

STATE NOTE: For all samples analyzed from Minnesota, the reporting limit must be verified at least monthly. The reporting limit verification (RLV) must recovery within ±40% of the expected concentration. If these criteria are not met, the RLV may be re-analyzed once, instrument maintenance can be performed or a higher concentration standard can be analyzed. If a higher concentration standard is utilized, the reporting limit must be raised to the higher level verified.

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10.13.1 Method 624.1 Calibration verification/LCS—The working calibration curve or RF must be verified immediately after calibration and at the beginning of each 12-hour shift by the measurement of an LCS. The LCS must be from a source different from the source used for calibration, but may be the same as the sample prepared for the DOC.

10.14 The laboratory participates in semi-annual proficiency testing that meets and/or exceeds the requirements of the Quality Control Sample as listed in the published Standard Method SM 6200B-2011, *Volatile Organic Compounds,* and SM 6020-2011, *Quality Assurance/Quality Control*.

10.15 For sample analyzed per the requirements of Method 8000D, the LLOQ (see Section 1.8.2) must be verified at least annually, and whenever significant changes are made to the preparation and/or analytical procedure, to demonstrate quantitation capability at lower analyte concentration levels.

10.15.1 The LLOQ verification (to be performed after the initial calibration) is prepared by spiking a clean control material with the analyte(s) of interest at 0.5-2 times the LLOQ concentration level(s).

10.15.2 The LLOQ check is carried through the same preparation and analytical procedures as environmental samples and other QC samples.

10.15.3 It is recommended to analyze the LLOQ verification on every instrument where data is reported; however, at a minimum, the lab must rotate the verification among similar analytical instruments such that all are included within three (3) years.

10.15.4 Recovery of target analytes in the LLOQ verification must be within established in-house limits or within other such project-specific acceptance limits to demonstrate acceptable method performance at the LLOQ. Until the laboratory has sufficient data to determine acceptance limits, the LCS criteria ± 20% (i.e., lower limit minus 20% and upper limit plus 20%) may be used for the LLOQ acceptance criteria.

11.0 DATA VALIDATION AND CORRECTIVE ACTION

11.1 SITE-SPECIFIC requirements and STATE SPECIFIC criteria must be reviewed and used, if known, for data review.

11.2 All data must undergo a primary review by the analyst. The analyst must check the performance of the initial calibration, mid-point check standard, and continuing calibrations to ensure that they meet the criteria of the method. The analyst must review any sample that has quantifiable compounds and make sure that they have been confirmed. The analyst must also verify that reported results are derived from quantitation between the MDL and the highest standard of the initial calibration curve. All calculations must be checked (any dilutions, %solids, etc.). Data must be checked for the presence or absence of appropriate flags. Comments must be noted when data is flagged.

11.3 Tune Check - A successful BFB tune must be achieved prior to initial calibration or daily calibration verification. If a tune does not meet the acceptance criteria detailed above, then re-inject the tuning solution. If the failure persists, instrument maintenance or detector adjustment is required. The instrument is equipped with detector adjustments in routines called “Autotunes” that can make minor adjustments to m/z ratios and detector

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setting and can align the analytical system to return the system to peak performance. If after performing the Autotune routine, the injected tuning standard still fails, the system may require injector and/or detector cleaning, column cutting or replacement, injection liner cleaning or replacement, or other maintenance as specified by the manufacturer.

11.4 INITIAL AND CONTINUING CALIBRATION VERIFICATION STANDARD: An Initial Calibration Verification (ICV) standard is analyzed before sample analysis can begin and a continuing calibration verification (CCV) standard was analyzed every 12 hours and meets the criteria in Section 8.0. If these criteria are exceeded and analysis of a second consecutive (immediate) calibration verification fails to produce results within acceptance criteria, corrective actions shall be performed. The laboratory shall demonstrate acceptable performance after the final round of corrective action with two consecutive calibration verifications, or a new initial instrument calibration shall be performed.

Method 8000D: To determine calibration function acceptability, refit the initial calibration data back to the calibration model and calculate %Error (see Section 9.5). Percent error between the calculated and expected amounts of an analyte must be ≤30% for all standards. For some data uses, ≤50% may be acceptable for the lowest calibration point.

11.5 METHOD BLANK: Blank contamination above the report limit – All samples containing detectable amounts above the reporting limit must be re-analyzed or qualified. Samples with no detectable amounts above the reporting limit do not require re-analysis, but the samples must be qualified with blank contamination and it must be mentioned in the case narrative in the data package.

General guidelines for qualifying sample results with regard to method blank quality are as follows:

- If the method blank concentration is less than the MDL and sample results are greater than the RL, then no qualification is required.
- No qualification is necessary when an analyte is detected in the method blank but not in the associated samples.
- If the concentration in a sample is more than ten times the concentration in the method blank, then no qualification is required.
- If the method blank concentration is greater than the MDL but less than the RL and sample results are greater than the MDL, then qualify associated sample results to indicate that analyte was detected in the method blank.
- If the method blank concentration is greater than the RL, further corrective action and qualification is required. An analyst should consult their supervisor for further instruction.

Instrument blanks may be injected at any time in the sequence to verify absence of contamination. The source of contamination must be investigated and reduced or eliminated. Any time contamination is noted in the method blank, the situation and impact on the data should be discussed in the case narrative.

11.5.1 **Method 8000D:** When samples that are extracted together are analyzed on separate instruments or in separate analytical shifts, the method blank associated with those samples (e.g., extracted with the samples) must be analyzed on at least one of those instruments. A solvent blank must be analyzed on all other instruments on which the set of samples was analyzed to demonstrate the instrument is not contributing contaminants to the samples. At

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least one method blank or instrument blank must be analyzed on every instrument after calibration standard(s) and prior to the analysis of any samples.

When sample extracts are subjected to cleanup procedures, the associated method blank must also be subjected to the same cleanup procedures.

Results of the method blank should be less than the LLOQ for the analyte or less than the level of acceptable blank contamination specified in the approved QAPP or other appropriate systematic planning document. Blanks are generally considered to be acceptable if target analyte concentrations are less than one-half the LLOQ or are less than project-specific requirements.

When new reagents or chemicals are received, the lab should monitor the blanks associated with samples for any signs of contamination. It is not necessary to test every new batch of reagents or chemicals prior to sample preparation if the source shows no prior problems. However, if reagents are changed during a preparation batch, separate blanks need to be prepared for each set of reagents.

11.6 LABORATORY CONTROL SAMPLES - If the recovery does not meet criteria, see section 11.6 for marginal failures. If it is still out of control limits, then all field and QC samples in the batch must be re-analyzed.

Qualifiers must be applied to any LCS compound that does not meet these criteria and are considered out of control. The percent difference for all method target analytes must be within QC RPD limits. If not, re-analyze the duplicate(s) or prepare a new calibration curve, as necessary.

STATE NOTE: SOUTH CAROLINA DHEC Compliance LCS: responses must be within 70 – 130% for Method 8260 and within the limits given in Attachment VI for Method 624. Qualifiers cannot be used. (If an LCS standard is above the acceptable QC criteria and all samples being reported are below the reporting limit, the data is acceptable based on a high bias with undetectable levels in the field samples. Any positive samples require reanalysis.) Failures require a batch re-analysis. For samples analyzed from South Carolina that are not utilized for compliance purposes, in house established acceptance limits are utilized to demonstrate controlled analyses.

11.7 LCS/LCSD & MS/MSD CRITERIA

11.7.1 Quality control criteria must be checked for the LCS and LCSD.

LCS samples that do not pass the acceptable QC criteria must be re-analyzed. LCS failures can meet marginal exceedance criteria below. Normal compound list for 8260/624.1 contains typical 90 analytes; therefore only five analyte can be considered as marginal exceedances. If the failure persists, re-prepare and re-analyze the entire sample batch.

When a large number of analytes exist in the LCS, it is statistically possible for a few analytes to be outside of control limits. Upper and lower marginal exceedance (ME) limits are established by +/- four times the standard deviation. The number of marginal exceedance is based on the number of analytes in the LCS.

Number of allowable marginal exceedances:

>90 analytes, 5 analytes allowed in the ME limit

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71 – 90 analytes, 4 analytes allowed in the ME limit
51 – 70 analytes, 3 analytes allowed in the ME limit
31 – 50 analytes, 2 analytes allowed in the ME limit
11 – 30 analytes, 1 analyte allowed in the ME limit
< 11 analytes, no analyte allowed in the ME limit

Marginal exceedances must be random events.

STATE NOTE: For South Carolina DHEC compliance samples, marginal exceedances do not apply. All outliers in QC require corrective action when possible and the data must be flagged when necessary.

11.7.2 **Method 8000D:** If, as in compliance monitoring, the concentration of a specific analyte in the sample is being checked against a regulatory concentration limit or action level, the spike should be at or below the limit, or 1 - 5 times the background concentration (if historical data are available), whichever concentration is higher. If historical data are not available, a background sample of the same matrix from the site may be submitted for matrix spiking purposes to ensure that high concentrations of target analytes and/or interferences will not prevent calculation of recoveries. If the background sample concentration is very low or non-detect, a spike of greater than five (5) times the background concentration is still acceptable. To assess data precision with duplicate analyses, it is preferable to use a low concentration field sample to prepare a MS/MSD for organic analyses. This spiking procedure will be performed when project-specific instructions are received from the client.

If the concentration of a specific analyte in a sample is not being checked against a limit specific to that analyte, then the analyst may spike the matrix spike or MS/MSD sample(s) at the same concentration as the reference sample at 20 times the estimated LLOQ in the matrix of interest, or at a concentration near the middle of the calibration range. It is suggested that a background sample of the same matrix from the site be submitted as a sample for matrix spiking purposes.

NOTE: Preparing the spiking solution from the same source as the calibration standards helps minimize additional variability due to differences between sources. Typically, spiking concentrations are near the middle of the calibration range.

To develop precision and bias data for the spiked compounds, the analyst has two choices: analyze the original sample, and an MS/MSD pair; or analyze the original sample, a duplicate sample, and one spiked sample. If samples are not expected to contain the target analytes of concern, then the laboratory may use a MS/MSD pair. If samples are expected to contain the target analytes of concern, then the laboratory may use one matrix spike and a duplicate analysis of an unspiked field sample as an alternative to the MS/MSD pair.

The laboratory should use 70 - 130% as interim acceptance criteria for recoveries of spiked analytes, until in-house LCS limits are developed. Where in-house limits have been developed for matrix spike percent recoveries, the LCS results should be similar to or tighter than those limits, as the LCS is prepared in a clean matrix.

11.8 MATRIX SPIKE ASSESSMENT: If acceptance criteria are not met, perform the following corrective actions as appropriate.

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- If both LCS and MS/MSD recoveries are unacceptable, then the entire batch of field and QC samples must be re-analyzed.
- If the MS/MSD is unacceptable, but the LCS is acceptable, then a potential matrix effect has been identified. Reported data must be flagged. Reasonable attempts must be made to address matrix interference.
- If analyst error appears to be the root cause of the failure (i.e., no spiked) reanalysis of the MS/MSD and parent is required if volume permits.

Acceptance criteria are that all RPD results must be within the current control limits found in the LIMS. If these conditions are not met, perform the following corrective actions as appropriate.

- Re-analyze the sample to verify a matrix effect only if analyst error appears to be the root cause.
- If the duplicate precision is still unacceptable, and LCS precision is acceptable, then a potential matrix effect has been identified.

STATE NOTE: South Carolina DHEC compliance analyses require that all target compounds meet the established MS/MSD criteria. No qualifiers can be applied, except in the circumstance where matrix interference is apparent.

PROJECT SPECIFIC CRITERIA (Non-South Carolina Samples): Acceptance criteria are that all %Recovery and/or RPD results meet project-established goals.

11.9 SURROGATE EVALUATION: If the surrogate recoveries are outside limits for Blank, ICV/CCV/SSCV, and LCS/LCSD, re-analysis must be performed for verification. If recoveries are still outside control limits, corrective action is necessary. All samples associated with batch or sequence needs to be re-analyzed. The surrogate recoveries for all field samples must be within established control limits. If more than two surrogate recoveries are outside limits, re-analysis must be performed for verification. If recoveries are still outside control limits, corrective action is necessary which includes qualifying data with J1 (outside upper limit) or J2 (outside lower limit). When surrogates fail, data is qualified with J1 (outside upper limit) or J2 (outside lower limit).

11.10 INTERNAL STANDARD AREA COUNT: If the area response for any of the internal standards changes by a factor of two (-50% to +100%) as per section 8.3.5, the mass spectrometer must be inspected for malfunctions and corrections must be made, as appropriate. In the event the internal standard area counts fail these criteria, the following corrective actions should be considered.

- Check to be sure there are no errors in the internal standards preparation or addition. Also check instrument performance.
- If any internal standard criteria fails high (> +100%), sample must be re-analyzed with possible dilution. If recoveries are still outside control limits, corrective action is necessary which includes qualifying compounds with associated internal standard with J9 (IS high, data is likely to show low bias).
- If more than two internal standard criteria fails low « -50%), sample must be re-analyzed. If recoveries are still outside control limits, corrective action is necessary which includes qualifying compounds with associated internal standard with J8 (IS low, data is likely to show high bias).

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- If one or two internal standard criteria fails low « -50%), corrective action is necessary which includes qualifying compounds with associated internal standard with J8 (IS low, data is likely to show high bias).

11.11 CALIBRATION RANGE: The analyst must verify all reported results are derived from analytical results that are below the highest standard of the initial calibration curve and above the low standard. Values reported below the low standard are to be reported as estimated values (J values). For samples that exceed the calibration curve, dilute and analyze an appropriate sample aliquot.

11.12 SECOND SOURCE (SSCV) or Initial Calibration Verification (ICV): If the SSCV does not meet acceptance criteria, if can be reanalyzed once. If the failure persists, a new initial calibration curve must be prepared and analyzed.

11.13 Data that does not meet acceptable QC criteria may be acceptable for use in certain circumstances.

11.13.1 If a method blank contains an amount of target analyte, but all samples are non-detected or the samples contain analyte at a level that is greater than 10 times the level present in the blank, the data is reported with the appropriate “B” flag.

11.13.1.1 When comparing analyte contamination in the blank to possible analyte contamination in the field sample, utilize the sample concentration without applying the multiplier value unless the same multiplier has been applied to the quantitation of the target analytes in the blank.

11.13.2 If the sample surrogate is above the acceptable QC range, but the samples are non-detected for all target analytes, flag the sample with a J1 and report. If the surrogate is below the acceptable QC range, re-analyze the sample if the surrogate still fails, re-extract and re-analyze or flag data.

11.13.3 Matrix spike failures must be flagged with "J5" (high) or "J6" (low), when QC limits are exceeded. If there is an RPD failure, the data is flagged with a “J3”.

11.14 Quantitation and manual integration of all QC samples and client samples must follow the procedures outlined in ENV-SOP-MTJL-0024, *Manual Integration Procedure*. “Before” and “After” quantitation reports must be printed in order to verify that any manual integration is performed properly and consistently.

11.15 Data must be checked to ascertain if it conforms to accepted practices. All sample analytical results used for final data reporting must be between the low standard and the high calibration standard. Values falling above the high standard must be diluted and re-analyzed.

11.15.1 Site specific DQO’s may require values below the reporting limit but above the method detection limit be reported as “UJ” or estimated value. The reporting limit is the concentration of the lowest standard used in the calibration.

11.15.2 All tentatively identified compounds (TICs) are reported with a “J” qualifier for estimated value and an “N” for presumptive evidence of material.

11.16 For samples analyzed per the requirements of Method 8000D, reported concentrations of target analytes between the MDL and the LLOQ must be qualified as estimated.

12.0 POLLUTION PREVENTION AND WASTE MANAGEMENT

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12.1 The EPA requires that laboratory waste management practice to be conducted consistent with all applicable federal and state laws and regulations. Excess reagents, samples and method process wastes must be characterized and disposed of in an acceptable manner. See *ENV-SOP-MTJL-0051, Waste Management Plan.*

12.2 See ENV-SOP-MTJL-0046, *Environmental Sustainability & Pollution Prevention*.

13.0 METHOD MODIFICATIONS/CLARIFICATIONS

13.1 Adjustments to the concentrations of standards/spiking solutions, standards providers, and quality control are subject to change to better meet client/project/regulatory needs or to improve laboratory method performance.

13.2 Modifications to this method are noted in the body of the text as state notes. Compliance analyses performed in conjunction with specific state requirements must be performed as noted within the specific state(s) note listed.

13.3 Heated purge may be used for all samples regardless of matrix or method.

14.0 REFERENCES

14.1 *Determinative Chromatographic Separations*, SW-846 Method 8000B, Revision 2, December 1996.

14.2 *Determinative Chromatographic Separations*, SW-846 Method 8000C, Revision 3, March 2003.

14.3 *Determinative Chromatographic Separations*, SW-846 Method 8000D, Revision 4, July 2014.

14.4 *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)*, SW-846 Method 8260B, Revision 2, December 1996.

14.5 *Purgeables*, 40 CFR 136, EPA Method 624/

14.6 *Volatile Organic Compounds by the Purge and Trap Capillary-Column Gas Chromatographic/Mass Spectrometric Method*, SM 6200B, 20th edition.

14.7 Policy Document, NELAC Standard, Chapter 2: Proficiency Testing Program Standard and the relevant section of NELAC Standard Chapter 5 National Environmental Laboratory Accreditation Conference

14.8 *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)*, SW-846 Method 8260C, Revision 3, August 2006.

14.9 *Volatile Organic Compounds by the Purge and Trap Capillary-Column Gas Chromatographic/Mass Spectrometric Method*, SM 6200B-2011.

14.10 *Purgeables by GC/MS*, EPA Method 624.1, Federal Register, Volume 82, Number 165, August 28, 2017.

14.11 40 Code of Federal Regulations §136.6(b)(4)(j).

14.12 *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry,* SW-846 Method 8260D, Revision 4, June 2018.

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Attachment I: Revision History

Current Version (Pace National):

Date	Description of Revisions
9/19/2019	Update in response to SC DHEC 8/29/2019 technical review letter. Revised Section 8.2.6.3 as well as added State Notes to Sections 8.2.2, 8.2.6.3, 8.2.9, 10.4.1, and 10.13.

Superseded Versions (ESC Lab Sciences SOP#330363):

Version	Date	Description of Revisions
0	8/23/94	Origination
1	7/25/95	
2	9/12/97	
3	8/4/98	
4	2/11/00	
5	8/21/00	
6	4/1/01	
7	10/16/01	
8	8/19/02	
9	7/23/03	
10	10/30/03	
11	1/26/04	
12	6/28/04	
13	12/11/04	
14	3/23/05	
15	12/19/07	
16	1/30/09	Technical and Quality Review and update. Updated Table 1; Clarified holding times; Updated Note in Section 7; Updated section 7.4.1 & 7.4.2; Updated section 7.6, 7.8.4, 8.1.2, 8.2.3, 8.2.3.2, 8.2.4.1, 8.2.6.2 & 12.0; Added state note (MN) section 8.2.2, added final bullet item, added state note (OH); Added section 8.2.6.4; section 9.11 (state note), section 11.1 (state note), section 11.7.1 (state note), section 11.13, & 13.1; Ohio VAP approved 1/30/09
17	3/12/12	Technical and Quality Review and update. Added Attachment VIII and sections 2.15 through 2.17, 8.2.7, 8.3.2, 9.10, 10.8 through 10.13, 13.2 14.5, 14.6, state note in section 1.0, and client note in section 11.11; Revised Attachments II through IV, VII and sections 1.3, 3.1, 4.1, 4.2, 4.3, 7.1, 7.5.1, 7.5.2, 7.9.3, 8.2.2, 8.2.3, 8.2.6, 8.3.1, 8.3.3, 8.3.4, 8.7.2, 9.1, 9.2, 9.6 through 9.8, 10.2, 10.3, 10.5, and 12.1; Removed section 9.3.
18	12/11/13	Technical and Quality Review and update. Added state notes in sections 1.0, 10.1, 10.3 and sections 10.14 and 14.7; Revised state notes in sections 1.0, 4.2 and sections 5.5, 6.1, 6.4, 7.1, 7.2, 7.5.1, 7.5.2, 7.6, 7.7, 8.2.4, 8.2.7.3, 8.3.1.4, 8.3.2.2, 8.5.1 and 10.5; Revised Attachments II, IV, VIII; Removed state notes pertaining to Ohio VAP throughout and sections 8.2.3.3 and 11.14.1.
19	2/13/15	Technical and Quality Review and update. Revised all state notes regarding South Carolina sample analyses; Revised sections 7.5.1, 7.5.2 and 8.3.3; Revised Attachments VIII.

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Version	Date	Description of Revisions
20	9/2/2015	Header and signature block re-formatting. Technical and Quality Review and update. Added Section 9.11 and Attachment IX. Revised Sections 10.2.1, 10.6, 10.6.1, 10.6.2, 10.9, 10.10, 10.11, and 11.7. Deleted Sections 10.6.3 and 10.6.4. Revised footnote in Attachment II. Replaced Attachment VIII.
21	10/29/2015	Technical and quality review and update. Revised Sections 8.3.4, 10.8, and 11.4. Added State Note in Sections 8.2.1 and 10.3.
22	11/17/2015	Technical and quality review and update. Revised Sections 1.3.1, 7.1, 8.3.4, 8.5.9, 10.9, 11.5, and 12.2.
23	10/19/2016	Technical and quality review and update. Header and signature block re-formatting. Revised Sections 1.0, 2.3, 2.4, 4.2, 4.3, 5.3.4, 5.5, 6.1, 6.6.4, 6.8, 7.2, 7.5.1.1, 7.5.2.1, 8.2.3.1, 8.2.4.1, 8.2.7.3, 8.2.8.2, 8.5.5, 8.5.6, 8.5.7.1, 8.5.7.3, 8.6.3, 8.7.2.4, 8.7.2.6, 8.7.2.7, 9.1, 9.2, 9.3, 9.5, 10.2.2, 10.9, 10.10, 11.3, 11.13, 14.1, 14.4, 14.5, 14.6, 14.8, 14.9, Attachment V, Attachment VIII, and Attachment IX Table 2. Added Sections 1.3.2, 9.4, 10.15, 10.15.1, 10.15.2, 10.15.3, 10.15.4, 11.4.1, 11.6.2, 11.15, 13.3, 14.2, and 14.3. Deleted Sections 2.4 through 2.17, 8.5.7.4, 8.5.7.5, 9.1, 9.2, 9.5, 9.6, 9.7, and 9.8.
24	11/28/2017	Technical and quality review and update. Changed ESC logo. Revised Sections 1.0, 3.1, 4.3, 7.5, 7.5.1, 7.5.1.1, 7.5.1.2, 7.5.2, 7.5.2.1, 7.5.2.2, 8.2.3.1, 8.2.3.2, 8.2.4.1, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2, 8.3.3, 8.4.1, 8.4.2, 10.2.1, 10.5, 10.9, 10.10, 10.12, 11.5, and Attachment IX Table 5. Added Sections 8.7.2.8 and 10.8.1.
25	1/2/2018	Technical and quality review and update. Added Method 624.1 to title. Revised Sections 2.1, 8.1.3, and 8.2.2. Added Section 4.4 and all subsections, 7.5.2.3, 8.2.9, 8.3.4, 8.3.5.1 and all subsections, 8.8.6.1, 8.8.6.2, 8.8.6.3, 8.8.6.4, 9.5, 10.1.1 and all subsections, 10.3.1 and all subsections, 10.4.1, 10.7.1, 10.8.2, 10.9.1 and all subsections, 10.10.1 and all subsections, 10.11.1, 10.12.1, 10.13.1, 14.10, and 14.11.

Superseded Versions (Pace National):

Date	Description of Revisions
2/9/2019	Technical and quality review and update. Deleted header, footer and signature block. Revised sections 1.0, 1.1, 1.3, 1.3.1, 2.1, 2.2, 3.1, 4.2, 4.4.1, 4.4.5, 5.3, 5.3.4, 5.5, 6.1, 6.2, 6.5, 6.6, 6.6.1, 6.6.4, 6.8, 7.1, 7.5, 7.5.1, 7.5.1.1, 7.5.1.2, 7.5.2, 7.5.2.1, 7.6, 7.6.1, 7.7, 7.7.1, 7.8, 7.9, 8.0, 8.1.3, 8.2.1, 8.2.2, 8.2.3.2, 8.2.5, 8.2.7.2, 8.2.9, 8.3.1, 8.3.1.4, 8.3.2, 8.3.2.2, 8.3.5, 8.5.1, 8.5.7.3, 8.5.8, 8.5.9, 8.6, 8.6.1, 8.7.1, 8.7.1.2, 8.7.2, 8.7.2.2, 8.7.2.5, 8.7.2.6, 8.8.6, 8.8.6.1, 8.9.2, 10.1, 10.1.1.2, 10.2, 10.3, 10.3.1.3, 10.5, 10.9, 10.10, 10.12, 10.13, 10.15.3, 11.4, 11.5, 11.6.1, 11.6.2, 11.7, 11.8, 11.9, 11.11, 11.13, 12.1, 12.2, 14.1, 14.2, 14.3, 14.5 and 14.11. Section 4.3 was split into 4.3 and 4.4, both sections were revised and remaining sections were renumbered as necessary. Added sections 5.4, 6.5.3, 8.2.9, 8.2.9.1, 8.2.9.2, 11.3 and 14.12 and renumbered as necessary. Deleted sections 5.10, 6.6.2, 7.5.2.3, 8.3.4, 8.3.5.1, 8.3.5.1.1, 8.3.5.1.2, 10.3.1.1, 10.3.1.2 and 10.7.1 and renumbered as necessary. Revised Attachments I, II and VI. Added Attachment VIII and renumbered remaining attachments. Revised Attachment IX(X) sections 4.11, 4.18, 4.19

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Date	Description of Revisions
829/2019	Revised in response to ORELAP audit findings. Added corporate header and footer. Revised Sections 1.0, 1.1, 6.2, 7.2, 7.5.1.1, 7.5.1.2, 7.5.2.1, 7.6, 7.7.1, 7.9.3, 8.2.3.2, 8.2.4, 8.2.5, 8.5.8, 8.7.1.4, and 10.11. Added Section 1.4. Deleted Section 8.2.4 and all subsections. Re-numbered sections as appropriate.

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Attachment II: 8260/624.1/6200B Reporting Limits and Common Analyte List

Compound	Water		Low Soil		High Soil	
	RL	Units	RL*	Units	RL	Units
Acetone	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Acrolein	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Acrylonitrile	0.010	mg/L	0.010	mg/Kg	0.5	mg/Kg
Benzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Bromobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Bromodichloromethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Bromoform	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Bromomethane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
1,3-Butadiene	0.0025	mg/L	0.0025	mg/Kg	0.125	mg/Kg
n-Butylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
sec-Butylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
tert-Butylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Carbon tetrachloride	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Chlorobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Chlorodibromomethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Chloroethane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
2-Chloroethyl vinyl ether	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Chloroform	0.002	mg/L	0.002	mg/Kg	0.10	mg/Kg
Chloromethane	0.0025	mg/L	0.001	mg/Kg	0.05	mg/Kg
2-Chlorotoluene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
4-Chlorotoluene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,2-Dibromo-3-Chloropropane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
1,2-Dibromoethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Dibromomethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,2-Dichlorobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,3-Dichlorobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,4-Dichlorobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Dichlorodifluoromethane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
1,1-Dichloroethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,2-Dichloroethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,1-Dichloroethene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
cis-1,2-Dichloroethene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
trans-1,2-Dichloroethene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,2-Dichloropropane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,1-Dichloropropene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,3-Dichloropropane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
cis-1,3-Dichloropropene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
trans-1,3-Dichloropropene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
2,2-Dichloropropane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Dicyclopentadiene	0.001	Mg/L	0.001	mg/Kg	0.05	mg/Kg
Di-isopropyl ether	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg

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ISSUER: Pace National – Mt. Juliet, Tennessee

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Compound	Water		Low Soil		High Soil	
	RL	Units	RL*	Units	RL	Units
4-Ethyltoluene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Ethylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Hexachlorobutadiene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Hexane	0.010	mg/L	0.010	mg/Kg	0.50	mg/Kg
Isopropylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
p-Isopropyltoluene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Propene	0.0025	mg/L	0.0025	mg/Kg	0.125	mg/Kg
2,2,4-Trimethyl Pentane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
2-Butanone (MEK)	0.010	mg/L	0.010	mg/Kg	0.50	mg/Kg
Methylene Chloride	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
4-Methyl-2-pentanone (MIBK)	0.010	mg/L	0.010	mg/Kg	0.50	mg/Kg
Methyl tert-butyl ether	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Naphthalene	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
n-Propylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Styrene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,1,1,2-Tetrachloroethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,1,2,2-Tetrachloroethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Tetrachloroethene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Toluene	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
1,2,3-Trichlorobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,2,4-Trichlorobenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,1,1-Trichloroethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,1,2-Trichloroethane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Trichloroethene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Trichlorofluoromethane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
1,2,3-Trichloropropane	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,2,4-Trimethylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
1,3,5-Trimethylbenzene	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Vinyl chloride	0.001	mg/L	0.001	mg/Kg	0.05	mg/Kg
Xylenes, Total	0.003	mg/L	0.003	mg/Kg	0.15	mg/Kg
Additional Compounds						
Acetonitrile	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Allyl Chloride	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
Chloroprene	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Trans-1,4-Dichloro-2-butene	0.0025	mg/L	0.0025	mg/Kg	0.125	mg/Kg
Isobutanol	0.100	mg/L	0.100	mg/Kg	5.0	mg/Kg
1,4-Dioxane+	0.100	mg/L	0.100	mg/Kg	5.0	mg/Kg
Methacrylonitrile	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Methyl Methacrylate	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
Ethyl methacrylate	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
Propionitrile	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Pentachloroethane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
Carbon Disulfide	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg

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ISSUER: Pace National – Mt. Juliet, Tennessee

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Compound	Water		Low Soil		High Soil	
	RL	Units	RL*	Units	RL	Units
Cyclohexanone	0.010	mg/L	0.010	mg/Kg	0.50	mg/Kg
2-Hexanone	0.010	mg/L	0.010	mg/Kg	0.50	mg/Kg
Iodomethane	0.010	mg/L	0.010	mg/Kg	0.50	mg/Kg
Isobutanol	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
Propionitrile	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
Vinyl Acetate	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Tetrahydrofuran	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
Bromoethane	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
2-Butanol	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Ethanol	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Tert-Butyl Alcohol	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Di-isopropyl ether	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
Ethyl tert-butyl ether	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
Methyl-tert-butyl ether	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
Tert-Butyl alcohol	0.050	mg/L	0.050	mg/Kg	2.5	mg/Kg
Tert-Amyl Methyl Ether	0.001	mg/L	0.001	mg/Kg	0.050	mg/Kg
Tert-Butyl Formate	0.020	mg/L	0.020	mg/Kg	1.0	mg/Kg
Tert Butyl Ethyl Alcohol	0.100	mg/L	0.100	mg/Kg	5.0	mg/Kg
Tert Amyl Alcohol	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
Dichlorofluoromethane	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg
2-Propanol	0.005	mg/L	0.005	mg/Kg	0.25	mg/Kg

RLs are based on a 5mL purge volume
Low Soil - Using a 5g soil sample to 5mL water – See Method 5035 (ENV-SOP-MTJL-0129) Section 8.2.4.1
High Soil – Using 200uL extract from 5g soil sample to 5mL methanol; see Method 5035 (ENV-SOP-MTJL-0129) Sect. 8.3.1.2
+ 1-4,Dioxane has a RL of .002 when run using the SIM mode.

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Attachment III: Characteristic Masses (m/z) for Purgeable Organic Compounds as printed from SW-846 Method 8260B Table 5

Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
Acetone	58	43
Acetonitrile	41	40, 39
Acrolein	56	55, 58
Acrylonitrile	53	52, 51
Allyl alcohol	57	58, 39
Allyl chloride	76	41, 39, 78
Benzene	78	-
Benzyl chloride	91	126, 65, 128
Bromoacetone	136	43, 138, 93, 95
Bromobenzene	156	77, 158
Bromochloromethane	128	49, 130
Bromodichloromethane	83	85, 127
Bromoform	173	175, 254
Bromomethane	94	96
1,3-Butadiene	39	54
iso-Butanol	74	43
n-Butanol	56	41
2-Butanone	72	43
n-Butylbenzene	91	92, 134
sec-Butylbenzene	105	134
tert-Butylbenzene	119	91, 134
Carbon disulfide	76	78
Carbon tetrachloride	117	119
Chloral hydrate	82	44, 84, 86, 111
Chloroacetonitrile	48	75
Chlorobenzene	112	77, 114
1-Chlorobutane	56	49
Chlorodibromomethane	129	208, 206
Chloroethane	64 (49*)	66 (51*)
2-Chloroethanol	49	44, 43, 51, 80
Bis(2-chloroethyl) sulfide	109	111, 158, 160
2-Chloroethyl vinyl ether	63	65, 106
Chloroform	83	85
Chloromethane	50 (49*)	52 (51*)
Chloroprene	53	88, 90, 51
3-Chloropropionitrile	54	49, 89, 91
2-Chlorotoluene	91	126
4-Chlorotoluene	91	126
Dicyclopentadiene	66	132
1,2-Dibromo-3-chloropropane	75	155, 157
Dibromochloromethane	129	127
1,2-Dibromoethane	107	109, 188
Dibromomethane	93	95, 174
1,2-Dichlorobenzene	146	111, 148
1,2-Dichlorobenzene-d4	152	115, 150
1,3-Dichlorobenzene	146	111, 148
1,4-Dichlorobenzene	146	111, 148

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Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
cis-1,4-Dichloro-2-butene	75	53, 77, 124, 89
trans-1,4-Dichloro-2-butene	53	88, 75
Dichlorodifluoromethane	85	87
1,1-Dichloroethane	63	65, 83
1,2-Dichloroethane	62	98
1,1-Dichloroethene	96	61, 63
cis-1,2-Dichloroethene	96	61, 98
trans-1,2-Dichloroethene	96	61, 98
1,2-Dichloropropane	63	112
1,3-Dichloropropane	76	78
2,2-Dichloropropane	77	97
1,3-Dichloro-2-propanol	79	43, 81, 49
1,1-Dichloropropene	75	110, 77
cis-1,3-Dichloropropene	75	77, 39
trans-1,3-Dichloropropene	75	77, 39
1,2,3,4-Diepoxybutane	55	57, 56
Diethyl ether	74	45, 59
1,4-Dioxane	88	58, 43, 57
Epichlorohydrin	57	49, 62, 51
Ethanol	31	45, 27, 46
Ethyl acetate	88	43, 45, 61
Ethylbenzene	91	106
Ethylene oxide	44	43, 42
Ethyl methacrylate	69	41, 99, 86, 114
4-Ethyltoluene	105	120
Hexachlorobutadiene	225	223, 227
Hexachloroethane	201	166, 199, 203
Hexane	57	86, 56
2-Hexanone	43	58, 57, 100
2-Hydroxypropionitrile	44	43, 42, 53
Iodomethane	142	127, 141
Isobutyl alcohol	43	41, 42, 74
Isopropylbenzene	105	120
p-Isopropyltoluene	119	134, 91
Malononitrile	66	39, 65, 38
Methacrylonitrile	41	67, 39, 52, 66
Methyl acrylate	55	85
Methyl-t-butyl ether	73	57
Methylene chloride	84	86, 49
Methyl ethyl ketone	72	43
Methyl iodide	142	127, 141
Methyl methacrylate	69	41, 100, 39
4-Methyl-2-pentanone	100	43, 58, 85
Naphthalene	128	-
Nitrobenzene	123	51, 77
2-Nitropropane	46	-
2-Picoline	93	66, 92, 78
Pentachloroethane	167	130, 132, 165, 169
Propargyl alcohol	55	39, 38, 53
Propene	41	39, 42

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Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
Propiolactone	42	43, 44
Propionitrile (ethyl cyanide)	54	52, 55, 40
n-Propylamine	59	41, 39
n-Propylbenzene	91	120
Pyridine	79	52
Styrene	104	78
1,2,3-Trichlorobenzene	180	182, 145
1,2,4-Trichlorobenzene	180	182, 145
1,1,1,2-Tetrachloroethane	131	133, 119
1,1,2,2-Tetrachloroethane	83	131, 85
Tert-butyl formate	59	57, 41
Tetrachloroethene	164	129, 131, 166
Toluene	92	91
1,1,1-Trichloroethane	97	99, 61
1,1,2-Trichloroethane	83	97, 85
Trichloroethene	95	97, 130, 132
Trichlorofluoromethane	151	101, 153
1,2,3-Trichloropropane	75	77
1,2,4-Trimethylbenzene	105	120
1,3,5-Trimethylbenzene	105	120
Vinyl acetate	43	86
Vinyl chloride	62	64
o-Xylene	106	91
m-Xylene	106	91
p-Xylene	106	91
Internal Standards/Surrogates:		
1,4-Difluorobenzene	114	63
1,4-Dichlorobenzene-d4	152	115, 150
1,1,2-Trichloroethane-d3	100	
4-Bromofluorobenzene	95	174, 176
Chloroform-d1	84	
Dibromofluoromethane	113	
4-Bromofluorobenzene	95	174, 176
Chloroform-d1	84	
Dibromofluoromethane	113	
Dichloroethane-d4	102	
Toluene-d8	98	
Pentafluorobenzene	168	
Fluorobenzene	96	77

* Characteristic ion for an ion trap mass spectrometer (to be used when ion-molecule reactions are observed).

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Attachment IV: Potential Compounds to be Analyzed by this Procedure

Acetone	Dicyclopentadiene
Acetonitrile	1,4-Dioxane
Acrolein	Epichlorohydrin
Acrylonitrile	Ethanol
Allyl alcohol	Ethylbenzene
Allyl chloride	Ethylene oxide
Benzene	Ethyl methacrylate
Benzyl chloride	n-Hexane
Bromoacetone	2-Hexanone
Bromochloromethane (I.S.)	2-Hydroxypropionitrile
Bromodichloromethane	Iodomethane
4-Bromofluorobenzene (Surr.)	Isobutylalcohol
Bromoform	Malononitrile
Bromomethane	Methacrylonitrile
2-Butanone	Methylene chloride
Carbon disulfide	Methyl iodide
Carbon tetrachloride	Methyl methacrylate
Chloral hydrate	4-methyl-2-pentanone
Chlorobenzene	Pentachloroethane
Chlorobenzene d-5 (I.S.)	2-Picoline
Chlorodibromomethane	Propargyl alcohol
2-Propanol	Propene
Chloroethane	B-propiolactone
2-Chloroethanol	Propionitrile
bis-(2-Chloroethyl) sulfide	n-Propylamine
2-Chloroethyl vinyl ether	Pyridine
Chlorofrom	Styrene
Chloromethane	1,1,1,2-Tetrachloroethane
Chloroprene	1,1,2,2-Tetrachloroethane
3-Chloropropionitrile	Tetrachloroethene
1,2- Dibromo-3-chloropropane	Toluene
1,2-Dibromoethane	1,3-Butadiene
Dibromomethane	1,1,1-Trichloroethane
1,4-Dichloro-2-butene	1,1,2-Trichloroethane
dichlorodifluoromethane	Trichloroethene
1,1-Dichloroethane	Trichlorofluoromethane
1,2-Dichloroethane	1,2,3-Trichloropropane
1,2-Dichloroethane d-4 (surr.)	Vinyl acetate
1,1-Dichloroethene	Vinyl chloride
Trans-1,2-dichloroethene	Xylene (total)
Cis-1,2-dichloroethene	1,2,3,4-Diepoxybutane
1,2-dichloropropane	4-Ethyltoluene

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Attachment V: The SIM Mode:

An alternate way of running compounds to achieve lower detection limits is by way of the Single Ion Monitoring (SIM) method. The SIM method allows the Mass spec to dwell on certain ions rather than scanning the full range of masses from 35 to 300. This process allows for much lower detection limit of desired compounds. This method is only for the detection of known compounds while a TIC cannot be performed while running the SIM method. Currently 1,4-Dioxane is the only compound that is analyzed using the SIM method in the volatiles laboratory.

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Attachment VI: EPA 624.1 CCC Criteria:

Table 7 – LCS (Q), DOC (s and $\bar{X}$), and MS/MSD (P and RPD) Acceptance Criteria[1]

Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P_1, P_2 (%)	Limit for RPD
Acrolein	60-140	30	50-150	40-160	60
Acrylonitrile	60-140	30	50-150	40-160	60
Benzene	65-135	33	75-125	37-151	61
Benzene-d_6					
Bromodichloromethane	65-135	34	50-140	35-155	56
Bromoform	70-130	25	57-156	45-169	42
Bromomethane	15-185	90	D-206	D-242	61
2-Butanone-d_5					
Carbon tetrachloride	70-130	26	65-125	70-140	41
Chlorobenzene	65-135	29	82-137	37-160	53
Chloroethane	40-160	47	42-202	14-230	78
Chloroethane-d_5					
2-Chloroethylvinyl ether	D-225	130	D-252	D-305	71
Chloroform	70-135	32	68-121	51-138	54
Chloroform-^{13}C					
Chloromethane	D-205	472	D-230	D-273	60
Dibromochloromethane	70-135	30	69-133	53-149	50
1,2-Dichlorobenzene	65-135	31	59-174	18-190	57
1,2-Dichlorobenzene-d_4					
1,3-Dichlorobenzene	70-130	24	75-144	59-156	43
1,4-Dichlorobenzene	65-135	31	59-174	18-190	57
1,1-Dichloroethane	70-130	24	71-143	59-155	40
1,2-Dichloroethane	70-130	29	72-137	49-155	49
1,2-Dichloroethane-d_4					
1,1-Dichloroethene	50-150	40	19-212	D-234	32
1,1-Dichloroethene-d_2					
trans-1,2-Dichloroethene	70-130	27	68-143	54-156	45
1,2-Dichloropropane	35-165	69	19-181	D-210	55
1,2-Dichloropropane-d_6					
cis-1,3-Dichloropropene	25-175	79	5-195	D-227	58
trans-1,3-Dichloropropene	50-150	52	38-162	17-183	86
trans-1,3-Dichloropropene-d_4.					
Ethyl benzene	60-140	34	75-134	37-162	63
2-Hexanone-d_5					
Methylene chloride	60-140	192	D-205	D-221	28
1,1,2,2-Tetrachloroethane	60-140	36	68-136	46-157	61
1,1,2,2-Tetrachloroethane-d_2					
Tetrachloroethene	70-130	23	65-133	64-148	39
Toluene	70-130	22	75-134	47-150	41
Toluene-d_8					
1,1,1-Trichloroethane	70-130	21	69-151	52-162	36
1,1,2-Trichloroethane	70-130	27	75-136	52-150	45
Trichloroethene	65-135	29	75-138	70-157	48
Trichlorofluoromethane	50-150	50	45-158	17-181	84
Vinyl chloride	5-195	100	D-218	D-251	66
Vinyl chloride-d_3					

[1] Criteria were calculated using an LCS concentration of 20 µg/L

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STANDARD OPERATING PROCEDURE
TITLE: ENV-SOP-MTJL-0100 Volatile Organic Compounds by GC/MS (EPA 8260B, 8260C, 624, 624.1, and SM6200 B)
ISSUER: Pace National – Mt. Juliet, Tennessee

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Attachment VII: EPA 8260C Minimum Relative Response Factor Criteria for Initial and Continuing Calibration Verification:

Volatile Compound	Minimum Response Factor (RF)
Dichlorodifluoromethane	0.100
Chloromethane	0.100
Vinyl chloride	0.100
Bromomethane	0.100
Chloroethane	0.100
Trichlorofluoromethane	0.100
1,1-Dichloroethene	0.100
1,1,2-Trichloro-1,2,2-trifluoroethane	0.100
Acetone	0.100
Carbon disulfide	0.100
Methyl Acetate	0.100
Methylene chloride	0.100
trans-1,2-Dichloroethene	0.100
cis-1,2-Dichloroethene	0.100
Methyl tert-Butyl Ether	0.100
1,1-Dichloroethane	0.200
2-Butanone	0.100
Chloroform	0.200
1,1,1-Trichloroethane	0.100
Cyclohexane	0.100
Carbon tetrachloride	0.100
Benzene	0.500
1,2-Dichloroethane	0.100
Trichloroethene	0.200
Methylcyclohexane	0.100

Volatile Compound	Minimum Response Factor (RF)
1,2-Dichloropropane	0.100
Bromodichloromethane	0.200
cis-1,3-Dichloropropene	0.200
trans-1,3-Dichloropropene	0.100
4-Methyl-2-pentanone	0.100
Toluene	0.400
1,1,2-Trichloroethane	0.100
Tetrachloroethene	0.200
2-Hexanone	0.100
Dibromochloromethane	0.100
1,2-Dibromoethane	0.100
Chlorobenzene	0.500
Ethylbenzene	0.100
meta-/para-Xylene	0.100
ortho-Xylene	0.300
Styrene	0.300
Bromoform	0.100
Isopropylbenzene	0.100
1,1,2,2-Tetrachloroethane	0.300
1,3-Dichlorobenzene	0.600
1,4-Dichlorobenzene	0.500
1,2-Dichlorobenzene	0.400
1,2-Dibromo-3-chloropropane	0.050
1,2,4-Triichlorobenzene	0.200

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Attachment VIII: EPA 8260D (Table 4) Guidance Response Factors Criteria From EPA Contract Laboratory Program (Min RF):

Analyte	RF
Acetone	0.01
Benzene	0.2
Bromochloromethane	0.1
Bromodichloromethane	0.3
Bromoform	0.1
Bromomethane	0.01
2-Butanone	0.01
Carbon disulfide	0.1
Carbon tetrachloride	0.1
Chlorobenzene	0.4
Chloroethane	0.01
Chloroform	0.3
Chloromethane	0.01
Cyclohexane	0.01
Dibromochloromethane	0.2
1,2-Dibromo-3-chloropropane	0.01
1,2-Dibromoethane (EDB, Ethylene dibromide)	0.2
1,2-Dichlorobenzene	0.6
1,3-Dichlorobenzene	0.5
1,4-Dichlorobenzene	0.6
Dichlorodifluoromethane	0.01
1,1-Dichloroethane	0.3
1,2-Dichloroethane	0.07
1,1-Dichloroethene (Vinylidene chloride)	0.06
cis-1,2-Dichloroethene	0.2
trans-1,2-Dichloroethene	0.1
1,2-Dichloropropane	0.2
cis-1,3-Dichloropropene	0.3
trans-1,3-Dichloropropene	0.3
Ethylbenzene	0.4
2-Hexanone	0.01
Isopropylbenzene	0.4
Methyl acetate	0.01
4-Methyl-2-pentanone	0.03
Methyl tert-butyl ether (MTBE)	0.1
Methylcyclohexane	0.05
Methylene chloride	0.01
Styrene	0.2
1,1,2,2-Tetrachloroethane	0.2
Tetrachloroethene	0.1
Toluene	0.3
1,2,3-Trichlorobenzene	0.4
1,2,4-Trichlorobenzene	0.4
1,1,1-Trichloroethane	0.05
1,1,2-Trichloroethane	0.2
1,1,2-Trichlorotrifluoroethane	0.05
Trichloroethene (Trichloroethylene)	0.2
Trichlorofluoromethane	0.01
Vinyl chloride	0.01
m,p-Xylene	0.2
o-Xylene	0.2

Values in this table are referenced from the CLP Statement of Work SOM 02.4. These response factors are provided as guidance only and are not intended to be a requirement. See Appendix B for additional information.

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Attachment IX: Laboratory Control Standard and Matrix Spike Typically Spiked Compounds

STANDARD ANALYTE LIST

1,1,1,2-TETRACHLOROETHANE
1,1,1-TRICHLOROETHANE
1,1,2,2-TETRACHLOROETHANE
1,1,2-TRICHLOROETHANE
1,1,2-TRICHLOROTRIFLUOROETHANE
1,1-DICHLOROETHANE
1,1-DICHLOROETHENE
1,1-DICHLOROPROPENE
1,2,3-TRICHLOROBENZENE
1,2,3-TRICHLOROPROPANE
1,2,3-TRIMETHYLBENZENE
1,2,4-TRICHLOROBENZENE
1,2,4-TRIMETHYLBENZENE
1,2-DIBROMO-3-CHLOROPROPANE
1,2-DIBROMOETHANE
1,2-DICHLOROBENZENE
1,2-DICHLOROETHANE
1,2-DICHLOROPROPANE
1,3,5-TRIMETHYLBENZENE
1,3-BUTADIENE
1,3-DICHLOROBENZENE
1,3-DICHLOROPROPANE
1,4-DICHLOROBENZENE
1-METHYLNAPHTHALENE
2,2,4-TRIMETHYLPENTANE
2,2-DICHLOROPROPANE
2-BUTANONE (MEK)
2-CHLOROETHYL VINYL ETHER
2-CHLOROTOLUENE
2-HEXANONE
2-METHYLNAPHTHALENE
4-CHLOROTOLUENE
4-ETHYLTOLUENE
4-METHYL-2-PENTANONE (MIBK)
ACETONE
ACROLEIN*
CHLORODIBROMOMETHANE
CHLOROETHANE
CHLOROFORM
CHLOROMETHANE
CIS-1,2-DICHLOROETHENE
CIS-1,3-DICHLOROPROPENE
DIBROMOMETHANE
DICHLORODIFLUOROMETHANE
DICHLOROFLUOROMETHANE
DICYCLOPENTADIENE
DI-ISOPROPYL ETHER
ETHYL ETHER
ETHYLBENZENE
HEXACHLORO-1,3-BUTADIENE
IODOMETHANE
ISOPROPYLBENZENE
M&P-XYLENE
METHYL TERT-BUTYL ETHER
METHYLENE CHLORIDE
NAPHTHALENE
N-BUTYLBENZENE
N-HEXANE
N-PROPYLBENZENE
O-XYLENE
P-ISOPROPYLTOLUENE
PROPENE
SEC-BUTYLBENZENE
STYRENE
TERT-BUTYLBENZENE
TETRACHLOROETHENE
TETRAHYDROFURAN
TOLUENE
TPH (GC/MS) LOW FRACTION
TRANS-1,2-DICHLOROETHENE
TRANS-1,3-DICHLOROPROPENE
TRANS-1,4-DICHLORO-2-BUTENE

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STANDARD ANALYTE LIST

ACRYLONITRILE*
BENZENE
BROMOBENZENE
BROMOCHLOROMETHANE
BROMODICHLOROMETHANE
BROMOFORM
BROMOMETHANE
CARBON DISULFIDE
CARBON TETRACHLORIDE
CHLOROBENZENE
TRICHLOROETHENE
TRICHLOROFLUOROMETHANE
VINYL ACETATE
VINYL CHLORIDE
XYLENES, TOTAL

SURROGATE LIMITS

4-BROMOFLUOROBENZENE
A,A,A-TRIFLUOROTOLUENE
DIBROMOFLUOROMETHANE
TOLUENE-D8

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Attachment X: DoD Requirements

1.0 Equipment/Instrument Maintenance

Instrument maintenance must be performed routinely to optimize instrument performance and improve chromatography. Commonly performed maintenance includes baking traps and columns, changing injection port liners, changing pump oil, etc. A new calibration curve must be analyzed following any major maintenance performed on the analytical system.

2.0 Computer Hardware and Software

Software name and version: HP Chemstation G1701CA Version C.00.00 or equivalent

3.0 Troubleshooting

Table 1. GCMS Troubleshooting Guide

Problem	Cause	Treatment
Peaks broaden and tail	Poor column installation causing dead volume in the injector	Reinstall column in injector. Check seal at ferrule. Check insertion depth. Ensure a good column cut.
	Solvent flashing in hot injector	Reduce injection speed on hot injectors and if possible reduce injector temperature
	Injector not being purged properly after splitless injection	For splitless injection, the vent flow should be 70 ml/min, and the injector should be switched to the split mode 0.5_1.5 min after injection.
Tailing sample peaks for active components	Active sites in the injector insert or liner	Change or clean the injector insert
	Active sites or degraded phase in column	Remove the front 15 cm of the column and reinstall. If retention times are changing or cutting the column does not help, replace the column.
	Injector not hot enough for higher boiling compounds	Increase the injector temperature and lower the injection speed. Check that the graphite ferrule is free of cracks and the septum support is tight.
Low response and tailing of high boiling point compounds	Injector is not hot enough to vaporize high boilers	Increase injector temperature
	Interface/ion source not getting to adequate temperature	Change the manifold heater
Leading sample peaks	Column overload due to excess amount of component injected	Dilute the sample or do split injection
	Degradation of stationary phase	Change the column
	Carrier gas velocity too low	Increase carrier gas flow rate
Poor chromatographic resolution	Column temperature or program not optimized	Modify method by changing temperature ramp segment slopes

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Table 1. GCMS Troubleshooting Guide

Problem	Cause	Treatment
	Carrier gas flow rate not optimized	Decrease carrier gas linear velocity
	Stationary phase has degraded	Replace the column
Peak splitting, especially low boilers	Sample is flashing in the injector simulating two injections	Lower injector temperature
Retention times shift in chromatogram	Unstable carrier gas flow controller/regulator	Check pneumatics for leaks. Replace flow controller/ regulator if necessary.
	Column contamination or degradation	Condition or replace column
	Leaks at septum or column to injector connection	Replace septum regularly and check that the septum nut and the capillary column nut are tight
Cannot reach operating vacuum	Analyzer contaminated by diffusion pump oil	Shut down and clean mass spec
	Major air leak around column fitting into interface	Replace column ferrule and reseat compression fitting
No tune peaks	Cal gas valve not open	Open cal gas valve
	PFTBA solenoid valve stuck open. All PFTBA has evaporated.	Have solenoid replaced. Put fresh PFTBA in the cal gas vial.
Analysis sensitivity has decreased	Background has increased	Check column bleed, septum bleed, pump oil, and ion source contamination
	Detector needs replacement	Replace detector
	Defective syringe	Try a new or proven syringe
	"Blown" septum or other massive leaks at the inlet or with carrier gas flow. Poor peak shapes usually result from bad leaks.	Find and fix leaks and adjust gas flow.
	Purge flow or split ratio too high	Adjust gas flow rates

4.0 Other Requirements

4.1 All hardcopy laboratory notebooks must be reviewed by the Supervisor, or their designee, on a monthly basis.

4.2 If not self-explanatory (e.g., a typo or transposed number), corrections to technical and quality records shall also include a justification for the change.

4.3 A storage blank must be stored with all volatile organic samples, regardless of suspected concentration levels.

4.4 A person performing a manual integration must sign and date each manually integrated chromatogram and record the rationale for performing manual integration. Electronic signatures are acceptable.

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4.5 The results of calibration and verification of support equipment must be within the specifications required of the application for which this equipment is used or the equipment must be removed from service until repaired. Calibration and verification records, including those of established correction factors, must be maintained. In the absence of method-specific requirements, the minimum requirements are as follows:

Table 2. Support Equipment Checks

Performance Check	Frequency	Acceptance Criteria
Balance calibration check [Using two standard weights that bracket the expected mass]	Daily prior to use	Top-loading balance: ±2% or ±0.02g, whichever is greater Analytical balance: ±0.1% or ±0.5 mg, whichever is greater
Verification of standard mass [Using weights traceable to the International System of Units (SI) through a NMI	Every 5 years	Certificate of Calibration from ISO/IEC 17025 accredited calibration laboratory
Monitoring of refrigerator/freezer temperatures	Daily (i.e. 7 days per week) [use MIN/MAX thermometers or data loggers equipped with notification of out of control event capabilities if personnel not available to record daily]	Refrigerators: 0˚C to 6˚C Freezers: ≤-10˚C
Thermometer verification check [Using a thermometer traceable to the SI through an NMI] [Performed at two temperatures that bracket the target temperature(s). Assume linearity between the two bracketing temperatures.] [If only a single temperature is used, at the temperature of use]	Liquid in glass: Before first use and annually Electronic: Before first use and quarterly	Apply correction factors or replace thermometer
Volumetric labware	Class B: By lot before first use Class A and B: Upon evidence of deterioration	Bias: Mean within ±2% of nominal volume Precision: RSD ≤1% of nominal volume (based on 10 replicate measurements)
Non-volumetric labware [Applicable only when used for measuring initial sample volume and final extract/ digestates volume]	By lot before first use or upon evidence of deterioration	Bias: Mean within ±3% of nominal volume Precision: RSD ≤3% of nominal volume (based on 10 replicate measurements)
Mechanical volumetric pipette	Quarterly	Bias: Mean within ±2% of nominal volume Precision: RSD ≤1% of nominal volume (based on minimum of 3 replicate measurements) [Note: for variable volume pipettes, the nominal volume is the volume of use]

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Table 2. Support Equipment Checks		
Performance Check	**Frequency**	**Acceptance Criteria**
Glass microliter syringe	Upon receipt and upon evidence of deterioration	General Certificate of Bias & Precision upon receipt Replace if deterioration is evident
Drying oven temperature check	Daily prior to and after use	Within ±5% of set temperature
Water purification system	Daily prior to use	See method blank criteria given in Section 4.20 of this addendum

4.6 The expiration date of the prepared standard shall not exceed the expiration date of the primary standard. All containers must bear a preparation date.

4.7 To avoid preparing non-representative samples, the laboratory shall not "target" within a relatively small mass range (e.g., 1.00 ± 0.01g) because such targeting will produce non-representative subsamples if the sample has high heterogeneity. The laboratory shall not manipulate the sample material so the sample aliquot weighs exactly 1.00g ± 0.01g, as an example.

4.8 In the absence of project-specific requirements, the minimum standard data qualifiers to be used are:

U Analyte was not detected and is reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

J The reported result is an estimated value (e.g., matrix interference was observed or the analyte was detected at a concentration outside the quantitation range).

B Blank contamination. The recorded result is associated with a contaminated blank.

N Non-target analyte. The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.

Q One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).

Additional data qualifiers may be used, or different letters or symbols to denote the qualifiers listed above, as long as they are appropriately defined and their use is consistent with project-specific requirements (e.g., QSM 5.0, the contract, and project-planning documents).

4.9 If the time of the sample collection is not provided, assume the most conservative time of day. For the purpose of batch processing, the start and stop dates and times of the batch preparation shall be recorded.

4.10 Each preparation method listed on the scope of accreditation must have quarterly LOD/LOQ verifications. However, not all possible combinations of preparation and cleanup techniques are required to have LOD/LOQ verifications. If LOD/LOQ verifications are not performed on all combinations, the laboratory must base the LOD/LOQ verifications on the worst case basis (preparation method with all applicable cleanup steps).

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4.11 After each MDL determination, the laboratory must establish the LOD by spiking a quality system matrix at a concentration of at least two (2) times but no greater than four times the MDL. This spike concentration establishes the LOD and the concentration at which the LOD shall be verified. It is specific to each suite of analyte, matrix, and method (including sample preparation). The following requirements apply to the initial LOD establishment and to the LOD verifications:

- The apparent signal to noise (S/N) ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification (e.g., ion abundance, second column confirmation, or pattern recognition). For data systems that do not provide a measure of noise, the signal produced by the verification sample must produce a result that is at least three standard deviations greater than the mean method blank concentration. This is initially estimated based on a minimum of four method blank analyses and later established with a minimum of 20 method blank results.
- If the LOD verification fails, then the laboratory must repeat the MDL determination and LOD verification or perform and pass two consecutive LOD verifications at a higher spike concentration and set the LOD at the higher concentration.
- The laboratory shall maintain documentation for all MDL determinations and LOD verifications.
- The DL and LOD must be reported for all analyte-matrix-methods suites, unless it is not applicable to the test or specifically excluded by project requirements.

4.12 The LOD shall be verified quarterly. In situations where methods are setup and used on an infrequent basis, the laboratory may choose to perform LOD verifications on a one per batch basis. All verification data will be in compliance, reported, and available for review.

4.13 For DoD, at a minimum, the LOQ shall be verified quarterly. In situations where methods are setup and used on an infrequent basis, the laboratory may choose to perform LOQ verifications on a one per batch basis.

4.14 All initial instrument calibrations must be verified with a standard obtained from a second manufacturer prior to analyzing any samples. The use of a standard from a second lot obtained from the same manufacturer (independently prepared from different source materials) is acceptable for use as a second source standard. The concentration of the second source standard shall be at or near the midpoint of the calibration range. The acceptance criteria for the initial calibration verification must be at least as stringent as those for the continuing calibration verification.

4.15 Exclusion of calibration points without documented scientifically valid technical justification is not permitted.

4.16 The concentration of the CCV standard shall be greater than the low calibration standard and less than or equal to the midpoint of the calibration range.

4.17 All CCVs analyzed must be evaluated and reported. If a CCV fails, reanalysis or corrective actions must be taken.

- If a CCV fails, the laboratory can immediately analyze two additional consecutive CCVs (immediately is defined as starting a consecutive pair within one hour; no samples can be run between the failed CCV and the two additional CCVs). This approach allows for spurious failures of analytes to be reported without reanalysis of samples. Any corrective actions that change the dynamics of the system (e.g., clip

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column, clean injection port, run blanks) requires that all samples since the last acceptable CCV be reanalyzed.
- Both of these CCVs must meet acceptance criteria in order for the samples to be reported without reanalysis.
- If either of these two CCVs fail or if the laboratory cannot immediately analyze two CCVs, the associated samples cannot be reported and must be reanalyzed.
- Corrective action(s) and recalibration must occur if the above scenario fails. All affected samples since the last acceptable CCV must be reanalyzed.
- Flagging of data for a failed CCV is only appropriate when the affected samples cannot be reanalyzed. The laboratory must notify the client prior to reporting data associated with a failed CCV.

4.18 The results of all MS/MSDs must be evaluated using the same acceptance criteria used for the DoD LCS limits (see Tables 3 and 4) or project limits, if specified. If the specific analyte(s) are not available in the Tables 3 and 4, the laboratory shall use their LCS in-house limits (see the LIMS) as a means of evaluating MS/MSDs. The MS and MSD must be spiked with all reported analytes.

4.19 Surrogate spike results shall be compared with DoD LCS limits (see Tables 3 and 4) or acceptance criteria specified by the client. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria (see the LIMS).

4.20 The method blank shall be considered to be contaminated if:

- The concentration of any target analyte (chemical of concern) in the blank exceeds 1/2 the LOQ and is greater than 1/10th the amount measured in any associated sample, or 1/0th the regulatory limit, whichever is greater;
- The concentration of any common laboratory contaminant in the blank exceeds the LOQ;
- If a method blank is contaminated as described above, then the laboratory shall reprocess affected samples in a subsequent preparation batch, except when sample results are below the LOD. If insufficient sample volume remains for reprocessing, the results shall be reported with appropriate data qualifiers.

4.21 Sporadic Marginal Exceedances are not allowed for target analytes (chemicals of concern as identified by a project) without project-specific approval. Target analytes are considered those few analytes that are critical for the success of a project (such as risk drivers) where sporadic marginal exceedances cannot be allowed. Laboratories should consult with clients whenever long lists of analytes are requested for analysis to determine if marginal exceedances will not be allowed.

4.22 DoD considers the same analyte exceeding the LCS control limit two (2) out of three (3) consecutive LCS to be indicative of non-random behavior, which requires corrective action and reanalysis of the LCS.

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Table 3. LCS Control Limits – Method 8260 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
630-20-6	1,1,1,2-Tetrachloroethane	11115	101.1	7.8	78	125
71-55-6	1,1,1-Trichloroethane	12156	101.6	9.4	73	130
79-34-5	1,1,2,2-Tetrachloroethane	11670	97	8.9	70	124
79-00-5	1,1,2-Trichloroethane	11772	99.7	7.2	78	121
76-13-1	1,1,2-Trifluoro-1,2,2-trichloroethane [Freon-113]	9760	100.8	11.7	66	136
75-34-3	1,1-Dichloroethane	11856	100.4	8.1	76	125
75-35-4	1,1-Dichloroethene	12352	100.3	10.1	70	131
563-58-6	1,1-Dichloropropene	10793	100.5	8.3	76	125
87-61-6	1,2,3-Trichlorobenzene	10572	97.8	10.6	66	130
96-18-4	1,2,3-Trichloropropane	10925	99.1	8.8	73	125
526-73-8	1,2,3-Trimethylbenzene	1948	99.8	6	82	118
120-82-1	1,2,4-Trichlorobenzene	10980	98	10.4	67	129
95-63-6	1,2,4-Trimethylbenzene	11085	98.7	7.9	75	123
96-12-8	1,2-Dibromo-3-chloropropane	11380	96.6	11.7	61	132
106-93-4	1,2-Dibromoethane	11408	100.1	7.3	78	122
95-50-1	1,2-Dichlorobenzene	11785	99.1	7.2	78	121
107-06-2	1,2-Dichloroethane	12328	100.5	9.2	73	128
17060-07-0	1,2-Dichloroethane-d4	5951	103.1	10.8	71	136
540-59-0	1,2-Dichloroethene	7748	99.9	7.3	78	122
78-87-5	1,2-Dichloropropane	12145	99.5	7.8	76	123
354-23-4	1,2-Dichlorotrifluoroethane [Freon 123a]	1269	97.8	11.3	64	132
108-70-3	1,3,5-Trichlorobenzene	4723	99.4	9.6	71	128
108-67-8	1,3,5-Trimethylbenzene	11080	98.4	8.4	73	124
541-73-1	1,3-Dichlorobenzene	11619	98.9	7.4	77	121
142-28-9	1,3-Dichloropropane	10713	99.1	7.3	77	121
542-75-6	1,3-Dichloropropene	3714	101.6	8.1	77	126
106-46-7	1,4-Dichlorobenzene	11848	97.5	7.6	75	120
105-05-5	1,4-Diethylbenzene	1896	96.6	5.9	79	114
123-91-1	1,4-Dioxane	7698	96.4	13.7	55	138
544-10-5	1-Chlorohexane	2543	100.4	9.8	71	130
594-20-7	2,2-Dichloropropane	10703	99.7	11.1	67	133
78-93-3	2-Butanone [MEK]	11514	99.6	16.3	51	148
126-99-8	2-Chloro-1,3-butadiene	6667	99	11.3	65	133
110-75-8	2-Chloroethyl vinyl ether	6957	96.1	17.6	43	149
95-49-8	2-Chlorotoluene	10838	98.5	7.9	75	122
591-78-6	2-Hexanone	11004	99.1	15.4	53	145
79-46-9	2-Nitropropane	4969	98.3	17.1	47	150
67-63-0	2-Propanol [Isopropyl alcohol]	1696	99.8	13.4	60	140
460-00-4	4-Bromofluorobenzene	6267	98.9	6.8	79	119
106-43-4	4-Chlorotoluene	10785	98.3	8.6	72	124
108-10-1	4-Methyl-2-pentanone [MIBK]	11364	99.6	11.6	65	135
67-64-1	Acetone	11089	99.6	21.4	36	164
75-05-8	Acetonitrile	5697	98.5	14.8	54	143
107-02-8	Acrolein [Propenal]	7528	101.1	18	47	155

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TITLE: ENV-SOP-MTJL-0100 Volatile Organic Compounds by GC/MS (EPA 8260B, 8260C, 624, 624.1, and SM6200 B)
ISSUER: Pace National – Mt. Juliet, Tennessee

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Table 3. LCS Control Limits – Method 8260 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
107-13-1	Acrylonitrile	8293	99.7	11.4	65	134
107-05-1	Allyl chloride	6908	101.1	11.2	68	135
71-43-2	Benzene	12853	99.2	7.4	77	121
100-44-7	Benzyl chloride	2743	92.1	9.4	64	120
108-86-1	Bromobenzene	10974	99.3	7.3	78	121
74-97-5	Bromochloromethane	11023	101.4	7.8	78	125
75-27-4	Bromodichloromethane	11850	101	8.5	75	127
75-25-2	Bromoform	11890	99.1	10.8	67	132
74-83-9	Bromomethane	11416	98.3	15	53	143
75-15-0	Carbon disulfide	11132	97.9	11.5	63	132
56-23-5	Carbon tetrachloride	12090	102.3	10.7	70	135
108-90-7	Chlorobenzene	12382	99.7	6.9	79	120
124-48-1	Chlorodibromomethane	11852	100.2	8.7	74	126
75-00-3	Chloroethane	11444	98.8	13.3	59	139
67-66-3	Chloroform	12344	100.3	7.6	78	123
74-87-3	Chloromethane	11876	93.3	14.3	50	136
156-59-2	cis-1,2-Dichloroethene	11645	99.9	7.6	77	123
10061-01-5	cis-1,3-Dichloropropene	11805	99.8	8.7	74	126
1476-11-5	cis-1,4-Dichloro-2-butene	977	106	12.4	69	143
110-82-7	Cyclohexane	8827	98.9	10.6	67	131
108-94-1	Cyclohexanone	3764	93.2	20.9	30	156
1868-53-7	Dibromofluoromethane	2142	98.1	6.8	78	119
74-95-3	Dibromomethane	10913	101.1	7.9	78	125
75-71-8	Dichlorodifluoromethane [Freon-12]	11467	88.9	20.1	29	149
75-05-8	Acetonitrile	5697	98.5	14.8	54	143
107-02-8	Acrolein [Propenal]	7528	101.1	18	47	155
107-13-1	Acrylonitrile	8293	99.7	11.4	65	134
107-05-1	Allyl chloride	6908	101.1	11.2	68	135
71-43-2	Benzene	12853	99.2	7.4	77	121
100-44-7	Benzyl chloride	2743	92.1	9.4	64	120
108-86-1	Bromobenzene	10974	99.3	7.3	78	121
74-97-5	Bromochloromethane	11023	101.4	7.8	78	125
75-27-4	Bromodichloromethane	11850	101	8.5	75	127
75-25-2	Bromoform	11890	99.1	10.8	67	132
74-83-9	Bromomethane	11416	98.3	15	53	143
75-15-0	Carbon disulfide	11132	97.9	11.5	63	132
56-23-5	Carbon tetrachloride	12090	102.3	10.7	70	135
108-90-7	Chlorobenzene	12382	99.7	6.9	79	120
124-48-1	Chlorodibromomethane	11852	100.2	8.7	74	126
75-00-3	Chloroethane	11444	98.8	13.3	59	139
67-66-3	Chloroform	12344	100.3	7.6	78	123
74-87-3	Chloromethane	11876	93.3	14.3	50	136
156-59-2	cis-1,2-Dichloroethene	11645	99.9	7.6	77	123
10061-01-5	cis-1,3-Dichloropropene	11805	99.8	8.7	74	126
1476-11-5	cis-1,4-Dichloro-2-butene	977	106	12.4	69	143

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Table 3. LCS Control Limits – Method 8260 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
110-82-7	Cyclohexane	8827	98.9	10.6	67	131
108-94-1	Cyclohexanone	3764	93.2	20.9	30	156
1868-53-7	Dibromofluoromethane	2142	98.1	6.8	78	119
74-95-3	Dibromomethane	10913	101.1	7.9	78	125
75-71-8	Dichlorodifluoromethane [Freon-12]	11467	88.9	20.1	29	149
75-43-4	Dichlorofluoromethane	717	100.8	18	47	155
60-29-7	Diethyl ether	6283	99.6	9.6	71	129
108-20-3	Diisopropyl ether	8542	98.3	9.7	69	127
64-17-5	Ethanol	3958	102.2	18.9	45	159
141-78-6	Ethyl acetate	4516	95.4	14.5	52	139
97-63-2	Ethyl methacrylate	7075	98.9	9.9	69	129
637-92-3	Ethyl tert-butyl ether	7514	98.9	9.1	72	126
100-41-4	Ethylbenzene	12427	99.1	7.7	76	122
462-06-6	Fluorobenzene	689	97.3	5.4	81	114
142-82-5	Heptane	5420	93.4	14.9	49	138
87-68-3	Hexachlorobutadiene	10264	98.1	12.4	61	135
67-72-1	Hexachloroethane	3265	102.5	10.1	72	133
110-54-3	Hexane	7116	93.6	16.1	45	142
74-88-4	Iodomethane	9457	100.9	10.1	71	131
78-83-1	Isobutyl alcohol	6162	97.5	12.6	60	135
108-21-4	Isopropyl acetate [Acetic acid]	2885	94.2	12.2	58	131
98-82-8	Isopropylbenzene	11596	100.8	11.1	68	134
179601-23-1	m/p-Xylene [3/4-Xylene]	10612	100.4	7.7	77	124
126-98-7	Methacrylonitrile	6736	99.2	11.1	66	132
79-20-9	Methyl acetate	8320	98.7	15.2	53	144
80-62-6	Methyl methacrylate	7050	98.4	11.9	63	134
1634-04-4	Methyl tert-butyl ether [MTBE]	11253	98.9	8.7	73	125
108-87-2	Methylcyclohexane	8565	99.4	11.2	66	133
75-09-2	Methylene chloride	12024	98.9	9.7	70	128
123-86-4	n-Butyl acetate	2981	95.1	11	62	128
71-36-3	n-Butyl alcohol	4800	92.9	12.6	55	131
104-51-8	n-Butylbenzene	10921	98.7	9.7	70	128
103-65-1	n-Propylbenzene	10947	98.9	8.8	73	125
91-20-3	Naphthalene	10602	95.6	11.2	62	129
95-47-6	o-Xylene	11940	100	7.7	77	123
99-87-6	p-Isopropyltoluene [p-Cymene]	10953	100.3	9	73	127
76-01-7	Pentachloroethane	5957	102	11.1	69	135
107-12-0	Propionitrile [Ethyl cyanide]	6734	101	11.1	68	134
135-98-8	sec-Butylbenzene	10960	99	8.8	73	126
100-42-5	Styrene	11809	100.2	8	76	124
994-05-8	tert-Amyl methyl ether [TAME]	7153	99.8	8.9	73	126
75-65-0	tert-Butyl alcohol	7492	100.5	10.7	68	133
98-06-6	tert-Butylbenzene	10974	98.8	8.6	73	125

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Table 3. LCS Control Limits – Method 8260 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
127-18-4	Tetrachloroethene	12091	100.5	9.2	73	128
109-99-9	Tetrahydrofuran	8039	98	12.4	61	135
108-88-3	Toluene	12499	99.3	7.3	77	121
2037-26-5	Toluene-d8	6232	100.7	5.2	85	116
156-60-5	trans-1,2-Dichloroethene	11849	99.2	8.6	74	125
10061-02-6	trans-1,3-Dichloropropene	11805	100.9	9.8	71	130
110-57-6	trans-1,4-Dichloro-2-butene	8307	98.6	12.3	62	136
79-01-6	Trichloroethene	12440	100.2	7.6	77	123
75-69-4	Trichlorofluoromethane [Freon-11]	11530	101	13.1	62	140
108-05-4	Vinyl acetate	7260	100.3	16.9	50	151
75-01-4	Vinyl chloride	12129	95.6	13.2	56	135
1330-20-7	Xylenes [total]	8623	100.7	7.7	78	124
104-51-8	n-Butylbenzene	10921	98.7	9.7	70	128
103-65-1	n-Propylbenzene	10947	98.9	8.8	73	125
91-20-3	Naphthalene	10602	95.6	11.2	62	129
95-47-6	o-Xylene	11940	100	7.7	77	123
99-87-6	p-Isopropyltoluene [p-Cymene]	10953	100.3	9	73	127
76-01-7	Pentachloroethane	5957	102	11.1	69	135
107-12-0	Propionitrile [Ethyl cyanide]	6734	101	11.1	68	134
135-98-8	sec-Butylbenzene	10960	99	8.8	73	126
100-42-5	Styrene	11809	100.2	8	76	124
994-05-8	tert-Amyl methyl ether [TAME]	7153	99.8	8.9	73	126
75-65-0	tert-Butyl alcohol	7492	100.5	10.7	68	133
98-06-6	tert-Butylbenzene	10974	98.8	8.6	73	125
127-18-4	Tetrachloroethene	12091	100.5	9.2	73	128
109-99-9	Tetrahydrofuran	8039	98	12.4	61	135
108-88-3	Toluene	12499	99.3	7.3	77	121
2037-26-5	Toluene-d8	6232	100.7	5.2	85	116
156-60-5	trans-1,2-Dichloroethene	11849	99.2	8.6	74	125
10061-02-6	trans-1,3-Dichloropropene	11805	100.9	9.8	71	130
110-57-6	trans-1,4-Dichloro-2-butene	8307	98.6	12.3	62	136
79-01-6	Trichloroethene	12440	100.2	7.6	77	123
75-69-4	Trichlorofluoromethane [Freon-11]	11530	101	13.1	62	140
108-05-4	Vinyl acetate	7260	100.3	16.9	50	151
75-01-4	Vinyl chloride	12129	95.6	13.2	56	135
1330-20-7	Xylenes [total]	8623	100.7	7.7	78	124

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Table 4. LCS Control Limits – Method 8260 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
630-20-6	1,1,1,2-Tetrachloroethane	24511	101.1	7.6	78	124
71-55-6	1,1,1-Trichloroethane	28223	102.7	9.6	74	131
79-34-5	1,1,2,2-Tetrachloroethane	27450	96.4	8.3	71	121
79-00-5	1,1,2-Trichloroethane	27338	99.5	6.5	80	119
76-13-1	1,1,2-Trifluoro-1,2,2-trichloroethane [Freon-113]	21122	103	11.1	70	136
75-34-3	1,1-Dichloroethane	28154	101.3	8	77	125
75-35-4	1,1-Dichloroethene	29436	101	10	71	131
563-58-6	1,1-Dichloropropene	23631	102	7.8	79	125
87-61-6	1,2,3-Trichlorobenzene	24271	98.7	10.1	69	129
96-18-4	1,2,3-Trichloropropane	24525	97.5	8	73	122
526-73-8	1,2,3-Trimethylbenzene	2965	100.9	6.2	82	120
120-82-1	1,2,4-Trichlorobenzene	25290	99.8	10.1	69	130
95-63-6	1,2,4-Trimethylbenzene	27917	99.6	8	76	124
96-12-8	1,2-Dibromo-3-chloropropane	24955	94.9	11.1	62	128
106-93-4	1,2-Dibromoethane	29096	99	7.2	77	121
95-50-1	1,2-Dichlorobenzene	27583	99.4	6.5	80	119
107-06-2	1,2-Dichloroethane	32965	100.3	9.2	73	128
17060-07-0	1,2-Dichloroethane-d4	8673	99.5	6.1	81	118
540-59-0	1,2-Dichloroethene	18667	100.2	7.1	79	121
78-87-5	1,2-Dichloropropane	27787	100.1	7.2	78	122
354-23-4	1,2-Dichlorotrifluoroethane [Freon 123a]	3144	103.1	10.9	70	136
108-70-3	1,3,5-Trichlorobenzene	10037	102.1	9.2	75	130
108-67-8	1,3,5-Trimethylbenzene	27820	99.5	8.1	75	124
106-99-0	1,3-Butadiene	1202	100.6	19.2	43	158
541-73-1	1,3-Dichlorobenzene	26951	99.7	6.5	80	119
142-28-9	1,3-Dichloropropane	23811	99.1	6.5	80	119
542-75-6	1,3-Dichloropropene	9784	99.9	7.6	77	123
106-46-7	1,4-Dichlorobenzene	27715	98.3	6.5	79	118
105-05-5	1,4-Diethylbenzene	1980	98.4	6.4	79	118
123-91-1	1,4-Dioxane	17866	99	13.4	59	139
544-10-5	1-Chlorohexane	5790	99.6	8	76	124
540-84-1	2,2,4-Trimethylpentane [Isooctane]	5432	95.2	12.3	58	132
594-20-7	2,2-Dichloropropane	23775	99.7	13.2	60	139
75-85-4	2-Butanol	4332	92.7	9.1	66	120
78-93-3	2-Butanone [MEK]	26659	99.6	14.6	56	143
126-99-8	2-Chloro-1,3-butadiene	15673	100	11.7	65	135
110-75-8	2-Chloroethyl vinyl ether	18225	94.7	14.7	51	139
95-49-8	2-Chlorotoluene	23750	100	7.2	79	122
591-78-6	2-Hexanone	25368	97.9	13.5	57	139
91-57-6	2-Methylnaphthalene	3754	79.4	20.9	17	142
79-46-9	2-Nitropropane	10213	92.6	14.5	49	136
67-63-0	2-Propanol [Isopropyl alcohol]	2034	98.8	14.4	56	142
624-95-3	3,3-Dimethyl-1-butanol	6491	90.9	13.9	49	133

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Table 4. LCS Control Limits – Method 8260 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
460-00-4	4-Bromofluorobenzene	9971	99.7	4.9	85	114
106-43-4	4-Chlorotoluene	23616	99.9	7.4	78	122
108-10-1	4-Methyl-2-pentanone [MIBK]	25796	98.5	10.6	67	130
67-64-1	Acetone	25006	99.5	20.1	39	160
75-05-8	Acetonitrile	13308	95.8	15.2	50	142
106-99-0	1,3-Butadiene	1202	100.6	19.2	43	158
541-73-1	1,3-Dichlorobenzene	26951	99.7	6.5	80	119
142-28-9	1,3-Dichloropropane	23811	99.1	6.5	80	119
542-75-6	1,3-Dichloropropene	9784	99.9	7.6	77	123
106-46-7	1,4-Dichlorobenzene	27715	98.3	6.5	79	118
105-05-5	1,4-Diethylbenzene	1980	98.4	6.4	79	118
123-91-1	1,4-Dioxane	17866	99	13.4	59	139
544-10-5	1-Chlorohexane	5790	99.6	8	76	124
540-84-1	2,2,4-Trimethylpentane [Isooctane]	5432	95.2	12.3	58	132
594-20-7	2,2-Dichloropropane	23775	99.7	13.2	60	139
75-85-4	2-Butanol	4332	92.7	9.1	66	120
78-93-3	2-Butanone [MEK]	26659	99.6	14.6	56	143
126-99-8	2-Chloro-1,3-butadiene	15673	100	11.7	65	135
110-75-8	2-Chloroethyl vinyl ether	18225	94.7	14.7	51	139
95-49-8	2-Chlorotoluene	23750	100	7.2	79	122
591-78-6	2-Hexanone	25368	97.9	13.5	57	139
91-57-6	2-Methylnaphthalene	3754	79.4	20.9	17	142
79-46-9	2-Nitropropane	10213	92.6	14.5	49	136
67-63-0	2-Propanol [Isopropyl alcohol]	2034	98.8	14.4	56	142
624-95-3	3,3-Dimethyl-1-butanol	6491	90.9	13.9	49	133
460-00-4	4-Bromofluorobenzene	9971	99.7	4.9	85	114
106-43-4	4-Chlorotoluene	23616	99.9	7.4	78	122
108-10-1	4-Methyl-2-pentanone [MIBK]	25796	98.5	10.6	67	130
67-64-1	Acetone	25006	99.5	20.1	39	160
75-05-8	Acetonitrile	13308	95.8	15.2	50	142
107-02-8	Acrolein [Propenal]	16380	96.8	19.3	39	155
107-13-1	Acrylonitrile	20173	99	11.9	63	135
107-05-1	Allyl chloride	15758	99	10.4	68	130
71-43-2	Benzene	34376	99.4	6.9	79	120
100-44-7	Benzyl chloride	10675	90.1	15.9	42	138
108-86-1	Bromobenzene	23762	99.7	6.7	80	120
74-97-5	Bromochloromethane	24356	100.8	7.5	78	123
75-27-4	Bromodichloromethane	26888	101.8	7.8	79	125
75-25-2	Bromoform	27675	97.8	10.8	66	130
74-83-9	Bromomethane	26717	97	14.7	53	141
75-15-0	Carbon disulfide	25719	98.8	11.5	64	133
56-23-5	Carbon tetrachloride	28870	103.8	10.7	72	136
108-90-7	Chlorobenzene	29802	100	6.1	82	118
124-48-1	Chlorodibromomethane	27424	100	8.5	74	126
75-45-6	Chlorodifluoromethane	7197	84.4	14.9	40	129

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Table 4. LCS Control Limits – Method 8260 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
75-00-3	Chloroethane	27069	99	13	60	138
67-66-3	Chloroform	29373	101.1	7.5	79	124
74-87-3	Chloromethane	27697	94.5	15	50	139
156-59-2	cis-1,2-Dichloroethene	27935	100.1	7.5	78	123
10061-01-5	cis-1,3-Dichloropropene	27197	99.5	8	75	124
1476-11-5	cis-1,4-Dichloro-2-butene	1524	101.5	14.9	57	146
110-82-7	Cyclohexane	20438	100.4	10	71	130
1868-53-7	Dibromofluoromethane	5702	99.1	6.5	80	119
74-95-3	Dibromomethane	24473	101.1	7.3	79	123
75-71-8	Dichlorodifluoromethane [Freon-12]	25410	92	20.1	32	152
107-02-8	Acrolein [Propenal]	16380	96.8	19.3	39	155
107-13-1	Acrylonitrile	20173	99	11.9	63	135
107-05-1	Allyl chloride	15758	99	10.4	68	130
71-43-2	Benzene	34376	99.4	6.9	79	120
100-44-7	Benzyl chloride	10675	90.1	15.9	42	138
108-86-1	Bromobenzene	23762	99.7	6.7	80	120
74-97-5	Bromochloromethane	24356	100.8	7.5	78	123
75-27-4	Bromodichloromethane	26888	101.8	7.8	79	125
75-25-2	Bromoform	27675	97.8	10.8	66	130
74-83-9	Bromomethane	26717	97	14.7	53	141
75-15-0	Carbon disulfide	25719	98.8	11.5	64	133
56-23-5	Carbon tetrachloride	28870	103.8	10.7	72	136
108-90-7	Chlorobenzene	29802	100	6.1	82	118
124-48-1	Chlorodibromomethane	27424	100	8.5	74	126
75-45-6	Chlorodifluoromethane	7197	84.4	14.9	40	129
75-00-3	Chloroethane	27069	99	13	60	138
67-66-3	Chloroform	29373	101.1	7.5	79	124
74-87-3	Chloromethane	27697	94.5	15	50	139
156-59-2	cis-1,2-Dichloroethene	27935	100.1	7.5	78	123
10061-01-5	cis-1,3-Dichloropropene	27197	99.5	8	75	124
1476-11-5	cis-1,4-Dichloro-2-butene	1524	101.5	14.9	57	146
110-82-7	Cyclohexane	20438	100.4	10	71	130
1868-53-7	Dibromofluoromethane	5702	99.1	6.5	80	119
74-95-3	Dibromomethane	24473	101.1	7.3	79	123
75-71-8	Dichlorodifluoromethane [Freon-12]	25410	92	20.1	32	152
75-43-4	Dichlorofluoromethane	1504	101.5	9.8	72	131
60-29-7	Diethyl ether	17189	98.6	10.2	68	129
108-20-3	Diisopropyl ether	22989	97.5	10.3	67	128
64-17-5	Ethanol	9543	99.2	17.1	48	151
141-78-6	Ethyl acetate	9208	96.8	13.9	55	138
97-63-2	Ethyl methacrylate	16674	98.7	9	72	126
637-92-3	Ethyl tert-butyl ether	19841	98.3	9.4	70	127
100-41-4	Ethylbenzene	33325	99.8	7	79	121
462-06-6	Fluorobenzene	1373	97.9	6.1	80	116

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ISSUER: Pace National – Mt. Juliet, Tennessee

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Table 4. LCS Control Limits – Method 8260 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
142-82-5	Heptane	11878	94.4	15	49	140
87-68-3	Hexachlorobutadiene	23535	100.1	11.3	66	134
67-72-1	Hexachloroethane	8718	102.9	10.3	72	134
110-54-3	Hexane	15545	95.5	15.9	48	143
74-88-4	Iodomethane	20229	100	10.4	69	131
78-83-1	Isobutyl alcohol	14123	97.7	11.7	63	133
108-21-4	Isopropyl acetate [Acetic acid]	7216	97.8	11.6	63	133
98-82-8	Isopropylbenzene	28636	101.5	9.9	72	131
179601-23-1	m/p-Xylene [3/4-Xylene]	28168	100.5	6.9	80	121
126-98-7	Methacrylonitrile	15982	97.9	11.6	63	133
79-20-9	Methyl acetate	19698	96	13.2	56	136
80-62-6	Methyl methacrylate	16524	97.7	10.2	67	128
1634-04-4	Methyl tert-butyl ether [MTBE]	29660	97.3	8.8	71	124
108-87-2	Methylcyclohexane	20025	101.8	10.1	72	132
75-09-2	Methylene chloride	27659	99.4	8.3	74	124
123-86-4	n-Butyl acetate	7247	96.8	9.4	69	125
75-43-4	Dichlorofluoromethane	1504	101.5	9.8	72	131
60-29-7	Diethyl ether	17189	98.6	10.2	68	129
108-20-3	Diisopropyl ether	22989	97.5	10.3	67	128
64-17-5	Ethanol	9543	99.2	17.1	48	151
141-78-6	Ethyl acetate	9208	96.8	13.9	55	138
97-63-2	Ethyl methacrylate	16674	98.7	9	72	126
637-92-3	Ethyl tert-butyl ether	19841	98.3	9.4	70	127
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74-88-4	Iodomethane	20229	100	10.4	69	131
78-83-1	Isobutyl alcohol	14123	97.7	11.7	63	133
108-21-4	Isopropyl acetate [Acetic acid]	7216	97.8	11.6	63	133
98-82-8	Isopropylbenzene	28636	101.5	9.9	72	131
179601-23-1	m/p-Xylene [3/4-Xylene]	28168	100.5	6.9	80	121
126-98-7	Methacrylonitrile	15982	97.9	11.6	63	133
79-20-9	Methyl acetate	19698	96	13.2	56	136
80-62-6	Methyl methacrylate	16524	97.7	10.2	67	128
1634-04-4	Methyl tert-butyl ether [MTBE]	29660	97.3	8.8	71	124
108-87-2	Methylcyclohexane	20025	101.8	10.1	72	132
75-09-2	Methylene chloride	27659	99.4	8.3	74	124
123-86-4	n-Butyl acetate	7247	96.8	9.4	69	125
71-36-3	n-Butyl alcohol	10122	95.1	12	59	131
104-51-8	n-Butylbenzene	24088	101.1	8.8	75	128
109-60-4	n-Propyl acetate	602	100.8	8.3	76	126
103-65-1	n-Propylbenzene	24419	101	8.5	76	126
91-20-3	Naphthalene	27847	94.6	11.3	61	128

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Table 4. LCS Control Limits – Method 8260 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
95-47-6	o-Xylene	31776	100	7.2	78	122
99-87-6	p-Isopropyltoluene [p-Cymene]	24335	102	8.5	77	127
76-01-7	Pentachloroethane	11688	101.1	10.7	69	133
109-66-0	Pentane	3915	74.8	19.7	16	134
107-12-0	Propionitrile [Ethyl cyanide]	15701	99.9	12	64	136
135-98-8	sec-Butylbenzene	24191	101.1	8.1	77	126
100-42-5	Styrene	26985	100.5	7.6	78	123
994-05-8	tert-Amyl methyl ether [TAME]	19726	98.1	10.1	68	128
75-65-0	tert-Butyl alcohol	21112	98.6	10.1	68	129
762-75-4	tert-Butyl formate	6651	98.1	11.1	65	132
98-06-6	tert-Butylbenzene	23919	101	7.7	78	124
127-18-4	Tetrachloroethene	29017	101.3	9.3	74	129
109-99-9	Tetrahydrofuran	18021	95	12.8	57	133
108-88-3	Toluene	33510	100.1	6.8	80	121
2037-26-5	Toluene-d8	9809	100.4	3.8	89	112
156-60-5	trans-1,2-Dichloroethene	27663	99.5	8.2	75	124
10061-02-6	trans-1,3-Dichloropropene	27134	100	8.9	73	127
110-57-6	trans-1,4-Dichloro-2-butene	19320	91.5	16.1	43	140
79-01-6	Trichloroethene	30150	101.1	7.3	79	123
75-69-4	Trichlorofluoromethane	26108	103	12.8	65	141
71-36-3	n-Butyl alcohol	10122	95.1	12	59	131
104-51-8	n-Butylbenzene	24088	101.1	8.8	75	128
109-60-4	n-Propyl acetate	602	100.8	8.3	76	126
103-65-1	n-Propylbenzene	24419	101	8.5	76	126
91-20-3	Naphthalene	27847	94.6	11.3	61	128
95-47-6	o-Xylene	31776	100	7.2	78	122
99-87-6	p-Isopropyltoluene [p-Cymene]	24335	102	8.5	77	127
76-01-7	Pentachloroethane	11688	101.1	10.7	69	133
109-66-0	Pentane	3915	74.8	19.7	16	134
107-12-0	Propionitrile [Ethyl cyanide]	15701	99.9	12	64	136
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762-75-4	tert-Butyl formate	6651	98.1	11.1	65	132
98-06-6	tert-Butylbenzene	23919	101	7.7	78	124
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108-88-3	Toluene	33510	100.1	6.8	80	121
2037-26-5	Toluene-d8	9809	100.4	3.8	89	112
156-60-5	trans-1,2-Dichloroethene	27663	99.5	8.2	75	124
10061-02-6	trans-1,3-Dichloropropene	27134	100	8.9	73	127

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Table 4. LCS Control Limits – Method 8260 Water Matrix

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79-01-6	Trichloroethene	30150	101.1	7.3	79	123
75-69-4	Trichlorofluoromethane [Freon-11]	26108	103	12.8	65	141
108-05-4	Vinyl acetate	18941	100.2	15.3	54	146
75-01-4	Vinyl chloride	29472	97.4	13.2	58	137
1330-20-7	Xylenes [total]	23426	100.1	7	79	121

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Table 5. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of BFB from method.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune.
Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up, prior to sample analysis	Each analyte must meet one of the three options below: **Option 1:** RSD for each analyte ≤ 15%; **Option 2:** linear least squares regression for each analyte: $r^2 \geq 0.99$; **Option 3**: non-linear least squares regression (quadratic) for each analyte: $r^2 \geq 0.99$.	Correct problem then repeat ICAL.	Flagging is not appropriate.	Minimum 5 levels for linear and 6 levels for quadratic. No samples shall be analyzed until ICAL has passed. If the specific version of a method requires additional evaluation (e.g., RFs or low calibration standard analysis and recovery criteria) these additional requirements must also be met.
Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL s performed. On days when ICAL is not performed, the initial CCV is used.	NA.	NA.	Calculated for each analyte and surrogate.
Evaluation of Relative Retention Times(RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	NA	After maintenance is performed which may affect retention times, RRTs may be updated based on the daily CCV. RRTs shall be compared with the most recently updated RRTs.

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Table 5. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis	All reported analytes within ± 20% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.
Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat the CCV and all associated samples since the last successful CCV. Alternately, Recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable calibration verification.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. If the specific version of a method requires additional evaluation (e.g., average RFs) these additional requirements must also be met.
Internal standards (IS)	Every field sample, standard and QC sample.	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the daily initial CCV can be used.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	If corrective action fails in field samples, data must be qualified and explained in the case narrative. Apply Q-flag to analytes associated with the non-compliant IS. Flagging is not appropriate for failed standards.	

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Table 5. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Common contaminants must not be detected > LOQ.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the limits in Tables 3 and 4 for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits (see the LIMS) if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all surrogates and all analytes to be reported. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the limits in Tables 3 and 4 for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits (see the LIMS) if project limits are not specified.	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	Must contain all surrogates and all analytes to be reported. For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference, i.e., matrix effect or analytical error.

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Table 5. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use the limits in Tables 3 and 4 for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits (see the LIMS) if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	MSD: Must contain all surrogates and all analytes to be reported. The data shall be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.
Surrogate Spike	All field and QC samples.	QC acceptance criteria specified by the project, if available; otherwise use limits in Tables 3 and 4 or in-house LCS limits (see the LIMS) if analyte(s) are not listed.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the case narrative.	Apply Q-flag to all associated analytes if acceptance criteria are not met and explain in the case narrative.	Alternative surrogates are recommended when there is obvious chromatographic interference.



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Document Title: Volatile Organic Compounds in Drinking Water (EPA Method 524.2)

Department(s): VOA

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Notes

Document Notes:

All Dates and Times are listed in: Central Time Zone

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Document Number: ENV-SOP-MTJL-0101 **Revision:** 04

Title: Volatile Organic Compounds in Drinking Water (EPA Method 524.2)

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ENV-SOP-MTJL-0101

QM Approval

Name/Signature	Title	Date	Meaning/Reason
Rebecca King (010125)	Quality Analyst 2	17 Feb 2020, 08:26:31 AM	Approved

Management Approval

Name/Signature	Title	Date	Meaning/Reason
Christopher Johnson (006487)	Manager - Operations	18 Feb 2020, 08:47:57 AM	Approved
James Burns (006456)	Manager - EHS	02 Mar 2020, 02:26:04 PM	Approved
Heidi Ferrell (006481)	Manager - Operations	17 Mar 2020, 09:23:01 AM	Approved

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STANDARD OPERATING PROCEDURE

TITLE: ENV-SOP-MTJL-0101 Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry (EPA Method 524.2, Supplement III, Revision 4.1, Aug. 1995)

ISSUER: Pace National – Mt. Juliet, Tennessee

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1.0 SCOPE AND APPLICATION

NOTE: All drinking water VOC samples received are analyzed for compliance purposes. In the event that any Utility District (UD) exceeds the Maximum Contaminant Level (MCL) established by the EPA, the UD is in federal violation and must notify the entire residential community where the UD is located. This may cause problems for the UD requiring QA support from Pace Analytical National Center for Testing & Innovation (Pace National). In these instances, the UD will contact Pace National and Pace National may be required to provide supporting documentation of the validity and defensibility of the data. Special attention must be paid to the QC requirements contained within this procedure.

1.1 This is a general-purpose standard operating procedure used in the identification and simultaneous measurement of purgeable volatile organic compounds in surface water, ground water, and drinking water in any stage of treatment. The method is applicable to a wide range of organic compounds, including the four trihalomethane disinfection by-products that have sufficiently high volatility and low water solubility, to be removed from water samples with purge and trap procedures. See Attachment II for target analyte information routinely reported using this procedure.

1.2 Analyte Identification/Quantitation:

1.2.1 Analytes that are not separated chromatographically, but which have different mass spectra and non-interfering quantitation ions, can be identified and measured in the same calibration mixture or water sample as long as their concentrations are somewhat similar.

1.2.2 Analytes that have very similar mass spectra cannot be individually identified and measured in the same calibration mixture or water sample unless they have different retention times.

1.2.2.1 Co-eluting compounds with very similar mass spectra, typically many structural isomers, must be reported as an isomeric group or pair. Two of the three isomeric xylenes and two of the three dichlorobenzenes are examples of structural isomers that may not be resolved on the capillary column, and if not, must be reported as isomeric pairs. Acceptable resolution is achieved if the height of the valley between two peaks is <25% of the average height of the two peaks.

1.2.2.2 The more water soluble compounds (>2% solubility) and compounds with boiling points above 200°C are purged from the water matrix with lower efficiencies. These analytes may be more susceptible to matrix effects.

1.3 An MDL study must be completed at least annually or more frequently if major instrumentation changes occur. Method Detection Limits (MDLs) are performed based on ENV-SOP-MTJL-0016.

1.3.1 Method detection limits (MDLs) are compound, instrument and matrix dependent. The applicable concentration range of this method is primarily column and matrix dependent. Volatile water-soluble polar compounds that have relatively low purging efficiencies can be determined using this method. Such compounds may be more susceptible to matrix effects and the quality of the data may be adversely influenced.

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1.3.2 Limit of Detection (LOD) and Limit of Quantitation (LOQ) studies are completed at the frequency required by the TNI standard per the procedure identified in the ENV-SOP-MTJL-0016, *Method Detection Limits (MDL), Limits of Detection (LOD) and Limits of Quantitation (LOQ).* Should the procedure be utilized for DOD support; then the frequency of these studies must meet the requirements of the current DOD QSM.

2.0 METHOD SUMMARY AND DEFINITIONS

2.1 Volatile organic compounds and surrogates with low water solubility are extracted (purged) from the sample matrix by bubbling an inert gas through the aqueous sample. Purged sample components are trapped in a tube containing suitable sorbent materials (trap). When purging is complete, the trap is heated and backflushed with helium to desorb the sample components onto a capillary gas chromatograph (GC) interfaced to a mass spectrometer (MS). The column temperature is programmed to facilitate the separation of the method analytes which are then detected with the MS. Compounds eluting from the GC column are identified by comparing their measured mass spectra and retention times to reference spectra and retention times in a database. Reference spectra and retention times for analytes are obtained by the measurement of calibration standards under the same conditions used for sample analysis. The concentration of each identified component is measured by relating the MS response of the quantitation ion produced by that compound to the MS response of the quantitation ion produced by a compound that is used as an internal standard. Surrogate analytes, whose concentrations are known in every sample, are measured with the same internal standard calibration procedure.

2.2 See the current Quality Assurance Manual for definitions associated with terms found in this document.

3.0 HEALTH AND SAFETY

3.1 The toxicity or carcinogenicity of each reagent used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable. A reference file of safety data sheets (SDSs) is made available on Pace National's intranet to all personnel. Use hazardous reagents in a fume hood whenever possible and if eye or skin contact occurs, flush with large volumes of water. Always wear safety glasses or a shield for eye protection, protective clothing and observe proper mixing protocols.

3.2 The following method analytes have been tentatively classified as known or suspected human or mammalian carcinogens: benzene, carbon tetrachloride, 1,4-dichlorobenzene, 1,2-dichlorethane, hexachlorobutadiene, 1,1,2,2- tetrachloroethane, 1,1,2-trichloroethane, chloroform, 1,2- dibromoethane, tetrachloroethene, trichloroethene, and vinyl chloride. Pure standard materials and stock standard solutions of these compounds should be handled in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

4.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING AND STORAGE

4.1 All samples must have been collected using a sampling plan that addresses the considerations of this method.

4.2 Sample Collection and Dechlorination

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4.2.1 Collect all samples in duplicate. If samples, such as finished drinking water or wastewater, are suspected to contain residual chlorine, add about 25mg of ascorbic acid per 40mL of sample to the sample bottle before filling. If analytes are gases at room temperature (such as vinyl chloride) or the analytes 2-Nitropropane, Pentachloroethane, Propionitrile, and Tetrahydrofuran are not to be determined, sodium thiosulfate is recommended to reduce the residual chlorine. Three milligrams of sodium thiosulfate should be added for each 40mL of water sample.

NOTE: If the residual chlorine is likely to be present >5mg/L, a determination of the amount of the chlorine may be necessary. Diethyl-p-phenylenediamine (DPD) test kits are commercially available to determine residual chlorine in the field. Add an additional 25mg of ascorbic acid or 3mg of sodium thiosulfate per each 5mg/L of residual chlorine.

4.2.2 When sampling from a water tap, open the tap and allow the system to flush until the water temperature has stabilized (usually about 10 min). Adjust the flow to about 500mL/min and collect duplicate 40mL samples containing the desired dechlorinating agent from the flowing stream.

4.2.3 When sampling from an open body of water, partially fill a 1-quart wide-mouth bottle or 1L beaker with sample from a representative area. Fill duplicate 40mL sample bottles containing the desired dechlorinating agent with sample from the larger container.

4.2.4 Fill sample bottles to overflowing, but take care not to flush out the rapidly dissolving dechlorinating agent. No air bubbles should be present in the sample as the bottle is filled, or trapped in the sample bottle when the bottle is sealed.

4.3 Sample Preservation

4.3.1 Adjust the pH of all samples to <2 at the time of collection, but after dechlorination, by carefully adding two drops of 1:1 HCl for each 40mL of sample. Seal the sample bottles, Teflon face down, and mix for one minute. Exceptions to the acidification requirement are detailed in the following sections.

NOTE: Do not mix the ascorbic acid or sodium thiosulfate with the HCl in the sample bottle prior to sampling.

4.3.1.1 If a sample foams vigorously when HCl is added, discard that sample. Collect a set of duplicate samples but do not acidify them. These samples must be flagged as "not acidified" and must be stored at 4 $\pm$ 2°C. These samples must be analyzed within 24 hours of collection if they are to be analyzed for any compounds other than THMs and they must be appropriately qualified.

4.3.1.2 When sampling the THM analysis only, acidification may be omitted if sodium thiosulfate is used to dechlorinate the sample. This exception to acidification does not apply if ascorbic acid is used for dechlorination.

4.3.2 The samples must be chilled to 4 $\pm$ 2°C when collected and maintained at that temperature until analysis. Field samples that will not be received at the laboratory on the day of collection must be packaged for shipment with sufficient ice to ensure that they will arrive at the laboratory with a substantial amount of ice remaining in the cooler.

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4.4 Sample Storage

4.4.1 Store samples at 4 ± 2°C until analysis. The sample storage area must be free of organic solvent vapors and direct or intense light.

4.4.2 Analyze all samples within 14 days of collection. Samples not analyzed within this period must be discarded and re-sampled.

4.5 Trip Blanks

4.5.1 A trip blank must be handled along with each sample set, which is composed of the samples collected from the same general sample site at approximately the same time. A sealed pre-purchased sample bottle with reagent water and sample preservative, are shipped to the sampling site along with empty sample bottles and back to the laboratory with filled sample bottles. Wherever a set of samples is shipped and stored, it is accompanied by an appropriate blank. Trip blanks must remain hermetically sealed until analysis.

4.5.2 Use the same procedures used for samples to add ascorbic acid and HCl to blanks. The same batch of ascorbic acid and HCl should be used for the trip blanks as for the field samples.

5.0 INTERFERENCES

5.1 During analysis, major contaminant sources are volatile materials in the laboratory and impurities in the inert purging gas and in the sorbent trap. The use of Teflon tubing, Teflon thread sealants, or flow controllers with rubber components in the purging device should be avoided since such materials out-gas organic compounds which will be concentrated in the trap during the purge operation. Analyses of laboratory reagent blanks provide information about the presence of contaminants. When potential interfering peaks are noted in laboratory reagent blanks, the analyst should change the purge gas source and regenerate the molecular sieve purge gas filter. Subtracting blank values from sample results is not permitted.

5.2 Interfering contamination may occur when a sample containing low concentrations of volatile organic compounds is analyzed immediately after a sample containing relatively high concentrations of volatile organic compounds. A preventive technique is between-sample rinsing of the purging apparatus and sample syringes with two portions of reagent water. After analysis of a sample containing high concentrations of volatile organic compounds, one or more laboratory reagent blanks should be analyzed to check for cross-contamination.

5.3 Special precautions must be taken to determine methylene chloride. The analytical and sample storage area should be isolated from all atmospheric sources of methylene chloride, otherwise random background levels will result. Since methylene chloride will permeate Teflon tubing, all GC carrier gas lines and purge gas plumbing should be constructed of stainless steel or copper tubing. Laboratory worker's clothing should be cleaned frequently since clothing previously exposed to methylene chloride fumes during common liquid/liquid extraction procedures can contribute to sample contamination.

5.4 Traces of ketones, methylene chloride, and some other organic solvents can be present even in the highest purity methanol. This is another potential source of contamination, and should be assessed before standards are prepared in the methanol.

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6.0 EQUIPMENT AND SUPPLIES

6.1 Sample Containers – pre-cleaned and pre-certified 40mL VOA vials each equipped with a Teflon-faced silicone septum, 8mL vials with Teflon™/silicon/Teflon™ septa and polypropylene open-top cap (used to store unused standards)

6.2 Syringes and Micro syringes – 0.5µL, 10µL, 25µL, 50µL, 100µL, 250µL, 500µL 1mL, 5mL and 25mL

6.3 The operation, cleaning and scheduled maintenance procedures, as prescribed by the equipment manufacturer, are followed as provided in the Operator's Manuals. Documentation of maintenance or system modifications is recorded in KanbanFlow.com under the "Archived Instrumentation Fixes" board under the instrument specific column.

Instrumentation: All instrumentation meets or exceeds EPA method requirements.

- Use (method #'s): 8260, 624, 502, 524, LL14Dioxane
- Model #: HP 6890, or equivalent
- Column (type, brand, size): RTX-VMS 30m x 0.25 mm, 1.40 micron, or equivalent
- Detector: MS 5973 or better
- Software name and version: HP Chemstation G1701CA Version C.00.00, or equivalent

6.4 Sample introduction system: EST Centurion, EST Evolution, or equivalent

6.5 The carrier gas used for volatiles analysis is Ultra Pure Helium

7.0 REAGENTS AND STANDARDS

7.1 All reagents and standards must be recorded in the appropriate preparation log and assigned a unique number. See ENV-SOP-MTJL-0041, *Standard Logger – Tree Operation*. Additional information regarding reagent preparation can be found in the Standards Logger (Tree) digital archive system. All spiking solutions and surrogate standard solutions should be replaced at least every six months or sooner if a problem is detected unless otherwise noted.

7.2 Methanol - demonstrated to be free of analytes

7.3 Reagent water - water prepared with a water purification system

7.4 Hydrochloric acid (1+1) - carefully add a measured volume of concentrated HCl to equal volume of reagent water.

7.5 Ascorbic acid - ACS reagent grade, granular (used for dechlorination)

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7.6 Stock Standard Solutions – Calibration and LCS

- Stock calibration solutions must be purchased as certified solutions.
- Certificates must be kept on file.
- All Stock standards must be stored at appropriate vendor temperature recommendations.
- All non-gas stock standards must be replaced after six months, or sooner, if check standards indicate a problem.
- Both gas and liquid standards must be monitored closely by comparison to the initial calibration curve and by comparison to a second source.
- Gas intermediate/secondary standards must be replaced weekly, or sooner, if comparison to check standards indicates a problem.
- Non-gas intermediate/secondary standards must be replaced after six months, or sooner, if comparison to check standards indicates a problem.

7.7 Primary Dilution Standards -- Use stock standard solutions to prepare primary dilution standard solutions that contain all the analytes of concern in methanol or other suitable solvent. The primary dilution standards should be prepared at concentrations that can be easily diluted to prepare aqueous calibration solutions that will bracket the working concentration range. Store the primary dilution standard solutions with minimal headspace and check frequently for signs of deterioration or evaporation, especially just before preparing calibration solutions. Storage times described for stock standard solutions also apply to primary dilution standard solutions.

7.8 Solutions for Internal Standard and Surrogates

7.8.1 A solution containing the internal standard and the surrogate compounds is required to prepare laboratory reagent blanks (also used as a laboratory performance check solution), and to fortify each sample. Prepare a fortification solution containing fluorobenzene (internal standard), 1,2-dichlorobenzene-d4 (surrogate), and BFB (surrogate) in methanol according to the table below. Final volume is 100mL.

Manufacturer	Product	Cat #	Amount added (mL)	Final Conc. (ppm)
Restek	524 IS/SS Mix 2000ppm	30201	1.0	20

Prior to analysis, 5µL of the solution is added to 25mL of calibration standards, QC samples and client samples, resulting in a final concentration of 4µg/L for the internal standard and surrogates.

7.9 Preparation of Laboratory Reagent Blank (LRB) – Fill a 25mL (or 5mL) syringe with reagent water and adjust to the mark (no air bubbles). The reagent water used for the Laboratory Reagent Blank analysis must match the matrix of the field sample. Acidify the nanopure water to a pH <2 with 1:1 HCl unless analyzing THM field samples that do not contain HCl.

7.10 Preparation of Second Source (SSCV) or Quality Control Standard (QCS) - Prepare the second source standard using the solutions and volume listed in the following table. The final volume of second source is 25mL in Methanol.

Manufacturer	Product	Cat. #	Amount added (mL)	Final Conc. (ppm)

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Ultra	Custom Standard	CUS-25206	0.4	100
NSI	Mix 2	Q-6354-O-ALT	0.4	500
Restek	Acrolein	30645	1	500
SPEXCertiPrep	Custom	VO-ESCTN9	0.8	100

7.10.1 The working second source (SSCV) is prepared by making a 1:1 ratio of the gas standard (Ultra Scientific, Custom Standard CUS-13691 or equivalent at 50µg/mL) and the second source standard.

7.10.1.1 The working second source standard is prepared by filling a 50mL volumetric flask with reagent water to the meniscus. Add 5uL of the above spiking solution resulting in a concentration of 5µg/L. The concentration of the second source standard may be changed if necessary. The reagent water used to prepare the second source standard must match the matrix of the field sample. Acidify the nanopure water to a pH <2 with 1:1 HCl unless analyzing THM field samples that do not contain HCl.

7.11 Preparation of Calibration Standards

7.11.1 The number of calibration solutions needed depends on the calibration range desired. A minimum of three calibration solutions is required to calibrate a range of a factor of 20 in concentration. A blank sample must not be included as one of the calibration standards. Prepare the calibration standards using the table below for the appropriate analysis. Separate lot numbers can be used for preparation of the calibration standard of the second source standard in lieu of different vendors. All standard aliquots are added to methanol.

The calibration standard is prepared in methanol in a 25mL volumetric flask by adding:

Manufacturer	Product	Cat. #	Amount added (mL)	Final Conc. (ppm)
Phenomenex	Custom 8260 Calibration Mix	AL0-130113	1	100
Phenomenex	Custom Ketones Mix	AL0-130115	1	500
Phenomenex	Acrolein	AL0-130159	1	500
Phenomenex	Custom 8260 Additions Mix	AL0-130114	2	100
Phenomenex	Vinyl Acetate	AL0-130117	1	500
Phenomenex	2-Chloroethyl vinyl ether	AL0-130116	1	500

A minimum of three calibration levels must be analyzed to generate a calibration curve. Typical calibration levels are 0.25 0.5, 1.0, 2.0, 5.0, 10, 25, 50, 100, and 150µg/L. The concentration of the calibration levels may be changed as necessary. Calibration standards are prepared and processed in the same manner as the samples.

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7.11.1.1 The working calibration standard is prepared by making a 1:1 ratio of the gas standard (Ultra Scientific, Custom Standard CUS-13691 or equivalent at 50 µg/mL.

8.0 PROCEDURE

8.1 Sample Preparation

8.1.1 Place vial onto autosampler without opening the vial.

8.1.2 The following procedure is appropriate for dilution purgeable samples. All steps must be performed without delay until the diluted sample is in a gas-tight syringe.

8.1.2.1 Dilutions are made in a 50mL volumetric flask. Intermediate dilutions may be necessary for extremely large dilutions.

8.1.2.2 Calculate the approximate volume of organic free reagent water to be added to the volumetric flask selected and add slightly less than this quantity of water to the flask.

8.1.2.3 Inject the proper aliquot of sample from a syringe into the volumetric flask. Aliquots of more than 25mL are not recommended. Dilute the sample to the mark on the volumetric flask with organic-free reagent water. Cap the flask, invert three times. Repeat the above procedure for additional dilutions if necessary.

8.1.2.4 Fill a clean 40mL VOA vial with the prepared diluted sample.

8.2 Sample Introduction and Purging

8.2.1 This method is designed for a 25mL sample volume. Adjust the helium purge gas flow rate to 40mL/min. Attach the trap inlet to the purging device and open the syringe valve on the purging device.

8.2.2 The Centurion autosampler measures 25mL of sample and transfers it to the Evolution purge unit; it then adds 5µL of the fortification solution containing the internal standard and the surrogates to the sample through the syringe valve.

8.2.3 Purge the sample for 11 minutes at ambient temperature.

8.2.4 Standards and samples must be analyzed in exactly the same manner. Room temperature must be reasonably constant, and changes in excess of 10˚F may adversely affect the accuracy and precision of the method.

8.3 Sample Desorption

8.3.1 After the 11-minute purge, place the purge and trap system in the desorb mode and preheat the trap to 240°C without a flow of desorption gas. Then simultaneously start the flow of desorption gas at a flow rate 40mL/min for about four minutes. Begin the GC temperature program, and start data acquisition.

8.3.2 While the trapped components are being introduced into the gas chromatograph, flush the purging device with a 25mL flush of reagent water.

NOTE: The times, temperatures, and rates presented in this section may be refined to achieve optimal performance of the analytical system.

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8.4 Gas Chromatography/Mass Spectrometry - Acquire and store data over the nominal mass range 35-300 with a total cycle time (including scan overhead time) of two seconds or less. If water, methanol, or carbon dioxide causes a background problem, start at 47 or 48 m/z. If ketones are to be determined, data must be acquired starting at m/z 43. Cycle time must be adjusted to measure five or more spectra during the elution of each GC peak. A suggested temperature program is provided in Section 8.3.1. Alternative temperature programs can be used.

8.4.1 Temperature program for a Restek VMS narrow bore column: Adjust the helium carrier gas flow rate to about 1 mL/min. The initial column temperature is 35°C then increases at 13°C/min until it reaches 150°C. Then it increases at 25°C/min until it reaches 240°C where it is held for two minutes.

NOTE: The times, temperatures, and rates presented in this section may be refined to achieve optimal performance of the analytical system.

8.5 Trap Reconditioning -- After desorbing the sample for four minutes, recondition the trap by placing the purge and trap system to the bake mode. Maintain the trap temperature at 260°C. Maintain the moisture control module, if utilized, at 260°C to remove residual water. After approximately five minutes, the trap heater is turned off. When the trap is cool, the next sample can be analyzed.

NOTE: The times, temperatures, and rates presented in this section may be refined to achieve optimal performance of the analytical system.

8.6 Termination of Data Acquisition -- When all the sample components have eluted from the GC, terminate MS data acquisition. Use appropriate data output software to display full range mass spectra and appropriate plots of ion abundance as a function of time. If any ion abundance exceeds the system working range, dilute the sample aliquot in the second syringe with reagent water and analyze the diluted aliquot.

8.7 Identification of Analytes -- Identify a sample component by comparison of its mass spectrum (after background subtraction) to a reference spectrum in the user-created database. The GC retention time of the sample component should be within three standard deviations of the mean retention time of the compound in the calibration mixture.

8.7.1 In general, all ions that are present above 10% relative abundance in the mass spectrum of the standard should be present in the mass spectrum of the sample component and should agree within absolute 20%. For example, if an ion has a relative abundance of 30% in the standard spectrum, its abundance in the sample spectrum should be in the range of 10 to 50%. Some ions, particularly the molecular ion, are of special importance, and should be evaluated even if they are below 10% relative abundance.

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8.7.2 Identification requires expert judgment when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When GC peaks obviously represent more than one sample component (i.e., broadened peak with shoulder(s) or valley between two or more maxima), appropriate analyte spectra and background spectra can be selected by examining plots of characteristic ions for tentatively identified components. When analytes co-elute (i.e., only one GC peak is apparent), the identification criteria can be met but each analyte spectrum will contain extraneous ions contributed by the co-eluting compound. Because purgeable organic compounds are relatively small molecules and produce comparatively simple mass spectra, this is not a significant problem for most method analytes.

8.7.3 Structural isomers that produce very similar mass spectra can be explicitly identified only if they have sufficiently different GC retention times. Acceptable resolution is achieved if the height of the valley between two peaks is <25% of the average height of the two peaks. Otherwise, structural isomers are identified as isomeric pairs. Two of the three isomeric xylenes and two of the three dichlorobenzenes are examples of structural isomers that may not be resolved on the capillary columns. If unresolved, these groups of isomers must be reported as isomeric pairs.

8.7.4 Methylene chloride, acetone, carbon disulfide, and other background components appear in variable quantities in laboratory and trip blanks, and generally cannot be accurately measured. Subtraction of the concentration in the blank from the concentration in the sample is not acceptable because the concentration of the background in the blank is highly variable.

9.0 DATA ANALYSIS AND CALCULATIONS

9.1 Complete chromatographic resolution is not necessary for accurate and precise measurements of analyte concentrations if unique ions when adequate intensities are available for quantitation. If the response for any analyte exceeds the linear range of the calibration established in Section 10, obtain and dilute a duplicate sample. Do not extrapolate beyond the calibration range.

9.1.1 Calculate analyte and surrogate concentrations using the multi-point calibration established in Section 10. Do not use the daily calibration verification data to quantitate analytes in samples.

9.1.2 Alternatively, use the GC/MS system software or other available validated software to compute the concentration of the analytes and surrogates from the linear or second order regression curve established in Section 10. Do not use the daily calibration verification data to quantitate analytes in samples.

9.1.3 Calculations should utilize all available digits of precision, but final reported concentrations should be rounded three significant figures.

9.1.4 THM's - Calculate the total trihalomethane concentration by summing the four individual trihalomethane concentrations.

9.2 See the current Quality Assurance Manual for other equations associated with common calculations.

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10.0 QUALITY CONTROL AND METHOD PERFORMANCE

10.1 All analysts must meet the qualifications specified in ENV-SOP-MTJL-0015, *Technical Training and Personnel Qualifications* before approval to perform this method. Analysts must complete an initial demonstration of proficiency before being approved to perform this method. Continuing proficiency must be demonstrated using proficiency testing, laboratory control sample analysis and/or MDL studies. Method performance is assessed per analyst. Updated method performance records are filed and stored in a central location within the department.

10.2 Use the designated Run log to record batch order and standards/reagents used during analysis. See ENV-SOP-MTJL-0014, *Data Handling and Reporting*.

10.3 Batches are defined as sets of 1 - 20 samples. Batch analysis must include the following: 1 method blank, 1 Continuing Calibration Verification (CCV)/LCS, 1 Reporting Limit Verification standard, and 1 Continuing Calibration Verification (CCV) every 12 hours. A Second Source Standard (QCS) must be analyzed at least quarterly. All batch information must be maintained in the preparation documentation assigned to the department. The CCV can be used as the LCS.

10.4 Calibration and Standardization

10.4.1 Demonstration and documentation of acceptable initial calibration is required before any samples are analyzed. A CCV is required at the beginning of each work shift, but no less than every 12 hours.

10.4.2 Initial Calibration

10.4.2.1 Calibrate the mass and abundance scales of the MS with calibration compounds and procedures prescribed by the manufacturer with any modifications necessary to meet the requirements in Section 10.4.2.2.

10.4.2.2 Introduce into the GC 25ng or less of BFB and acquire mass spectra for m/z 35-300 at 70eV (nominal). If the spectrum does not meet all criteria in Table 10.2, the MS must be returned and adjusted to meet all criteria before proceeding with calibration. An average spectrum across the GC peak may be used to evaluate the performance of the system.

Table 10.2

Mass (m/z)	Relative Abundance Criteria
50	15 to 40% of mass 95
75	30 to 80% of mass 95
95	Base Peak, 100% Relative Abundance
96	5 to 9% of mass 95
173	<2% of mass 174
174	>50% but <100% of mass 95
175	5 to 9% of mass 174
176	>95% but <101% of mass 174
177	5 to 9% of mass 176

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STATE NOTE: For samples analyzed in conjunction with Arizona DEP compliance, the tuning technique for initial calibration and daily calibration verification must be consistently applied through the course of time between initial calibration events. For example, if the "Find BFB Peak" is used to tune the instrument prior to the initial calibration performance, then the "Find BFB Peak" must be utilized daily throughout the acceptable span of time that that initial calibration is used to quantitate Arizona samples.

10.4.3 Purge a mid-range calibration solution (e.g. 5ug/L)

10.4.4 Performance criteria for calibration standards. Examine the stored GC/MS data with the data system software.

10.4.4.1 GC performance. Good column performance will produce symmetrical peaks with minimum tailing for most compounds. If peaks are unusually broad, or if there is poor resolution between peaks, the wrong column has been selected or remedial action is probably necessary.

10.4.4.2 MS sensitivity. The peak identification software should be able to recognize a GC peak in the appropriate retention time window for each of the compounds in calibration solution, and make correct tentative identifications. If fewer than 99% of the compounds are recognized, system maintenance is required.

10.4.5 If all performance criteria are met, purge an aliquot of each of the other CALIBRATION solutions using the same GC/MS conditions.

10.4.6 Using the calculations found in section 9.2, calculate a response factor (RF) for each analyte and isomer pair for each CALIBRATION solution using the internal standard fluorobenzene. This calculation is supported in acceptable GC/MS data system software, and many other software programs. RF is a unitless number, but units used to express quantities of analyte and internal standard must be equivalent.

10.4.6.1 For each analyte and surrogate, calculate the mean RF from analyses of CALIBRATION solutions. Calculate the standard deviation (SD) and the relative standard deviation (RSD) from each mean: RSD = 100 (SD/M). If the RSD of any analyte or surrogate mean RF exceeds 20%, either analyze additional aliquots of appropriate CALIBRATION solutions to obtain an acceptable RSD of RFs over the entire concentration range, or take action to improve GC/MS performance. Surrogate compounds are present at the same concentration on every sample, calibration standard, and all types of blanks.

10.4.7 As an alternative to calculating mean response factors and applying the RSD test, use the GC/MS data system software or other available software to generate a linear or second order regression calibration curve, by plotting A/A(is) vs. Q(x) using the equations found in section 9.3. Either equal weighting factors or 1/x regressions may be used.

10.5 Continuing Calibration Check -- Verify the MS tune and continuing calibration at the beginning of each 12-hr work shift during which analyses are performed using the following procedure.

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10.5.1 Introduce into the GC (either by purging a laboratory reagent blank or making a syringe injection) 25ng or less of BFB and acquire a mass spectrum that includes data for m/z 35-260. If the spectrum does not meet all criteria presented in Table 10.2, the MS must be returned and adjusted to meet all criteria before proceeding with the continuing calibration check.

10.5.2 Purge a calibration solution and analyze with the same conditions used during the initial calibration. Selection of the concentration level of the calibration check standard should be varied so that the calibration is verified at more than one point over the course of several days.

10.5.3 Demonstrate acceptable performance for the established QC criteria.

10.5.4 Determine the absolute areas of the quantitation ions of the internal standard and surrogates have not decreased by more than 30% from the areas measured in the most recent continuing calibration check, or by more than 50% from the areas measured during initial calibration. If these areas have decreased by more than these amounts, adjustments must be made to restore system sensitivity. These adjustments may require cleaning of the MS ion source, or other maintenance as indicated in Section 10.5.6, and recalibration.

10.5.5 Calculate the RF for each analyte of concern and surrogate compound from the data measured in the continuing calibration check. The RF for each analyte and surrogate must be within 30% of the mean value measured in the initial calibration. Alternatively, if a linear or second order regression is used, the concentration measured using the calibration curve must be within 30% of the true value of the concentration in the calibration solution. If these conditions do not exist, remedial action must be taken which may require recalibration. All data from field samples obtained after the last successful calibration check standard should be considered suspect. After remedial action has been taken, duplicate samples should be analyzed if they are available.

10.5.6 Some possible remedial actions. Major maintenance such as cleaning an ion source, cleaning quadrupole rods, etc. require returning to the initial calibration step.

10.5.6.1 Check and adjust GC and/or MS operating conditions; check the MS resolution, and calibrate the mass scale.

10.5.6.2 Clean or replace the splitless injection liner; silanize a new injection liner. This applies only if the injection liner is an integral part of the system.

10.5.6.3 Flush the GC column with solvent according to manufacturer's instructions.

10.5.6.4 Break off a short portion (about 1 meter) of the column from the end near the injector; or replace GC column. This action will cause a slight change in retention times. Analyst may need to redefine retention windows.

10.5.6.5 Prepare fresh CALIBRATION solutions, and repeat the initial calibration step.

10.5.6.6 Clean the MS ion source and rods (if a quadrupole).

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10.5.6.7 Replace any components that allow analytes to come into contact with hot metal surfaces.

10.5.6.8 Replace the MS electron multiplier, or any other faulty components.

10.5.6.9 Replace the trap, especially when only a few compounds fail the criteria in Section 10.5.5 while the majority are determined successfully. Also check for gas leaks in the purge and trap unit as well as the rest of the analytical system.

10.6 Quality control (QC) requirements are the initial demonstration of laboratory capability followed by regular analyses of laboratory reagent blanks, trip blanks, and Laboratory Control Samples. Each laboratory must maintain records to document the quality of the data generated. Additional quality control practices are recommended.

10.7 Initial demonstration of low system background. Before any samples are analyzed, it must be demonstrated that a laboratory reagent blank (LRB) is reasonably free of contamination that would prevent the determination of any analyte of concern. Sources of background contamination are glassware, purge gas, sorbents, and equipment. Background contamination must be reduced to an acceptable level before proceeding with the next section. In general, background from method analytes should be below the method detection limit.

10.8 To perform an initial demonstration of laboratory accuracy and precision, analyze four of a calibration standard/LCS containing each analyte of concern at a concentration in the range of 2-5µg/L depending upon the calibration range of the instrumentation.

10.8.1 Prepare each replicate by adding an appropriate aliquot of a quality control sample to reagent water. It is recommended that a QCS from a source different than the calibration standards be used for this set of LCSs, since it will serve as a check to verify the accuracy of the standards used to generate the calibration curve. This is particularly useful if the laboratory is using the method for the first time, and has no historical data base for standards. Prepare each replicate by adding an appropriate aliquot of quality control sample to reagent water. Also add the appropriate amounts of internal standard and surrogates. If it is expected that field samples will contain a dechlorinating agent and HCl, then add these to the DOCs in the same amounts. Analyze each replicate according to the procedures described in Section 8.

10.8.2 Calculate the measured concentration of each analyte replicate, the mean concentration of each analyte in all replicates, and mean accuracy (as mean percentage of true value) for each analyte, and the precision (as relative standard deviation, RSD) of the measurements for each analyte.

10.8.3 Some analytes, particularly the early eluting gases and late eluting higher molecular weight compounds, will be measured with less accuracy and precision than other analytes. However, the accuracy and precision for all analytes must fall within the limits expressed below. If these criteria are not met for an analyte of interest, take remedial action and repeat the measurements for that analyte until satisfactory performance is achieved. For each analyte, the mean accuracy must be 80-120% (i.e. an accuracy of $\pm$20%). The precision of the recovery (accuracy) for each analyte must be less than twenty percent (<20%).

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10.8.4 To determine the MDL, analyze a minimum of seven LCSs prepared at a low concentration. Analyze the seven replicates on a schedule that results in the analyses being conducted over several days. Calculate the mean accuracy and standard deviation for each analyte. Calculate the MDL using the equation in SOP #030306.

10.9 Laboratory Reagent Blanks (LRB) -- With each batch of samples processed as a group within a work shift, analyze an LRB to determine the background system contamination.

10.10 Assessing Laboratory Performance. Evaluate the accuracy of the measurement of the Laboratory Control Sample (LCS), which must be analyzed with each batch of samples that is processed as a group within a work shift. If more than 20 samples are in a work shift batch, analyze one LCS per 20 samples. Prepare the LCS at a concentration of 5ppb. If the acceptable accuracy for this measurement (±30%) is not achieved, the problem must be solved before additional samples may be reliably analyzed. Since the calibration check sample and the LCS are made the same way and since procedural standards are used, the sample analyzed here may also be used as a calibration check. Add the results of the LCS analysis to the control charts to document data quality.

10.11 If matrix effects are observed from the MS/MSD or suspected to be causing low recoveries the sample results should be flagged and the MS/MSD results should be reported with them.

10.12 Reporting Level Standard (MRL) – With each batch of samples processed as a group within a work shift, analyze an MRL at 1ppb for the THM's and 0.5ppb for full list V524. Acceptable limits for the MRL check are ±50%. Poor performing purge compound have in house limits based on control charting. High MRL recoveries when target analyte is non-detect does not require qualification.

Poor Performer Compounds:

- Bromomethane
- Acetone
- 2,2-Dichloropropane
- Chloroethane
- 1,2-Dibromo-3-chloropropane

10.13 Numerous other quality control measures are incorporated into other parts of this procedure, and serve to alert the analyst to potential problems.

10.14 Internal standards are evaluated from one CCV to the next to ensure that drift is not greater than 30% and evaluated against the initial calibration to ensure that the drift is not >50%. If the drift does not meet either criterion, maintenance must be performed on the instrument and a new calibration curve must be generated before additional samples are analyzed.

10.15 The quarterly QC Sample (QCS) as required by this method is analyzed at least quarterly. An attempt is made to analyze the QCS sample approximately every 90 days. A second source calibration verification is performed with every initial calibration, the SSCV can be used as the QCS.

10.16 Manual Integration – All manual integrations must comply with the requirements found in ENV-SOP-MTJL-0025, *Manual Integration Procedure*. Before and after integrations must be available for review by the secondary data reviewer.

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11.0 DATA VALIDATION AND CORRECTIVE ACTION

11.1 All data must undergo a second analyst review. The analyst checking the data must check the performance of the initial calibration, mid-point check standard, and continuing calibrations to ensure that they meet the criteria of the method (see Section 10 for method specific QC criteria).

11.1.1 The analyst should look at any sample that has quantifiable compounds and make sure that they have been confirmed.

11.1.2 All calculations must be checked.

11.1.3 All surrogate recoveries must be checked to see if they are within limits.

11.1.4 Blanks must be clean of all interfering peaks.

11.1.5 Quality control criteria should be checked for the CCV/LCS, MS, and MSD.

11.1.6 Data must be checked for the presence or absence of appropriate flags. Comments should be noted when data is flagged. See ENV-SOP-MTJL-0014, *Data Handling and Reporting*.

11.1.7 The analyst must verify all reported results are derived from analytical results that are either above the MDL or below the highest standard of the initial calibration curve.

11.2 See ENV-SOP-MTJL-0018, *Corrective and Preventive Action* and Section 10 of this procedure.

11.3 **DETECTABLE AMOUNTS AND TRIP BLANKS**: If a water sample is contaminated with an analyte, verify that it is not a sampling error by analyzing a trip blank. The results of these analyses will help define contamination resulting from field sampling, storage and transportation activities. If the trip blank shows unacceptable contamination, analyst should notify a Supervisor, who should then contact the TSR for that client.

STATE NOTE: Drinking water samples analyzed using this procedure for compliance cannot be qualified.

12.0 POLLUTION PREVENTION AND WASTE MANAGEMENT

12.1 The EPA requires that a laboratory waste management practice be conducted consistent with all applicable federal and state laws and regulations. Excess reagents, samples and method process wastes must be characterized and disposed of in an acceptable manner. See *Pace National Waste Management Plan.*

12.2 See ENV-SOP-MTJL-0046, *Environmental Sustainability & Pollution Prevention*.

13.0 METHOD MODIFICATIONS/CLARIFICATIONS

Integrated areas of quantitation ions of internal standards and surrogates are not monitored in all samples, calibration checks, and blanks. Internal standards are evaluated per the requirements of Section 10.14. Surrogates are monitored using percent recovery (see Section 11.1.3).

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STANDARD OPERATING PROCEDURE
TITLE: ENV-SOP-MTJL-0101 Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry (EPA Method 524.2, Supplement III, Revision 4.1, Aug. 1995)
ISSUER: Pace National – Mt. Juliet, Tennessee

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14.0 REFERENCES

14.1 *Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry,* EPA Method 524.2, EPA-500 Series Supplement III, Revision 4.1, August 1995, EPA/600/R-95-131.

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Attachment I: Revision History

Current Version (Pace National):

Date	Description of Revisions
2/14/2020	Technical and quality review and update. Modified date in header. Revised section 10.12.

Superseded Versions (ESC Lab Sciences SOP #330364):

Version	Date	Description of Revisions
0	7/26/99	Origination
1	4/18/00	
2	8/23/00	
3	12/12/00	
4	7/24/03	
5	8/5/04	
6	3/29/06	Added additional syringe sizes to section 6.2, Updated instrumentation table in section 6.4, Updated preparation information for ISTD and Surrogate solutions, Updated calibration levels used.
7	6/12/09	Technical and Quality Review and update. Reformat to current convention. Update of instrument list in Table 6.4; Revised sections 7.1, 7.3, 7.12, 7.13.1, 8.3.1, 8.4, 10.1, 10.3, & 12.1; Added sections 10.1 through 10.3, 10.13, State Note in section 11; Removed section 10.4; incorporated previous minor revisions.
8	6/16/10	Technical and Quality Review and update. Removed section 1.2; Revised section 1.3, 2.8, 3.1, 7.1, 7.11, 7.12.1, 7.13.1, 10.4.6, 10.4.7, and 12.1; Added sections 7.14 and 10.16.
9	9/7/11	Technical and Quality Review and update. Revised section 1.3.2, 6.2, 6.4, 7.12, 7.13, 9.2 through 9.6, 10.4.6, 10.4.7 and 12.1; Added sections 2.14, 2.15, and 10.17; Removed sections 6.3, and 7.8.4.
10	1/30/13	Technical and Quality Review and update. Revised section 1.1, 1.3.2, 6.3, 7.12, 7.13.1, 9.3, 10.4.2 (state note); Added Attachment II and sections 2.14 through 2.25.
11	4/9/14	Technical and Quality Review and update. Revised sections 7.1, 7.11, and 7.12; Removed section 7.5.
12	11/25/2015	Technical and Quality Review and update. Revised Sections 1.3.2, 2.14, Table 6.3, 7.9.1, 8.1.2, 8.3, 10.5.1, 10.5.4, 10.8, 11.2, and 12.2.
13	10/18/2016	Technical and quality review and update. Header and signature block re-formatting. Revised Sections 1.3, 2.2, 4.3.1.2, 4.5.1, 6.1, 6.3, 7.7, 7.11, 7.11.1, 7.11.1.1, 7.12.1, 8.1.2, 8.2.1, 8.3.1, 8.4, 9.1.2, 9.2, 10.15, 11.3, and 13.1. Deleted Sections 2.2 through 2.27, Table 6.3, 9.2 through 9.6, 10.5.4, and 10.9. Added Sections 6.4, 6.5, and 7.12.1.1.
14	8/23/2017	Technical and quality review and update. Revised ESC logo and Sections 3.1, 6.3, 7.9, 7.10, 7.10.1, 7.10.1.1, 7.11.1, 7.11.1.1, 8.1.1, 8.2.1, 8.3.1, 9.1.3, 10.3, 10.4.2.2, Table 10.2, 10.5, 10.8, 10.8.1, 10.15, 11.1.5, and 13.0. Deleted Sections 4.3.1.1, 7.6, 7.13, 13.1 – and re-numbered as necessary.

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Version	Date	Description of Revisions
15	8/14/2018	Technical and quality review and update. Replaced logo. Revised signature bar and footer. Revised sections 1.0, 1.1, 1.3, 1.3.2, 2.1, 3.1, 4.3.1, 4.3.1.1, 6.1, 6.2, 6.3, 7.1, 7.2, 7.3, 7.4, 7.5, 7.9, 7.10, 7.10.1, 7.10.1.1, 7.11.1, 7.11.1.1, 8.1.2, 8.1.3, 8.2.1, 8.3, 8.3.1, 8.4, 9.1, 9.1.1, 9.1.3, 10.3, 10.4, 10.4.2.1, 10.4.3, 10.4.4.1, 10.5.5.9, 10.8.1, 10.8.4, 10.16, 12.1 and 14.1. Added sections 8.1, 8.1.1, 8.1.2, 8.1.2.1, 8.1.2.2, 8.1.2.3 and 8.1.2.4 and renumbered as necessary.
16	9/18/2018	AZ Audit (CAR3300): Added Section 10.5.4 and renumbered 10.5 subsections as necessary.

Superseded Versions (Pace National):

Date	Description of Revisions
2/13/2019	Complete re-formatting for upload into Master Control. Revised Sections 1.0, 1.3, 1.3.2, 7.1, 7.9, 7.10.1.1, 7.11.1, 10.1, 10.2, 10.16, 11.1.6, 11.2, and 12.2. Added Section 4.3.1.2.
6/20/2019	Added corporate header and footer. Revised desorb time based on LA DW Auditor's comments in Sections 8.3.1 and 8.5.

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Attachment II: Target Analytes, CAS# and Routine RL values:

Analyte	CAS #	RL mg/L	MCL mg/L
1,1,1,2-Tetrachloroethane	630-20-6	0.0005	
1,1,1-Trichloroethane	71-55-6	0.0005	0.2
1,1,2,2-Tetrachloroethane	79-34-5	0.0005	
1,1,2-Trichloroethane	79-00-5	0.0005	0.005
1,1-Dichloroethane	75-34-3	0.0005	
1,1-Dichloroethene	75-35-4	0.0005	0.007
1,1-Dichloropropanone	513-88-2		
1,1-Dichloropropene	563-58-6	0.0005	
1,2,3-Trichlorobenzene	87-61-6	0.0005	
1,2,3-Trichloropropane	96-18-4	0.0005	
1,2,4-Trichlorobenzene	120-82-1	0.0005	
1,2,4-Trimethylbenzene	95-63-6	0.0005	
1,2-Dibromo-3-chloropropane	96-12-8	0.0010	
1,2-Dibromoethane	106-93-4	0.0010	
1,2-Dichlorobenzene	95-50-1	0.0005	0.60
1,2-Dichloroethane	107-06-2	0.0005	0.005
1,2-Dichloropropane	78-87-5	0.0005	0.005
1,3,5-Trimethylbenzene	108-67-8	0.0005	
1,3-Dichlorobenzene	541-73-1	0.0005	
1,3-Dichloropropane	142-28-9	0.0005	
1,4-Dichlorobenzene	106-46-7	0.0005	0.075
1-Chlorobutane	109-69-3		
2,2-Dichloropropane	590-20-7	0.0005	
2-Butanone	78-93-3		
2-Chlorotoluene	95-49-8	0.0005	
2-Hexanone	591-78-6		
2-Nitropropane	79-46-9		
4-Chlorotoluene	106-43-4	0.0005	
4-Isopropyltoluene	99-87-6	0.0005	
4-Methyl-2-pentanone	108-10-1		
Acetone	67-64-1	0.01	
Acrylonitrile	107-13-1		
Allyl Chloride	107-05-1		
Benzene	71-43-2	0.0005	0.005
Bromobenzene	108-86-1	0.0005	
Bromochloromethane	74-97-5	0.0005	
Bromodichloromethane	75-27-4	0.0005	
Bromoform	75-25-2	0.0005	

Analyte	CAS #	RL mg/L	MCL mg/L
Chlorobenzene	108-90-7	0.0005	
Chloroethane	75-00-3	0.0005	0.10
Chloroform	67-66-3	0.0005	
Chloromethane	74-87-3	0.0005	
Cis-1,2-dichloroethene	156-59-4	0.0005	0.07
Cis-1,3-dichloropropene	10061-01-5	0.0010	
Dibromochloromethane	124-48-1		0.06
Dibromomethane	74-95-3	0.0005	
Dichlorodifluoromethane	75-71-8	0.0005	
Diethyl ether	60-29-7		
Ethyl Methacrylate	97-63-2		
Ethylbenzene	100-41-4	0.0005	0.7
Hexachlorobutadiene	87-68-3	0.0005	
Hexachloroethane	67-72-1		
Isopropylbenzene	98-82-8	0.0005	
Meta-xylene	108-38-3		
Methacrylonitrile	126-98-7		
Methyl Iodide	74-88-4		
Methylacrylate	96-33-3		
Methylene Chloride	75-09-2	0.0005	0.005
Methylmethacrylate	80-62-6		
Methyl-t-butyl ether	1634-04-4	0.0005	
Naphthalene	91-20-3	0.0050	
N-butylbenzene	104-51-8	0.0005	
Nitrobenzene	98-95-3		
N-propylbenzene	103-65-1	0.0005	
Ortho-xylene	95-47-6		
Para-xylene	106-42-3		
Pentachloroethane	76-01-7		
Propionitrile	107-12-0		
Sec-butylbenzene	135-98-8	0.0005	
Styrene	100-42-5	0.0005	0.10
Tert-butylbenzene	98-06-6	0.0005	
Tetrachloroethene	127-18-4	0.0005	0.005
Tetrahydrofuran	109-99-9		
Toluene	108-88-3	0.0005	1.0
Trans-1,2-dichloroethene	156-60-5	0.0005	0.10
Trans-1,3-dichloropropene	10061-02-6	0.0010	

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Analyte	CAS #	RL mg/L	MCL mg/L
Bromomethane	74-83-9	0.0005	
Carbon Disulfide	75-15-0		
Carbon Tetrachloride	56-23-5	0.0005	0.005
Chloroacetonitrile	107-14-2		
THMs			0.080

Analyte	CAS #	RL mg/L	MCL mg/L
Trans-1,4-dichloro-2-butene	110-57-6		
Trichloroethene	79-01-6	0.0005	0.005
Trichlorofluoromethane	75-69-4	0.0005	
Vinyl Chloride	75-01-4	0.0005	0.002
Xylenes – total		0.0005	10.0



Document Information

Document Number: ENV-SOP-MTJL-0081 **Revision:** 02

Document Title: Semi-volatile Organics by GCMS using Capillary Column (EPA Methods 8270C, EPA 8270D, EPA Method 625, SM 6410B), Including Provisions for Analysis in SIM Mode

Department(s): SVOA

Date Information

Effective Date: 23 Oct 2020

Notes

Document Notes:

All Dates and Times are listed in: Central Time Zone

Signature Manifest

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All dates and times are in Central Time Zone.

ENV-SOP-MTJL-0081

QM Approval

Name/Signature	Title	Date	Meaning/Reason
Fallon Labeots (006500)	Quality Analyst 1	13 Oct 2020, 08:24:02 AM	Approved

Management Approval

Name/Signature	Title	Date	Meaning/Reason
Shakir Wani (010007)	Manager	12 Oct 2020, 05:07:04 PM	Approved
James Burns (006456)	Manager - EHS	12 Oct 2020, 06:09:00 PM	Approved
Christopher Johnson (006487)	Manager - Operations	16 Oct 2020, 11:07:41 AM	Approved

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STANDARD OPERATING PROCEDURE
TITLE: ENV-SOP-MTJL-0081 Semivolatile Organics by GCMS using Capillary Column (EPA Methods 8270C, 8270D, 625, 625.1 and SM6410 B) Including Provisions for Analysis in SIM Mode
ISSUER: Pace National – Mt. Juliet, Tennessee

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1.0 SCOPE AND APPLICATION

STATE NOTE: For samples analyzed in conjunction with the Ohio Voluntary Action Program (VAP) please utilize SOP #330345OH.

1.1 This method is used to determine the concentration of semi-volatile organic compounds in extracts prepared from many types of solid waste matrices, soils, and water samples. The lists of compounds that are routinely determined by this method are listed in Attachment II. This table represents a default list to be used in the absence of a project-specific list, which would take precedence. See section 13.4.

1.2 This method is used to quantitate most neutral, acidic and/or basic organic compounds that are soluble in methylene chloride and capable of being eluted, without derivatization, from a gas chromatographic fused-silica column coated with a slightly polar methyl silicone phase. Such compounds include polynuclear aromatic hydrocarbons, chlorinated hydrocarbons and pesticides, phthalate esters, organophosphate esters, nitrosamines, haloethers, aldehydes, ethers, ketones, anilines, pyridines, quinolines, aromatic nitro compounds, and phenols, including nitrophenols.

1.3 In general, this method is not appropriate for the quantitation of multi-component analytes (i.e. Toxaphene, Chlordane, Aroclors, etc.) because of the limited sensitivity for those analytes; however when those analytes are identified using another analytical technique, this procedure is appropriate for confirmation pending sufficient analyte concentration is present in the extract.

1.4 Detection limits, sensitivity and optimum ranges of organic compounds vary with sample matrices, extraction technique, detector parameters, and model of GC/MS.

1.5 Qualifier ions are method specified and can be found in Attachment IV.

1.6 Use of this method is restricted to analysts who are knowledgeable in the interpretation of Mass Spectrometry and use of GC/MS systems.

1.7 The use of selected ion monitoring (SIM) is acceptable for applications requiring limits below the normal range of electron impact mass spectrometry. However, SIM may provide a lesser degree of confidence in the compound identification unless multiple ions are monitored for each compound.

1.8 An MDL study must be completed at least annually or more frequently if major instrumentation changes occur. Method Detection Limits (MDLs) are performed based on ESC SOP #030206. Updated MDL records are filed and stored on ESC's intranet.

1.8.1 Limit of Detection (LOD) and Limit of Quantitation (LOQ) studies are completed at the frequency required by the TNI standard per the procedure identified in the ESC SOP #030206, *Method Detection Limits (MDL), Limits of Detection (LOD) and Limits of Quantitation (LOQ).* Should the procedure be utilized for DOD support; then the frequency of these studies must meet the requirements of the current DOD QSM (see Attachment IX).

1.8.2 Lower Limit of Quantitation (LOQ) – For analyses performed per the requirements of Method 8000D, the LLOQ is established at concentrations where both quantitative and qualitative requirements can consistently be met (see Sections 2.10 and 10.4).

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2.0 METHOD SUMMARY AND DEFINITIONS

2.1 Field samples are prepared for analysis by gas chromatography/mass spectrometry (GC/MS) using the appropriate sample extraction technique. See ESC SOPs 330702/330702A/330702B/330705/330707/330708/330709/330754 for extraction and extract concentration methods. A measured volume or weight of sample is extracted using the appropriate extraction technique. Liquid samples are extracted at neutral pH with methylene chloride using a separatory funnel (SOP #330702) per EPA method 3510C. Reduced volume (RV) extraction using EPA method 3510C that requires a smaller volume (usually 100mL) of field sample is also available for use where applicable. Large volume injection (LVI) extraction using EPA method 3511 that requires a smaller volume (usually 40mL) of field sample is also available for use where applicable. See section 13.5 of this procedure and ESC SOP #330702B. Soil analysis using the same technology can also be performed with extraction as noted in ESC SOP #330707 and no concentration performed on the extract. This process is termed throughout this SOP as non-concentrated soil. Solid samples can also be extracted traditionally using methylene chloride-acetone (1:1) and a sonication process (SOP #330705) or with methylene chloride using the microwave process (SOP #330707), where permitted. These extracts are denoted in this procedure using the terminology “concentrated soil” extracts.

2.2 The semi-volatile compounds are introduced into the GC/MS by directly injecting a volume of the sample extract into a gas chromatograph oven (GC) equipped with a narrow-bore fused-silica capillary column. The oven, containing the capillary column, is temperature and pressure programmed to separate the analytes by molecular composition. The capillary column transfers the eluting analytes to the detector (MS) connected to a computer that then collects and stores the information for each injection.

2.3 Identification of target analytes is accomplished by comparing the mass spectra of each peak with the reference spectra of authentic standards.

2.4 Quantitation of the analytes of interest is accomplished by comparing the response of a major (quantitation) ion, present in the target analyte, relative to an internal standard in each extract, in conjunction with the response factor generated from a calibration curve.

2.5 Proper quantitation ions for each compound must be selected so that no interferences are present from adjoining (or co-eluting) analytes with common ions. Proper GC conditions must be used to resolve compounds with similar mass spectra. Background subtraction of mass spectra may be necessary when matrix interference is present.

2.6 Qualitative - The identification of compounds based on retention time and comparison of the sample mass spectra, after background correction, with characteristic ions in the reference mass spectra. The reference mass spectra must be generated by the laboratory using the same analytical conditions used for the analysis of field samples. The characteristic ions from the reference mass spectra are defined as the three ions of greatest relative intensity or any ions over 30% relative intensity if less than three such ions occur in the reference spectra.

2.7 Quantitative – Following qualitative identification, the quantitation of the identified compound is based on the integrated abundance of the primary characteristic ion from the Extracted Ion Current Profile (EICP).

2.8 Relative Retention Time (RRT) – The process of normalizing the response (peak area) of the target compound to the response of the internal standard.

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2.9 Isotope dilution calibration - Isotope dilution calibration is essentially a special case of internal standard calibration. In isotope dilution, the internal standards are stable isotopically-labeled analogs of the target analytes *and* they are added to the sample prior to any sample handling steps, including sample extraction. Because the spiked compounds differ from the target compounds only in the presence of the stable isotopes, the physical and chemical behavior of each labeled compound is virtually the same as its unlabeled "native" analog. Thus, any losses of the target compound that may occur during any of the sample preparation, extraction, cleanup, or determinative steps will be mirrored by a similar loss of the labeled standard.

2.10 Lower Limit of Quantitation (LLOQ) – For analyses performed according to the requirements of Method 8000D, the lowest concentration at which the laboratory has demonstrated target analytes can be reliably measured and reported with a certain degree of confidence, which must be greater than or equal to the lowest point in the calibration curve.

2.11 Large Volume Injection (LVI): any injection volume >5µL. Technique is dependent upon type of GC inlet used and sensitivity of detection.

2.12 Minimum Level (ML): A term used in Method 625.1 which refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the MDL, whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the MDL in a method, or the MDL determined by a laboratory, by a factor of 3. For the purposes of NPDES compliance monitoring, EPA considers the following terms to be synonymous: ‘‘quantitation limit,’’ ‘‘reporting limit,’’ and ‘‘minimum level.’’

2.13 See the current Quality Assurance Manual for other definitions associated with terms found in this document.

3.0 HEALTH AND SAFETY

3.1 The toxicity or carcinogenicity of each chemical material used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable.

3.2 The laboratory maintains documentation of hazard assessments and OSHA regulations regarding the safe handling of the chemicals specified in each method. Safety data sheets (SDS) for all hazardous chemicals are available to all personnel. Employees must abide by the environmental, health, and safety (EHS) policies and procedures specified in this SOP and in the Pace National Chemical Hygiene / Safety Manual.

3.3 Personal protective equipment (PPE) such as safety glasses and/or side shields, gloves, a laboratory coat, and shoes that are not cloth, canvas, and/or perforated must be worn in designated areas and while handling samples and chemical materials to protect against physical contact with samples that contain potentially hazardous chemicals and exposure to chemical materials used in the procedure. When handling glass, needles, knives, or any material with a potential sharp edge, employees must use cut-resistant gloves.

3.4 Concentrated corrosives present additional hazards and are damaging to skin and mucus membranes. Use these acids, bases, or oxidizers in a fume hood whenever possible with the appropriate PPE designed for handing these materials. If eye or skin contact occurs,

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flush with large volumes of water. When working with acids, always add acid to water to prevent violent reactions. Any processes that emit large volumes of solvents (evaporation/concentration processes) must be in a hood or apparatus that prevents employee exposure.

3.5 Spill kits are located in each laboratory department. Employees are to familiarize themselves with the location and contents of each spill kit in their area.

3.6 Universal precautions should be observed when performing any tests or procedures. Hard surfaces, instrument surfaces may be contaminated and should be handled according to good laboratory practices.

3.7 Contact your supervisor or local EHS coordinator with questions or concerns regarding safety protocol or safe handling procedures for this procedure. Any accidents involving personnel or sample supplies are to be reported immediately to either the Manager and/or to the Safety Officer.

4.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

4.1 All samples must have been collected using a sampling plan that addresses the considerations of this method.

4.2 Requirements for sample extraction are detailed in SOP numbers 330702, 330702A, 330702B, 330705, 330707, 330708, 330709, and 330754.

4.3 The sample holding time for solid samples is 14 days to extraction and, for aqueous samples, the holding time is 7 days. Holding time begins when (date and time) the samples are collected and ends either 14 or 7 days following sampling, at the time sampled.

4.4 The holding time for each extract is 40 days from sample preparation to analysis.

4.5 The container for aqueous samples and liquid sludge being extracted using the traditional 1L EPA 3510 method are 1L amber glass bottles. For the reduced volume extraction process using the EPA 3510 method, 100mL amber glass bottles are utilized. The containers for aqueous samples being extracted using EPA Method 3511 are 40mL amber glass bottles. Add 0.008% $Na_2S_2O_3$ per liter, if residual chlorine is expected or present.

4.6 Collect solid sample materials in 4 oz. jars or larger, depending on the weight and density of the sampled materials.

4.7 All samples and extracts must be shipped and stored at <6°C (not frozen).

4.8 Samples submitted for analysis that do not meet the requirements contained within this section must be addressed before performing the logging process within the laboratory. In some cases, exceeding the appropriate preservation and storage criteria can cause significant bias in the resulting data. Clients may need to resubmit samples where the conditions during shipment cause uncertainty regarding sample integrity. If samples do not meet the requirements for preservation, sampling, shipment and storage and the client approves the completion of the analytical process, sample results can be qualified and possible bias is narrated per the ESC SOP #030201, *Data Handling and Reporting*.

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5.0 INTERFERENCES

5.1 Raw GC/MS data from all method blanks, samples, and spikes is evaluated for interferences. Determine if the source of interference is in the preparation and/or cleanup of samples and take corrective action to eliminate the problem.

5.2 Contamination by carryover can occur whenever high-concentration and low-concentration samples are sequentially analyzed. To reduce carryover, the sample syringe is rinsed between sample injections. Whenever an unusually concentrated sample is encountered, it should be followed by analysis of solvent to check for cross-contamination. Clean/replace injector liner or clip column, check with solvent blanks, and repeat samples if necessary.

5.3 Choice of quantitative ions and qualifier ions: Some compounds may co-elute, so the selection of quantitation ions and qualifier ions must be made carefully so these ions are specific to each of the compounds that co-elute. Qualifier ions that are most commonly used are listed in Attachment IV and are recommended from the published 8270 methods. There is no method stated ions for the following: Pyridine, 1-Methylnaphthalene, Biphenyl, Carbazole. Aniline and Bis (2-Chloroethyl)ether quantitation ions may vary due to chromatographic conditions causing co-elution of the shared primary ion. Targets have strongly-responding, analyte-specific secondary ions suitable for quantitative use. Refer to Attachment IV for ESC ions.

5.4 Problematic Compounds:

5.4.1 Benzidine may be subject to oxidative losses during solvent concentration and exhibits poor chromatographic behavior.

5.4.2 Hexachlorocyclopentadiene is subject to thermal decomposition in the GC inlet, as well as photochemical decomposition.

5.4.3 N-nitrosodimethylamine may be difficult to separate from the solvent using the chromatographic conditions listed in this method.

5.4.4 N-nitrosodiphenylamine decomposes in the GC inlet and can't be separated from diphenylamine.

5.4.5 Pentachlorophenol, 2,4-Dinitrophenol, 4-Nitrophenol, Benzoic Acid, 4,6-Dinitro-2-methylphenol, 4-Chloro-3-methylphenol, 2-Nitroaniline, 3-Nitroaniline, 4-Chloroaniline, and Benzyl Alcohol are subject to erratic chromatographic behavior, especially when there is high boiling material contamination of the GC system.

5.4.6 Pyridine may perform poorly at the GC injection port temperatures listed in this method. The amount of degradation may be reduced by lowering the injection port temperature. Modification of the injection port temperature may adversely affect the performance of other target analytes.

5.4.7 Benzenethiol, or thiophenol, can be found in refinery wastes at caustic pH values. Benzenethiol is unstable in water/soils of neutral or acidic pH values. Benzenethiol rapidly degrades in organic solvents used to prepare the instrument calibration standards. Benzenethiol is part of Appendix VIII and the 1985 Skinner List, but was never included in Appendix IX to 40 CFR 264, due to its instability in the environment

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6.0 EQUIPMENT AND SUPPLIES

6.1 Gas chromatograph/mass spectrometer system.

6.1.1 Gas chromatograph (HP 6890/7890 or equivalent)- An analytical system complete with a temperature- programmable gas chromatograph suitable for split-less injection and all required accessories, including, auto sampler, syringes, analytical columns, and gases. The capillary column is directly coupled with the source.

6.1.2 Column 1 - 30m x 0.25mm ID with a 0.25µm film thickness silicon-coated fused silica capillary column (Phenomonex ZB-5MS or equivalent).

6.1.3 Column 2 – J&W 30m x 0.25mm x 0.5um film DB5MS or an equivalent is used. Ultrapure (99.999%) Helium gas is used for a mobile phase.

6.1.4 Syringes: Agilent (or equivalent) syringes sizes 10µL, 25µL, 50µL, 100µL and 1.0mL.

6.2 Mass spectrometer (HP-5973/5975 or equivalent) capable of scanning from 35 to 550 amu every 1 second, using 70 volts (nominal) electron energy in the electron impact ionization mode. The mass spectrum for decafluorotriphenylphosphine (DFTPP) must meet the applicable criteria in method 8270C, 8270D or 525 when 50ng of DFTPP GC/MS tuning standard is injected.

6.3 GC/MS interface - The interface is capillary-direct into the mass spectrometer source.

6.4 Data system (HP Chemstation with Enviroquant) - A computer system is interfaced to the mass spectrometer. The system allows the continuous acquisition and storage of machine-readable media of all mass spectra obtained throughout the duration of the chromatographic program. The computer has software that can search any GC/MS data file for ions of a specific mass and that can plot such ion abundances versus time or scan number. This type of plot is defined as Extracted Ion Current Profile (EICP). The most recent version of the EPA/NIST Mass Spectral Library is also available

6.5 Volumetric flasks, Class A - Appropriate sizes with ground-glass stoppers.

6.6 Balance - Analytical, capable of weighing 0.0001g

7.0 REAGENTS AND STANDARDS

7.1 All reagents and standards must be recorded in the appropriate preparation log and assigned a unique number. See SOP #030230, *Standard Logger – Tree Operation*. Additional information regarding reagent preparation can be found in the Standards Logger (Tree) digital archive system. All spiking solutions and surrogate standard solutions should be replaced at least every 6 months or sooner if a problem is detected unless otherwise noted.

7.2 Reagent grade inorganic chemicals are used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the committee on Analytical Reagents of the American Chemical Society, where such specifications are available. Other grades may be used, provided it is ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

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7.3 Organic-free reagent water - all references to water in this method refer to organic-free reagent water (ASTM II or equivalent).

7.4 Burdick & Jackson Omni Solv Dichloromethane Dx0831-1 (or equivalent).

7.5 Stock standard solutions - Standard solutions are purchased as certified solutions. Commercially–prepared stock standards are used at concentrations that are certified by the manufacturer or by an independent source.

7.6 Stock standard solutions

7.6.1 Restek 8270 MegaMix – 31850, or equivalent, at 1000ppm

7.6.2 Agilent ULTRAgold Custom Standard – CUS-28559, at 1000ppm

7.6.3 NSI Lab Solutions Custom BNA Mix – Q6330, or equivalent, at 2000ppm

7.6.4 Restek Custom a-Terpineol/Quinoline Standard – 572011, or equivalent, at 2000ppm

7.6.5 Restek 8270 Benzidines Mix #2 – 31852, or equivalent, at 1000ppm

7.6.6 Restek Benzoic Acid Mix – 31879, or equivalent, at 2000ppm

7.6.7 NSI Lab Solutions 8270 BNA Mix – C-701, or equivalent, at 1000ppm

7.6.8 Phenova Custom 8270 Appendix IX Mix – ALO-130094, or equivalent, at 1000ppm

7.6.9 Phenova Benzidines Standard – ALO-101244, or equivalent, at 2000ppm

7.6.10 Phenova Benzoic Acid Mix – ALO-101246, or equivalent, at 2000ppm

7.6.11 Phenova Custom Appendix IX Mix 2 – ALO-130203, or equivalent, at 2000ppm

7.6.12 Phenova Methapyrilene – ALO-130204, or equivalent, at 2000ppm

7.6.13 Phenova Hexachlorophene – ALO-130233, or equivalent, at 4000ppm

7.6.14 Phenova Custom Appendix IX Mix 1 – ALO-130202, or equivalent, at 2000ppm

7.6.15 Phenova 8270 OP Pesticides Mix – ALO-101256, or equivalent, at 2000ppm

7.6.16 Phenova 1,4-Dioxane – ALO-101313, or equivalent, at 2000ppm

7.6.17 Restek 1,4-Dioxane – 31853, or equivalent, at 2000ppm

7.6.18 Phenova Benezenethiol – ALO-130085, or equivalent, at 1000ppm

7.6.19 Phenova Sulfolane Mix – ALO-130201, or equivalent, at 800ppm

7.6.20 Restek Sulfolane Standard – 36413, or equivalent, at 800ppm

7.6.21 Restek Custom BNA Subgroup Standard #1 – 574999, or equivalent, at 200ppm

7.6.22 Agilent ULTRAgold Custom Standard – CUS-23897, or equivalent, at 1000ppm

7.6.23 Agilent ULTRAgold Custom Standard – CUS-23952, or equivalent, at 1000ppm

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7.6.24 Restek TX TPH Calibration Mix – 569373, or equivalent, at 10000ppm

7.7 Transfer the stock standard solutions into bottles with PTFE-lined screw caps. Store, protected from light, at –10°C or less or as recommended by the standard manufacturer. Stock standards should be checked frequently for signs of degradation or evaporation, especially just prior to preparing calibration standards from them. Stock standards are assigned a 6 month expiration date from the day that a sealed ampoule is opened. Standards are discarded if signs of degradation are apparent when compared to a second source standard.

STANDARD NAME	TOTAL VOLUME (mL)	RECIPE
BNA INTERNAL STANDARD	10	Open Ampule - No dilution required, Custom BNA Internal Standard, NSI Lab Solutions, Cat. No. Q-6343-O
1,4-DIOXANE-D8 IS @ 50ppm	10	250uL 1,4-Dioxane-d8 Standard, Restek, 30614 9.75mL Methylene Chloride
NDMA-D6 IS @ 50ppm	10	500uL 521 Surrogate Std., Restek, Cat. No. 33910 9.5mL Methylene Chloride
TUNE @ 50ppm	10	500uL GC/MS tuning std, Accu Standard, Cat. No. M-625-TS-20X 9.5mL Methylene Chloride
TUNE @ 10ppm	10	100 uL GC/MS tuning std, Accu Standard, Cat. No. M-625-TS-20X 9.9 mL Methylene Chloride
8270 PRIMARY INT @ 200ppm	10	2mL 8270 MegaMix, Restek, Cat. No. 31850 2mL ULTRAgold Custom Standard, Agilent, Cat. No. CUS-28559 6mL Methylene Chloride
8270 TCL INT @ 200ppm	10	1mL Custom BNA Mix, NSI Lab Solutions, Cat. No. Q6330 1mL Custom a-Terpineol/Quinoline Standard, Restek, Cat. No. 572011 1mL 8270 Benzidines Mix #2, Restek, Cat. No. 31852 1mL Benzoic Acid Mix, Restek, Cat. No. 31879 6mL Methylene Chloride
8270 SVMS SSCV @ 10ppm	1	10uL 8270 BNA Mix, NSI Lab Solutions, Cat. No. C-701 10uL ULTRAgold Custom Standard, Agilent, CUS-28559 980uL Methylene Chloride
8270 TCL SSCV @ 200ppm	10	2mL Custom 8270 Appendix IX Mix, Phenova, Cat. No. ALO-130094 1mL Benzidies Standard, Phenova, ALO-101244 1mL Benzoic Acid Mix, Phenova, ALO-101246 1mL Custom Appendix IX Mix 2, Phenova, Cat. No. ALO-130203 5mL Methylene Chloride
8270 TCL SSCV @ 10ppm	1	100uL 8270 TCL SSCV @ 200ppm, 900uL Methylene Chloride
SVAM INT @ 200ppm	10	1mL Custom Appendix IX Mix 2, Phenova, ALO-130203 1mL Methapyrilene, Phenova, Cat. No. ALO-130204 1mL Hexachlorophene, Phenova, Cat. No. ALO-130233 7mL Methylene Chloride
SVAP INT @ 200ppm	10	1mL Custom Appendix IX Mix 1, Phenova, Cat. No. ALO-130202 9mL Methylene Chloride

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SVOP INT @ 200ppm	10	1mL 8270 OP Pesticides Mix, Phenova, Cat. No. ALO-101256 9mL Methylene Chloride
NDMA/1,4-DIOXANE INT @ 20ppm	10	100uL 1,4-Dioxane, Phenova, Cat. No. ALO-101313 1mL 8270 Primary Int. @ 200ppm, 8.9mL Methylene Chloride
NDMA/1,4-DIOXANE INT @ 2ppm	5	500ul NDMA/1,4-Dioxane Int @ 20 4.5mL Methylene Chloride
1,4-DIOXANE SSCV @ 200ppm	10	1mL 1,4-Dioxane, Restek, Cat. No. 31853 9mL Methylene Chloride
1,4-DIOXANE SSCV @ 10ppm	10	500uL 1,4-Dioxane SSCV @ 200pm 9.5mL Methylene Chloride
NDMA SSCV @ 10ppm	10	100uL 8270 BNA Mix, NSI Lab Solutions, Cat. No. C-701 9.9mL Methylene Chloride
BENZENETHIOL CAL INT @ 100ppm	10	1mL Benzenethiol, Phenova, Cat. No. ALO-130085 1mL Ultragold Custom Standard, Agilent, CUS-28559 8mL Methylene Chloride
BENZENETHIOL SSCV @ 100ppm	10	1mL Benzenethiol, Phenova, Cat. No. ALO-130085 9mL Methylene Chloride
SULFOLANE CAL INT @ 50ppm	10	625uL Sulfolane Mix, Phenova, Cat. No. ALO-130201 500uL Ultragold Custom Standard, Agilent, CUS-28559 8.875mL Methylene Chloride
SULFOLANE SSCV @ 50ppm	10	625uL Sulfolane, Restek, Cat. No. 36413 9.375mL Methylene Chloride

7.8 Internal standards solutions- the internal standards are naphthalene-d8, acenaphthene-d10, phenanthrene-d10, chrysene-d12, perylene-d12 and 1-4 dichlorobenzene-d4. Purchase from NSI (Cat # Q-6343-O) as certified stock solution at 800µg/mL. Alternative internal standard concentrations may be used for LVI work. Internal standard intermediates at 16µg/mL and 4µg/mL are prepared for spiking, RV/LVI 8270PAHand RV/LVI 8270SIM analyses, respectively.

7.8.1 For all concentrated soil and 8270 full run water reduced volume extracts, use the 8000µg/mL internal standard solution. Each sample extract undergoing analysis is spiked with 5µL of internal standard intermediate solution, resulting in a concentration of 8µg/mL of each internal standard.

7.8.2 For non-concentrated soil, reduced volume water and 3511 water analyses, including PAH and DROMO, use the 16µg/mL ISTD intermediate. For non-concentrated soil, reduced volume and EPA 3511 water extracts being analyzed by the SIM process, use the 4µg/mL ISTD intermediate. Each sample extract undergoing analysis is spiked with 10µL of the appropriate internal standard intermediate solution, resulting in a concentration of 160µg/L and 40µg/L, respectively, for each internal standard.

7.9 Using a volumetric syringe, measure each of the solutions listed in Section 7.9 and place into a 10mL volumetric flask.

7.10 Preparation of Working Standards

Standards must be stored at ≤6°C. The expiration date of any working standard will be 6 months unless the manufacturer's stock expires prior to that date or if the standard starts

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showing signs of degradation. See section 7.11.1 through 7.11.6 for preparation instructions. Concentrations of standards used are subject to change depending on instrument condition, client needs and sample preparation method of the variety of analysis being performed. A minimum of five calibration levels is required for Method 8270C and 8270D, while a minimum of 3 calibration levels is required for Method 625.

7.10.1 8270C/D Calibration standards for concentrated soil and 1L concentrated water extractions: A minimum of five calibration standards is prepared at different concentrations. At least one of the calibration standards must correspond to a sample concentration at or below the laboratory's reporting limit (RL). The remaining standards correspond to the working range of the GC/MS system. Each standard contains each analyte for detection. Working standards are made directly from the intermediate stock standard described in section 7.10 give solutions at concentrations of 0.2µg/mL up to 50µg/mL. Surrogates are included at the same concentrations. Internal standards are spiked at a constant concentration per extraction method for quantitation purposes.

SVOC mix (200ppm) µL	ISTD mix uL	Final volume	Final conc. ppm	Level
1	10	1.0mL	0.2	1
5	10	1.0mL	1	2
10	10	1.0mL	2	3
25	10	1.0mL	5	4
50	10	1.0mL	10	5
75	10	1.0mL	15	6
100	10	1.0mL	20	7
150	10	1.0mL	30	8
200	10	1.0mL	40	9
250	10	1.0mL	50	10

A minimum of 5 points are used to construct the calibration curve.

7.10.2 Calibration standards for 8270C/D reduced volume and EPA 3511 (soil and water) extracted samples: A minimum of five calibration standards is prepared at different concentrations. At least one of the calibration standards must correspond to a sample concentration at or below the laboratory-reporting limit (RL). The remaining standards correspond to the working range of the GC/MS system. Each standard contains each analyte for detection. Working standards are made directly from the intermediates described in section 7.9 to give solutions at concentrations of 0.01µg/mL up to 1µg/mL. Surrogates are included at the same concentrations. Internal standards are spiked at a constant of 160µg/L for quantitation purposes.

SVOC mix (2ppm) µL	ISTD mix uL	Final volume	Final conc. ppb	Level
5	10	1.0mL	10	1
25	10	1.0mL	50	2
50	10	1.0mL	100	3
100	10	1.0mL	200	4
200	10	1.0mL	400	5
300	10	1.0mL	600	6
400	10	1.0mL	800	7
500	10	1.0mL	1000	8

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7.10.3 For SIM analyses concentrated soil and 1L water extractions**,** calibration standards are diluted from the intermediate standard solution (section 7.9.1) to give a calibration at the following concentrations: 20, 50, 100, 500, 1000, 2000, 4000, 10,000µg/L. A minimum of five calibration standards is prepared at different concentrations. At least one of the calibration standards must correspond to a sample concentration at or below the laboratory-reporting limit (RL). The calibration levels may change based on the working range of the GC/MS system. Surrogates are included at the same concentrations. The internal standards are at a constant 8µg/mL.

SIM Standard Concentration (ug/L)	Amount Added (uL) 5µg/mL Int.	Final Volume (mL)
20	2.0	1.0
50	5.0	1.0
100	10.0	1.0
500	50.0	1.0
1000	100.0	1.0
2000	200.0	1.0
4000	400.0	1.0
10000	1000.0	1.0

7.10.4 For SIM analyses using reduced volume, non-concentrated soil, or EPA 3511 extracts**,** calibration standards are diluted from the intermediate standard solution (section 7.9.3) to give a calibration at the following concentrations: 1, 5, 10, 20, 40, 80, 200µg/L. A minimum of five calibration standards is prepared at different concentrations. At least one of the calibration standards must correspond to a sample concentration at or below the laboratory-reporting limit (RL). The calibration levels may change based on the working range of the GC/MS system. Surrogates are included at the same concentrations. The internal standards are at a constant 40µg/L.

SIM RV 3511 Standard Concentration (ug/L)	Amount Added (uL) 200µg/L Int.	Final Volume (mL)
1	5	1.0
5	25	1.0
10	50	1.0
20	100	1.0
40	200	1.0
80	400	1.0
200	1000	1.0

7.10.5 For Missouri DRO analysis by 3511 and non-concentrated soil, prepare the working calibration curve as reflected in the following table.

DROMO mix (200ppb) µL	Final Volume	Final conc. (ppb)
25	1.0 mL	5
50	1.0 mL	10
100	1.0 mL	20
200	1.0 mL	40
400	1.0 mL	80
600	1.0 mL	120
800	1.0 mL	160

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8.0 PROCEDURE

STATE NOTE: For samples analyzed in conjunction with the Ohio VAP program, the criteria found and itemized in this procedure for EPA method 8270C must be utilized. Alternative GCMS tuning criteria from that specified in EPA 8270C is acceptable as permitted in Section 7 of the published method.

8.1 GC Conditions: The GC conditions are listed in each instrument maintenance log and are updated as necessary.

8.1.1 Due to the tuning and calibration requirements outlined in this method, a liner change is necessary prior to beginning an analytical sequence. Any additional maintenance performed on the instrumentation will be documented as performed in the specific instrument maintenance log. (i.e., column clip/change, septa change, inlet cleaning, detector cleaning/maintenance, etc.)

8.2 Mass Spectrometer Tuning Criteria: The GC/MS is hardware-tuned using a 50ng (or less) injection of DFTPP. Analyses must not begin until the tuning criteria are met. It is recommended that each initial tune verification utilize the "Autofind" function and be set up to look at three scans (the apex & ±1 scan) and average the three scans then perform background subtraction. If Autofind is not utilized, select the mass spectrum at the peak apex for evaluation, or use an average mass spectrum across the entire DFTPP peak. Background subtraction is required prior to the start of the peak but no more than 20 scans prior. Background correction cannot include any parts of the target peak. The scans must be averaged and background corrected.

The mass spectrometer must be tuned every 12 hours if samples, standards, etc. are to be analyzed for Methods 8270C, 8270D, and 625.1. ESC uses 8270D evaluation criteria per method allowances.

TABLE 8.2
Method 8270D
DFTPP Key Ions And Ion Abundance Criteria[a, b]

Mass	Ion Abundance Criteria
51	10-80% of mass 198
68	<2% of mass 69
70	<2% of mass 69
127	10-80% of mass 198
197	<2% of mass 198
198	Base peak, or >50% of mass 442
199	5-9% of mass 198
275	10-60% of mass 198
365	>1% of mass 198
441	Present, but <24% of mass 442
442	Base peak, or >50% of mass 198
443	15-24% of mass 442

(a) Data taken from Table 3 in SW-846 Method 8270D.

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(b) Alternate tuning criteria may be used (e.g., CLP, Method 525, or manufacturers' instructions), providing that method performance is not adversely affected.

STATE NOTE: All South Carolina samples require a tune every 12 hours, regardless of which method is being utilized.

The GC/MS tuning standard solution must also be used to assess GC column performance and injection port inertness. Degradation of DDT to DDE and DDD is used to assess breakdown occurring in the injection port. The calculation for the determination of the breakdown occurring is found in section 9.1 and must include both DDD and DDE. Breakdown must not exceed 20%. Benzidine and pentachlorophenol total ion chromatogramsl are used to assess tailing occurring within the analytical system and both analytes should be present at their normal responses with no obvious peak tailing. To determine the tailing factor for benzidine and pentachlorophenol, use the calculation found in section 9.2. For EPA Methods 625 and 8270C, benzidine must have a tailing ratio of <3 and pentachlorophenol must have a tailing ratio of <5. For EPA Method 8270D and 625.1, benzidine and pentachlorophenol must have a tailing ratio of <2. The Missouri diesel method does not require tailing or degradation checks prior to or during analysis.

8.3 The use of selected ion monitoring (SIM) is acceptable for applications requiring quantitation limits below the normal range of electron impact mass spectrometry. However, SIM may provide a lesser degree of confidence in the compound identification since less mass spectral information is available. Using the primary ion for quantitation and the secondary ions for confirmation set up the collection groups based on their retention times. The selected ions are nominal ions and most compounds have small mass defect, usually less than 0.2 amu, in their spectra. These mass defects should be used in the acquisition table. The dwell time may be automatically calculated by the laboratory's GC/MS software or manually calculated using the following formula. The total scan time should be less than 1,000 msec and produce at least 5 to 10 scans per chromatographic peak. The start and stop times for the SIM groups are determined from the full scan analysis using the formula below: Additional guidance for performing SIM analyses, in particular for PAHs and phenol target analyte compounds, can be found in the most recent CLP semivolatile organic methods statement of work (SOW). See the SIM sections from the following CLP SOW for further details: EPA CLP Organics SOW. (Reference 14)

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SIM Groups for PAHs and including pentachlorophenol and hexachlorobenzene

SIM Group	1	2	3	4	5	6	7	8
RT start	Solvent delay	Before 2-Methyl naphthalene	Before Acenaph-thalene	Before Fluorene	Before Fluor-anthene	Before Benzo (a)-anthracene	Before Benzo (b)-fluoranthene	Before Dibenz (a,h-)anthracene
Ions	82, 128, 129, 136, 137	127, 141, 142, 162, 171, 172	139, 151, 152, 153, 154, 162, 164, 168	94, 165, 166, 176, 178, 179, 188, 264, 266, 268, 282, 284, 286	200, 202, 203, 244, 245	226, 228, 229, 240, 241	252, 253, 260, 264	138, 139, 276, 277, 278, 279
Dwell	40	35	25	30	40	50	75	50

8.4 Calibration

8.4.1 **Initial Calibration**

EPA Method 8270C: The working standards prepared in section 7.10 are injected and average response factors are calculated. The calibration curve is typically constructed of six to nine standards, however, this may change depending on instrument conditions and/or client needs (see Section 13.4). See section 8.3.2 for information regarding use and deletion of calibration points.

The calibration check compounds (CCCs) listed in Section 8.3.1a must have an average percent relative standard deviation (%RSD) of less than or equal to 30%. Any target analyte that has a %RSD >15% for the RF must be calculated by linear or quadratic regression instead of RF. If the RSD of any target analyte is ≤15%, the average response factor may be used for quantitation. When any compound does not meet the calibration criteria for RF, the analyst MUST use linear regression or quadratic curve fit. The calibration curve cannot be forced through zero and does not include a method blank. It must also meet a correlation coefficient of 0.995 or better. If a quadratic curve fit is used, a minimum of 6 calibration standards must be utilized to obtain a working calibration curve.

The system performance check compounds (SPCCs) in Table 8.3.1b must have an average RF of ≥0.05. When these criteria are met, samples can be analyzed.

Table 8.3.1a: Calibration Check Compounds (CCC)

Base/Neutral Fraction	Acid Fraction
Acenaphthene	4-Chloro-3-methylphenol
1,4-Dichlorobenzene	2,4-Dichlorophenol
Hexachlorobutadiene	2-Nitrophenol
n-Nitrosodiphenylamine	Phenol
Di-n-octyl phthalate	Pentachlorophenol
Fluoranthene	2,4,6-Trichlorophenol
Benzo(a)pyrene	

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Table 8.3.1b: System Performance Check Compounds (SPCC)

Compound	*Minimum Average Response Factor*
n-Nitroso-di-n-propylamine	>0.05
Hexachlorocyclopentadiene	>0.05
2,4-Dinitrophenol	>0.05
4-Nitrophenol	>0.05

EPA Method 8270D: The working standards prepared in section 7.10 are injected and average response factors are calculated. The calibration curve is typically constructed of six to nine standards, however, this may change depending on instrument conditions and/or client needs (see section 13.4). At least five standards are required for Response Factor and linear regression calibration. If a quadratic curve fit is used, a minimum of 6 calibration standards must be utilized to obtain a working calibration curve. See section 8.3.2 for information regarding use and deletion of calibration points.

Target analytes must have an average RSD of ≤20%. Any target analyte that has a %RSD >20% for the RF must be calculated by linear or quadratic regression instead of RF. If the RSD of any target analyte is ≤20%, the average response factor may be used for quantitation. When any compound does not meet the calibration criteria for RF, the analyst MUST use linear regression or, if permitted, quadratic curve fit. The calibration curve cannot be forced through zero. It must also meet a correlation coefficient of 0.995 or better.

In addition to the minimum %RSD criteria, it is recommended that a minimum response factor for the most common target analytes be demonstrated for each individual calibration level to ensure that these compounds are performing as expected. See Table 8.3.1c. Meeting the minimum response factor criteria for the lowest calibration standard is critical in establishing and demonstrating the desired sensitivity.

Table 8.3.1c: Recommended Minimum Response Factors for Each Calibration Level (Initial and Continuing Calibration)

Compound	*Minimum Response Factor*	*Compound*	*Minimum Response Factor*
Benaldehyde	0.010	2-Nitrophenol	0.100
Phenol	0.800	2,4-Dimethylphenol	0.200
Bis(2-chloroethyl)ether	0.700	Bis(2-chloroethoxy)methane	0.300
2-Chlorophenol	0.800	2,4-Dichlorophenol	0.200
2-Methylphenol	0.700	Naphthalene	0.700
2,2-Oxybis-(1-chloropropane)	0.010	4-Chloroaniline	0.010
Acetophenone	0.010	Hexachlorobutadiene	0.010
4-Methylphenol	0.600	Caprolactam	0.010
n-Nitroso-di-n-propylamine	0.500	4-Chloro-3-methylphenol	0.200
Hexachloroethane	0.300	2-Methylnaphthalene	0.400
Nitrobenzene	0.200	Hexachlorocyclopentadiene	0.050
Isophorone	0.400	2,4,6-Trichlorophenol	0.200

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Compound	*Minimum Response Factor*	*Compound*	*Minimum Response Factor*
2,4,5-Trichlorophenol	0.200	Atrazine	0.010
1,1-Biphenyl	0.010	Pentachlorophenol	0.050
2-Chloronaphthalene	0.800	Phenanthrene	0.700
2-Nitroaniline	0.010	Anthracene	0.700
Dimethyl phthalate	0.010	Carbazole	0.010
2,6-Dinitrotoluene	0.200	Di-n-butyl phthalate	0.010
Acenaphthylene	0.900	Fluoranthene	0.600
3-Nitroaniline	0.010	Pyrene	0.600
Acenaphthene	0.900	Butyl Benzyl phthalate	0.010
2,4-Dinitrophenol	0.010	3,3-Dichlorobenzidine	0.010
4-Nitrophenol	0.010	Benzo(a)anthracene	0.800
Dibenzofuran	0.800	Chrysene	0.700
2,4-Dinitrotoluene	0.200	Bis (2-ethylhexyl)phthalate	0.010
Diethyl phthalate	0.010	Di-n-octyl phthalate	0.010
1,2,4,5-Tetrachlorobenzene	0.010	Benzo(b)fluoranthene	0.700
4-Chlorophenyl-phenyl ether	0.400	Benzo(k)fluoranthene	0.700
Fluorene	0.900	Benzo(a)pyrene	0.700
4-Nitroaniline	0.010	Indeno(1,23-c,d)pyrene	0.500
4,6-Dinitro-2-methylphenol	0.010	Dibenz(a,h)anthracene	0.400
4-Bromophenyl-phenyl ether	0.100	Benzo(g,h,i)perylene	0.500
n-Nitrosodiphenylamine	0.010	2,3,4,6-Tetrachlorophenol	0.010
Hexachlorobenzene	0.100		

EPA 8270C GC/MS SIM: When analyzing samples using SW-846 8270C SIM, all target compounds must be treated as CCCs and must have an average RSD of ≤30%.

EPA 8270D GC/MS SIM: If analyzing samples by EPA 8270D SIM, follow the initial calibration criteria for the specified referenced method as found in section 8.3.1 (EPA Method 8270D).

EPA Method 625: The working standards prepared in section 7.10 are injected and average response factors are calculated. A minimum of 3 points calibration is required for method 625. The %RSD is calculated for the standards analyzed and must be ≤35% for all compounds in order to assume linearity.

EPA Method 625.1: One of the calibration standards should be at a concentration at or below the reporting limit. The resulting calibration must meet all applicable acceptance criteria in Section 10, based on the RSD, RSE, or r^2. The concentrations of the other calibration standards should correspond to the expected range of concentrations found in real samples or should define the working range of the GC/MS system for full-scan and/ or SIM operation, as appropriate. A minimum of six concentration levels is required for a second order, non-linear (i.e., quadratic) calibration.

Calculate the mean (average) and relative standard deviation (RSD) of the responses factors. If the RSD is less than 35%, the RF can be assumed to be invariant and the average RF can be used for calculations. Alternatively, the results can be used to fit a linear or quadratic regression of response ratios, As/Ais, vs. concentration ratios Cs/Cis. If used, the regression must be weighted inversely proportional to concentration. The coefficient of determination (r^2) of the weighted

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regression must be greater than 0.920 (this value roughly corresponds to the RSD limit of 35%). Alternatively, the relative standard error (RSE) may be used as an acceptance criterion. As with the RSD, the RSE must be less than 35%. If an RSE less than 35% cannot be achieved for a quadratic regression, system performance is unacceptable and the system must be adjusted and re-calibrated.

All Published Methods: Reference spectra must be updated upon analysis of each new calibration curve.

Linear Regression Weighting: As an alternative to calculating mean response factors and applying the RSD test, use the GC/MS data system software or other available software to generate a linear or second order regression calibration curve, by plotting A/A(is) vs. Q(x) using the equations found in section 9.4. Either equal weighting factors or 1/x regressions may be used.

STATE NOTE: For all Minnesota sample analyses, the RL level standard is re-injected and quantitated against the newly updated calibration curve or the applicable standards are reprocessed (re-quantitated) using the completed calibration curve and is evaluated for the ±40% deviation criterion with the exception of the listed poor performers in this procedure.

STATE NOTE: For all Wisconsin sample analyses, analysts must evaluate the %RSD of calibrations to ensure that they do not have unacceptable curvature. The %RSD limit criteria, as found in the specific methods listed above, applies to calibrations using average RF calibrations. For linear and quadratic curve fits, a limit of 40% RSD is used for normal target analytes and 50% RSD is utilized for known poor performing compounds.

STATE NOTE: When analyzing samples in conjunction with the Ohio VAP or South Carolina DHEC programs, the calibration model must be RSD or linear. Quadratic curve modeling is not permitted unless historical performance of analytes exhibited a nonlinear response (i.e., Benzoic Acid and problematic phenols). Quadratic models cannot be used to extend the calibration range or bypass instrument maintenance.

8.4.2 CALIBRATION POINTS – Usage and Deletion

When the appropriate number of calibration standards is used, all points must be considered in the average response factor calculation or linear regression calculation. The deletion of the highest point is acceptable when necessary, with the analyst noting that the high end of the calibration has been lowered. The deletion of the lowest calibration point is acceptable, when necessary, provided that the analyst notes the deletion on the injection log and raises the reporting limit, if necessary, for that compound.

8.4.3 **EPA Method 8270D:** LINEAR REGRESSION USE – The method of linear regression calibration has the potential for a significant bias to the lower portion of the calibration model. This bias is not normally seen in relative percent difference methods. When utilizing linear regression fits, a minimum quantitation check on the viability of the lowest calibration point should be performed by re-

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fitting the response from the lowest concentration standard back into the completed calibration curve. It is not necessary to re-analyze a low concentration standard, but using the analytical system software, the low standard can be re-quantitated as if it were a field sample. The recalculated concentrations of the analytes utilizing the linear regression curve fit must be within ~~±30%~~ 50%of the true standard concentration.

STATE NOTE: For the analysis of South Carolina samples, all target analytes, including Hexachlorophene, is required to utilize linear regression. Quadratic curve fit is not allowed. To achieve this, the calibration curve may be modified by the removal of the lowest two levels and will utilize calibration levels of 60, 80, 100, 120, and 140 for quantitation of this analyte in South Carolina samples. The reporting limit (RL) for South Carolina will routinely be 100ppb for water samples.

8.4.4 Quadratic Regression: Quadratic regression may be used for the following compounds: Pentachlorophenol, 4-Nitrophenol, 2,3,4,6-Tetrachlorophenol, 4,6-Dinitro-2-methylphenol, 2,4-Dinitrophenol. Plots must have a minimum of 6 points and a correlation coefficient of 0.995 or better.

STATE NOTE: Quadratic curve modeling is not permitted for samples originating in South Carolina or for samples reported for the Ohio VAP unless historical performance of analytes exhibited a nonlinear response (e.g., Benzoic Acid).

8.4.5 Second Source Calibration Verification – the initial calibration for each target analyte must be checked with a standard from a source that is different from those used for initial calibration.

8.4.6 **Daily Tuning and Continuing Calibration**

As with the initial calibration, the system must be tuned with 50ng of DFTPP or less to meet the acceptance criteria found in section 8.1. Following successful tuning, the midpoint level standard (CCV) is analyzed. Calibration verification for each method, as listed below, must be met prior to the analysis of field samples and every 12 hours for 8270C/D and every 24 hours for EPA 625 (see the method note in Section 8.2 for Method 625.1 requirements).

EPA Method 8270C: The percent difference of the CCCs (see Table 8.3.1a & b) in the mid-level standard must be ≤20% and the SPCCs must have an RF ≥0.05. The retention time of the internal standards must be within ±30 seconds from the mid-point standard level of the last initial calibration curve and the area response must be within –50% to +100%. Once these criteria are met, samples can be analyzed.

EPA Method 625.1: The RF or calibration curve must be verified immediately after calibration and at the beginning of each 12-hour shift, by analysis of a standard at or near the concentration of the mid-point calibration standard. The standard(s) must be obtained from a second manufacturer or a manufacturer's batch prepared independently from the batch used for calibration. Include the surrogates in this solution. It is necessary to verify calibration for the analytes of interest only.

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Compare the recoveries for the analytes of interest against the acceptance criteria for recovery (Q) in Attachment VII and the recoveries for surrogates against the acceptance criteria in Attachment VIII. If recovery of the analytes of interest and surrogates meet acceptance criteria, system performance is acceptable and analysis of samples may continue. If any individual recovery is outside its limit, system performance is unacceptable for that analyte.

EPA Methods 8270C and 625 (analyzed concurrently): The CCV must be evaluated for CCC and SPCCs as per EPA Method 8270C requirements. All non-CCC and other target analytes must meet the criteria established in Method 625 for all analytes (±20%). For analytes not contained in the Method 625 analyte list, the analyst evaluates the CCV and the experience of the analyst weighs heavily in determining the usability of the data.

STATE NOTE: For all Wisconsin sample analyses, non-CCC compounds for 8270C requires a ±50% criteria for the CCV.

EPA 8270C GC/MS SIM: When analyzing samples using SW-846 EPA 8270C SIM, all compounds in the CCV must be treated as CCCs and must meet the minimum requirements of ≤20% difference.

EPA 8270D GC/MS SIM: If analyzing samples by EPA 8270D SIM, follow the initial calibration criteria for the specified referenced method as found in section 8.3.6 (EPA Method 8270D below).

EPA Method 8270D: Each of the most common target analytes in the CCV must meet the minimum response factors in Table 8.3.1c. When using the average RF, the percent difference for each target compound in the CCV must be ≤20%. When using regression fit calibration, the percent drift of the CCV must be ≤20%. The retention time of the internal standards must be within ±30 seconds from the mid-point standard level of the last initial calibration curve and the area response must be within –50% to +100%.

8.4.7 For corrective action regarding tuning and calibration, see sections 11.1 and 11.2.

8.5 Method Blank Analysis – A method blank should be analyzed prior to any field sample analysis to verify that the analytical system is free from contaminants. If the method blank indicates that contamination may be present in the analytical system, it may be necessary to analyze a solvent blank to demonstrate the source of the contamination is not carryover from standards or lingering field sample artifacts.

8.6 GC/MS analysis of field samples and preparation QC.

8.6.1 It is highly recommended that the extracts be screened on a GC/FID or GC/PID using the same type of capillary column used in the GC/MS system. This will minimize contamination of the GC/MS system from unexpectedly high concentrations of organic compounds.

8.6.2 Allow the extracts to warm to room temperature. Just prior to analysis, add 10µL of the internal standard solution to the 1mL concentrated extract or 5µL of the internal standard solution to the 0.5mL extract obtained from sample preparation.

8.6.3 If the response for any quantitation ion exceeds highest level of the initial calibration range, the extract must be diluted and re-analyzed. Additional internal

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standard must be added to the diluted extract to maintain the same concentration as in the calibration standards (0.04, 0.16 or 8ng/uL, unless a more sensitive GC/MS system is being used). For example, if performing a 1:10 dilution on a concentrated extract, take 100uL of the extract and dilute to a volume of 1mL with the appropriate solvent. Add 9uL of the appropriate internal standard solution to the diluted extract and inject on the analytical system. It can be assumed that 1uL of internal standard was contained in the 100uL extract used for the initial dilution.

8.6.4 Internal standard area counts and retention times must be monitored in all samples, spikes and method blanks to monitor system performance, check for drifting, ensure effective autosampler performance, etc. If the area of the Extracted Ion Current Profile (EICP) changes by a factor of 2 (-50% to +100%) from the areas in the daily CCV, corrective action is required. The RRT of the internal standard in the extract must be within ± 0.06RRT units of the RRT of the daily CCV.

STATE NOTE: With each new calibration curve, a reporting limit verification (RLV) standard must be analyzed for samples analyzed from Minnesota. This standard consists of either re-injecting the low calibration standard(s) or re-processing the low standard(s) utilized in the construction of the calibration curve. The RLV must recover within ±40% of the expected concentration. See section 11.10 for additional information.

8.7 Qualitative Identification

8.7.1 The qualitative identification of compounds determined by this method is based on retention time and on comparison of the sample mass spectrum, after background correction, with characteristic ions in a reference mass spectrum. The reference mass spectrum must be generated by the laboratory using the conditions of this method. The characteristic ions from the reference mass spectrum are defined as the three ions of greatest relative intensity, or any ions over 30% relative intensity if less than three such ions occur in the reference spectrum. Retention time windows for internal standards and target compounds integrations are updated with each calibration curve and after any instrument maintenance occurs that causes a shift that may affect ChemStation integrations.

8.7.1.1 The intensities of the characteristic ions of a compound must maximize in the same scan or within one scan of each other. Selection of a peak by a data system target compound search routine where the search is based on the presence of a target chromatographic peak containing ions specific for the target compound at a compound-specific retention time will be accepted as meeting this criterion.

8.7.1.2 The RRT of the sample component is within ± 0.06RRT units of the RRT of the standard component.

8.7.1.3 The relative intensities of the characteristic ions agree within 30% of the relative intensities of these ions in the reference spectrum.

(EXAMPLE: For an ion with an abundance of 50% in the reference spectrum, the corresponding abundance in a sample spectrum can

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range between 20% and 80%). Analyst experience is vital in this determination when interferences are present.

8.7.1.4 Structural isomers that produce very similar mass spectra should be identified as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between the two isomers is <50% of the average of the two peak heights (for Method 8270D) and <25% of the sum of the two peak heights (for Methods 8270C & 625). Otherwise, structural isomers are identified as isomeric pairs.

8.7.1.5 Identification is hampered when sample components are not resolved chromatographically and produce mass spectra containing ions contributed by more than one analyte. When gas chromatographic peaks obviously represent more than one sample component (i.e., a broadened peak with shoulder(s) or a valley between two or more maxima), appropriate selection of analyte spectra and background spectra is important.

8.7.1.6 Examination of extracted ion current profiles of appropriate ions can aid in the selection of spectra, and in qualitative identification of compounds. When analytes co-elute (i.e., only one chromatographic peak is apparent), the identification criteria can be met, but each analyte spectrum will contain extraneous ions contributed by the co-eluting compound.

8.7.1.7 Absolute retention times are used for compound identification in all GC methods that do *not* employ internal standard calibration. Retention time windows are established to compensate for minor shifts in absolute retention times as a result of sample loadings and normal chromatographic variability. The width of the retention time window should be carefully established to minimize the occurrence of both false positive and false negative results. Tight retention time windows may result in false negatives and/or may cause unnecessary reanalysis of samples when surrogates or spiked compounds are erroneously not identified. Overly wide retention time windows may result in false positive results that may not be confirmed.

8.7.1.7.1 Before establishing retention time windows, make sure that the chromatographic system is operating reliably and that the system conditions are optimized for the target analytes and surrogates in the sample matrix to be analyzed. Make three injections of all standard mixtures over the course of a 72-hour period. Serial injections or injections over a period of less than 72 hours may result in retention time windows that are too tight.

8.7.1.7.2 Record the retention time (in minutes) for each single component analyte and surrogate to three decimal places. Calculate the mean and standard deviation of the three absolute retention times for each single component analyte and surrogate. For multi-component analytes, choose three to

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five major peaks (see the determinative methods for more details) and calculate the mean and standard deviation of those peaks.

8.7.1.7.3 If the standard deviation of the retention times for a target compound is 0.000 (i.e., no difference between the absolute retention times), then either collect data from additional injections of standards or use a default standard deviation of 0.01 minutes.

8.7.1.7.4 The width of the retention time window for each analyte, surrogate, and major constituent in multi-component analytes is defined as ± 3 times the standard deviation of the mean absolute retention time established during the 72-hour period or 0.03 minutes, whichever is greater.

8.7.1.7.5 Establish the center of the retention time window for each analyte and surrogate by using the absolute retention time for each analyte and surrogate from the calibration verification standard at the beginning of the analytical shift. For samples run during the same shift as an initial calibration, use the retention time of the mid-point standard of the initial calibration.

8.7.1.7.6 Calculate absolute retention time windows for each analyte and surrogate on each chromatographic column and instrument. New retention time windows must be established when a new GC column is installed or if a GC column has been shortened during maintenance.

8.8 TICs – Tentatively Identified Compounds

Periodically, clients may request the tentative identification of compounds present in the field sample that are not normal target compounds and are not normally calibrated. This identification is limited to the compounds in the current NBS (National Bureau of Standards) mass spectral library employed by ESC.

Library Search Identification – For samples containing components not associated with the calibration standards, a library search may be made for the purpose of a tentative identification. Data system library searches must not use normalization routines that would misrepresent the library or unknown spectra when making comparisons. For example, the RCRA permit or waste delisting requirements may require the reporting of non-target analytes. The analyst may only assign tentative identifications after visual comparison of sample spectra with the nearest library searches.

Guidelines for tentative identification are:

- Relative intensities of major ions in the reference spectrum (ions >10% of the most abundant ion) should be present in the sample spectrum.
- The relative intensities of the major ions should agree within ±20%. (EXAMPLE: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30% and 70%).
- Molecular ions present in the reference spectrum should be present in the sample spectrum.

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- Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of co-eluting compounds.
- Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or co-eluting peaks. Data system library reduction programs can sometimes create these discrepancies.

Routinely, ESC employs a minimum Q value of 80 for tentative identifications and a minimum concentration of 10ppb. Peaks below a Q value of 80 but above 10ppb are reported as "Unknown". Any identified peaks below 10ppb are removed as these could result from baseline noise or other interferences, not necessarily attributable to the field sample or reliably quantifiable using GCMS technology. Additionally, any peaks that are attributable to instrument contamination (I.e., siloxanes) are also removed.

8.9 Quantitative analysis

8.9.1 Once a compound has been identified, the quantitation of that compound will be based on the integrated abundance of the primary characteristic ion from the EICP.

8.9.1.1 It is recommended to use the integrations produced by the software if the integration is correct because the software will produce more consistent integrations of peaks in chromatograms. Manual integrations may be necessary in some cases and must be performed in conjunction with ESC SOP #030215, *Manual Integration*.

DOD samples must include a reason for each integration performed on the manual integration documentation.

8.9.2 If the RSD of a compound's response factor meets method requirements, then the concentration in the extract may be determined using the average response factor (average RF) from initial calibration data.

8.9.3 Where applicable, the concentration of any tentatively identified compounds in the sample should be estimated. The same formula as is used to calculate target analyte concentrations is used with the following modifications: The areas A_x and A_{is} must be from the total ion chromatograms and the RF for the compound is assumed at 1. See section 9.7 for calculation.

8.9.4 The resulting concentration must be reported indicating that the value is an estimate. Use the nearest internal standard free of interferences for estimated concentration calculations.

8.9.5 Quantitation of multi-component compounds (e.g., Toxaphene, Aroclors, etc.) is beyond the scope of Method 8270. Normally, quantitation is performed using a GC/ECD, by Methods 8081or 8082. However, Method 8270 may be used to confirm the identification of these compounds, when the concentrations are at least 10ng/µL in the concentrated sample extract.

8.9.6 **Peak Resolution:** Structural isomers that produce very similar spectra must be quantitated as individual isomers if they have sufficiently different GC retention times. Sufficient GC resolution is achieved if the height of the valley between the two isomers is <50% of the average of the two peak heights (for Method 8270D)

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and <25% of the sum of the two peak heights (for Methods 8270C & 625). Otherwise, structural isomers should be identified as isomeric pairs.

STATE NOTE: Minnesota MPCA requires that peak resolution of all co-eluters, analyzed using Method 8270C, must be resolved as close to 75% as possible, but not <70%. Resolution must be adequate at lower levels and not worsen as concentration increases.

8.9.7 Indeno(1,2,3-cd)pyrene and dibenz(a,h)anthracene share a similar structure and physical properties. Under routine analytical production conditions it is very difficult to achieve resolved chromatographic separation. The mass-spectra of these compounds exhibit base peaks separated by 2 AMUs (276 and 278 respectively) and these unique ions are used for quantitation of the respective compounds as defined by Method 8270. It has been found that the major base ion, 276, for indeno(1,2,3-cd)pyrene includes a significant contribution from dibenz(a,h)anthracene when the targets are present together at equal concentrations; however, indeno(1,2,3-cd)pyrene presence *does not* contribute significant ion 278 abundance to dibenz(a,h)anthracene quantitation at equal concentrations. For these reasons when dibenz(a,h)anthracene is found to be present at similar or lesser concentrations than indeno(l,2,3-cd)pyrene, the results are normalized by the calibration conditions and considered to be non-impacted. Alternatively, when dibenz(a,h)anthracene is found to be present at relatively greater concentrations than indeno(l ,2,3-cd)pyrene, the indeno(1,2,3-cd)pyrene results are considered to be elevated and may be confirmed by a secondary acquisition and analysis utilizing a technique for chromatographic separation of the targets. Concentrations shall be considered similar up to a factor of two.

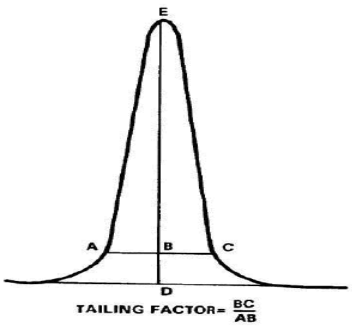
9.0 DATA ANALYSIS AND CALCULATIONS

9.1 GC/MS Tune: DDT Breakdown Determination during Tuning:

$$\%\ \text{breakdown of DDT} = \frac{\text{sum of degradation peak areas (DDD + DDE)}}{\text{sum of all peak areas (DDT + DDE + DDD)}} \times 100$$

9.2 GC/MS Tune: Benzidine and Pentachlorophenol Tailing Factor

$$\text{TailingFactor} = \frac{BC}{AB}$$



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where: BC is the width of the back ½ of the peak at 10% of the peak height
AB is the width of the front ½ of the peak at 10% of the peak height.

9.3 Internal Calibration Equations (Response Factors):

$$RF = \frac{[A_s][C_{is}]}{[A_{is}][C_s]}$$

where:
A_s = Peak area (or height) of the analyte or surrogate.
A_{is} = Peak area (or height) of the internal standard.
C_s = Concentration of the analyte or surrogate, in µg/L.
C_{is} = Concentration of the internal standard, in µg/L.

- Percent Relative Standard Deviation (%RSD)

$$\overline{RF} = \frac{\sum_{i=1}^{n} RF_i}{n} \qquad SD = \sqrt{\frac{\sum_{i=1}^{n} (RF_i - \overline{RF})^2}{n-1}} \qquad RSD = \frac{SD}{\overline{RF}} x100\%$$

where:
RSD = Relative standard deviation.
RF = Mean of 5 initial RFs for a compound.
SD = Standard deviation of average RFs for a compound.

- Concentration of an analyte in an extract using RF (on column):

$$X_s = \frac{(Conc._{IStd})(Area_{Analyte})}{(Average\ RF_{analyte})(Area_{IStd})}$$

where:
X_s = Calculated raw concentration of analyte (in ppb)

- Quantitation Report Multiplier"

$$M_a = \frac{(V_t)(D)}{(V_s)} \quad or \quad M_s = \frac{(V_t)(D)}{(W_s)}$$

where:
M_a = Quantitation Report Multiplier for Aqueous Samples
M_s = Quantitation Report Multiplier for Solid Samples
V_t = Total volume of concentrated extract (in mL)
D = Dilution factor. If no dilution, D=1. Always dimensionless
V_s = Volume of aqueous sample extracted (in mL)
W_s = Weight sample extracted (in grams)

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- Sample concentration by volume (ug/L) for aqueous samples:

$$Concentration\ in\ \frac{\mu g}{L} = (X_s)(M_a)$$

- Sample concentration by weight (ug/kg) for solid samples and non-aqueous liquids:

$$Concentration\ in\ \frac{\mu g}{kg} = \frac{(X_s)(M_s)}{(\%S)}$$

where:
%S = Percent solids expressed as a decimal

9.4 Relative Retention Time (RRT):

$$RRT = \frac{RT\ of\ Target\ Analyte}{RT\ of\ Internal\ Standard}$$

9.5 Percent Error (%Error)

$$\%Error = \frac{x_i - x'_i}{x_i} * 100$$

where:
x'_i = Measured amount of analyte at the calibration level *i*, in mass or concentration units
x_i = True amount of analyte at calibration level *i*, in mass or concentration units

9.6 Relative Standard Error (%RSE) – As an alternative to using the average response factor when using Method 625.1, the quality of the calibration may be evaluated using the Relative Standard Error (RSE). The acceptance criterion for the RSE is the same as the acceptance criterion for Relative Standard Deviation (RSD), in the method. RSE is calculated as:

$$\%RSE = 100 \times \frac{\sum_{i=1}^{n}\left[\frac{x'_i - x_i}{x_i}\right]^2}{(n-p)}$$

where:
x'i = Calculated concentration at level i
xi = Actual concentration of the calibration level i
n = Number of calibration points
p = Number of terms in the fitting equation (average = 1; linear = 2; quadratic = 3)

9.7 See the current Quality Assurance Manual for other equations associated with common calculations.

10.0 QUALITY CONTROL AND METHOD PERFORMANCE

10.1 All analysts must meet the qualifications specified in SOP #030205, *Technical Training and Personnel Qualifications* before approval to perform this method. Analysts must

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complete an initial demonstration of proficiency before being approved to perform this method. Continuing proficiency must be demonstrated using proficiency testing, laboratory control sample analysis and/or MDL studies. Method performance is assessed per analyst. Updated method performance records are filed and stored in a central location within the department.

10.1.1 Method 625.1 Demonstration of Capability (DOC) Requirements

10.1.1.1 For the DOC, a QC check sample (LCS) concentrate containing each analyte of interest is prepared in a water miscible solvent. The QC check sample concentrate must be prepared independently from those used for calibration, but may be from the same source as the second-source standard used for calibration verification. The concentrate should produce concentrations of the analytes of interest in water at the midpoint of the calibration range, and may be at the same concentration as the LCS.

10.1.1.2 Prepare four QC check samples by adding an appropriate volume of the concentrate and of the surrogate(s) to each of four aliquots of reagent water and mix well. The volume of reagent water must be the same as the volume that will be used for the sample, blank, and MS/MSD.

10.1.1.3 Extract and analyze the four LCSs samples.

10.1.1.4 Calculate the average percent recovery ($\overline{X}$) and the standard deviation (s) of the percent recovery for each analyte using the four results.

10.1.1.5 For each analyte, compare s and $\overline{X}$ with the acceptance criteria for precision and recovery presented in Attachment VII. For analytes that are not listed, QC acceptance criteria must be developed by the laboratory.

If s and $\overline{X}$ for all analytes of interest meet the acceptance criteria, system performance is acceptable and analysis of blanks and samples can begin. If any individual s exceeds the precision limit or any individual $\overline{X}$ falls outside the range for recovery, system performance is unacceptable for that analyte.

10.1.1.6 When one or more of the analytes tested fail at least one of the acceptance criteria, repeat the test for only the analytes that failed. If results for these analytes pass, system performance is acceptable and analysis of samples and blanks may proceed. If one or more of the analytes again fail, system performance is unacceptable for the analytes that failed the acceptance criteria. Correct the problem and repeat the test.

10.2 Use the designated Run log to record batch order and standards/reagents used during analysis. See SOP #030201, *Data Handling and Reporting*.

10.3 Batches:

Batches are defined as sets of 1 - 20 samples. Batch analysis must include the following: 1 method blank, 1 Laboratory Control Sample (LCS), 1 Laboratory Control Sample

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Duplicate (LCSD), 1 Matrix Spike/Spike Duplicate (MS/MSD) (if client has supplied sufficient sample volume). All batch information must be maintained in the preparation documentation assigned to the department.

10.4 For sample analyzed per the requirements of Method 8000D, the LLOQ (see Section 1.8.2) must be verified at least annually, and whenever significant changes are made to the preparation and/or analytical procedure, to demonstrate quantitation capability at lower analyte concentration levels

10.4.1 The LLOQ verification (to be performed after the initial calibration) is prepared by spiking a clean control material with the analyte(s) of interest at 0.5-2 times the LLOQ concentration level(s).

10.4.2 The LLOQ check is carried through the same preparation and analytical procedures as environmental samples and other QC samples.

10.4.3 It is recommended to analyze the LLOQ verification on every instrument where data is reported; however, at a minimum, the lab must rotate the verification among similar analytical instruments such that all are included within 3 years.

10.4.4 Recovery of target analytes in the LLOQ verification must be within established in-house limits or within other such project-specific acceptance limits to demonstrate acceptable method performance at the LLOQ. Until the laboratory has sufficient data to determine acceptance limits, the LCS criteria ± 20% (i.e., lower limit minus 20% and upper limit plus 20%) may be used for the LLOQ acceptance criteria.

10.5 For acceptance criteria for calibration standards, QC samples and field samples and corrective actions, see section 11.0.

11.0 DATA VALIDATION AND CORRECTIVE ACTION

11.1 A successful DFTPP tune must be achieved prior to initial calibration or daily calibration verification. If a tune does not meet the acceptance criteria in section 8.2, then re-inject the tuning solution. If the failure persists, instrument maintenance or detector adjustment is required. The instrument is equipped with detector adjustments in routines called “Autotunes” that can make minor adjustments to m/z ratios and detector setting and can align the analytical system to return the system to peak performance. If after performing the Autotune routine, the injected tuning standard still fails, the system may require injector and/or detector cleaning, column cutting or replacement, injection liner cleaning or replacement, or other maintenance as specified by the manufacturer.Following successful tuning of the DFTPP solution, the DDT degradation and Benzidine/Pentachlorophenol tailing must be assessed using the total ion chromatograms for each. If either fail to meet the required acceptance criteria, instrument maintenance is required. The DDT degradation is most likely an inlet or column condition and corrective action entails clipping 6-12” from the injector end of the column, changing the injection port liner, possibly changing the gold inlet seal and re-injecting the tuning solution. The tailing issue is most likely caused by the same type of inlet issues and the same corrective action steps should occur when the tailing criteria is not met. Tailing may also be caused by incorrect column positioning in the inlet and the correct position of the column should be verified prior to performing more involved corrective action processes.

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A successful instrument tune, including degradation and tailing acceptability, must be achieved prior to the analysis of calibration standards and sample extracts.

11.2 Initial or Continuing Calibration:

Method 8270C, SM 6410B & Method 625.1: If the calibration curve or daily calibration verification fails to meet the applicable method verification criteria for RSD, the analyst MUST use linear regression or quadratic curve fit. Quadratic models cannot be used to extend the calibration range or bypass instrument maintenance. If the method criteria are still not met when using the alternate curve fits, samples may not be quantitated using the calibration curve and a new calibration curve must be analyzed. Instrument maintenance and/or new standard preparation may also be required prior to the analysis of the new calibration curve. Following maintenance, the new calibration curve can be generated. The system may require injector and/or detector cleaning, column cutting or replacement, injection liner cleaning or replacement, or other maintenance as specified by the manufacturer. Additional actions that can be taken to address failures in calibration are included in section 8.3.

Method 8270D: Due to the large number of compounds that may be analyzed by this method, some compounds in the initial and/or daily calibration verification will fail to meet the initial and continuing calibration acceptance criteria. For these instances, failing compounds may not be critical to specific project needs and therefore may be utilized as qualified data or estimated values for screening purposes. If more than 10% of the compounds in the initial or continuing calibration exceed the 20% RSD limit and/or do not meet the minimum correlation coefficient (0.995) for alternate curve fits, then the chromatographic system is considered too reactive for analysis. Instrument maintenance must be performed and the calibration process must be repeated. The system may require injector and/or detector cleaning, column cutting or replacement, injection liner cleaning or replacement, or other maintenance as specified by the manufacturer. Additional actions that can be taken to address failures in calibration are included in section 8.3.

TNI: If the ICV or CCV results obtained are outside the established acceptance criteria and analysis of a second consecutive (immediate) calibration verification fails to produce results within acceptance criteria, corrective actions shall be performed. The laboratory shall demonstrate acceptable performance after the final round of corrective action with two consecutive calibration verifications, or a new initial instrument calibration shall be performed.

Method 8000D: To determine calibration function acceptability, refit the initial calibration data back to the calibration model and calculate %Error (see Section 9.5). Percent error between the calculated and expected amounts of an analyte must be $\leq$30% for all standards. ($\leq$50% is acceptable for the lowest calibration point.)

Method 625.1: The RF or calibration curve must be verified immediately after calibration and at the beginning of each 12-hour shift, by analysis of a standard at or near the concentration of the mid-point calibration standard. The standard(s) must be obtained from a second manufacturer or a manufacturer's batch prepared independently from the batch used for calibration.

When one or more analytes fail acceptance criteria, analyze a second aliquot of the calibration verification standard and compare ONLY those analytes that failed the first test with their respective acceptance criteria. If these analytes now pass, system performance is acceptable and analysis of samples may continue. A repeat failure of any analyte that failed the first test, however, will confirm a general problem with the measurement system. If this

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occurs, repair the system and repeat the test, or prepare a fresh calibration standard and repeat the test. If calibration cannot be verified after maintenance or injection of the fresh calibration standard, re-calibrate the instrument.

11.3 The method blank must be extracted and analyzed with each set of samples at a frequency of at least 5% and must be free of the analytes of interest at the method detection limit. If the method blank contains target analytes at a detectable concentration, it may be necessary to analyze a solvent blank to demonstrate the source of the contamination is not carryover from standards or lingering field sample artifacts. Following verification that the analytical system is free from interferences, the method blank can be re-analyzed once. A passing method blank must be analyzed before any samples are analyzed; otherwise corrective action is required. Corrective action can take the form of checking the original calculations to ensure accuracy or instrument maintenance (i.e. column clipping or changing, inlet liner cleaning/replacement, etc.) or re-calibration. The surrogate recoveries in the method blank must meet the established control criteria (see the LIMS). If not, the recovery demonstrates an analytical system that is in an out-of-control mode and the batch must be re-extracted/re-analysis unless directed otherwise by the client.

General guidelines for qualifying sample results with regard to method blank quality are as follows:

- If the method blank concentration is less than the MDL and sample results are greater than the RL, then no qualification is required.
- No qualification is necessary when an analyte is detected in the method blank but not in the associated samples.
- If the concentration in a sample is more than ten times the concentration in the method blank, then no qualification is required.
- If the method blank concentration is greater than the MDL but less than the RL and sample results are greater than the MDL, then qualify associated sample results to indicate that analyte was detected in the method blank.
- If the method blank concentration is greater than the RL, further corrective action and qualification is required. An analyst should consult their supervisor for further instruction.

11.4 Second Source Calibration Verification

Method 8270D: The value determined from the second source calibration verification (SSCV) should be within $\pm$30% drift of the expected concentration. Alternative recovery limits may be appropriate based on analyte performance and project specific requirements. Quantitative analysis cannot proceed for analytes that fail the SSCV, except for screening purposes only.

Method 8270C/SM6410B: The value determined from the second source calibration verification (SSCV) must be $\leq$50% drift for non-CCC compounds; $\leq$20% drift for CCC compounds and meet the minimum response factor criteria for SPCC compounds as in the initial calibration construction. Historical performance weighs heavily in the acceptability of those analytes that are known to perform poorly. Corrective action can take the form of checking the original calculations to ensure accuracy, re-analysis of the SSCV to verify initial results, instrument maintenance (i.e. column clipping or changing, inlet liner cleaning/replacement, etc.) or re-calibration.

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STATE NOTE: If the samples are analyzed in conjunction with South Carolina DHEC, alternate recovery limits can only be used if they are more stringent than method criteria.

Method 625.1: Method 625.1 utilizes CCV limits for evaluation.

11.5 Surrogates: If the surrogate recoveries in the samples do not fall within the appropriate acceptance criteria presented in the LIMS, ensure that there were no errors in calculations, internal standard, or instrument performance. If the recovery of any one surrogate is critically low (, then the sample must be re-extracted unless otherwise directed by the client or a clear, documented matrix interference is exhibited. If two of three acid and two of three base/neutral surrogates are within acceptance criteria, then the sample may be reported. If surrogate recoveries present a high bias, and samples are BDL, then data is not impacted and may be reported. If re-extraction is required and there is no more sample available or it has exceeded holding times, the data must be flagged with a “J1" (surrogate high) or a “J2” (surrogate low). See SOP #030201, *Data Handling and Reporting*, for more information on qualifying out of control data.

STATE NOTE: If the sample is from North Carolina, two of the three acid and two of the three base/neutral surrogates must pass. If two of the three acid or base/neutral surrogates fail, the sample must be re-extracted. For all other samples, one of the three surrogates must pass from both the acid and base/neutral sides. If any surrogates have less than a 10% or greater than 200% recovery, and matrix interferences are not confirmed as the cause of the failure, the sample must be re-extracted.

STATE NOTE: If field samples are analyzed in conjunction with the Ohio VAP program, surrogate outliers in batch QC samples, including the method blank, LCS/LCSD, MS/MSD require re-extraction of the entire batch, if sufficient volume has been submitted by the client and an obvious matrix interferent is not present.

STATE NOTE: If the sample is analyzed in conjunction with the Ohio VAP, corrective action for failing QC (i.e. method blank, surrogate, MS/MSD, LCS/LCSD, ISTD, etc.) must be performed prior to flagging data, if sufficient sample volume was submitted by the client. Corrective action can include re-analysis, if instrument malfunction is suspected, or re-preparation and re-analysis, if the failure is suspected as either extraction or sample related.

11.6 Internal Standard: The internal standard area counts must be monitored for all ICVs. ISTDs must recover within –50% to +100% of the area counts from the internal standard area counts of the midpoint standard of the most recent initial calibration sequence. If any internal standard response is beyond the acceptable recovery, corrective action is required. Corrective action can take the form of checking the original calculations to ensure accuracy, re-analysis of the ICV to verify initial results, instrument maintenance (i.e. column clipping or changing, inlet liner cleaning/replacement, etc.) or re-calibration.

The internal standard responses and retention times in the check calibration standard must be evaluated immediately after or during data acquisition. If the retention time for any internal standard changes by more than 30 seconds from the last calibration verification, the chromatographic system must be inspected for malfunctions and corrections must be made, as required. When corrections are made, re-analysis of the

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CCV or a complete re-calibration is necessary, depending on the impact of the correction on the analytical system.

Internal standards must be monitored for each sample. ISTDs in samples must meet the –50% to +100% criteria when compared to the ISTDs in the daily CCV or mid-level of the calibration curve, on 12h shifts when full calibration is performed. Possible corrective actions include: re-analysis, if instrument malfunction is suspected, or re-preparation and re-analysis, if the failure is suspected as either extraction or sample related. If the sample has an obvious matrix interferent and the internal standard recovery is greater than +100%, the sample can be diluted (if acceptable reporting limits can be achieved) to minimize the interference or the sample must be re-extracted and re-analyzed to confirm the original results. ISTD failures <50% of daily ICV may be reported if all corresponding analytes are BDL as the high quantitation bias created by the reduced internal standard recovery has not adversely impacted the reported analyte results.

11.7 LCS/LCSD and MS/MSD: The laboratory control sample, laboratory control sample duplicate, matrix spike and matrix spike duplicate recoveries must be evaluated against the acceptance criteria given in the LIMS. The LCS/LCSD and MS/MSD are spiked with the same list of compounds for which the instrument is calibrated. Due to the large number of compounds analyzed using these methods, it is statistically likely that accuracy and precision failures will occur.

LCS or LCSD samples that do not pass the acceptable QC criteria must be re-analyzed. LCS/LCSD failures must meet the marginal exceedance criteria below. The normal compound list for 8270/625 typically contains 90 analytes; therefore only 5 analytes can be considered as marginally exceeding the acceptance criteria. If more than 5 failures occur or if the failures demonstrate a pattern that is causing the outliers, the entire sample batch with associated QC must be re-extracted and re-analyzed. Marginal exceedances must be random events.

Upper and lower marginal exceedance (ME) limits are established by +/- four times the standard deviation of historical accuracy data and the number of marginal exceedances allowed is based on the number of analytes spiked in the LCS.

Number of allowable marginal exceedances:

90 analytes, 5 analytes allowed in the ME limit
71 – 90 analytes, 4 analytes allowed in the ME limit.
51 – 70 analytes, 3 analytes allowed in the ME limit.
31 – 50 analytes, 2 analytes allowed in the ME limit.
11 – 30 analytes, 1 analyte allowed in the ME limit.
< 11 analytes, no analyte allowed in the ME limit.

If the MS/MSD fails to meet recovery limits listed in the LIMS, the data on the unspiked field sample for that compound must be flagged with a “J5” (high recovery) or a “J6” (low recovery). If the MS/MSD fail to pass precision limits (%RSD), the data on the unspiked field sample for that compound must be flagged with a “J3” qualifier.

STATE NOTE: For South Carolina or Ohio VAP samples, marginal exceedances do not apply. All outliers in QC require corrective action when possible and the data must be flagged when necessary.

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STATE NOTE: For all samples from South Carolina, the LCS/LCSD recovery must be evaluated within 70-130% and the MS/MSD recoveries must be within in-house derived recovery limits; however, if the limits given in Method 625 Table 6 are more stringent, then those limits must be used. The following are the current limits:

Parameter	LCS/LCSD	MS/MSD
1,2,4-TRICHLOROBENZENE	70 - 130%	44 – 104%
2,4,6-TRICHLOROPHENOL	70 - 130%	37 - 132%
2,4-DICHLOROPHENOL	70 - 130%	39 - 117%
2,4-DIMETHYLPHENOL	70 - 119%	32 - 119%
2,4-DINITROPHENOL	70 - 130%	10 - 141%
2,4-DINITROTOLUENE	70 - 130%	45.4 - 139%
2,6-DINITROTOLUENE	70 - 130%	50 - 134%
2-CHLORONAPHTHALENE	70 - 118%	60 - 118%
2-CHLOROPHENOL	70 - 130%	23 - 111%
2-NITROPHENOL	70 - 130%	29 - 135%
3,3-DICHLOROBENZIDINE	70 - 130%	10 - 143%
4,6-DINITRO-2-METHYLPHENOL	70 - 130%	10 - 143%
4-BROMOPHENYL-PHENYLETHER	70 - 127%	53 - 127%
4-CHLORO-3-METHYLPHENOL	70 - 130%	38.4 - 123%
4-CHLOROPHENYL-PHENYLETHER	70 - 130%	49.8 -127%
4-NITROPHENOL	70 - 130%	10 - 52.8%
ACENAPHTHENE	70 - 130%	47 - 141%
ACENAPHTHYLENE	70 - 130%	40 - 132%
ANTHRACENE	70 - 130%	44.5 - 130%
BENZO(A)ANTHRACENE	70 - 130%	46.4 - 130%
BENZO(A)PYRENE	70 - 130%	34.6 - 129%
BENZO(B)FLUORANTHENE	70 - 130%	36.3 - 137%
BENZO(G,H,I)PERYLENE	70 - 130%	10 - 140%
BENZO(K)FLUORANTHENE	70 - 130%	30.3 - 136%
BENZYLBUTYL PHTHALATE	70 - 130%	44.8 - 152%
BIS(2-CHLORETHOXY)METHANE	70 - 130%	39.2 - 128%
BIS(2-CHLOROETHYL)ETHER	70 - 130%	14.8 - 131%
BIS(2-CHLOROISOPROPYL)ETHER	70 - 130%	36 - 117%
BIS(2-ETHYLHEXYL)PHTHALATE	70 - 130%	12.6 - 153%
CHRYSENE	70 - 130%	40 - 133%
DIBENZ(A,H)ANTHRACENE	70 - 130%	10 - 143%
DIETHYL PHTHALATE	70 - 114%	50.4 - 114%
DIMETHYL PHTHALATE	70 - 112%	9.1 - 112%
DI-N-BUTYL PHTHALATE	70 - 118%	53.3 - 118%
DI-N-OCTYL PHTHALATE	70 - 130%	13.3 - 146%
FLUORANTHENE	70 - 130%	42.9 - 137%
FLUORENE	70 - 121%	59 - 121%
HEXACHLORO-1,3-BUTADIENE	70 - 116%	28.9 - 116%
HEXACHLOROBENZENE	70 - 130%	47 - 121%
HEXACHLOROCYCLOPENTADIENE	70 - 130%	10 - 128%
HEXACHLOROETHANE	70 - 113%	40 - 109%
INDENO(1,2,3-CD)PYRENE	70 - 130%	10 - 141%
ISOPHORONE	70 - 130%	31.9 - 118%
NAPHTHALENE	70 - 130%	29 - 115%
NITROBENZENE	70 - 130%	35 - 118%
N-NITROSODI-N-PROPYLAMINE	70 - 130%	35.4 - 129%
PENTACHLOROPHENOL	70 - 130%	14 - 128%

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Parameter	LCS/LCSD	MS/MSD
PHENANTHRENE	70 - 130%	54 - 120%
PHENOL	70 - 112%	10 - 55.7%
PYRENE	70 - 115%	52 - 115%

Method 625.1: For LCS analyses, repeat the test only for those analytes that failed to meet the acceptance criteria (PS). If these analytes now pass, system performance is acceptable and analysis of blanks and samples may proceed. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, repeat the test using a fresh LCS or an LCS prepared with a fresh QC check sample concentrate, or perform and document system repair. Subsequent to analysis of the LCS prepared with a fresh sample concentrate, or to system repair, repeat the LCS test. If failure of the LCS indicates a systemic problem with samples in the batch, re-extract and re-analyze the samples in the batch.

The large number of analytes tested in performance tests in this method present a substantial probability that one or more will fail acceptance criteria when many analytes are tested simultaneously, and a retest is allowed if this situation should occur. If, however, continued re-testing results in further repeated failures, the laboratory must document and report the failures (e.g., as qualifiers on results), unless the failures are not required to be reported as determined by the regulatory/control authority. Results associated with a QC failure for an analyte regulated in a discharge cannot be used to demonstrate regulatory compliance. QC failures do not relieve a discharger or permittee of reporting timely results.

NOTE: To maintain the validity of the test and re-test, system maintenance and/or adjustment is not permitted between the pair of tests.

For MS/MSD analyses, compare the percent recoveries (P1 and P2) and the RPD for each analyte in the MS/MSD aliquots with the corresponding QC acceptance criteria in Attachment VII. A laboratory may develop and apply QC acceptance criteria more restrictive than the criteria in Attachment VII, if desired.

If any individual P falls outside the designated range for recovery in either aliquot, or the RPD limit is exceeded, the result for the analyte in the unspiked sample is suspect. The large number of analytes tested in performance tests in this method present a substantial probability that one or more will fail acceptance criteria when many analytes are tested simultaneously, and a retest is allowed if this situation should occur. If, however, continued re-testing results in further repeated failures, the laboratory must document and report the failures (e.g., as qualifiers on results), unless the failures are not required to be reported as determined by the regulatory/control authority. Results associated with a QC failure for an analyte regulated in a discharge cannot be used to demonstrate regulatory compliance. QC failures do not relieve a discharger or permittee of reporting timely results.

11.8 Calibration Range: For any compound found in a sample at a level above the highest standard, the extract must be diluted and re-analyzed to allow quantitation within the range of instrument calibration. Whenever an extract dilution is made, the appropriate amount of internal standard must be added to bring the ISTD concentrations back to the concentrations consistent with the calibration standards.

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STATE NOTE: For all samples analyzed from Minnesota, the reporting limit must be verified at least monthly, with each new initial calibration, or when there has been significant change to the instrument (column replacement, cleaning source, etc.) whichever is more frequent. The reporting limit verification can be performed by either re-injecting the low standard or by re-processing the low standard that was analyzed in the calibration curve. The reporting limit verification (RLV) must recovery within ±40% of the expected concentration. If this criterion is not met, the RLV may be re-analyzed once, instrument maintenance can be performed, a higher concentration standard can be injected, or a new calibration curve must be generated. If a higher concentration standard is utilized, the reporting limit must be raised to the higher level verified.

11.9 All data must undergo a primary review by the analyst. The analyst must check the performance of the initial calibration, check standard, and continuing calibrations to ensure that they meet the criteria of the method. The analyst must review any sample that has quantifiable compounds and make sure that they have been confirmed, if necessary. The analyst must also verify that reported results are derived from quantitation between the RL and the highest standard of the initial calibration curve. All calculations must be checked (any dilutions, %solids, etc.). Data must be checked for the presence or absence of appropriate flags. Comments must be noted when data is flagged.

11.10 All data must undergo a second analyst review. The analyst checking the data must check the performance of the initial calibration, mid-point check standard, and continuing calibrations to ensure that they meet the criteria of the method.

11.10.1 The analyst should must review any sample that has quantifiable compounds and make sure that they have been confirmed.

11.10.2 All surrogate recoveries must be checked to ensure that they are within QC acceptance criteria or that corrective action has occurred.

11.10.3 Blanks must be free of all interfering peaks.

11.10.4 Quality control criteria must be checked for the LCS, LCSD, MS, and MSD.

11.10.5 Data must be checked to determine the need for appropriate flags. Comments are noted when results are flagged.

11.10.7 All manual integrations must be verified through checking the before/after shot of the sample, method blank, and/or QC (LCS/LCSD/MS/MSD).

11.10.8 See SOP #030201, *Data Handling and Reporting* and SOP #030227*, Data Review*.

12.0 POLLUTION PREVENTION AND WASTE MANAGEMENT

12.1 The EPA requires that laboratory waste management practice to be conducted consistent with all applicable federal and state laws and regulations. Excess reagents, samples and method process wastes must be characterized and disposed of in an acceptable manner. See *ESC Waste Management Plan.*

12.2 See SOP #030302, *Environmental Sustainability & Pollution Prevention*.

13.0 METHOD MODIFICATIONS/CLARIFICATIONS

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13.1 The **Missouri Department of Natural Resources requires** that **DRO** be analyzed by GC/MS. Tuning and frequency requirements are the same as 8270C, omitting DDT, pentachlorophenol, and benzidine assessments. Extract samples the same as 8270PAH using the appropriate extraction method. Only base/neutral surrogates are needed. GC/MS mass range should be 35-550amu. Prepare a five-point calibration curve with 1:1 unleaded gasoline and #2 diesel fuel at 10,000 µg/mL each in methylene chloride. Calibration standards range from 200 to 10,000ug/mL for concentrated soil or 1L water extractions and calibration levels for EPA 3511 extracted water samples and non-concentrated Soil range from 5-200ppm from a 200ppm intermediate. Retention time windows are set using C_{10}, C_{21}, and C_{35}. For DRO, set RT 0.1 minutes after C_{10} to 0.1 minutes after C_{21}. For ORO, set RT 0.1 minutes after C_{21} to 0.1 minutes after C_{35}. Verify RT windows daily (24 hours) by running component standard. Quantitate using baseline-to baseline, not valley–to-valley. The total ion chromatogram must be used to quantitate. DRO is quantitated using external standard method. The response factor determined for DRO (C_{10}-C_{21}) **must** be used for C_{21}-C_{35}. Subtract area for any internal standard and surrogates. %RSD <20. Run a CCV every 12 hours near mid-point of calibration, %D <20. Run a method blank, LCS and MS/MSD every extraction batch. May re-process files to quantitate PAH analytes, if needed. Quantitation of DRO must be performed using the external standard process.

13.4 The reduction of the size of the field sample used in this procedure is performed in accordance with section 7.1 of the published EPA 3510C/625method. The reduction in volume extracted along with increased sensitivity at detection and/or analysis of the resulting extract using large volume injection (>5uL) on each GCMS allows for low detection limits typical of those obtained using a 1L extraction. Complete method validation is performed for each method prior to utilizing the reduced volume extraction. This validation is maintained by the Regulatory Affairs Department and is regularly verified using LCS/LCSD, MDL studies and DOCs.

13.5 **Low level NDMA and 1,4-Dioxane by SIM scan/isotope dilution.** Tuning and frequency requirements are the same as 8270C. Extract samples the same as 8270BNA using the appropriate extraction method. 250ng of N-nitrosodimethylamine-d6 or 1,4Dioxane-d_8 is added to each sample per every 0.5mL of final extract volume prior to extraction resulting in a true value of 500ppb in extract. Only base/neutral surrogates monitoring is necessary. GC/MS is set to scan for masses 42, 43, 46, 48, 54, 74, 80, 82, 115, 128, 150 and 152 for NDMA-d_6 or masses 57, 58, 62, 64, and 88 for 1,4-Dioxane-d_8 in SIM mode. Calibrate at least 5 points using 8270BNA mega mix or 1,4-Dioxane ICAL standard. 500ng of N-nitrosodimethylamine-d_6 is added per every 1mL of calibration standard to each level of the calibration resulting in a true value of 500ppb Calibration standards range from 5ppb to 10,000ppb for 3510RV extracted water samples. Quantitate using Chemstation auto-integration software unless a significant discrepancy is noted in which case manually adjust integrations to best represent the calibration. Select ion monitoring should be used for acquisition and quantitation. NDMA and 1,4-Dioxane are quantitated using the isotope dilution method as described in 8000C. The %RSD determined for NDMA RFs **must** be <15% in order to use the average of response factors for quantitation, otherwise linear regression is to be used. Run a DFTPP tune and CCV every 12 hours near mid-point of calibration, %Diff must be <20% for the calibration to be deemed in control and sample analysis to proceed. Run a method blank, LCS and LCSD with every extraction batch. MS/MSDs will be processed with batches when requested by the client as matrix spiking and duplication does not yield reliable precision data when analyzed by the isotope dilution method. Quantitation

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of low level NDMA and 1,4-Dioxane should be performed using the isotope dilution process.

14.0 REFERENCES

14.1 *Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)*, SW846 Method 8270C, Revision 3, December 1996.

14.2 *Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)*, SW846 Method 8270D, Revision 4, February 2007.

14.3 *Determinative Chromatographic Separations*, SW846 Method 8000B, Revision 2, December 1996.

14.4 *Determinative Chromatographic Separations*, SW846 Method 8000C, Revision 3, March 2003.

14.5 *Determinative Chromatographic Separations*, SW846 Method 8000D, Revision 4, July 2014.

14.6 *Base/Neutrals and Acids*, 40 CFR Part 136, Appendix A, EPA Method 625, October 1991.

14.7 *Extractable Base/Neutrals and Acids*, Standard Methods for the Examination of Water and Wastewater, Method 6410B-2000.

14.8 *Extractable Base/Neutrals and Acids*, Standard Methods for the Examination of Water and Wastewater, Method 6410B-1997 (20th Ed).

14.9 *Base/Neutrals and Acids by GC/MS*, EPA Method 625.1, Federal Register, Volume 82, Number 165, August 28, 2017.

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Attachment I: Revision History

Current Version (Pace National):

Date	Description of Revisions
10/8/2020	Technical and quality review and revision. Removed date from header. Replaced section 3.0, Health and Safety.

Superseded Versions (ESC Lab Sciences SOP #330345):

Version	Date	Description of Revisions
0	4/27/95	Origination
1	7/13/95	
2	8/22/96	
3	8/20/99	
4	4/18/00	
5	8/21/00	
6	12/20/00	
7	9/3/01	
8	7/30/02	
9	7/9/03	
10	3/25/04	
11	8/7/06	Technical and Quality Review and update.
12	2/11/09	Addition of 8270D requirements; Addition of State Notes; Update of standards information; Technical and Quality Review and update. Ohio VAP approval 2/11/09.
13	11/23/10	Technical and Quality Review and update. Revised sections 2.1, 2.10, 4.2 through 4.6, 7.1, 7.6, 7.8, 7.10.2, 7.12, 7.13, 8.3, 8.6, 9.3, 9.4, 9.5, 9.10 through 9.13, 11.3, 11.6, 12.1; Added sections 2.27 through 2.30, 4.7, 7.14, state note following section 11.9, 11.10, and 13.4; Removed section 1.2.
14	2/24/12	Technical and Quality Review and update. Revised sections 2.1, 4.2, 4.5, 5.3, 6.1.4, 6.2, 7.8, 7.9, 7.10, 7.13, 8.2, 8.3, 8.5, 8.6, 8.8, 11.2, 11.10, 13.1 and Attachment IV; Added state note to section 1.0; Added sections 1.8.1, 2.31, 2.32, and 13.5.
15	6/12/12	Technical and Quality Review and update. Revised sections 2.1, 7.9, 7.10, 8.3.2, 9.9, 9.14, 11.2, 11.3, 11.4, and 11.11; Added sections 2.19, 2.34, 4.8, 11.9 through 11.10, and 11.11.4 through 11.11.7.
16	3/26/13	Technical and Quality Review and update. Revised title, Attachment IV and sections 2.1, 7.8, 7.9, 7.10, 8.0 (state note), 8.3, 11.6, and 13.1; Added sections 7.13, 14.6 and state notes in sections 1.0 and 11.4; Removed sections 7.10.5 and 8.5.3.
17	6/10/14	Technical and Quality Review and update. Revised Attachments II, IVc through IVk, and V along with sections 5.3, 8.3.1, 8.3.6; 11.7; Added sections 5.4.7, 7.5.10 through 7.5.13, 7.7, 8.3.4; Removed sections 6.1.4 and 11.11.2.
18	8/14/14	Technical and Quality Review and update. Added sections 2.35, 7.5.14, and 13.6.

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Version	Date	Description of Revisions
19	11/17/2015	Technical and quality review and update. Header and signature block re-formatting. Revised Sections 1.5, 1.8.1, 5.3, 7.9.1, 7.11.1, 8.1.1, 8.4.1, 8.4.4, 8.4.6, 8.7.1, 8.8, 8.9.1.1, 11.3, 11.5, 11.7, 11.11.4, 11.11.5, and 13.5. Added Section 8.6.1.7, 8.6.1.7.1 through 8.6.1.7.6, and Attachment VI. Deleted Attachment Iva, Attachment IVb, Attachment IVc, Attachment IVd, Attachment IVe, Attachment IVf, Attachment IVg, Attachment IVh, Attachment IVi, Attachment IVj, and Attachment IVk.
20	4/1/2016	Technical and quality review and update. Revised Sections 1.8.1, 2.8, 2.9, 2.10, 4.8, 7.1, 9.4, 9.5, 11.2, 11.4, 11.11.7, 12.2, and 13.6. Deleted Sections 2.11 through 2.35 and 9.6 through 9.13. Added Sections 7.5.16, 7.5.17, 7.5.18, and 8.9.7.
21	10/24/16	Technical and quality review and update to satisfy the requirements of SC DHEC (see correspondence dated 6/24/16) Header and signature block re-formatting. Revised Sections 11.2, 11.3, 11.4, 11.7, 14.1, 14.2, 14.3, 14.4, 14.6, 14.7, 14.8, and Attachment VII Table 2. Added Sections 1.8.2, 2.10, 9.5, 10.4 and all subsections, and 11.11.7.1.
22	6/19/2017	Technical and quality review and update. Revised Sections 1.8, 3.1, 7.5.14, 7.8, 7.11.1, 8.4.1, 8.8, 9.3, 10.3, 11.7, and Attachment III.
23	7/10/2017	Technical and quality review and update. Revised Sections 2.1, 2.11, 2.12, 7.9.2, 7.10.2, 7.10.3, 7.10.4, 7.11.4, 7.11.5, 9.3, 13.1, 13.5
24	10/6/2017	Technical and quality review and update. Revised Sections 7.9.2, 11.5, and Attachment IV. Added Table 8 in Attachment VII.
25	11/29/2017	Update in response to A2LA audit finding CAR2872. Revised Attachment IV.
26	3/22/2018	Technical and quality review and update. Added 625.1 requirements. Revised SOP Title and Sections 1.8.1, 2.11, 8.2, 8.4.1, 8.4.6, 9.7, 10.6, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, and 11.7. Added Sections 2.12, 9.6, 10.1.1 and all subsections, 10.5 and all subsections, 14.9, Attachment VII, and Attachment VIII.

Revised Versions (Pace National):

Date	Description of Revisions
9/19/2019	Technical and quality review and revision. Additional update in response to SC DHEC 8/29/2019 technical review letter. Replaced existing header and footer with corporate header and footer. Revised Sections 4.7, 7.61 through 7.6.24, 7.7, 7.8 and all subsections, 7.9, 7.10 and all subsections, 8.2, 8.4.1, 8.4.3, 8.4.6, 10.5, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, and 11.7. Deleted all subsections of 10.5 as well as Sections 11.10.2, 11.10.7, 11.10.9, 11.10.10, 11.10.11, 11.11 and all subsections, 13.2, 13.3, 13.4, and re-numbered as appropriate.

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Attachment II: 8270/625 Common Calibration List & Reporting Limits *(may be updated without notice)**

Analyte	Water mg/L	Soil mg/Kg
Acenaphthene	0.001	0.033
Acenaphthylene	0.001	0.033
Acetophenone	0.01	0.33
Anthracene	0.001	0.033
Atrazine	0.01	0.33
Benzaldehyde	0.01	0.33
Benzidine	0.05	0.33
Benzo(a)anthracene	0.001	0.033
Benzo(b)fluoranthene	0.001	0.033
Benzo(k)fluoranthene	0.001	0.033
Benzo(g,h,i)perylene	0.001	0.033
Benzo(a)pyrene	0.001	0.033
Bis(2-chlorethoxy)methane	0.01	0.33
Bis(2-chloroethyl)ether	0.01	0.33
Bis(2-chloroisopropyl)ether	0.01	0.33
4-Bromophenyl-phenylether	0.01	0.33
Caprolactam	0.01	0.33
2-Chloronaphthalene	0.01	0.33
4-Chlorophenyl-phenylether	0.01	0.33
Chrysene	0.001	0.033
Dibenz(a,h)anthracene	0.001	0.033
3,3-Dichlorobenzidine	0.01	0.33
2,4-Dinitrotoluene	0.01	0.33
2,6-Dinitrotoluene	0.01	0.33
Fluoranthene	0.001	0.033
Fluorene	0.001	0.033
Hexachlorobenzene	0.01	0.33
Hexachloro-1,3-butadiene	0.01	0.33
Hexachlorocyclopentadiene	0.01	0.33
Hexachloroethane	0.01	0.33
Indeno(1,2,3-cd)pyrene	0.001	0.033
Isophorone	0.01	0.33
Naphthalene	0.001	0.033
Nitrobenzene	0.01	0.33
n-Nitrosodimethylamine	0.01	0.33
n-Nitrosodiphenylamine	0.01	0.33
n-Nitrosodi-n-propylamine	0.01	0.33

Analyte	Water mg/L	Soil mg/Kg
Phenanthrene	0.001	0.033
Benzylbutyl phthalate	0.003	0.033
Bis(2-ethylhexyl)phthalate	0.003	0.033
Di-n-butyl phthalate	0.003	0.033
Diethyl phthalate	0.003	0.033
Dimethyl phthalate	0.003	0.033
Di-n-octyl phthalate	0.003	0.033
Pyrene	0.001	0.033
1,2,4-Trichlorobenzene	0.01	0.33
4-Chloro-3-methylphenol	0.01	0.33
2-Chlorophenol	0.01	0.33
2,4-Dichlorophenol	0.01	0.33
2,4-Dimethylphenol	0.01	0.33
4,6-Dinitro-2-methylphenol	0.01	0.33
2,4-Dinitrophenol	0.01	0.33
2-Methylphenol	0.01	0.33
4-Methylphenol	0.01	0.33
2-Nitrophenol	0.01	0.33
4-Nitrophenol	0.01	0.33
Pentachlorophenol	0.01	0.33
Phenol	0.01	0.33
2,4,6-Trichlorophenol	0.01	0.33
1-Methylnapthalene	0.001	0.033
2-Methylnapthalene	0.001	0.033
4-Chloroaniline	0.01	0.33
2-Nitroaniline	0.01	0.33
3-Nitroaniline	0.01	0.33
4-Nitroaniline	0.01	0.33
1,2,3,4-Tetrachlorobenzene	0.05	1.65
1,2,3,5-Tetrachlorobenzene	0.05	1.65
1,2,4,5-Tetrachlorobenzene	0.05	1.65
1,2,4,5-Tetrachlorobenzene	0.05	1.65
1,2-diphenylhydrazine	0.01	0.33
1,3-Dinitrobenzene	0.05	1.65
1,4-Naphthoquinone	0.05	1.65
1-Chloronaphthalene	0.05	1.65
1-Naphthylamine	0.05	1.65

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Analyte	Water mg/L	Soil mg/Kg
2,3,4,6-Tetrachlorophenol	0.05	1.65
2,3-Dichloroaniline	0.01	0.33
2,6-Dichlorophenol	0.05	1.65
2-Acetylaminofluorene	0.05	1.65
2-Naphthylamine	0.05	1.65
2-Picoline	0.05	1.65
3,3'-Dimethylbenzidine	0.05	1.65
3-Methylcholanthrene	0.05	1.65
4-Aminobiphenyl	0.05	1.65
4-Nitroquinoline-1-oxide	0.05	1.65
5-Nitro-o-toluidine	0.05	1.65
7,12-Dimethylbenz(a)anthracene	0.05	1.65
7H-Dibenzo (c,g) carbazole	0.05	1.65
a,a-Dimethylphenethylamine	0.05	1.65
Acetophenone	0.01	0.33
Alpha-terpineol	0.01	0.33
Aniline	0.01	0.33
Aramite	0.05	1.65
Benzal Chloride	0.05	1.65
Benzo (j) fluoranthene	0.05	1.65
Benzotrichloride	0.05	1.65
Benzyl Chloride	0.05	1.65
Chlorobenzilate	0.05	1.65
Diallate (cis)	0.05	1.65
Diallate (trans)	0.05	1.65
Dibenz (a,e) pyrene	0.05	1.65
Dibenz (a,h) acridine	0.05	0.33
Dibenz (a,h) pyrene	0.05	1.65
Dibenz (a,i) pyrene	0.05	1.65
Dimethoate	0.05	1.65
Dinoseb	0.05	1.65
Diphenylamine	0.05	1.65
Disulfoton	0.05	1.65
Ethyl methanesulfonate	0.05	1.65
Famphur	0.05	1.65
Hexachlorophene	0.05	1.65
Hexachloropropene	0.05	1.65
Isodrin	0.05	1.65

Analyte	Water mg/L	Soil mg/Kg
Isosafrole (cis)	0.05	1.65
Isosafrole (trans)	0.05	1.65
Kepone	0.05	1.65
Methapyriline	0.05	1.65
Methyl methanesulfonate	0.05	1.65
Methyl parathion	0.05	1.65
N-Nitrosodiethylamine	0.05	1.65
n-nitrosodi-n-butylamine	0.01	0.33
N-Nitrosodi-n-butylamine	0.05	1.65
N-Nitrosomethylethylamine	0.05	1.65
N-Nitrosomorpholine	0.05	1.65
N-Nitrosopiperidine	0.05	1.65
N-Nitrosopyrrolidine	0.05	1.65
o,o,o-Triethylphoshorothioate	0.05	1.65
o-cresol	0.01	0.33
o-Toluidine	0.05	1.65
Parathion	0.05	1.65
p-cresol	0.01	0.33
p-Dimethylaminoazobenzene	0.05	1.65
Pentachlorobenzene	0.05	1.65
Pentachloroethane	0.05	1.65
Pentachloronitrobenzene	0.05	1.65
Phenacetin	0.05	1.65
Phorate	0.05	1.65
p-Phenyleneamine	0.05	1.65
Pronamide	0.05	1.65
Safrole	0.05	1.65
Sulfotepp	0.05	1.65
sym-Trinitrobenzene	0.05	1.65
Thionazin	0.05	1.65
2-nitrodiphenylamine	0.01	0.33
n-decane	0.01	0.33
n-octadecane	0.01	0.33
Pentachlorphenol (SIM)	0.001	-
Sulfolane	0.0002	0.33
Mirex	0.02	NA
Dicofol	0.02	NA
Quinoline	0.05	0.33

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Analyte	Water mg/L	Soil mg/Kg
Indene	NA	0.33
Benzenethiol	0.02	3.3

*Alternate reporting levels may be possible using different technologies (i.e. SIM, LVI, etc.). Please contact the laboratory for additional information.

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Attachment III – Appropriate Extraction Methods by Analyte *(printed from SW-846 Method 8270C)*

ANALYTE:	3510*	3520	3540/3541	3550*	3580*	CAS #(a)
Acenaphthene	X	X	X	X	X	83-32-9
Acenaphthylene	X	X	X	X	X	208-96-8
Acetophenone	X	ND	ND	ND	X	98-86-2
2-Acetylaminofluorene	X	ND	ND	ND	X	53-96-3
1-Acetyl-2-thiourea	LR	ND	ND	ND	LR	591-08-2
Aldrin	X	X	X	X	X	309-00-2
2-Aminoanthraquinone	X	ND	ND	ND	X	117-79-3
Aminoazobenzene	X	ND	ND	ND	X	60-09-3
4-Aminobiphenyl	X	ND	ND	ND	X	92-67-1
3-Amino-9-ethylcarbazole	X	X	ND	ND	ND	132-32-1
Anilazine	X	ND	ND	ND	X	101-05-3
Aniline	X	X	ND	X	X	62-53-3
Ortho-anisidine	X	ND	ND	ND	X	90-04-0
Anthracene	X	X	X	X	X	120-12-7
Aramite HS	(43)	ND	ND	ND	X	140-57-8
Aroclor 1016	X	X	X	X	X	12674-11-2
Aroclor 1221	X	X	X	X	X	11104-28-2
Aroclor 1232	X	X	X	X	X	11141-16-5
Aroclor 1242	X	X	X	X	X	53469-21-9
Aroclor 1248	X	X	X	X	X	12672-29-6
Aroclor 1254	X	X	X	X	X	11097-69-1
Aroclor 1260	X	X	X	X	X	11096-82-5
Azinphos-methyl HS	(62)	ND	ND	ND	X	86-50-0
Barban	LR	ND	ND	ND	LR	101-27-9
Benzidine	CP	CP	CP	CP	CP	92-87-5
Benzoic Acid	X	X	ND	X	X	65-85-0
Benz(a)anthracene	X	X	X	X	X	56-55-3
Benzo(b)fluoranthene	X	X	X	X	X	205-99-2
Benzo(k)fluoranthene	X	X	X	X	X	207-08-9
Benzo(g,h,i)perylene	X	X	X	X	X	191-24-2
Benzo(a)pyrene	X	X	X	X	X	50-32-8
Para-benzoquinone	OE	ND	ND	ND	X	106-51-4
Benzyl Alcohol	X	X	ND	X	X	100-51-6
Alpha-BHC	X	X	X	X	X	319-84-6
Beta-BHC	X	X	X	X	X	319-85-7
Delta-BHC	X	X	X	X	X	319-86-8
Gamma-BHC	X	X	X	X		58-89-9
Lindane	X	X	X	X	X	58-89-9
Bis(2-chloroethoxy)methane	X	X	X	X	X	111-91-1
Bis(2-chloroethyl) Ether	X	X	X	X	X	111-44-4
Bis(2-chloroisopropyl) Ether	X	X	X	X	X	108-60-1
Bis(2-ethylhexyl) Phthalate	X	X	X	X	X	117-81-7
4-Bromophenyl Phenyl Ether	X	X	X	X	X	101-55-3
Bromoxynil	X	ND	ND	ND	X	1689-84-5

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ANALYTE:	3510*	3520	3540/3541	3550*	3580*	CAS #(a)
Butyl Benzyl Phthalate	X	X	X	X	X	85-68-7
Captafol HS	(55)	ND	ND	ND	X	6/1/2425
Captan HS	(40)	ND	ND	ND	X	133-06-2
Carbaryl	X	ND	ND	ND	X	63-25-2
Carbofuran	X	ND	ND	ND	X	1563-66-2
Carbophenothion	X	ND	ND	ND	X	786-19-6
Chlordane	X	X	X	X	X	57-74-9
Chlorfenvinphos	X	ND	ND	ND	X	470-90-6
4-Chloroaniline	X	ND	ND	ND	X	106-47-8
Chlorobenzilate	X	ND	ND	ND	X	510-15-6
5-Chloro-2-methylaniline	X	ND	ND	ND	X	95-79-4
4-Chloro-3-methylphenol	X	X	X	X	X	59-50-7
hydrochloride	X	ND	ND	ND	X	6959-48-4
1-Chloronaphthalene	X	X	X	X	X	90-13-1
2-Chloronaphthalene	X	X	X	X	X	91-58-7
2-Chlorophenol	X	X	X	X	X	95-57-8
4-Chloro-1,2-phenylenendiamine	X	X	ND	ND	ND	95-83-0
4-Chloro-1,3-phenylenendiamine	X	X	ND	ND	ND	5131-60-2
4-Chlorophenyl Phenyl Ether	X	X	X	X	X	7005-72-3
Chrysene	X	X	X	X	X	218-01-9
Coumaphos	X	ND	ND	ND	X	56-72-4
Para-cresidine	X	ND	ND	ND	X	120-71-8
Crotoxyphos	X	ND	ND	ND	X	7700-17-6
2-Cyclohexyl-4,6-dinitrophenol	X	ND	ND	ND	LR	131-89-5
4,''-DDD	X	X	X	X	X	72-54-8
4,''-DDE	X	X	X	X	X	72-55-9
4,''-DDT	X	X	X	X	X	50-29-3
Demeton-O HS	(68)	ND	ND	ND	X	298-03-3
Demeton-S	X	ND	ND	ND	X	126-75-0
Diallate (cis or trans)	X	ND	ND	ND	X	2303-16-4
2,4-Diaminotoluene DC,	OE(42) ND	ND	ND	ND	X	95-80-7
Dibenz(a,j)acridine	X	ND	ND	ND	X	224-42-0
Dibenz(a,h)anthracene	X	X	X	X	X	53-70-3
Dibenzofuran	X	X	ND	X	X	132-64-9
Dibenzo(a,e)pyrene	ND	ND	ND	ND	X	192-65-4
1,2-Dibromo-3-chloropropane	X	X	ND	ND	ND	96-12-8
Di-n-butyl Phthalate	X	X	X	X	X	84-74-2
Dichlone	OE	ND	ND	ND	X	117-80-6
1,2-Dichlorobenzene	X	X	X	X	X	95-50-1
1,3-Dichlorobenzene	X	X	X	X	X	541-73-1
1,4-Dichlorobenzene	X	X	X	X	X	106-46-7
3,3''-Dichlorobenzidine	X	X	X	X	X	91-94-1
2,4-Dichlorophenol	X	X	X	X	X	120-83-2
2,6-Dichlorophenol	X	ND	ND	ND	X	87-65-0
Dichlorovos	X	ND	ND	ND	X	62-73-7

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ANALYTE:	3510*	3520	3540/3541	3550*	3580*	CAS #(a)
Dicrotophos	X	ND	ND	ND	X	141-66-2
Dieldrin	X	X	X	X	X	60-57-1
Diethyl Phthalate	X	X	X	X	X	84-66-2
Diethylstilbestrol	AW,OS(67)	ND	ND	ND	X	56-53-1
Diethyl Sulfate	LR	ND	ND	ND	LR	64-67-5
Dihydrosaffrole	ND	ND	ND	ND	ND	56312-13-1
Dimethoate	HE,HS	ND	ND	ND	X	60-51-5
3,''-Dimethoxybenzidine	X	ND	ND	ND	LR	119-90-4
Dimethylaminoazobenzene	X	ND	ND	ND	X	60-11-7
7,12-Dimethylbenz(a)-anthracene	CP(45)	ND	ND	ND	CP	57-97-6
3,''-Dimethylbenzidine	X	ND	ND	ND	X	119-93-7
α,α-Dimethylphenethylamine	ND	ND	ND	ND	X	122-09-8
2,4-Dimethylphenol	X	X	X	X	X	105-67-9
Dimethyl Phthalate	X	X	X	X	X	131-11-3
1,2-Dinitrobenzene	X	ND	ND	ND	X	528-29-0
1,3-Dinitrobenzene	X	ND	ND	ND	X	99-65-0
1,4-Dinitrobenzene	HE(14)	ND	ND	ND	X	100-25-4
4,6-Dinitro-2-methylphenol	X	X	X	X	X	534-52-1
2,4-Dinitrophenol	X	X	X	X	X	51-28-5
2,4-Dinitrotoluene	X	X	X	X	X	121-14-2
2,6-Dinitrotoluene	X	X	X	X	X	606-20-2
Dinocap	CP,HS(28)	ND	ND	ND	CP	39300-45-3
Dinoseb	X	ND	ND	ND	X	88-85-7
Dioxathion	ND	ND	ND	ND	ND	78-34-2
Diphenylamine	X	X	X	X	X	122-39-4
5,5-Diphenylhydantoin	X	ND	ND	ND	X	57-41-0
1,2-Diphenylhydrazine	X	X	X	X	X	122-66-7
Di-n-octyl Phthalate	X	X	X	X	X	117-84-0
Disulfoton	X	ND	ND	ND	X	298-04-4
Endosulfan I	X	X	X	X	X	959-98-8
Endosulfan II	X	X	X	X	X	33212-65-9
Endosulfan Sulfate	X	X	X	X	X	1031-07-8
Endrin	X	X	X	X	X	72-20-8
Endrin Aldehyde	X	X	X	X	X	7421-93-4
Endrin Ketone	X	X	ND	X	X	53494-70-5
EPN	X	ND	ND	ND	X	2104-64-5
Ethion	X	ND	ND	ND	X	563-12-2
Ethyl Carbamate	DC(28)	ND	ND	ND	X	51-79-6
Ethyl Methanesulfonate	X	ND	ND	ND	X	62-50-0
Famphur	X	ND	ND	ND	X	52-85-7
Fensulfothion	X	ND	ND	ND	X	115-90-2
Fenthion	X	ND	ND	ND	X	55-38-9
Fluchloralin	X	ND	ND	ND	X	33245-39-5
Fluoranthene	X	X	X	X	X	206-44-0
Fluorene	X	X	X	X	X	86-73-7

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ANALYTE:	3510*	3520	3540/3541	3550*	3580*	CAS #(a)
2-Fluorobiphenyl (Surr)	X	X	X	X	X	321-60-8
2-Fluorophenol (Surr)	X	X	X	X	X	367-12-4
Heptachlor	X	X	X	X	X	76-44-8
Heptachlor Epoxide	X	X	X	X	X	1024-57-3
Hexachlorobenzene	X	X	X	X	X	118-74-1
Hexachlorobutadiene	X	X	X	X	X	87-68-3
Hexachlorocyclopentadiene	X	X	X	X	X	77-47-4
Hexachloroethane	X	X	X	X	X	67-72-1
Hexachlorophene	AW,CP(62)	ND	ND	ND	CP	70-30-4
Hexachloropropene	X	ND	ND	ND	X	1888-71-7
Hexamethylphosphoramide	X	ND	ND	ND	X	680-31-9
Hydroquinone	ND	ND	ND	ND	X	123-31-9
Indeno(1,2,3-cd)pyrene	X	X	X	X	X	193-39-5
Isodrin	X	ND	ND	ND	X	465-73-6
Isophorone	X	X	X	X	X	78-59-1
Isosafrole	DC(46) ND	ND	ND	ND	X	120-58-1
Kepone	X	ND	ND	ND	X	143-50-0
Leptophos	X	ND	ND	ND	X	21609-90-5
Malathion	HS(5)	ND	ND	ND	X	121-75-5
Maleic Anhydride	HE	ND	ND	ND	X	108-31-6
Mestranol	X	ND	ND	ND	X	72-33-3
Methapyrilene	X	ND	ND	ND	X	91-80-5
Methoxychlor	X	ND	ND	ND	X	72-43-5
3-Methylcholanthrene	X	ND	ND	ND	X	56-49-5
4,''-Methylenebis (2-chloroaniline)	OE,OS(0)	ND	ND	ND	LR	101-14-4
4,''-Methylenebis-(N-n-dimethylaniline)	X	X	ND	ND	ND	101-61-1
Methyl methanesulfonate	X	ND	ND	ND	X	66-27-3
2-Methylnaphthalene	X	X	ND	X	X	91-57-6
Methyl Parathion	X	ND	ND	ND	X	298-00-0
2-Methylphenol	X	ND	ND	ND	X	95-48-7
3-Methylphenol	X	ND	ND	ND	X	108-39-4
4-Methylphenol	X	ND	ND	ND	X	106-44-5
2-Methylpyridine	X	X	ND	ND	ND	109-06-8
Mevinphos	X	ND	ND	ND	X	7786-34-7
Mexacarbate	HE,HS(68)	ND	ND	ND	X	315-18-4
Mirex	X	ND	ND	ND	X	2385-85-5
Monocrotophos	HE	ND	ND	ND	X	6923-22-4
Naled	X	ND	ND	ND	X	300-76-5
Naphthalene	X	X	X	X	X	91-20-3
1,4-Naphthoquinone	X	ND	ND	ND	X	130-15-4
1-Naphthylamine	OS(44)	ND	ND	ND	X	134-32-7
2-Naphthylamine	X	ND	ND	ND	X	91-59-8
Nicotine	DE(67)	ND	ND	ND	X	54-11-5
5-Nitroacenaphthene	X	ND	ND	ND	X	602-87-9

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ANALYTE:	3510*	3520	3540/3541	3550*	3580*	CAS #(a)
2-Nitroaniline	X	X	ND	X	X	88-74-4
3-Nitroaniline	X	X	ND	X	X	99-09-2
4-Nitroaniline	X	X	ND	X	X	100-01-6
5-Nitro-o-anisidine	X	ND	ND	ND	X	99-59-2
Nitrobenzene	X	X	X	X	X	98-95-3
4-Nitrobiphenyl	X	ND	ND	ND	X	92-93-3
Nitrofen	X	ND	ND	ND	X	1836-75-5
2-Nitrophenol	X	X	X	X	X	88-75-5
4-Nitrophenol	X	X	X	X	X	100-02-7
5-Nitro-o-toluidine	X	ND	ND	ND	X	99-55-8
Nitroquinoline-1-oxide	X	ND	ND	ND	X	56-57-5
N-nitrosodi-n-butylamine	X	ND	ND	ND	X	924-16-3
N-nitrosodiethylamine	X	ND	ND	ND	X	55-18-5
N-nitrosodimethylamine	X	X	X	X	X	62-75-9
N-nitrosomethylethylamine	X	ND	ND	ND	X	10595-95-6
N-nitrosodiphenylamine	X	X	X	X	X	86-30-6
N-nitrosodi-n-propylamine	X	X	X	X	X	621-64-7
N-nitrosomorpholine	ND	ND	ND	ND	X	59-89-2
N-nitrosopiperidine	X	ND	ND	ND	X	100-75-4
N-nitrosopyrrolidine	X	ND	ND	ND	X	930-55-2
Octamethyl Pyrophosphoramide	LR	ND	ND	ND	LR	152-16-9
Parathion	X	ND	ND	ND	X	56-38-2
Pentachlorobenzene	X	ND	ND	ND	X	608-93-5
Pentachloronitrobenzene	X	ND	ND	ND	X	82-68-8
Pentachlorophenol	X	X	X	X	X	87-86-5
Phenacetin	X	ND	ND	ND	X	62-44-2
Phenanthrene	X	X	X	X	X	85-01-8
Phenobarbital	X	ND	ND	ND	X	50-06-6
Phenol	DC(28)	X	X	X	X	108-95-2
1,4-Phenylenediamine	X	ND	ND	ND	X	106-50-3
Phorate	X	ND	ND	ND	X	298-02-2
Phosalone	HS(65)	ND	ND	ND	X	2310-17-0
Phosmet	HS(15)	ND	ND	ND	X	732-11-6
Phosphamidon	HE(63)	ND	ND	ND	X	13171-21-6
Phthalic Anhydride	CP,HE(1)	ND	ND	ND	CP	85-44-9
2-Picoline	X	X	ND	ND	ND	109-06-8
Piperonyl Sulfoxide	X	ND	ND	ND	X	120-62-7
Pronamide	X	ND	ND	ND	X	23950-58-5
Pyrene	X	X	X	X	X	129-00-0
Pyridine	ND	ND	ND	ND	ND	110-86-1
Resorcinol	DC, OE(10)	ND	ND	ND	X	94-59-7
Safrole	X	ND	ND	ND	X	60-41-3
Sulfallate	X	ND	ND	ND	X	95-06-7
Terbufos	X	ND	ND	ND	X	13071-79-9
Terphenyl d(l4)(surr)	X	X	ND	X	X	1718-51-0

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ANALYTE:	3510*	3520	3540/3541	3550*	3580*	CAS #(a)
1,2,4,5-Tetrachlorobenzene	X	ND	ND	ND	X	95-94-3
2,3,4,6-Tetrachlorophenol	X	ND	ND	ND	X	58-90-2
Tetrachlorvinphos	X	ND	ND	ND	X	961-11-5
Tetraethyl Dithiopyrophosphate	X	X	ND	ND	ND	3689-24-5
Tetraethyl Pyrophosphate	X	ND	ND	ND	X	107-49-3
Thionazine	X	ND	ND	ND	X	297-97-2
Thiophenol	X	ND	ND	ND	X	108-98-5
Benzenethiol	X	ND	ND	ND	X	108-98-5
Toluene Diisocyanate	HE(6)	ND	ND	ND	X	584-84-9
Ortho-toluidine	X	ND	ND	ND	X	95-53-4
Toxaphene	X	X	X	X	X	8001-35-2
1,2,4-Trichlorobenzene	X	X	X	X	X	120-82-1
2,4,5-Trichlorophenol	X	X	ND	X	X	95-95-4
2,4,6-Trichlorophenol	X	X	X	X	X	88-06-2
Trifluralin	X	ND	ND	ND	X	1582-09-8
2,4,5-Trimethylaniline	X	ND	ND	ND	X	137-17-7
Trimethyl Phosphate	HE(60)	ND	ND	ND	X	512-56-1
1,3,5-Trinitrobenzene	X	ND	ND	ND	X	99-35-4
Tris(2,3-dibromopropyl) phosphate	X	ND	ND	ND	LR	126-72-7
O,O,O-Triethyl Phosphorothioate	X	ND	ND	ND	X	126-68-1

KEY TO ANALYTE LIST ESC extraction technique Chemical Abstract Service Registry Number
(b) See Sec. 1.2 for other acceptable preparation methods.
(IS) This compound may be used as an internal standard.
(surr) This compound may be used as a surrogate.
(AW) Adsorption to walls of glassware during extraction and storage.
(CP) Non-reproducible chromatographic performance.
(DC) Unfavorable distribution coefficient (number in parenthesis is percent recovery).
(HE) Hydrolysis during extraction accelerated by acidic or basic conditions (number in parenthesis is percent recovery).
(HS) Hydrolysis during storage (number in parenthesis is percent stability).
(LR) Low response.
(ND) Not determined.
(OE) Oxidation during extraction accelerated by basic conditions (number in parenthesis is percent recovery).
(OS) Oxidation during storage (number in parenthesis is percent stability).
(X) Greater than 70 percent recovery by this technique.

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Attachment IV: Characteristic Masses (m/z) for Extractable Organic Compounds

(Reprinted from SW-846 Method 8270C /Dec. 1996)

Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
Pyridine	79	52,78,51
N-Nitrosodimethylamine	42	74,44
2-Picoline	93	66,92
Aniline	93	66,65
Phenol	94	65,66
Benzaldehyde	105	106,77,51
Bis(2-chloroethyl) ether	93	63,95
2-Chlorophenol	128	64,130
1,3-Dichlorobenzene	146	148,111
1,4-Dichlorobenzene-d4 (ISTD)	152	150,115
1,4-Dichlorobenzene	146	148,111
Benzyl alcohol	108	79,77
1,2-Dichlorobenzene	146	148,111
N-Nitrosomethylethylamine	88	42,43,56
Bis(2-chloroisopropyl) ether	45	77,121
Methyl methanesulfonate	80	79,65,95
N-Nitrosodi-n-propylamine	70	42,101,130
Hexachloroethane	117	201,199
Nitrobenzene	77	123,65
Isophorone	82	95,138
N-Nitrosodiethylamine	102	42,57,44,56
2-Nitrophenol	139	109,65
2,4-Dimethylphenol	122	107,121
Bis(2-chloroethoxy)methane	93	95,123
Benzoic acid	122	105,77
2,4-Dichlorophenol	162	164,98
Ethyl methanesulfonate	79	109,97,45,65
1,2,4-Trichlorobenzene	180	182,145
Naphthalene-d8 (ISTD)	136	68
Naphthalene	128	129,127
Hexachlorobutadiene	225	223,227
Caprolactam	113	55,56,42
4-Chloro-3-methylphenol	107	144,142
2-Methylnaphthalene	142	141
1-Methylnaphthalene	142	141
2-Methylphenol	107	108,77,79,90
Hexachloropropene	213	211,215,117,106,141
Hexachlorocyclopentadiene	237	235,272
N-Nitrosopyrrolidine	100	41,42,68,69
Acetophenone	105	71,51,120
4-Methylphenol	107	108,77,79,90
2,4,6-Trichlorophenol	196	198,200
2,4,5-Trichlorophenol	196	198,200

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Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
o-Toluidine	106	107,77,51,79
3-Methylphenol	107	108,77,79,90
2-Chloronaphthalene	162	127,164
N-Nitrosopiperidine	114	42,55,56,41
1-Chloronaphthalene	162	127,164
2-Nitroaniline	65	92,138
Dimethyl phthalate	163	194,164
Acenaphthylene	152	151,153
2,6-Dinitrotoluene	165	63,89
3-Nitroaniline	138	108,92
Acenaphthene-d10 (ISTD)	164	162,160
Acenaphthene	154	153,152
2,4-Dinitrophenol	184	63,154
2,6-Dinitrophenol	162	164,126,98,63
4-Chloroaniline	127	129,65,92
Isosafrole	162	131,104,77,51
Dibenzofuran	168	139
2,4-Dinitrotoluene	165	63,89
4-Nitrophenol	139	109,65
2-Naphthylamine	143	115,116
1,4-Naphthoquinone	158	104,102,76,50,130
Diethyl phthalate	149	177,150
Fluorene	166	165,167
N-Nitrosodi-n-butylamine	84	57,41,116,158
4-Chlorophenyl phenyl ether	204	206,141
Atrazine	200	215,58
4,6-Dinitro-2-methylphenol	198	51,105
N-Nitrosodiphenylamine	169	168,167
Safrole	162	104,77,103,135
Diphenylamine	169	168,167
1,2,4,5-Tetrachlorobenzene	216	214,179,108,143,218
1-Naphthylamine	143	115,89,63
4-Bromophenyl phenyl ether	248	250,141
2,4,5-Trichlorophenol	196	198,97,132,99
Hexachlorobenzene	284	142,249
Pentachlorophenol	266	264,268
5-Nitro-o-toluidine	152	77,79,106,94
Thionazine	107	96,97,143,79,68
4-Nitroaniline	138	65,108,92,80,39
Phenanthrene-d10 (ISTD)	188	94,80
Phenanthrene	178	179,176
Anthracene	178	176,179
Carbazole	167	166,168,139
1,3-Dinitrobenzene	168	76,50,75,92,122
Diallate (cis or trans)	86	234,43,70

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Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
Pentachlorobenzene	250	252,108,248,215,254
Pentachloronitrobenzene	237	142,214,249,295,265
4-Nitroquinoline-1-oxide	174	101,128,75,116
Di-n-butyl phthalate	149	150,104
2,3,4,6-Tetrachlorophenol	232	131,230,166,234,168
Demeton-O	88	89,60,61,115,171
Fluoranthene	202	101,203
1,3,5-Trinitrobenzene	75	74,213,120,91,63
Benzidine	184	92,185
Pyrene	202	200,203
Phorate	75	121,97,93,260
Demeton-S	88	60,81,89,114,115
Phenacetin	108	180,179,109,137,80
Dimethoate	87	93,125,143,229
4-Aminobiphenyl	169	168,170,115
Dimethylphenylamine	58	91,65,134,42
Pronamide	173	175,145,109,147
Dinoseb	211	163,147,117,240
Disulfoton	88	97,89,142,186
Butyl benzyl phthalate	149	91,206
Methyl parathion	109	125,263,79,93
Dimethylaminoazobenzene	225	120,77,105,148,42
Benz(a)anthracene	228	229,226
Chrysene-d12 (ISTD)	240	120,236
3,3'-Dichlorobenzidine	252	254,126
Chrysene	228	226,229
Kepone	272	274,237,178,143,270
Parathion	109	97,291,139,155
Bis(2-ethylhexyl) phthalate	149	167,279
3,3'-Dimethylbenzidine	212	106,196,180
Methapyrilene	97	50,191,71
Isodrin	193	66,195,263,265,147
Di-n-octyl phthalate	149	167,43
Aramite	185	191,319,334,197,321
Benzo(b)fluoranthene	252	253,125
Benzo(k)fluoranthene	252	253,125
Famphur	218	125,93,109,217
Benzo(a)pyrene	252	253,125
Perylene-d12 (ISTD)	264	260,265
7,12-Dimethylbenz(a)anthracene	256	241,239,120
2-Acetylaminofluorene	181	180,223,152
3-Methylcholanthrene	268	252,253,126,134,113
Dibenz(a,j)acridine	279	280,277,250
Indeno(1,2,3-cd)pyrene	276	138,227

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Compound	Primary Characteristic Ion	Secondary Characteristic Ion(s)
Dibenz(a,h)anthracene	278	139,279
Benzo(g,h,i)perylene	276	138,277
Hexachlorophene	196	198,209,211,406,408
1,2-Diphenylhydrazine/Azobenzene	77	105,182
Mirex	272	274, 237,270
Kelthane (Dicofol)	251	139.111.253
Indene	115	116,117
Quinoline	129	128,130,102
Benzenethiol	110	109,66
Diphenyl Disulfide	218	109,65
Surrogates		
2-Fluorobiphenyl (surr)	172	171
2-Fluorophenol (surr)	112	64
Nitrobenzene-d5 (surr)	82	128,54
Phenol-d6 (surr)	99	42,71
Terphenyl-d14 (surr)	244	122,212
2,4,6-Tribromophenol (surr)	330	332,141
2-Methylnaphthalene-d10 (surr)	152	150, 122, 151
Fluoranthene-d10 (surr)	212	208, 313, 210
PAH by SIM		
Naphthalene	128	129
2-Methylnaphthalene	142	141
1-Methylnaphthalene	142	141
2-Chloronaphthalene	162	127
Acenaphthylene	152	153, 151
Acenaphthene	153	154, 152, 151
Dibenzofuran	168	139
Fluorene	166	165
Phenanthrene	178	179
Anthracene	178	179, 176
Fluoranthene	202	203, 200
Pyrene	202	203, 200
Benzo(a)anthracene	228	226
Chrysene	228	226, 229
Benzo(b)fluoranthene	252	253
Benzo(k)fluoranthene	252	253
Benzo(a)pyrene	252	253
Indeno(1,2,3-cd)pyrene	276	277, 138
Dibenz(a,h)anthracene	278	279, 139, 138
Benzo(g,h,i)perylene	276	138

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Attachment V - QC Acceptance Criteria for Method 625

Compound	Test conc. (µg/L)	Limit for s (µg/L)	Range for x (µg/L)	Range p, p(s) (%)
Acenaphthene	100	27.6	60.1-132.3	47-145
Acenaphthylene	100	40.2	53.5-126.0	33-145
Aldrin	100	39	7.2-152.2	D-166
Anthracene	100	32	43.4-118.0	27-133
Benz(a)anthracene	100	27.6	41.8-133.0	33-143
Benzo(b)fluoranthene	100	38.8	42.0-140.4	24-159
Benzo(k)fluoranthene	100	32.3	25.2-145.7	11-162
Benzo(a)pyrene	100	39	31.7-148.0	17-163
Benzo(g,h,i)perylene	100	58.9	D-195.0	D-219
Benzyl butyl phthalate	100	23.4	D-139.9	D-152
beta-BHC	100	31.5	41.5-130.6	24-149
delta-BHC	100	21.6	D-100.0	D-110
Bis(2-chloroethyl) ether	100	55	42.9-126.0	12-158
Bis(2-chloroethoxy)methane	100	34.5	49.2-164.7	33-184
Bis(2-chloroisopropyl) ether	100	46.3	62.8-138.6	36-166
Bis(2-ethylhexyl) phthalate	100	41.1	28.9-136.8	8-158
4-Bromophenyl phenyl ether	100	23	64.9-114.4	53-127
2-Chloronaphthalene	100	13	64.5-113.5	60-118
4-Chlorophenyl phenyl ether	100	33.4	38.4-144.7	25-158
Chrysene	100	48.3	44.1-139.9	17-168
4,4'-DDD	100	31	D-134.5	D-145
4,4'-DDE	100	32	19.2-119.7	4-136
4,4'-DDT	100	61.6	D-170.6	D-203
Dibenzo(a,h)anthracene	100	70	D-199.7	D-227
Di-n-butyl phthalate	100	16.7	8.4-111.0	1-118
1,2-Dichlorobenzene	100	30.9	48.6-112.0	32-129
1,3-Dichlorobenzene	100	41.7	16.7-153.9	D-172
1,4-Dichlorobenzene	100	32.1	37.3-105.7	20-124
3,3'-Dichlorobenzidine	100	71.4	8.2-212.5	D-262
Dieldrin	100	30.7	44.3-119.3	29-136
Diethyl phthalate	100	26.5	D-100.0	D-114
Dimethyl phthalate	100	23.2	D-100.0	D-112
2,4-Dinitrotoluene	100	21.8	47.5-126.9	39-139
2,6-Dinitrotoluene	100	29.6	68.1-136.7	50-158
Di-n-octyl phthalate	100	31.4	18.6-131.8	4-146
Endosulfan sulfate	100	16.7	D-103.5	D-107
Endrin aldehyde	100	32.5	D-188.8	D-209
Fluoranthene	100	32.8	42.9-121.3	26-137
Fluorene	100	20.7	71.6-108.4	59-121
Heptachlor	100	37.2	D-172.2	D-192
Heptachlor epoxide	100	54.7	70.9-109.4	26.155
Hexachlorobenzene	100	24.9	7.8-141.5	D-152
Hexachlorobutadiene	100	26.3	37.8-102.2	24-116
Hexachloroethane	100	24.5	55.2-100.0	40-113
Indeno(1,2,3-cd)pyrene	100	44.6	D-150.9	D-171

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Compound	Test conc. (µg/L)	Limit for s (µg/L)	Range for x (µg/L)	Range p, p(s) (%)
Isophorone	100	63.3	46.6-180.2	21-196
Naphthalene	100	30.1	35.6-119.6	21-133
Nitrobenzene	100	39.3	54.3-157.6	35-180
N-Nitrosodi-n-propylamine	100	55.4	13.6-197.9	D-230
Aroclor 1260	100	54.2	19.3-121.0	D-164
Phenanthrene	100	20.6	65.2-108.7	54-120
Pyrene	100	25.2	69.6-100.0	52-115
1,2,4-Trichlorobenzene	100	28.1	57.3-129.2	44-142
4-Chloro-3-methylphenol	100	37.2	40.8-127.9	22-147
2-Chlorophenol	100	28.7	36.2-120.4	23-134
2,4-Chlorophenol	100	26.4	52.5-121.7	39-135
2,4-Dimethylphenol	100	26.1	41.8-109.0	32-119
2,4-Dinitrophenol	100	49.8	D-172.9	D-191
2-Methyl-4,6-dinitrophenol	100	93.2	53.0-100.0	D-181
2-Nitrophenol	100	35.2	45.0-166.7	29-182
4-Nitrophenol	100	47.2	13.0-106.5	D-132
Pentachlorophenol	100	48.9	38.1-151.8	14-176
Phenol	100	22.6	16.6-100.0	5-112
2,4,6-Trichlorophenol	100	31.7	52.4-129.2	37-144

(s) = Standard deviation of four recovery measurements, in µg/L

(x) = Average recovery for four recovery measurements, in µg/L

(p, p(s)) = Measured percent recovery

(D) = Detected; result must be greater than zero

(a) = Criteria from 40 CFR Part 136 for Method 625, using a packed GC column. These criteria are based directly on the method performance data. Where necessary, the limits for recovery have been broadened to assure applicability of the limits to concentrations below those used to develop method performance data. These values are for guidance only. Appropriate derivation of acceptance criteria for capillary columns should result in much narrower ranges. See Method 8000 for information on developing and updating acceptance criteria for method performance.

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Attachment VI - BNA Poor Performing Compounds

The following compounds are considered to be poor performing compounds.
Pyridine
Aniline
Benzoic Acid
n-Nitrosodimethylamine
Hexachlorocyclopentadiene
4-Chloroaniline
2-Nitroaniline
3-Nitroaniline
4-Nitroaniline
2,4-Dinitro-2-methylphenol
Pentachlorophenol
Carbazole
Benzidine
Atrazine
Acetophenone
Caprolactam
Benzaldehyde
1,2,4,5-Tetrachlorobenzene
Hexachlorophene

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Attachment VII – Method 625.1 Criteria

Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
Acenaphthene*	70-130	29	60-132	47-145	48
Acenaphthylene*	60-130	45	54-126	33-145	74
Anthracene*	58-130	40	43-120	27-133	66
Benzidine*					
Benzo(a)anthracene*	42-133	32	42-133	33-143	53
Benzo(a)pyrene*	32-148	43	32-148	17-163	72
Benzo(b)fluoranthene*	42-140	43	42-140	24-159	71
Benzo(k)fluoranthene*	25-146	38	25-146	11-162	63
Benzo(ghi)perylene*	13-195	61	D-195	D-219	97
Benzyl butyl phthalate*	43-140	36	D-140	D-152	60
bis(2-Chloroethoxy)methane	52-164	32	49-165	33-184	54
bis(2-Ethylhexyl)phthalate*	43-137	50	29-137	8-158	82
bis(2-Chloroisopropyl) ether (2,2'-Oxybis[1-chloropropane])*	63-139	46	63-139	36-166	76
4-Bromophenyl phenyl ether*	70-130	26	65-120	53-127	43
2-Chloronaphthalene*	70-130	15	65-120	60-120	24
4-Chlorophenyl phenyl ether*	57-145	36	38-145	25-158	61
Chrysene*	44-140	53	44-140	17-168	87
Dibenz(a,h)anthracene*	13-200	75	D-200	D-227	126
Di-n-butylphthalate*	52-130	28	8-120	1-120	47
3,3'-Dichlorobenzidine*	18-213	65	8-213	D-262	108
Diethyl phthalate*	47-130	60	D-120	D-120	100
Dimethyl phthalate*	50-130	110	D-120	D-120	183
2,4-Dinitrotoluene*	53-130	25	48-127	39-139	42
2,6-Dinitrotoluene*	68-137	29	68-137	50-158	48
Di-n-octylphthalate*	21-132	42	19-132	4-146	69
Fluoranthene*	47-130	40	43-121	26-137	66
Fluorene*	70-130	23	70-120	59-121	38
Hexachlorobenzene*	38-142	33	8-142	D-152	55
Hexachlorobutadiene*	68-130	38	38-120	24-120	62
Hexachloroethane*	55-130	32	55-120	40-120	52
Indeno(1,2,3-cd)pyrene*	13-151	60	D-151	D-171	99
Isophorone*	52-180	56	47-180	21-196	93
Naphthalene*	70-130	39	36-120	21-133	65
Nitrobenzene*	54-158	37	54-158	35-180	62
N-Nitrosodi-n-propylamine*	59-170	52	14-198	D-230	
Phenanthrene*	67-130	24	65-120	54-120	39
Pyrene*	70-130	30	70-120	52-120	49
1,2,4-Trichlorobenzene*	61-130	30	57-130	44-142	50
4-Chloro-3-methylphenol	68-130	44	41-128	22-147	73
2-Chlorophenol	55-130	37	36-120	23-134	61
2,4-Dichlorophenol	64-130	30	53-122	39-155	50
2,4-Dimethylphenol	58-130	35	42-120	32-120	58
2,4-Dinitrophenol	39-173	79	D-173	D-191	132
2-Methyl-4,6-dinitrophenol	56-130	122	53-130	D-181	203

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
2-Nitrophenol	61-163	33	45-167	29-182	55
4-Nitrophenol	35-130	79	13-129	D-132	131
Pentachlorophenol	42-152	52	38-152	14-176	86
Phenol	48-130	39	17-120	5-120	64
2,4,6-Trichlorophenol	69-130	35	52-129	37-144	58
4-Chloro-3-methylphenol					
2-Chlorophenol					
2,4-Dichlorophenol					
2,4-Dimethylphenol					
2,4-Dinitrophenol					
2-Methyl-4,6-dinitrophenol					
2-Nitrophenol					
4-Nitrophenol					
Acetophenone					
2-Acetylaminofluorene					
1-Acetyl-2-thiourea					
Alachlor					
Aldrin	7-152	39	7-152	D-166	81
Ametryn					
2-Aminoanthraquinone					
Aminoazobenzene					
4-Aminobiphenyl					
3-Amino-9-ethylcarbazole					
Anilazine					
Aniline					
o-Anisidine					
Aramite					
Atraton					
Atrazine					
Azinphos-methyl					
Barban					
Benzanthrone					
Benzenethiol					
Benzoic acid					
2,3-Benzofluorene					
p-Benzoquinone					
Benzyl alcohol					
alpha-BHC					
beta-BHC	42-131	37	42-131	24-149	61
gamma-BHC (Lindane)					
delta-BHC	D-130	77	D-120	D-120	129
Biphenyl					
Bromacil					
2-Bromochlorobenzene					
3-Bromochlorobenzene					
Bromoxynil					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
Butachlor					
Butylate					
n-C10 (n-decane)					
n-C12 (n-undecane)					
n-C14 (n-tetradecane)					
n-C16 (n-hexadecane)					
n-C18 (n-octadecane)					
n-C20 (n-eicosane)					
n-C22 (n-docosane)					
n-C24 (n-tetracosane)					
n-C26 (n-hexacosane)					
n-C28 (n-octacosane)					
n-C30 (n-triacontane)					
Captafol					
Captan					
Carbaryl					
Carbazole					
Carbofuran					
Carboxin					
Carbophenothion					
Chlordane 3,5					
bis(2-Chloroethyl) ether	52-130	65	43-126	12-158	108
Chloroneb					
4-Chloroaniline					
Chlorobenzilate					
Chlorfenvinphos					
4-Chloro-2-methylaniline					
3-(Chloromethyl)pyridine hydrochloride					
4-Chloro-2-nitroaniline					
Chlorpropham					
Chlorothalonil					
1-Chloronaphthalene					
3-Chloronitrobenzene					
4-Chloro-1,2-phenylenediamine					
4-Chloro-1,3-phenylenediamine					
2-Chlorobiphenyl					
Chlorpyrifos					
Coumaphos					
m + p-Cresol					
o-Cresol					
p-Cresidine					
Crotoxyphos					
2-Cyclohexyl-4,6-dinitro-phenol					
Cyanazine					
Cycloate					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
p-Cymene					
Dacthal (DCPA)					
4,4'-DDD	D-135	56	D-135	D-145	93
4,4'-DDE	19-130	46	19-120	4-136	77
4,4'-DDT	D-171	81	D-171	D-203	135
Demeton-O					
Demeton-S					
Diallate (cis or trans)					
2,4-Diaminotoluene					
Diazinon					
Dibenz(a,j)acridine					
Dibenzofuran					
Dibenzo(a,e)pyrene					
Dibenzothiophene					
1,2-Dibromo-3-chloropropane					
3,5-Dibromo-4-hydroxybenzonitrile					
2,6-Di-tert-butyl-p-benzoquinone					
Dichlone					
2,3-Dichloroaniline					
2,3-Dichlorobiphenyl					
2,6-Dichloro-4-nitroaniline					
2,3-Dichloronitrobenzene					
1,3-Dichloro-2-propanol					
2,6-Dichlorophenol					
Dichlorvos					
Dicrotophos					
Dieldrin 3	70-130	38	44-119	29-136	62
1,2:3,4-Diepoxybutane					
Di(2-ethylhexyl) adipate					
Diethylstilbestrol					
Diethyl sulfate					
Dilantin (5,5-Diphenylhydantoin)					
Dimethoate					
3,3′-Dimethoxybenzidine					
Dimethylaminoazobenzene					
7,12-Dimethylbenz(a)anthracene					
3,3′-Dimethylbenzidine					
N,N-Dimethylformamide					
3,6-Dimethylphenathrene					
alpha, alpha-Dimethylphenethylamine					
Dimethyl sulfone					
1,2-Dinitrobenzene					
1,3-Dinitrobenzene					
1,4-Dinitrobenzene					
Dinocap					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
Dinoseb					
Diphenylamine					
Diphenyl ether					
1,2-Diphenylhydrazine					
Diphenamid					
Diphenyldisulfide					
Disulfoton					
Disulfoton sulfoxide					
Disulfoton sulfone					
Endosulfan I					
Endosulfan II					
Endosulfan sulfate	D-130	42	D-120	D-120	70
Endrin					
Endrin aldehyde	D-189	45	D-189	D-209	75
Endrin ketone					
EPN					
EPTC					
Ethion					
Ethoprop					
Ethyl carbamate					
Ethyl methanesulfonate					
Ethylenethiourea					
Etridiazole					
Ethynylestradiol-3-methyl ether					
Famphur					
Fenamiphos					
Fenarimol					
Fensulfothion					
Fenthion					
Fluchloralin					
Fluridone					
Heptachlor	D-172	44	D-172	D-192	74
Heptachlor epoxide	70-130	61	71-120	26-155	101
2,2′,3,3′,4,4′,6-Heptachlorobiphenyl					
2,2′,4,4′,5′,6-Hexachlorobiphenyl					
Hexachlorocyclopentadiene					
Hexachlorophene					
Hexachloropropene					
Hexamethylphosphoramide					
Hexanoic acid					
Hexazinone					
Hydroquinone					
Isodrin					
2-Isopropylnaphthalene					
Isosafrole					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
Kepone					
Leptophos					
Longifolene					
Malachite green					
Malathion					
Maleic anhydride					
Merphos					
Mestranol					
Methapyrilene					
Methoxychlor					
2-Methylbenzothioazole					
3-Methylcholanthrene					
4,4′-Methylenebis(2-chloroaniline)					
4,4′-Methylenebis(N,N-dimethylaniline)					
4,5-Methylenephenanthrene					
1-Methylfluorene					
Methyl methanesulfonate					
2-Methylnaphthalene					
Methylparaoxon					
Methyl parathion					
1-Methylphenanthrene					
2-(Methylthio)benzothiazole					
Metolachlor					
Metribuzin					
Mevinphos					
Mexacarbate					
MGK 264					
Mirex					
Molinate					
Monocrotophos					
Naled					
Napropamide					
1,4-Naphthoquinone					
1-Naphthylamine					
2-Naphthylamine					
1,5-Naphthalenediamine					
Nicotine					
5-Nitroacenaphthene					
2-Nitroaniline					
3-Nitroaniline.					
4-Nitroaniline.					
5-Nitro-o-anisidine					
4-Nitrobiphenyl					
Nitrofen					
5-Nitro-o-toluidine					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
Nitroquinoline-1-oxide					
N-Nitrosodi-n-butylamine					
N-Nitrosodiethylamine					
N-Nitrosodimethylamine					
N-Nitrosodiphenylamine					
N-Nitrosomethylethylamine					
N-Nitrosomethylphenylamine					
N-Nitrosomorpholine					
N-Nitrosopiperidine					
N-Nitrosopyrrolidine					
trans-Nonachlor					
Norflurazon					
2,2′,3,3′,4,5′,6,6′-Octachlorobiphenyl					
Octamethyl pyrophosphoramide					
4,4'-Oxydianiline					
Parathion					
PCB–1016					
PCB–1221					
PCB–1232					
PCB–1242					
PCB–1248					
PCB–1254					
PCB–1260	19-130	77	19-130	D-164	128
PCB–1268					
Pebulate					
Pentachlorobenzene					
Pentachloronitrobenzene					
2,2′,3,4′,6-Pentachlorobiphenyl					
Pentachloroethane					
Pentamethylbenzene					
Perylene					
Phenacetin					
cis-Permethrin					
trans-Permethrin					
Phenobarbital					
Phenothiazene					
1,4-Phenylenediamine					
1-Phenylnaphthalene					
2-Phenylnaphthalene					
Phorate					
Phosalone					
Phosmet					
Phosphamidon					
Phthalic anhydride					
alpha-Picoline (2-Methylpyridine)					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
Piperonyl sulfoxide					
Prometon					
Prometryn					
Pronamide					
Propachlor					
Propazine					
Propylthiouracil					
Pyridine					
Resorcinol (1,3-Benzenediol)					
Safrole					
Simazine					
Simetryn					
Squalene					
Stirofos					
Strychnine					
Styrene 9					
Sulfallate					
Tebuthiuron					
Terbacil..					
Terbufos					
Terbutryn					
alpha-Terpineol					
1,2,4,5-Tetrachlorobenzene					
2,2′,4,4′-Tetrachlorobiphenyl					
2,3,7,8-Tetrachlorodibenzo-p-dioxin					
2,3,4,6-Tetrachlorophenol					
Tetrachlorvinphos					
Tetraethyl dithiopyrophosphate					
Tetraethyl pyrophosphate					
Thianaphthene (2,3-Benzothiophene)					
Thioacetamide					
Thionazin					
Thiophenol (Benzenethiol)					
Thioxanthone					
Toluene-1,3-diisocyanate					
Toluene-2,4-diisocyanate					
o-Toluidine					
Toxaphene 3,5					
Triadimefon					
1,2,3-Trichlorobenzene					
2,4,5-Trichlorobiphenyl					
2,3,6-Trichlorophenol					
2,4,5-Trichlorophenol					
Tricyclazole					
Trifluralin					

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Analyte	Range for Q (%)	Limit for s (%)	Range for $\bar{X}$ (%)	Range for P1, P2 (%)	Limit for RPD (%)
1,2,3-Trimethoxybenzene					
2,4,5-Trimethylaniline					
Trimethyl phosphate					
Triphenylene					
Tripropyleneglycolmethyl ether					
1,3,5-Trinitrobenzene					
Tris(2,3-dibromopropyl) phosphate					
Tri-p-tolyl phosphate					
O,O,O-Triethyl phosphorothioate.					
Trithiane					
Vernolate					

Many of the analytes in this table do not have QC acceptance criteria. If calibration is to be verified and other QC tests are to be performed for these analytes, acceptance criteria must be developed and applied. EPA has provided guidance for development of QC acceptance criteria (see 40 CFR 136.6(b)(2)(i) and *Protocol for EPA Approval of New Methods for Organic and Inorganic Analytes in Wastewater and Drinking Water* (EPA–821–B–98–003) March 1999). Alternatively, analytes that do not have acceptance criteria may be based on laboratory control charts, or 60 to 140% may be used.

* At a minimum, these compounds must be spiked into the MS/MSD analyses when direction cannot be obtained from the data user.

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Attachment VIII – Method 625.1 Suggested Internal Standards and Surrogates

Compound	Range for Surrogate Recovery	
	Calibration Verification	Recovery from Samples
Base/Neutral Fraction		
Acenaphthalene-d_8	66-152	33-168
Acenaphthene-d_{10}	71-141	30-180
Aniline-d5		
Anthracene-d_{10}	58-171	53-142
Benzo(a)anthracene-d_{12}	28-357	22-329
Benzo(a)pyrene-d_{12}	32-194	32-194
4-Chloroaniline-d_4	1-145	1-145
bis(2-Chloroethyl)ether-d_8	52-194	25-222
Chrysene-d_{12}	23-290	23-290
Decafluorobiphenyl		
4,4'-Dibromobiphenyl		
4,4'-Dibromooctafluorobiphenyl		
1,4-Dichlorobenzene-d_4	65-153	11-245
2,2'-Difluorobiphenyl		
Dimethyl phthalate-d_6	47-211	1-500
Fluoranthene-d_{10}	61-164	38-172
4-Fluoroaniline		
1-Fluoronaphthalene		
2-Fluoronaphthalene		
2-Methylnaphthalene-d_{10}	50-150	50-150
Naphthalene-d_8	71-141	22-192
Nitrobenzene-d_5	46-219	15-314
2,3,4,5,6-Pentafluorobiphenyl		
Perylene-d_{12}		
Phenanthrene-d_{10}	67-149	34-168
Pyrene-d_{10}	48-210	28-196
Pyridine-d_5		
Acid Fraction		
2-Chlorophenol-d_4	55-180	33-180
2,4-Dichlorophenol-d_3	64-157	34-182
4,6-Dinitro-2-methylphenol-d_2	56-177	22-307
2-Fluorophenol		
4-Methylphenol-d_8	25-111	25-111
2-Nitrophenol-d_4	61-163	37-163
4-Nitrophenol-d_4	35-287	6-500
Pentafluorophenol		
2-Perfluoromethylphenol		
Phenol-d_5	48-208	8-424

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Many of the surrogates in this table do not have QC acceptance criteria. If calibration is to be verified and other QC tests are to be performed for these surrogates, acceptance criteria must be developed and applied. EPA has provided guidance for development of QC acceptance criteria (see 40 CFR 136.6(b)(2)(i) and *Protocol for EPA Approval of New Methods for Organic and Inorganic Analytes in Wastewater and Drinking Water* (EPA–821–B–98–003) March 1999). Alternatively, surrogates that do not have acceptance criteria may be based on laboratory control charts, or 60 to 140% may be used.

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ISSUER: Pace National – Mt. Juliet, Tennessee

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Attachment IX – DoD Requirements

1.0 Equipment/Instrument Maintenance

Instrument maintenance must be performed routinely to optimize instrument performance and improve chromatography. Commonly performed maintenance includes baking columns, changing injection port liners, changing pump oil, etc. A new calibration curve must be analyzed following any major maintenance performed on the analytical system.

2.0 Computer Hardware and Software

Software name and version: HP Chemstation G1701CA Version C.00.00 or equivalent

3.0 Troubleshooting

Table 1. GCMS Troubleshooting Guide

Problem	Cause	Treatment
Peaks broaden and tail	Poor column installation causing dead volume in the injector	Reinstall column in injector. Check seal at ferrule. Check insertion depth. Ensure a good column cut.
	Solvent flashing in hot injector	Reduce injection speed on hot injectors and if possible reduce injector temperature
	Injector not being purged properly after splitless injection	For splitless injection, the vent flow should be 70 ml/min, and the injector should be switched to the split mode 0.5_1.5 min after injection.
Tailing sample peaks for active components	Active sites in the injector insert or liner	Change or clean the injector insert
	Active sites or degraded phase in column	Remove the front 15 cm of the column and reinstall. If retention times are changing or cutting the column does not help, replace the column.
	Injector not hot enough for higher boiling compounds	Increase the injector temperature and lower the injection speed. Check that the graphite ferrule is free of cracks and the septum support is tight.
Low response and tailing of high boiling point compounds	Injector is not hot enough to vaporize high boilers	Increase injector temperature
	Interface/ion source not getting to adequate temperature	Change the manifold heater
Leading sample peaks	Column overload due to excess amount of component injected	Dilute the sample or do split injection
	Degradation of stationary phase	Change the column
	Carrier gas velocity too low	Increase carrier gas flow rate
Poor chromatographic resolution	Column temperature or program not optimized	Modify method by changing temperature ramp segment slopes

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Table 1. GCMS Troubleshooting Guide		
Problem	**Cause**	**Treatment**
	Carrier gas flow rate not optimized	Decrease carrier gas linear velocity
	Stationary phase has degraded	Replace the column
Peak splitting, especially low boilers	Sample is flashing in the injector simulating two injections	Lower injector temperature
Retention times shift in chromatogram	Unstable carrier gas flow controller/regulator	Check pneumatics for leaks. Replace flow controller/ regulator if necessary.
	Column contamination or degradation	Condition or replace column
	Leaks at septum or column to injector connection	Replace septum regularly and check that the septum nut and the capillary column nut are tight
Cannot reach operating vacuum	Analyzer contaminated by diffusion pump oil	Shut down and clean mass spec
	Major air leak around column fitting into interface	Replace column ferrule and reseat compression fitting
No calibration gas peaks	Cal gas valve not open	Open cal gas valve
	Calibration gas solenoid valve stuck open. All calibration gas evaporated.	Have solenoid replaced. Put fresh PFBTA in the cal gas vial.
Analysis sensitivity has decreased	Background has increased	Check column bleed, septum bleed, pump oil, and ion source contamination
	Detector needs replacement	Replace detector
	Defective syringe	Try a new or proven syringe
	"Blown" septum or other massive leaks at the inlet or with carrier gas flow. Poor peak shapes usually result from bad leaks.	Find and fix leaks and adjust gas flow.
	Purge flow or split ratio too high	Adjust gas flow rates

4.0 Other Requirements

4.1 All hardcopy laboratory notebooks must be reviewed by the Supervisor, or their designee, on a monthly basis.

4.2 If not self-explanatory (e.g., a typo or transposed number), corrections to technical and quality records shall also include a justification for the change.

4.3 A storage blank must be stored with all volatile organic samples, regardless of suspected concentration levels.

4.4 A person performing a manual integration must sign and date each manually integrated chromatogram and record the rationale for performing manual integration. Electronic signatures are acceptable.

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4.5 The results of calibration and verification of support equipment must be within the specifications required of the application for which this equipment is used or the equipment must be removed from service until repaired. Calibration and verification records, including those of established correction factors, must be maintained. In the absence of method-specific requirements, the minimum requirements are as follows:

Table 2. Support Equipment Checks

Performance Check	Frequency	Acceptance Criteria
Balance calibration check [Using two standard weights that bracket the expected mass]	Daily prior to use	Top-loading balance: ±2% or ±0.02g, whichever is greater Analytical balance: ±0.1% or ±0.5 mg, whichever is greater
Verification of standard mass [Using weights traceable to the International System of Units (SI) through a NMI	Every 5 years	Certificate of Calibration from ISO/IEC 17025 accredited calibration laboratory
Monitoring of refrigerator/freezer temperatures	Daily (i.e. 7 days per week) [use MIN/MAX thermometers or data loggers equipped with notification of out of control event capabilities if personnel not available to record daily]	Refrigerators: 0˚C to 6˚C Freezers: ≤-10˚C
Thermometer verification check [Using a thermometer traceable to the SI through an NMI] [Performed at two temperatures that bracket the target temperature(s). Assume linearity between the two bracketing temperatures.] [If only a single temperature is used, at the temperature of use]	Liquid in glass: Before first use and annually Electronic: Before first use and quarterly	Apply correction factors or replace thermometer
Volumetric labware	Class B: By lot before first use Class A and B: Upon evidence of deterioration	Bias: Mean within ±2% of nominal volume Precision: RSD ≤1% of nominal volume (based on 10 replicate measurements)
Non-volumetric labware [Applicable only when used for measuring initial sample volume and final extract/ digestates volume]	By lot before first use or upon evidence of deterioration	Bias: Mean within ±3% of nominal volume Precision: RSD ≤3% of nominal volume (based on 10 replicate measurements)
Mechanical volumetric pipette	Quarterly	Bias: Mean within ±2% of nominal volume Precision: RSD ≤1% of nominal volume (based on minimum of 3 replicate measurements) [Note: for variable volume pipettes, the nominal volume is the volume of use]

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Table 2. Support Equipment Checks		
Performance Check	**Frequency**	**Acceptance Criteria**
Glass microliter syringe	Upon receipt and upon evidence of deterioration	General Certificate of Bias & Precision upon receipt Replace if deterioration is evident
Drying oven temperature check	Daily prior to and after use	Within ±5% of set temperature
Water purification system	Daily prior to use	See method blank criteria given in Section 4.20 of this addendum

4.6 The expiration date of the prepared standard shall not exceed the expiration date of the primary standard. All containers must bear a preparation date.

4.7 To avoid preparing non-representative samples, the laboratory shall not "target" within a relatively small mass range (e.g., 1.00 ± 0.01g) because such targeting will produce non-representative subsamples if the sample has high heterogeneity. The laboratory shall not manipulate the sample material so the sample aliquot weighs exactly 1.00g ± 0.01g, as an example.

4.8 In the absence of project-specific requirements, the minimum standard data qualifiers to be used are:

U Analyte was not detected and is reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

J The reported result is an estimated value (e.g., matrix interference was observed or the analyte was detected at a concentration outside the quantitation range).

B Blank contamination. The recorded result is associated with a contaminated blank.

N Non-target analyte. The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.

Q One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).

Additional data qualifiers may be used, or different letters or symbols to denote the qualifiers listed above, as long as they are appropriately defined and their use is consistent with project-specific requirements (e.g., QSM 5.0, the contract, and project-planning documents).

4.9 If the time of the sample collection is not provided, assume the most conservative time of day. For the purpose of batch processing, the start and stop dates and times of the batch preparation shall be recorded.

4.10 Each preparation method listed on the scope of accreditation must have quarterly LOD/LOQ verifications. However, not all possible combinations of preparation and cleanup techniques are required to have LOD/LOQ verifications. If LOD/LOQ verifications are not performed on all combinations, the laboratory must base the

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LOD/LOQ verifications on the worst case basis (preparation method with all applicable cleanup steps).

4.11 After each MDL determination, the laboratory must establish the LOD by spiking a quality system matrix at a concentration of at least 2 times but no greater than four times the MDL. This spike concentration establishes the LOD and the concentration at which the LOD shall be verified. It is specific to each suite of analyte, matrix, and method (including sample preparation). The following requirements apply to the initial LOD establishment and to the LOD verifications:

- The apparent signal to noise (S/N) ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification (e.g., ion abundance, second column confirmation, or pattern recognition). For data systems that do not provide a measure of noise, the signal produced by the verification sample must produce a result that is at least three standard deviations greater than the mean method blank concentration. This is initially estimated based on a minimum of four method blank analyses and later established with a minimum of 20 method blank results.
- If the LOD verification fails, then the laboratory must repeat the MDL determination and LOD verification or perform and pass two consecutive LOD verifications at a higher spike concentration and set the LOD at the higher concentration.
- The laboratory shall maintain documentation for all MDL determinations and LOD verifications.
- The DL and LOD must be reported for all analyte-matrix-methods suites, unless it is not applicable to the test or specifically excluded by project requirements.

4.12 The LOD shall be verified quarterly. In situations where methods are setup and used on an infrequent basis, the laboratory may choose to perform LOD verifications on a one per batch basis. All verification data will be in compliance, reported, and available for review.

4.13 For DoD, at a minimum, the LOQ shall be verified quarterly. In situations where methods are setup and used on an infrequent basis, the laboratory may choose to perform LOQ verifications on a one per batch basis.

4.14 All initial instrument calibrations must be verified with a standard obtained from a second manufacturer prior to analyzing any samples. The use of a standard from a second lot obtained from the same manufacturer (independently prepared from different source materials) is acceptable for use as a second source standard. The concentration of the second source standard shall be at or near the midpoint of the calibration range. The acceptance criteria for the initial calibration verification must be at least as stringent as those for the continuing calibration verification.

4.15 Exclusion of calibration points without documented scientifically valid technical justification is not permitted.

4.16 The concentration of the CCV standard shall be greater than the low calibration standard and less than or equal to the midpoint of the calibration range.

4.17 All CCVs analyzed must be evaluated and reported. If a CCV fails, reanalysis or corrective actions must be taken.

- If a CCV fails, the laboratory can immediately analyze two additional consecutive CCVs (immediately is defined as starting a consecutive pair within one hour; no

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samples can be run between the failed CCV and the two additional CCVs). This approach allows for spurious failures of analytes to be reported without reanalysis of samples. Any corrective actions that change the dynamics of the system (e.g., clip column, clean injection port, run blanks) requires that all samples since the last acceptable CCV be reanalyzed.

- Both of these CCVs must meet acceptance criteria in order for the samples to be reported without reanalysis.
- If either of these two CCVs fail or if the laboratory cannot immediately analyze two CCVs, the associated samples cannot be reported and must be reanalyzed.
- Corrective action(s) and recalibration must occur if the above scenario fails. All affected samples since the last acceptable CCV must be reanalyzed.
- Flagging of data for a failed CCV is only appropriate when the affected samples cannot be reanalyzed. The laboratory must notify the client prior to reporting data associated with a failed CCV.

4.18 The results of all MS/MSDs must be evaluated using the same acceptance criteria used for the DoD LCS limits (see Addendum Tables 3 through 6) or project limits, if specified. If the specific analyte(s) are not available in the Addendum Tables 3 through 6, the laboratory shall use their LCS in-house limits (see the LIMS) as a means of evaluating MS/MSDs. The MS and MSD must be spiked with all reported analytes.

4.19 Surrogate spike results shall be compared with DoD LCS limits (see Addendum Tables 3 through 6) or acceptance criteria specified by the client. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria (see the LIMS).

4.20 The method blank shall be considered to be contaminated if:

- The concentration of any target analyte (chemical of concern) in the blank exceeds 1/2 the LOQ and is greater than 1/10th the amount measured in any associated sample, or 1/0th the regulatory limit, whichever is greater;
- The concentration of any common laboratory contaminant in the blank exceeds the LOQ;
- If a method blank is contaminated as described above, then the laboratory shall reprocess affected samples in a subsequent preparation batch, except when sample results are below the LOD. If insufficient sample volume remains for reprocessing, the results shall be reported with appropriate data qualifiers.

4.21 Sporadic Marginal Exceedances are not allowed for target analytes (chemicals of concern as identified by a project) without project-specific approval. Target analytes are considered those few analytes that are critical for the success of a project (such as risk drivers) where sporadic marginal exceedances cannot be allowed. Laboratories should consult with clients whenever long lists of analytes are requested for analysis to determine if marginal exceedances will not be allowed.

4.22 DoD considers the same analyte exceeding the LCS control limit two (2) out of three (3) consecutive LCS to be indicative of non-random behavior, which requires corrective action and reanalysis of the LCS.

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Table 3. LCS Control Limits – Method 8270 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
92-52-4	1,1-Biphenyl	1645	78.5	13	40	117
95-94-3	1,2,4,5-Tetrachlorobenzene	1810	77.8	13.7	37	119
120-82-1	1,2,4-Trichlorobenzene	3577	75.7	13.9	34	118
95-50-1	1,2-Dichlorobenzene	3352	74.6	14	33	117
528-29-0	1,2-Dinitrobenzene [1,2-DNB]	203	79.4	11.9	44	115
122-66-7	1,2-Diphenylhydrazine [Azobenzene]	2039	83	13.9	41	125
99-35-4	1,3,5-Trinitrobenzene [1,3,5-TNB]	154	89.2	10.7	57	121
541-73-1	1,3-Dichlorobenzene	3288	72.6	14.1	30	115
99-65-0	1,3-Dinitrobenzene [1,3-DNB]	598	84.6	14	43	127
106-46-7	1,4-Dichlorobenzene	3793	73.1	13.9	31	115
100-25-4	1,4-Dinitrobenzene	248	84.4	15.7	37	132
130-15-4	1,4-Naphthoquinone	150	81.2	8.8	55	108
90-13-1	1-Chloronaphthalene	119	81.1	11.1	48	115
90-12-0	1-Methylnaphthalene	3004	79.2	13.2	40	119
58-90-2	2,3,4,6-Tetrachlorophenol	1724	84.7	13.6	44	125
935-95-5	2,3,5,6-Tetrachlorophenol	227	75.9	11.9	40	112
608-27-5	2,3-Dichloroaniline	108	82.4	13	44	121
95-95-4	2,4,5-Trichlorophenol	4014	82.6	13.7	41	124
118-79-6	2,4,6-Tribromophenol	2930	85.7	15.4	39	132
88-06-2	2,4,6-Trichlorophenol	4183	82.1	14.5	39	126
120-83-2	2,4-Dichlorophenol	3794	80.9	13.7	40	122
105-67-9	2,4-Dimethylphenol	3886	78.4	16.2	30	127
121-14-2	2,4-Dinitrotoluene	4075	86.8	12.9	48	126
87-65-0	2,6-Dichlorophenol	1364	79.2	12.6	41	117
606-20-2	2,6-Dinitrotoluene	3706	85	13	46	124
53-96-3	2-Acetylaminofluorene	175	94	13.3	54	134
91-58-7	2-Chloronaphthalene	3569	77.5	12.1	41	114
95-57-8	2-Chlorophenol	3977	77.3	14.5	34	121
321-60-8	2-Fluorobiphenyl	3191	79.5	11.8	44	115
367-12-4	2-Fluorophenol	3008	75.2	13.3	35	115
91-57-6	2-Methylnaphthalene	5059	80.1	14	38	122
95-48-7	2-Methylphenol (o-Cresol)	4016	77	14.9	32	122
88-74-4	2-Nitroaniline	3639	85.4	13.8	44	127
119-75-5	2-Nitrodiphenylamine	279	88.1	11.6	53	123
88-75-5	2-Nitrophenol	3804	79.6	14.5	36	123
109-06-8	2-Picoline [2-Methylpyridine]	181	64.5	12.7	27	103
91-94-1	3,3'-Dichlorobenzidine	3521	71.3	16.5	22	121
56-49-5	3-Methylcholanthrene	188	95.1	13	56	134
99-09-2	3-Nitroaniline	3454	75.9	14.3	33	119
65794-96-9	3/4-Methylphenol [m/p-Cresol]	2900	76.5	14.1	34	119
534-52-1	4,6-Dinitro-2-methylphenol	3739	80.7	17.2	29	132
101-55-3	4-Bromophenyl phenyl ether	3708	85.1	13	46	124

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Table 3. LCS Control Limits – Method 8270 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
59-50-7	4-Chloro-3-methylphenol	3880	83.3	12.9	45	122
106-47-8	4-Chloroaniline [p-Chloroanlinie]	3435	61.3	14.9	17	106
7005-72-3	4-Chlorophenyl phenyl ether	3673	83	12.7	45	121
106-44-5	4-Methylphenol [p-Cresol]	1555	84.1	14.1	42	126
100-02-7	4-Nitrophenol	3976	80.6	17	30	132
99-55-8	5-Nitro-o-toluidine [2-Amino-4-nitrotoluene]	187	69.8	15.8	23	117
57-97-6	7,12-Dimethylbenz(a)-anthracene	338	96.2	15.3	50	142
83-32-9	Acenaphthene	5300	81.3	13.7	40	123
208-96-8	Acenaphthylene	5194	81.8	16.8	32	132
98-86-2	Acetophenone	2101	73.9	13.6	33	115
120-12-7	Anthracene	5250	85.2	12.7	47	123
1912-24-9	Atrazine	1428	87.1	13.4	47	127
103-33-3	Azobenzene	378	82.1	14.2	39	125
56-55-3	Benz(a)anthracene	5385	87.4	12.9	49	126
50-32-8	Benzo(a)pyrene	5500	86.9	13.9	45	129
205-99-2	Benzo(b)fluoranthene	5323	88.3	14.5	45	132
191-24-2	Benzo(g,h,i)perylene	5263	88.5	15.1	43	134
207-08-9	Benzo(k)fluoranthene	5386	89.6	14.2	47	132
100-51-6	Benzyl alcohol	2895	75.7	15.6	29	122
111-91-1	bis(2-Chloroethoxy)methane	3705	78.4	14.2	36	121
111-44-4	Bis(2-chloroethyl) ether	3711	75.4	14.9	31	120
39638-32-9	bis(2-Chloroisopropyl) ether	769	82	16.3	33	131
117-81-7	Bis(2-ethylhexyl) phthalate	4018	91.9	13.7	51	133
103-23-1	bis(2-Ethylhexyl)adipate	156	90.8	10.1	61	121
85-68-7	Butyl benzyl phthalate	3956	90.3	14	48	132
105-60-2	Caprolactam	1203	81.3	11.9	46	117
86-74-8	Carbazole	3095	86.3	12	50	123
510-15-6	Chlorobenzilate	172	99.7	16.9	49	150
218-01-9	Chrysene	5395	87.1	12.2	50	124
84-74-2	Di-n-butyl phthalate	4041	89.4	12.8	51	128
117-84-0	Di-n-octyl phthalate	3985	92.4	16	45	140
2303-16-4	Diallate [cis or trans]	173	93.7	12.7	56	132
53-70-3	Dibenzo(a,h)anthracene	5393	89.5	14.7	45	134
132-64-9	Dibenzofuran	3749	81.5	12.7	44	120
84-66-2	Diethyl phthalate	4012	87.2	12.3	50	124
60-51-5	Dimethoate	137	68	13.3	28	108
131-11-3	Dimethyl phthalate	4023	85.9	12.6	48	124
60-11-7	Dimethylaminoazobenzene	177	98.7	11.6	64	134
88-85-7	Dinoseb	123	67.3	17.1	16	119
101-84-8	Diphenyl ether	114	95.6	6	78	114
122-39-4	Diphenylamine	854	79.5	10.6	48	111
62-50-0	Ethyl methanesulfonate	174	85.1	16.9	34	136

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Table 3. LCS Control Limits – Method 8270 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
206-44-0	Fluoranthene	5340	88.3	12.9	50	127
86-73-7	Fluorene	5150	84.2	13.8	43	125
118-74-1	Hexachlorobenzene	4138	83.5	13	45	122
87-68-3	Hexachlorobutadiene	4003	77.3	15.3	32	123
67-72-1	Hexachloroethane	4049	72.2	14.9	28	117
1888-71-7	Hexachloropropene	259	81.9	16.7	32	132
95-13-6	Indene	188	85.3	8.9	59	112
193-39-5	Indeno(1,2,3-cd)pyrene	5367	89.3	14.7	45	133
465-73-6	isodrin	167	93.8	12.8	56	132
78-59-1	Isophorone	3787	75.9	15.2	30	122
120-58-1	Isosafrole	174	89.5	15.4	43	136
66-27-3	Methyl methanesulfonate	150	77.9	13.1	38	117
100-75-4	N-Nitorosopiperidine	232	89.4	9.8	60	119
924-16-3	N-Nitrosodi-n-butylamine	236	91.7	10.8	59	124
621-64-7	N-Nitrosodi-n-propylamine	3857	78.2	13.9	36	120
55-18-5	N-nitrosodiethylamine	421	82.1	13.8	41	124
62-75-9	N-Nitrosodimethylamine	3170	71.6	16.2	23	120
86-30-6	N-Nitrosodiphenylamine	2968	82.7	14.8	38	127
10595-95-6	n-Nitrosomethylethylamine	265	78.7	14.9	34	123
59-89-2	n-Nitrosomorpholine	172	91.3	13.8	50	133
930-55-2	n-Nitrosopyrrolidine	326	85.5	13.6	45	126
91-20-3	Naphthalene	5342	78.8	14.7	35	123
98-95-3	Nitrobenzene	4103	77.8	14.7	34	122
4165-60-0	Nitrobenzene-d5	3226	79.3	14.2	37	122
56-57-5	Nitroquinoline-1-oxide	177	91.3	24.5	18	165
126-68-1	O,O,O-Triethyl phosphorothioate	138	91.6	10.8	59	124
593-45-3	Octadecane	113	87.4	14.5	44	131
608-93-5	Pentachlorobenzene	346	89.7	11.8	54	125
76-01-7	Pentachloroethane	131	70.4	10.6	39	102
87-86-5	Pentachlorophenol	4161	78.7	18	25	133
82-68-8	Pentchloronitrobenzene	579	86.1	16	38	134
62-44-2	Phenacetin	185	95	12.5	57	133
85-01-8	Phenanthrene	5259	85.4	12	50	121
108-95-2	Phenol	4029	77.3	14.4	34	121
4165-62-2	Phenol-d5	1016	77.4	14.9	33	122
23950-58-5	Pronamide	179	93	12.4	56	130
129-00-0	Pyrene	5518	87.2	13.3	47	127
91-22-5	Quinoline	219	90	11.9	54	126
94-59-7	Safrole	176	87.8	13.6	47	129
1718-51-0	Terphenyl-d14	3111	90.5	12.3	54	127
3689-24-5	Tetraethyl dithiopyrophosphate [Sulfotep]	136	94.4	14	52	137
297-97-2	Thionazine	139	94.6	10.7	62	127

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ISSUER: Pace National – Mt. Juliet, Tennessee

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Table 4. LCS Control Limits – Method 8270 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
92-52-4	1,1-Biphenyl	2247	82.1	11.1	49	115
95-94-3	1,2,4,5-Tetrachlorobenzene	2326	77.9	14.5	35	121
120-82-1	1,2,4-Trichlorobenzene	4716	72.6	14.5	29	116
95-50-1	1,2-Dichlorobenzene	4442	71.4	13.3	32	111
528-29-0	1,2-Dinitrobenzene [1,2-DNB]	112	83.9	8.3	59	109
122-66-7	1,2-Diphenylhydrazine [Azobenzene]	2244	85.4	12.2	49	122
99-35-4	1,3,5-Trinitrobenzene [1,3,5-TNB]	241	89.1	16	41	137
541-73-1	1,3-Dichlorobenzene	4375	68.6	13.6	28	110
99-65-0	1,3-Dinitrobenzene [1,3-DNB]	601	88.2	13.1	49	128
106-46-7	1,4-Dichlorobenzene	5433	70.4	13.9	29	112
90-13-1	1-Chloronaphthalene	211	84.5	8.8	58	111
90-12-0	1-Methylnaphthalene	3742	80	13.1	41	119
134-32-7	1-Naphthylamine	258	73.7	16.6	24	124
58-90-2	2,3,4,6-Tetrachlorophenol	2293	89	13	50	128
935-95-5	2,3,5,6-Tetrachlorophenol	266	85.6	11.7	50	121
608-27-5	2,3-Dichloroaniline	150	99.2	9.8	70	129
95-95-4	2,4,5-Trichlorophenol	5707	88.1	11.8	53	123
118-79-6	2,4,6-Tribromophenol	2059	91.5	16	43	140
88-06-2	2,4,6-Trichlorophenol	6136	87.2	12.4	50	125
120-83-2	2,4-Dichlorophenol	5330	84	12.2	47	121
105-67-9	2,4-Dimethylphenol	5298	77.5	15.6	31	124
51-28-5	2,4-Dinitrophenol	5127	82.9	20	23	143
121-14-2	2,4-Dinitrotoluene	6032	92.3	11.8	57	128
87-65-0	2,6-Dichlorophenol	1583	84	11.4	50	118
606-20-2	2,6-Dinitrotoluene	5107	90.7	11.2	57	124
53-96-3	2-Acetylaminofluorene	228	98.9	12.9	60	138
91-58-7	2-Chloronaphthalene	5084	78	12.8	40	116
95-57-8	2-Chlorophenol	5571	77.5	13.2	38	117
93951-73-6	2-Chlorophenol-d4	119	79.9	8.7	54	106
321-60-8	2-Fluorobiphenyl	2263	81.2	12.4	44	119
367-12-4	2-Fluorophenol	2022	68.8	16.6	19	119
91-57-6	2-Methylnaphthalene	6330	80.7	13.6	40	121
95-48-7	2-Methylphenol (o-Cresol)	5800	73	14.5	30	117
88-74-4	2-Nitroaniline	4855	90.8	12.1	55	127
119-75-5	2-Nitrodiphenylamine	272	97.3	11.3	64	131
88-75-5	2-Nitrophenol	5097	84.6	12.7	47	123
109-06-8	2-Picoline [2-Methylpyridine]	195	71.6	12.6	34	109
91-94-1	3,3'-Dichlorobenzidine	4815	77.9	16.9	27	129
56-49-5	3-Methylcholanthrene	237	94	12.8	56	133
99-09-2	3-Nitroaniline	4808	84.4	14.5	41	128

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Table 4. LCS Control Limits – Method 8270 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
65794-96-9	3/4-Methylphenol [m/p-Cresol]	3472	69.7	13.6	29	110
534-52-1	4,6-Dinitro-2-methylphenol	5097	90.1	15.5	44	137
101-55-3	4-Bromophenyl phenyl ether	5074	89.1	11.5	55	124
59-50-7	4-Chloro-3-methylphenol	5338	85.5	11.3	52	119
106-47-8	4-Chloroaniline [p-Chloroanlinie]	4687	75.3	14	33	117
7005-72-3	4-Chlorophenyl phenyl ether	5071	86.7	11.3	53	121
106-44-5	4-Methylphenol [p-Cresol]	2798	72.5	15.8	25	120
99-55-8	5-Nitro-o-toluidine [2-amino-4-nitrotoluene]	260	82.1	14.6	38	126
57-97-6	7,12-Dimethylbenz(a)-anthracene	373	97.1	11.9	61	133
83-32-9	Acenaphthene	6952	84.5	12.3	47	122
208-96-8	Acenaphthylene	6662	85.3	14.7	41	130
98-86-2	Acetophenone	2877	82.1	12	46	118
120-12-7	Anthracene	6792	89.6	11	57	123
140-57-8	Aramite	100	82.8	16.3	34	132
1912-24-9	Atrazine	2328	92.8	16.4	44	142
103-33-3	Azobenzene	578	88.5	9.3	61	116
56-55-3	Benz(a)anthracene	6867	91.6	11.1	58	125
50-32-8	Benzo(a)pyrene	7045	90.8	12.4	54	128
205-99-2	Benzo(b)fluoranthene	6767	92	12.9	53	131
191-24-2	Benzo(g,h,i)perylene	6624	92	13.9	50	134
207-08-9	Benzo(k)fluoranthene	6803	93.2	12.1	57	129
100-51-6	Benzyl alcohol	3349	71.2	13.5	31	112
111-91-1	bis(2-Chloroethoxy)methane	5094	83.9	11.9	48	120
111-44-4	Bis(2-chloroethyl) ether	5139	80.8	12.6	43	118
39638-32-9	bis(2-Chloroisopropyl) ether	1140	83.4	15.4	37	130
117-81-7	Bis(2-ethylhexyl) phthalate	5288	95.2	13.3	55	135
85-68-7	Butyl benzyl phthalate	5173	93.3	13.5	53	134
86-74-8	Carbazole	4187	91.1	10.4	60	122
510-15-6	Chlorobenzilate	226	104.3	15.4	58	150
218-01-9	Chrysene	6779	91.3	10.7	59	123
124-18-5	Decane	126	66.9	12.8	29	105
84-74-2	Di-n-butyl phthalate	5329	93	11.4	59	127
117-84-0	Di-n-octyl phthalate	5222	95.5	15	51	140
2303-16-4	Diallate [cis or trans]	249	95.3	9.6	67	124
226-36-8	Dibenz(a,h)acridine	136	104.4	9.7	75	134
53-70-3	Dibenzo(a,h)anthracene	6840	92.7	13.8	51	134
132-64-9	Dibenzofuran	4963	85.3	10.8	53	118
84-66-2	Diethyl phthalate	5207	90.1	11.5	56	125
131-11-3	Dimethyl phthalate	4977	86	13.7	45	127
60-11-7	Dimethylaminoazobenzene	238	97.1	11.6	62	132
88-85-7	Dinoseb	144	93.4	10.8	61	126

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Table 4. LCS Control Limits – Method 8270 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
101-84-8	Diphenyl ether	142	91.7	7.8	68	115
122-39-4	Diphenylamine	754	83	9.2	55	111
298-04-4	Disulfoton	122	92.5	12.5	55	130
62-50-0	Ethyl methanesulfonate	215	90.1	9.4	62	118
206-44-0	Fluoranthene	6826	92.6	11.9	57	128
86-73-7	Fluorene	6786	88.1	12	52	124
118-74-1	Hexachlorobenzene	6263	88.7	12.1	53	125
87-68-3	Hexachlorobutadiene	5878	73.1	16.9	22	124
39638-32-9	bis(2-Chloroisopropyl) ether	1140	83.4	15.4	37	130
117-81-7	Bis(2-ethylhexyl) phthalate	5288	95.2	13.3	55	135
85-68-7	Butyl benzyl phthalate	5173	93.3	13.5	53	134
86-74-8	Carbazole	4187	91.1	10.4	60	122
510-15-6	Chlorobenzilate	226	104.3	15.4	58	150
218-01-9	Chrysene	6779	91.3	10.7	59	123
124-18-5	Decane	126	66.9	12.8	29	105
84-74-2	Di-n-butyl phthalate	5329	93	11.4	59	127
117-84-0	Di-n-octyl phthalate	5222	95.5	15	51	140
2303-16-4	Diallate [cis or trans]	249	95.3	9.6	67	124
226-36-8	Dibenz(a,h)acridine	136	104.4	9.7	75	134
53-70-3	Dibenzo(a,h)anthracene	6840	92.7	13.8	51	134
132-64-9	Dibenzofuran	4963	85.3	10.8	53	118
84-66-2	Diethyl phthalate	5207	90.1	11.5	56	125
131-11-3	Dimethyl phthalate	4977	86	13.7	45	127
60-11-7	Dimethylaminoazobenzene	238	97.1	11.6	62	132
88-85-7	Dinoseb	144	93.4	10.8	61	126
101-84-8	Diphenyl ether	142	91.7	7.8	68	115
122-39-4	Diphenylamine	754	83	9.2	55	111
298-04-4	Disulfoton	122	92.5	12.5	55	130
62-50-0	Ethyl methanesulfonate	215	90.1	9.4	62	118
206-44-0	Fluoranthene	6826	92.6	11.9	57	128
86-73-7	Fluorene	6786	88.1	12	52	124
118-74-1	Hexachlorobenzene	6263	88.7	12.1	53	125
87-68-3	Hexachlorobutadiene	5878	73.1	16.9	22	124
67-72-1	Hexachloroethane	5904	68	15.7	21	115
95-13-6	Indene	253	93.8	13.7	53	135
193-39-5	Indeno(1,2,3-cd)pyrene	6880	92.6	13.6	52	134
465-73-6	isodrin	212	97.6	10	68	128
78-59-1	Isophorone	5190	83.3	13.7	42	124
120-58-1	Isosafrole	230	91.1	11.8	56	126
66-27-3	Methyl methanesulfonate	237	70.1	12.3	33	107
298-00-0	Methyl parathion	121	101.6	19	45	159
100-75-4	N-Nitorosopiperidine	299	88.6	10.8	56	121
924-16-3	N-Nitrosodi-n-butylamine	322	90.4	10.3	60	121
621-64-7	N-Nitrosodi-n-propylamine	5145	84	11.7	49	119
55-18-5	N-nitrosodiethylamine	488	81.8	12.9	43	121

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Table 4. LCS Control Limits – Method 8270 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
86-30-6	N-Nitrosodiphenylamine	3743	86.8	11.9	51	123
10595-95-6	n-Nitrosomethylethylamine	311	78.7	12.7	41	117
59-89-2	n-Nitrosomorpholine	214	86.2	10.3	55	117
930-55-2	n-Nitrosopyrrolidine	716	80.8	10.8	48	113
91-20-3	Naphthalene	6953	80	13.5	40	121
98-95-3	Nitrobenzene	5955	83	12.8	45	121
4165-60-0	Nitrobenzene-d5	2223	82.1	12.6	44	120
126-68-1	O,O,O-Triethyl phosphorothioate	212	92.6	8.8	66	119
95-53-4	o-Toluidine	296	69.9	13.2	30	110
593-45-3	Octadecane	151	89	13.1	50	128
56-38-2	Parathion	152	102.6	12.3	66	140
608-93-5	Pentachlorobenzene	401	91.1	10.7	59	123
76-01-7	Pentachloroethane	139	60.9	10.4	30	92
87-86-5	Pentachlorophenol	6083	86.4	17.1	35	138
82-68-8	Pentchloronitrobenzene	618	94.5	13.4	54	135
62-44-2	Phenacetin	241	97.9	8.9	71	124
85-01-8	Phenanthrene	6822	89.6	10.2	59	120
298-02-2	Phorate	126	88.6	16.8	38	139
23950-58-5	Pronamide	249	97	10.5	65	129
129-00-0	Pyrene	7013	91.1	11.5	57	126
91-22-5	Quinoline	249	100.1	10.5	69	132
94-59-7	Safrole	233	90	9.7	61	119
1718-51-0	Terphenyl-d14	1893	91.7	13.9	50	134
3689-24-5	Tetraethyl dithiopyrophosphate [Sulfotep]	200	96.7	11.9	61	133
297-97-2	Thionazine	196	102	10.1	72	132

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Table 5. LCS Control Limits – Method 8270 SIM Solid Matrix						
CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
90-12-0	1-Methylnaphthalene	2267	76.6	11.3	43	111
95-95-4	2,4,5-Trichlorophenol	169	79.9	14.9	35	125
91-58-7	2-Chloronaphthalene	615	76.7	10.5	45	108
321-60-8	2-Fluorobiphenyl	1961	80.6	11.6	46	115
91-57-6	2-Methylnaphthalene	2535	76.8	12.5	39	114
83-32-9	Acenaphthene	2813	77.7	11.2	44	111
208-96-8	Acenaphthylene	2761	77.1	12.8	39	116
120-12-7	Anthracene	2812	82.1	10.7	50	114
56-55-3	Benz(a)anthracene	2827	88	11.4	54	122
50-32-8	Benzo(a)pyrene	2789	87.3	12.5	50	125
205-99-2	Benzo(b)fluoranthene	2790	90.3	12.6	53	128
191-24-2	Benzo(g,h,i)perylene	2739	87.8	13	49	127
207-08-9	Benzo(k)fluoranthene	2761	89.3	11.2	56	123
111-44-4	Bis(2-chloroethyl) ether	192	65.4	15.8	18	113
117-81-7	Bis(2-ethylhexyl) phthalate	181	108.9	13.9	67	150
85-68-7	Butyl benzyl phthalate	144	103.5	10.6	72	135
86-74-8	Carbazole	183	79.3	14.6	36	123
218-01-9	Chrysene	2812	87.5	10.2	57	118
84-74-2	Di-n-butyl phthalate	150	106.5	12.9	68	145
117-84-0	Di-n-octyl phthalate	144	105.5	16.8	55	156
53-70-3	Dibenzo(a,h)anthracene	2778	89.2	13.2	50	129
132-64-9	Dibenzofuran	282	71.9	12.2	35	108
84-66-2	Diethyl phthalate	147	99.3	10.9	67	132
131-11-3	Dimethyl phthalate	149	99.3	9.3	71	127
206-44-0	Fluoranthene	2782	87.3	10.7	55	119
86-73-7	Fluorene	2795	80.6	11.2	47	114
118-74-1	Hexachlorobenzene	201	81.9	14.2	39	125
193-39-5	Indeno(1,2,3-cd)pyrene	2812	89.6	13.5	49	130
62-75-9	N-Nitrosodimethylamine	117	90.7	10.9	58	124
91-20-3	Naphthalene	2823	74.7	12.2	38	111
4165-60-0	Nitrobenzene-d5	531	84.7	13.6	44	125
87-86-5	Pentachlorophenol	259	82.4	15.5	36	129
85-01-8	Phenanthrene	2792	80.8	10.6	49	113
129-00-0	Pyrene	2792	85.8	10.2	55	117
1718-51-0	Terphenyl-d14	1864	95.3	12.6	58	133

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Table 6. LCS Control Limits – Method 8270 SIM Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
92-52-4	1,1-Biphenyl	106	77.3	7.3	56	99
90-12-0	1-Methylnaphthalene	2566	77.9	12.5	41	115
95-95-4	2,4,5-Trichlorophenol	488	84.1	13.4	44	124
118-79-6	2,4,6-Tribromophenol	164	83.7	12.7	46	122
606-20-2	2,6-Dinitrotoluene	118	67.2	15.8	20	115
91-58-7	2-Chloronaphthalene	717	72.4	12.7	34	111
321-60-8	2-Fluorobiphenyl	747	79.2	8.8	53	106
91-57-6	2-Methylnaphthalene	2984	76.5	12.6	39	114
83-32-9	Acenaphthene	3241	80.9	11.1	48	114
208-96-8	Acenaphthylene	3234	77.8	14.4	35	121
120-12-7	Anthracene	3224	85.8	11	53	119
56-55-3	Benz(a)anthracene	3277	89.3	10.1	59	120
50-32-8	Benzo(a)pyrene	3284	86.4	11.2	53	120
205-99-2	Benzo(b)fluoranthene	3248	89.7	12.3	53	126
191-24-2	Benzo(g,h,i)perylene	3178	86	14.1	44	128
207-08-9	Benzo(k)fluoranthene	3167	89.3	11.9	54	125
111-44-4	Bis(2-chloroethyl) ether	775	77.8	12.6	40	116
117-81-7	Bis(2-ethylhexyl) phthalate	275	114.1	19.6	55	173
85-68-7	Butyl benzyl phthalate	159	90.7	17.3	39	143
86-74-8	Carbazole	631	84	13.1	45	123
218-01-9	Chrysene	3215	88.3	10.4	57	120
84-74-2	Di-n-butyl phthalate	153	102.5	14.2	60	145
117-84-0	Di-n-octyl phthalate	157	103.3	19	46	160
53-70-3	Dibenzo(a,h)anthracene	3233	87.2	14.5	44	131
132-64-9	Dibenzofuran	864	77.5	14.1	35	120
84-66-2	Diethyl phthalate	142	94.5	13.5	54	135
206-44-0	Fluoranthene	3242	89.1	10.4	58	120
86-73-7	Fluorene	3232	84.1	11.3	50	118
118-74-1	Hexachlorobenzene	947	84.8	13	46	124
87-68-3	Hexachlorobutadiene	187	84.5	14.7	40	129
193-39-5	Indeno(1,2,3-cd)pyrene	3244	88.7	13.7	48	130
62-75-9	N-Nitrosodimethylamine	162	62.5	10	33	92
91-20-3	Naphthalene	3277	78.8	11.9	43	114
4165-60-0	Nitrobenzene-d5	444	83.1	9.2	55	111
87-86-5	Pentachlorophenol	808	88.4	17.6	36	141
85-01-8	Phenanthrene	3240	83.6	10.3	53	115
129-00-0	Pyrene	3252	87.1	11.3	53	121
1718-51-0	Terphenyl-d14	642	95.1	12.4	58	132

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Table 7. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of DFTPP from method.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune.
Performance Check	At the beginning of each 12-hour period, prior to analysis of samples.	Degradation ≤ 20% for DDT. Benzidine and penta-chlorophenol shall be present at their normal responses, and shall not exceed a tailing factor of 2.	Correct problem, then repeat performance checks.	Flagging is not appropriate.	No samples shall be analyzed until performance check is within criteria. The DDT breakdown and Benzidine/Pentachlorophenol tailing factors are considered overall system checks to evaluate injector port inertness and column performance and are required regardless of the reported analyte list.
Initial calibration (ICAL) for all analytes (including surrogates)	At instrument set-up, prior to sample analysis	Each analyte must meet one of the three options below: **Option 1:** RSD for each analyte ≤ 15%; **Option 2:** linear least squares regression for each analyte: r2 ≥ 0.99; **Option 3**: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.	Flagging is not appropriate.	Minimum 5 levels for linear and 6 levels for quadratic. No samples shall be analyzed until ICAL has passed. If the specific version of a method requires additional evaluation (e.g., RFs or low calibration standard analysis and recovery criteria) these additional requirements must also be met.

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Table 7. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL s performed. On days when ICAL is not performed, the initial CCV is used.	NA.	NA.	Required for each analyte and surrogate.
Evaluation of Relative Retention Times(RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL.	NA	RRTs may be updated based on the daily CCV. RRTs shall be compared with the most recently updated RRTs.
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis	All reported analytes within ± 20% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.
Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Recalibrate, and reanalyze all affected samples since the last acceptable CCV; or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable calibration verification.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed. If the specific version of a method requires additional evaluation (e.g., average RFs) these additional requirements must also be met.

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ISSUER: Pace National – Mt. Juliet, Tennessee

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Table 7. Quality Control Requirements – Organic Analysis by Gas Chromatography/Mass Spectrometry

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Internal standards (IS)	Every field sample, standard and QC sample.	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within - 50% to +100% of ICAL midpoint standard.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	If corrective action fails in field samples, data must be qualified and explained in the case narrative. Apply Q-flag to analytes associated with the non-compliant IS. Flagging is not appropriate for failed standards.	
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Common contaminants must not be detected > LOQ.	Correct problem. If required, reprep and reanalyze MB and all samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid method blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

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QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Laboratory Control Sample (LCS)	One per preparatory batch.	A laboratory must use the limits in Tables 3 through 6 for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits (see the LIMS) if project limits are not specified.	Correct problem, then reprep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all surrogates and all analytes to be reported. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use the limits in Tables 3 through 6 for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits (see the LIMS) if project limits are not specified.	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	Must contain all surrogates and all analytes to be reported. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference, i.e., matrix effect or analytical error.
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use the limits in Tables 3 through 6 for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits (see the LIMS) if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	MSD: Must contain all surrogates and all analytes to be reported. The data shall be evaluated to determine the source of difference.

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QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Surrogate Spike	All field and QC samples.	QC acceptance criteria specified by the project, if available; otherwise use limits in Tables 3 through 6 or in-house LCS limits (see the LIMS) if analyte(s) are not listed.	Correct problem, then reprep and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary.	Apply Q-flag to all associated analytes if acceptance criteria are not met and explain in the case narrative.	Alternative surrogates are recommended when there is obvious chromatographic interference.

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Specific ion abundance criteria of DFTPP from method 8270. Tune check can be acquired as a full scan.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune. In addition to the full scan tune check, optimization for the analytes of interest is recommended.
Deuterated Monitoring Compounds (DMCs) (surrogates)	All field and QC samples.	PAH analysis: DMCs required for polyaromatic hydrocarbon (PAH) target analytes: fluoranthene-d10 and 2-methylnaphthalene-d10. Minimum RRF for PAH DMCs: 0.40. All DMCs: Requires 50-150% recovery until in-house limits can be established.	Correct problem, and then reprep and reanalyze all samples with failing DMCs if sufficient sample material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the Case Narrative.	Apply Q-flag to all associated samples and analytes if acceptance criteria are not met and explain in the Case Narrative.	For non-PAH target analytes, other DMCs with similar chemistry must be assigned. Laboratories may use the same extract for full scan and SIM analysis if the SIM-specific DMCs are added prior to extraction.

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Performance Checks	At the beginning of each 12-hour period, prior to analysis of samples.	Degradation ≤ 20% for DDT.	Correct problem, then repeat performance checks.	Flagging is not appropriate.	No samples shall be analyzed until the performance checks are within criteria. DDT breakdown and tailing factors are considered overall measures of port inertness and column performance and are required checks for SIM operation. DDT breakdown and tailing factor checks can be acquired as a full scan.
Initial Calibration (ICAL) for all analytes	At instrument set-up, prior to sample analysis.	Each analyte must meet one of the following options: RSD for each analyte ≤ 20% [If pentachlorophenol is a target analyte, an RSD of ≤ 40% allowed] Or Linear least squares regression for each analyte: r2 ≥ 0.99.	Correct problem then repeat ICAL.	Flagging is not appropriate.	Minimum 5 levels required for ICAL with one calibration point at the same concentration as the daily CCV. No samples shall be analyzed until ICAL has passed.

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Retention Time window position establishment	Once per ICAL and at the beginning of the analytical sequence.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA.	NA.	Calculated for each analyte.
Evaluation of Relative Retention Times (RRT)	With each sample.	RRT of each reported analyte within ± 0.06 RRT units of the mean RRT of the calibration standards. RRTs may be updated based on the daily CCV.	Correct problem, then rerun ICAL.	NA.	RRTs shall be compared with the most recently updated RRTs. Characteristic ions must maximize in the same scan or within one scan of each other. After any maintenance is performed which could affect retention times, RRTs may be updated based on the daily CCV.
Initial Calibration Verification (ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 20% of true value. If pentachlorophenol is a target analyte, a %D from the true value of ±50% is allowed.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Continuing Calibration Verification (CCV)	Daily before sample analysis; after every 12 hours of analysis time; and at the end of the analytical batch run.	Concentration the same as the mid-point calibration standard (or lower). All reported analytes within ± 20% of true value. If pentachlorophenol is a target analyte, a %D from true value of ± 50% is allowed. All reported analytes within ±50% for end of analytical batch within ± 50% for end of analytical batch CCV.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) until a passing CCV is attained, and then reanalyze all associated samples since last acceptable CCV. Alternatively, perform an ICAL (including appropriate instrument QC) if necessary; then reanalyze all associated samples since the last acceptable CCV	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable calibration verification.	Results may not be reported without valid CCVs. Flagging is only appropriate in cases where the samples cannot be reanalyzed. If the specific version of a method requires additional evaluation (e.g., average RFs), these additional requirements must also be met.

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Internal Standards (IS)	Every field sample, Standards, blanks, and QC sample.	Retention time within ± 10 seconds from retention time of the midpoint standard in the ICAL; EICP area within -50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the initial CCV is used.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory.	If corrective action fails in field samples, data must be qualified and explained in the Case Narrative. Apply Q-flag to analytes associated with the non-compliant IS. Flagging is not appropriate for failed standards.	Internal Standard is spiked no greater than0.40 ng/µL concentration. According to the EPA Contract Laboratory Program Statement of Work (CLP SOW), this is the concentration of internal standard specified for SIM analysis. The SOW indicates calibration standards range from 0.10 to 1.0 ng/µL, so 0.40 ng/µL is mid-range. 1, 4-dichlorobenzene-d4 is ignored for SIM
Method Blank (MB)	One per preparation batch, prior to analysis of any field samples.	No analytes detected > ½ LOQ or > 1/10th the amount measured in any sample or 1/10th the regulatory limit, whichever is greater.	Conduct investigation to determine the source of the contamination and take appropriate corrective actions. Correct problem. If required, reprep and reanalyze MB and all QC samples and field samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated analytical batch.	Laboratories may use the same extract for full scan and SIM analysis provided the applicable DMCs and IS are spiked at the appropriate concentrations. Results may not be reported without a valid Method Blank. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Laboratory Control Sample (LCS)	One per preparation batch.	A laboratory must use Table 3 through Table 6 Limits (8270 SIM) for batch control if project specific limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, and then reanalyze the LCS and all samples in the associated analytical batch for failed analytes if sufficient sample material is available.	If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to specific analyte(s) in all samples in the associated analytical batch.	Must contain all analytes to be reported. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparation batch.	A laboratory must use the QSM Appendix C Limits (8270 SIM) for batch control if project specific limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply the J-flag if acceptance criteria are not met and explain in the Case Narrative.	Must contain all analytes to be reported spiked at concentrations appropriate for SIM analysis. For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference (i.e., matrix effect or analytical error).

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Table 8. Quality Control Requirements – Organic Semi-Volatile Analysis by GC/MS in SIM Mode

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparation batch.	A laboratory must use the QSM Appendix C Limits (8270 SIM) for batch control if project specific limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 40% (between MS and MSD or sample and MD).	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply the J-flag if acceptance criteria are not met and explain in the Case Narrative.	The MSD must contain all analytes to be reported spiked at concentrations appropriate for SIM analysis. All data must be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.
Characteristic ions for MS confirmation	Minimum 3 ions.	The relative intensities of the characteristic ions of target analytes agree within 30% of the relative intensities in the reference spectrum and the relative intensities must be > 0. Confirmation requires S/N ratio of ≥ 3 for each quant and confirmation ion.	No data can be reported without MS confirmation.	NA.	Need 3 structurally significant ions that are logical fragments – not isotopic clusters. Internal standard and DMC can use fewer than 3 ions.



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ENV-SOP-MTJL-0221

QM Approval

Name/Signature	Title	Date	Meaning/Reason
Regina Stone (006490)	Quality Analyst 3	26 Aug 2020, 02:18:03 PM	Approved

Management Approval

Name/Signature	Title	Date	Meaning/Reason
Jeremiah Gupton (006426)	Manager	26 Aug 2020, 10:12:11 AM	Approved
James Burns (006456)	Manager - EHS	26 Aug 2020, 01:20:38 PM	Approved

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1.0 SCOPE AND APPLICATION

STATE NOTE: For samples analyzed in conjunction with the Ohio Voluntary Action Program (VAP) please utilize ENV-SOP-MTJL-0220.

1.1 This procedure is applicable to drinking water (DW), ground water (GW), wastewater (WW), waste and soil sample digestates are analyzed for trace metals utilizing an Agilent 7700x ICP-MS, and Agilent 7900 ICP-MS.

1.2 Pace National maintains approval for the analysis of up to 29 elements by the EPA Methods 200.8, 6020A and 6020 for water and soil matrices in standard mode. All target analytes are analyzed either in Helium mode (Collision Cell) or No gas mode on the Agilent instruments depending on the sample matrix type. The following Table (1.2) contains a list of the analytes that are currently analyzed along with routine reporting limits per matrix. See also section 13.3.

Table 1.2 Analytes and Reporting Limits**

Analyte	Aqueous Samples				Solid Samples	
	DW RL	GW RL	WW RL	Units	SS RL	Units
Aluminum	0.100	0.100	0.100	mg/L	10.0	mg/Kg
Antimony	0.001	0.002	0.002	mg/L	0.100	mg/Kg
Arsenic	0.001	0.002	0.001	mg/L	0.100	mg/Kg
Barium	0.002	0.005	0.005	mg/L	0.200	mg/Kg
Beryllium	0.001	0.002	0.001	mg/L	0.100	mg/Kg
Boron	0.020	0.020	0.020	mg/L	2.00	mg/Kg
Cadmium	0.001	0.001	0.001	mg/L	0.100	mg/Kg
Calcium	1.00	1.00	1.00	mg/L	100.	mg/Kg
Chromium	0.001	0.002	0.001	mg/L	0.100	mg/Kg
Cobalt	0.001	0.002	0.002	mg/L	0.100	mg/Kg
Copper	0.002	0.005	0.001	mg/L	0.200	mg/Kg
Iron	0.100	0.100	0.100	mg/L	10.0	mg/Kg
Lead	0.001	0.002	0.001	mg/L	0.100	mg/Kg
Magnesium	1.00	1.00	1.00	mg/L	100.	mg/Kg
Manganese	0.002	0.005	0.005	mg/L	0.200	mg/Kg
Molybdenum	0.002	0.005	0.005	mg/L	0.200	mg/Kg
Nickel	0.001	0.002	0.001	mg/L	0.100	mg/Kg
Potassium	1.00	1.00	1.00	mg/L	100.	mg/Kg
Selenium	0.001	0.002	0.002	mg/L	0.100	mg/Kg
Silver	0.001	0.002	0.001	mg/L	0.200	mg/Kg
Sodium	1.00	1.00	1.00	mg/L	100.	mg/Kg
Strontium	0.010	0.010	0.010	mg/L	1.00	mg/Kg
Thallium	0.001	0.002	0.001	mg/L	0.100	mg/Kg
Thorium	0.010	0.010	0.010	mg/L	1.00	mg/Kg
Tin	0.001	0.002	0.002	mg/L	0.100	mg/Kg
Titanium	0.010	0.010	0.010	mg/L	1.00	mg/Kg
Uranium	0.001	0.001	0.001	mg/L	1.00	mg/Kg
Vanadium	0.002	0.005	0.005	mg/L	0.200	mg/Kg
Zinc	0.010	0.025	0.010	mg/L	1.00	mg/Kg

***See section 13.1 & 13.3.*

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1.3 An MDL study must be completed at least annually or more frequently if major instrumentation changes occur. Method Detection Limits (MDLs) are performed based on ENV-SOP-MTJL-0016. Updated MDL records are filed and stored in a central location within the department.

1.3.1 Limit of Detection (LOD) and Limit of Quantitation (LOQ) studies are completed at the frequency required by the TNI standard per the procedure identified in the ENV-SOP-MTJL-0016, *Method Detection Limits (MDL), Limits of Detection (LOD) and Limits of Quantitation (LOQ).* Should the procedure be utilized for DoD support; then the frequency of these studies must meet the requirements of the current DoD QSM (see Attachment III).

1.4 Instrument Detection Limit studies must be analyzed at least quarterly for each analytical instrument.[14.2, 14.4] Linear dynamic ranges must be established for each analyte from a minimum of three different concentration standard across the range of expected use for each instrument. These ranges should be rechecked for accuracy every six (6) months.[14.4]

1.5 Analysis without acid digestion can be used for drinking water samples if the samples have been properly preserved with acid and have turbidity of <1 NTU at the time of analysis. These samples must be acidified to match the acid matrix of the calibration standards and analyzed directly. This total recoverable determination procedure is referred to as "direct analysis". Silver concentration cannot be determined from direct analysis when chloride ions are present as a silver chloride precipitate may be formed. The sample must be acid digested to form a soluble silver chloride complex. Some primary drinking water metal contaminants may require sample concentration to meet regulatory drinking water reporting limits criteria.

2.0 METHOD SUMMARY AND DEFINITIONS

2.1 The ICP-MS uses inductively coupled plasma as the source of metal cations for the quadrupole mass spectrometer detector. This results in an instrument capable of detecting a wide variety of metals. This method measures ions produced by a radio frequency inductively coupled plasma. Analytes originating in a liquid are nebulized and the resulting aerosol transported by argon gas into the plasma torch. The ions produced are introduced in the plasma gas, by means of an interface, into a mass spectrometer. The ions produced are sorted according to their mass-to-charge ratios and are quantified with a channel electron multiplier.

2.2 The detection limits for ICP-MS are comparable to those of graphite furnace atomic absorption spectroscopy (GFAAS). Although ICP-MS data is actually acquired sequentially, ICP-MS has the capability of determining all the metals of interest in the time it would take GFAAS methods to determine one analyte. Internal standards are used to compensate for changes in instrumental sensitivity and mass transport phenomena.

2.3 Tuning Solution – A solution that is used to determine acceptable instrument performance prior to calibration and sample analyses.

2.4 Linear Dynamic Range (LDR) - The range over which the instrument response to analyte concentration is linear.

2.5 Serial Dilution (SD) – When the concentration of an element of interest is at least x25 the MDL, the sample must be diluted by a minimum of x5 dilution. One serial dilution must be

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prepared and analyzed per batch of samples, except for drinking water samples by EPA Method 200.8.

2.6 Post Spike (PS) – A second aliquot of a field sample that is spiked with known concentrations of target analytes and analyzed to assess recovery of the spike. A post spike must be analyzed when the MS and/or MSD fail due to a suspected matrix effect. One sample is spiked after digestion and analyzed per batch. Post spikes are not performed for drinking water samples EPA Method 200.8.

2.7 Interference Check Sample (ICS) – A series of two solutions (ICSA & ICSAB) to verify that inter-element interferences are correctly compensated. The ICSA and ICSAB provide an adequate on-going test of inter-element correction (IEC) factors.

2.8 Lower Limit of Quantitation (LLOQ) - A term associated with analysis per the requirements of Method 6010D. The lowest point of quantitation, which in most cases is the lowest concentration in the calibration curve.

2.9 See the current Quality Assurance Manual for other definitions associated with terms found in this document.

3.0 HEALTH AND SAFETY

3.1 The toxicity or carcinogenicity of each chemical material used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable.

3.2 The laboratory maintains documentation of hazard assessments and OSHA regulations regarding the safe handling of the chemicals specified in each method. Safety data sheets (SDS) for all hazardous chemicals are available to all personnel. Employees must abide by the environmental, health, and safety (EHS) policies and procedures specified in this SOP and in the Pace National Chemical Hygiene / Safety Manual.

3.3 Personal protective equipment (PPE) such as safety glasses and/or side shields, gloves, a laboratory coat, and shoes that are not cloth, canvas, and/or perforated must be worn in designated areas and while handling samples and chemical materials to protect against physical contact with samples that contain potentially hazardous chemicals and exposure to chemical materials used in the procedure. When handling glass, needles, knives, or any material with a potential sharp edge, employees must use cut-resistant gloves.

3.4 Concentrated corrosives present additional hazards and are damaging to skin and mucus membranes. Use these acids, bases, or oxidizers in a fume hood whenever possible with the appropriate PPE designed for handing these materials. If eye or skin contact occurs, flush with large volumes of water. When working with acids, always add acid to water to prevent violent reactions. Any processes that emit large volumes of solvents (evaporation/concentration processes) must be in a hood or apparatus that prevents employee exposure.

3.5 Spill kits are located in each laboratory department. Employees are to familiarize themselves with the location and contents of each spill kit in their area.

3.6 Universal precautions should be observed when performing any tests or procedures. Hard surfaces, instrument surfaces may be contaminated and should be handled according to good laboratory practices.

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3.7 Contact your supervisor or local EHS coordinator with questions or concerns regarding safety protocol or safe handling procedures for this procedure. Any accidents involving personnel or sample supplies are to be reported immediately to either the Manager and/or to the Safety Officer.

4.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

4.1 All samples must have been collected using a sampling plan that addresses the considerations of this method.

4.2 Prior to collection of an aqueous sample, consideration should be given to the type of data required (i.e., dissolved or total recoverable), so that appropriate preservation and pretreatment steps can be taken. The pH of all aqueous samples must be tested immediately prior to taking an aliquot for processing or "direct analysis" to ensure the sample has been properly preserved.

4.3 For the determination of dissolved elements, the sample must be filtered through a 0.45-um pore diameter membrane filter at the time of collection or as soon thereafter as practically possible. Use a portion of the sample to rinse the filter flask, discard this portion and collect the required volume of filtrate. Acidify the filtrate with nitric acid immediately following filtration to pH<2. The sample is now ready for digestion.

The hold time begins from the time of collection and ends with analysis within 180 days of collection.

4.4 For the determination of total recoverable elements in aqueous samples, samples are not filtered, but acidified with (1+1) nitric acid to pH < 2 (approximately, 3mL of (1+1) acid per liter of sample is sufficient for most ambient and drinking water samples). Preservation may be done at the time of collection; however, to avoid the hazards of strong acids in the field, transport restrictions, and possible contamination, it is recommended that the sample be returned to the laboratory within two weeks of collection and acid preserved upon receipt in the laboratory. Following acidification, the sample should be mixed, held for 24 hours, and then verified to be pH < 2 just prior to withdrawing an aliquot for processing or "direct analysis". If for some reason, such as high alkalinity, the sample pH is verified to be > 2, a T2 qualifier is applied in Prep Data. If the sample is reactive with Nitric acid, the volume of sample is reduced to 5mL for digestion. .

The holding times for total recoverable elements begins from the time of collection and ends with analysis within 180 days of collection.

4.5 Solid samples require no preservation prior to preparation/analysis unless mercury or hexavalent chromium analyses will be performed from the same container. If so, then storage at 4° ± 2°C is required[14.5]. The holding times for total recoverable elements begins from the time of collection and ends with analysis within 180 days of collection.

4.6 For aqueous samples, a field blank should be prepared and analyzed as required by the data user. Use the same container and acid as used in sample collection.

4.7 Samples submitted for analysis that do not meet the requirements contained within this section must be addressed before performing the logging process within the laboratory. In some cases, exceeding the appropriate preservation and storage criteria can cause significant bias in the resulting data. Clients may need to resubmit samples where the conditions during shipment cause uncertainty regarding sample integrity. If samples do not meet the requirements for preservation, sampling, shipment and storage and the

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client approves the completion of the analytical process, sample results can be qualified per the ENV-SOP-MTJL-0014, *Data Handling and Reporting*.

5.0 INTERFERENCES

5.1 Several interference sources may cause inaccuracies in the determination of trace elements by ICP-MS. These are:

5.1.1 Isobaric elemental interferences - Are caused by isotopes of different elements which form singly or doubly charged ions of the same nominal mass-to-charge ratio and which cannot be resolved by the mass spectrometer in use. All elements determined by this method have, at a minimum, one isotope free of isobaric elemental interference. Of the analytical isotopes recommended for use with this method, only molybdenum-98 (ruthenium) and selenium-82 (krypton) have isobaric elemental interferences. If alternative analytical isotopes having higher natural abundance are selected in order to achieve greater sensitivity, an isobaric interference may occur. All data obtained under such conditions must be corrected by measuring the signal from another isotope of the interfering element and subtracting the appropriate signal ratio from the isotope of interest. A record of this correction process must be included with the report and data. It should be noted that such corrections would only be as accurate as the accuracy of the isotope ratio used in the elemental equation for data calculations. Relevant isotope ratios should be established prior to the application of any corrections.

5.1.2 Abundance sensitivity - A property defining the degree to which the wings of a mass peak contribute to adjacent masses. The abundance sensitivity is affected by ion energy and quadrupole operating pressure. Wing overlap interferences may result when a small ion peak is being measured adjacent to a large one. The potential for these interferences must be recognized and the spectrometer resolution adjusted to minimize them.

5.1.3 Isobaric polyatomic ion interferences - Caused by ions consisting of more than one atom which have the same nominal mass-to-charge ratio as the isotope of interest, and which cannot be resolved by the mass spectrometer in use. These ions are commonly formed in the plasma or interface system from support gases or sample components. Most of the common interferences have been identified with the method elements affected. Such interferences must be recognized, and when they cannot be avoided by the selection of alternative analytical isotopes, appropriate corrections must be made to the data. Equations for the correction of data must be established at the time of the analytical sequence as the polyatomic ion interferences are highly dependent on the sample matrix and chosen instrument conditions. In particular, the common 82Kr interference that affects the determination of both arsenic and selenium can be greatly reduced with the use of high purity krypton free argon.

5.1.4 Physical interferences - Are associated with the physical processes that govern the transport of sample into the plasma, sample conversion processes in the plasma, and the transmission of ions through the plasma-mass spectrometer interface. These interferences may result in differences between instrument responses for the sample and the calibration standards. Physical interferences may occur in the transfer of solution to the nebulizer (e.g., viscosity effects), at the point of aerosol formation and transport to the plasma (e.g., surface tension), or during excitation and ionization processes within the plasma itself. High levels

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of dissolved solids in the sample may contribute deposits of material on the extraction and/or skimmer cones reducing the effective diameter of the orifices and therefore ion transmission. Dissolved solids levels not exceeding 0.2% (w/v) have been recommended to reduce such effects. Internal standardization may be effectively used to compensate for many physical interference effects. Ideally internal standards ideally should have similar analytical behavior to the elements being determined.

5.1.5 Memory interferences - Result when isotopes of elements in a previous sample contribute to the signals measured in a new sample. Memory effects can result from sample deposition on the sampler and skimmer cones and from the buildup of sample material in the plasma torch and spray chamber. The site where these effects occur is dependent on the element and can be minimized by flushing the system with a rinse blank between samples. The possibility of memory interferences must be recognized within an analytical sequence and suitable rinse times should be used to reduce them. The rinse times necessary for a particular element must be estimated prior to analysis. This may be achieved by aspirating a standard containing elements corresponding to ten times the upper end of the linear range for a normal sample analysis period, followed by analysis of the rinse blank at designated intervals. The length of time required to reduce analyte signals to within a factor of ten of the method detection limit must be noted. Memory interferences may also be assessed within an analytical sequence by using a minimum of three replicate integrations for data acquisition. If the integrated signal values drop consecutively, the analyst must be alerted to the possibility of a memory effect, and should examine the analyte concentration in the previous sample to identify if this was high. If memory interference is suspected, the sample should be reanalyzed after a long rinse period.

5.2 Instrument Interferences: The primary interferences in ICPMS are molecular ions such as oxides, doubly-charged ions, and isobaric interferences. For the few target isotopes that isobaric interferences affect (Se), a correction is entered into the parameter set to compensate for each one. The interference check SRM solution, IC6020 is used to assess the effects of a variety of molecular interferences. This solution should pass for all components to be reported. In addition, the data for samples with requested target analytes above the MDL should be examined for evidence of interfering molecular ions or doubly-charged ions. A list of the peaks that need to be monitored follows here.

Target Analyte	Common Interference	Monitor	Correction Based On
$^{111}Cd^{+}$	$^{95}Mo^{16}O^{+}$	$^{95}Mo^{+}$	$^{95}Mo^{+}$
114Cd	95Mo16o+, 50Sn	118Sn	NA
$^{65}Cu^{+}$	$^{25}Mg^{40}Ar^{+}$	$^{25}Mg^{+}$	NA
$^{65}Cu^{+}$	$^{32}S^{33}S^{+}$	$^{32}S^{+}$	NA
$^{60}Ni^{+}$	$^{44}Ca^{16}O^{+}$	$^{44}Ca^{+}$	NA
$^{75}As^{+}$	$^{40}Ar^{35}Cl^{+}$	$^{77}Se^{+}$	See 11.5.
$^{40}Ar^{37}Cl^{+}$	$^{77}Se^{+}$	$^{82}Se^{+}$	See 11.5.
$^{77,78,82}Se^{+}$	$^{82}Kr^{+}$, $^{1}H^{81}Br^{+}$	$^{83}Kr^{+}$, $^{79}Br^{+}$	$^{83}Kr^{+}$
$^{98}Mo^{+}$	$^{98}Ru^{+}$	$^{101}Ru^{+}$	$^{101}Ru^{+}$
$^{115}In^{+}$	$^{115}Sn^{+}$	$^{118}Sn^{+}$	$^{118}Sn^{+}$
$^{66}Zn^{+}$	$^{50}Ti^{+16}O^{+}$	$^{50}Ti^{+}$	$^{50}Ti^{+}$

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NA - Not Applicable

NOTE: 40 Ar 37 Cl + is not the target analyte monitored; rather any ion or combination thereof possessing a mass of 77amu is monitored.

5.3 Representative Correction Equations

V51 -0.0108*Cl37
As75 -3.127*[Arcl77-(.873*Se82)]
Se82, 77, 78 -0.978*Kr83
Mo98 -0.110588*Ru101
Cd111 -1.073*[Mo0108-(.712*Pb106)]
In115 -0.014032*Sn118
Ba137 -0.000903*La139 - 0.002825*Ce140
Cd114 -0.026826*Sn118
Sn119 -0.013447*Te125
Sn120 -0.013447*Te125
Sb123 -0.127189*Te125
Pb208 +1*Pb206+1*Pb207
Cd114 -0.027250*Sn118
Fe54 -0.028226*Cr52

6.0 EQUIPMENT AND SUPPLIES

6.1 The inductively coupled plasma mass spectrometer used is an Agilent 7700x ICP-MS, or Agilent 7900 ICP-MS.

6.2 Each ICP-MS is coupled to a Cetac ASX-500 series Autosampler or Agilent SPS 4 series Autosampler. A modified pumped rinse station was added to maintain fresh rinse solution at a constant level that ensures a clean Autosampler probe.

6.3 The pump tubing used is as follows:

Agilent Tubing:
Sample white-white1.02mm ID
Internal standard orange-blue 0.25mm ID
Drain yellow-blue 1.52mm ID

6.4 Samples and Standards are aspirated from polypropylene centrifuge tubes arranged in the Autosampler.

6.5 Argon gas supply: High purity grade (99.99%).

6.6 Adjustable pipettes (Eppendorf or equivalent).

6.7 Class A volumetric flasks.

6.8 Ultra high purity Helium gas supply for Agilent collision cell.

7.0 REAGENTS AND STANDARDS

7.1 All reagents and standards must be recorded in the appropriate preparation log and assigned a unique number. See ENV-SOP-MTJL-0041, *Standards Logger – Tree Operation*. Additional information regarding reagent preparation can be found in the Standards Logger (Tree) digital archive system. All spiking solutions and surrogate

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standard solutions should be replaced at least every six (6) months or sooner if a problem is detected unless otherwise noted.

7.2 Be careful not to contaminate solutions with metals or minerals during preparation and use. Be sure to mix all solutions thoroughly after they are prepared. Store standard solutions in Teflon™ bottles if possible (polyethylene is acceptable for standards containing analytes at high concentration. Label all bottles containing solutions giving the following information: name of solution (as given below), analytes, concentrations, instructions for use (if any), date prepared, expiration date and initials of preparer. Record the details of preparation in the LIMS.

7.3 Laboratory Reagent water

7.4 ICP/MS Standard List

Calibration	Stock Std Cat #	Working Standard Preparation
1ppb Standard #1	EE: HP6604-500 soln. A EE: HP6604-500 soln. B	0.5mL of the 100ppb Cal Std #5 poured up to 50mL with 2.5% Rinse
2ppb Standard #2		1mL of the 100ppb Cal Std #5 poured up to 50mL with 2.5% Rinse
10ppb Standard #3		50uL of Cal Std A and Cal Std B poured up to 50mL with 2.5% Rinse
50ppb Standard #4		0.25mL of Cal Std A and Cal Std B poured up to 50mL with 2.5% Rinse
100ppb Standard #5		0.5mL of Cal Std A and Cal Std B poured up to 50mL with 2.5% Rinse
200ppb Standard #6		1mL of Cal Std A and Cal Std B poured up to 50mL with 2.5% Rinse
1ppm Standard #7		5mL of Cal Std A and Cal Std B poured up to 50mL with 2.5% Rinse
ICV	PlasmaCal: S180223039	0.5ml of ICV Std poured up to 50mL with 2.5% Rinse
CCV	EE: HP6604-500 soln. A EE: HP6604-500 soln. B	0.5mL of Cal Std A and Cal Std B poured up to 50mL with 2.5% Rinse
ICVLL	Inorganic Ventures: ESC-12	0.5mL of LL Std A and LL Std B poured up to 50mL with 2.5% Rinse
CCVLL	Inorganic Ventures: ESC-12	0.5mL of LL Std A and LL Std B poured up to 50mL with 2.5% Rinse
ICSA	Inorganic Ventures: 6020ICS-0A	5mL of ICSA Std poured up to 50mL with 2.5% Rinse
ICSAB	Inorganic Ventures: 6020ICS-0A Inorganic Ventures: ESC-1 Inorganic Ventures: ESC-2	5mL of ICSA Std, 0.5mL of ICSAB Std A and 0.5mL of ICSAB Std B poured up to 50mL with 2.5% Rinse
Agilent Tune	Agilent Tech: #5188-6564	0.5mL of Agilent Tune Std poured up to 50mL with 2.5% Rinse
EPA Tune	EE: HP2047-A-250	5mL of EPA Tune Std poured up to 50mL with 2.5% Rinse

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Calibration	Stock Std Cat #	Working Standard Preparation
Internal Standard	VGH Labs: VHG-PTEH-500	2.5mL of Tellurium poured up to 1000mL with 2.5% Rinse
	EE: HP10006-1	0.5 mL of Bismuth poured up to 1000mL with 2.5% Rinse
	VHG Labs: VHG-SPCN-100	0.5 mL of Scandium poured up to 1000mL with 2.5% Rinse
	EE: 10M44-2	500uL of Rhodium poured up to 1000mL with 2.5% Rinse
	EE: HP10M20-3	500uL of Germanium poured up to 1000mL with 2.5% Rinse
	Triton X	50µL of Triton X
2.5% Blank and Rinse	Fisher:UN2031/ VWR: UN1789	Fill rinse container with 3.9L of DI water. Add 80mL of HNO3 and 20mL of HCL

7.5 Mixed Calibration Standard Solutions are used to make the following calibration solutions. All standards are prepared in Class A volumetric flasks using adjustable pipettes. The final acid concentration is matrix matched to digested field sample concentrations. See section 7.4 above for preparation of these standards.

7.6 Initial Calibration Verification (ICV) – The ICV is an analytical standard solution from a second source different from the calibration and CCV standards. The ICV is prepared at a mid-range concentration within the linear working range of the instrument. The ICV must have the same acid matrix as the Calibration Standards. See Section 7.4 above for the preparation of this standard.

7.7 Continuing Calibration Verification (CCV) – The CCV is the mid-range calibration standard prepared from the same source as the initial calibration curve. The CCV is used to verify the regression of the initial calibration of the instrument and must be repeated following every ten samples and at the conclusion of the sequence. See Section 7.4 above for the preparation of this standard.

7.8 Low Level Initial/Continuing Calibration Verification (ICVLL/CCVLL) – The ICVLL/CCVLL is prepared at a low concentration within the linear working range of the instrument and defines the lowest level of quantitation/reporting. The ICVLL/CCVLL must have the same acid matrix as the calibration standards. See Section 7.4 above for the preparation of this standard.

7.9 For the preparation of Laboratory Control Samples (LCSs) and Matrix Spikes (MSs) see the applicable sample preparation SOPs.

8.0 PROCEDURE

8.1 Sample Preparation

8.1.1 Digestion. All wastewater and drinking water samples and spikes that require a digestion follow ENV-SOP-MTJL-0208, *Digestion of Metals and Trace Elements in Drinking Water and Wastes for ICP-AES and ICPMS by Microwave and Hot Block Digestion*. All RCRA samples must be digested using one of the following

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SOPs: ENV-SOP-MTJL-0217 for 3050B/3051 and ENV-SOP-MTJL-0219 for 3005A, 3010A and 3015.

8.1.2 Internal Standards. The internal standard solution (100ppb each Sc, Te, Ge, Rh, and Bi) and sample solution are mixed in a mixing block prior to nebulization. The ratio of sample to internal standard is 4:1.

8.2 Sample Analysis – Instructions vary slightly depending on the specific instrument being used for analysis. Consult the instrument operating guides for each instrument for the exact directions for each instrument.

8.2.1 Pre-Start Checks: Turn on the computer and load the software. Initiate appropriate operating configuration of the instrument's computer according to the instrument manufacturer's instructions. Check the following:

8.2.2 Vacuum pump oil - Examine the sight glasses of the vacuum pump. Oil should be no darker than a light brown color. If it is, change the oil in the pump according to the directions in the manufacturer's guide.

8.2.3 Peristaltic pump tubing - Change the sample and internal standard tubing, spray chamber drain tubing and the rinse station tubing as needed. Allow at least 1 hour for break-in period.

8.2.4 Wash solution level - The wash solution supply is maintained in a 4-liter carboy. (See 7.3). Ensure that there is sufficient volume present for the analytical sequence.

8.2.5 Nebulizer waste and rinse waste flow into one waste container.

8.2.6 Ar/O pressure - The argon supply pressure should be set at about 100psi. If the supply argon pressure falls below about 45psi, a safety interlock automatically shuts off the torch.

8.2.7 Liquid Ar level - Liquid argon is maintained in a bulk supply tank. This tank is refilled on a regular basis before the argon supply is exhausted and bleeding of the argon lines is not necessary.

8.2.8 Torch alignment – Torch alignment is done automatically during performance check.

8.2.9 Interface cones - Remove and inspect the outside of the sampling and skimmer cones around the orifice. Install a new set of cones if needed or clean the existing cones using the following procedure:

Carefully polish each cone with silver polish and cotton swabs dampened with deionized water. Rinse cones with deionized water and blow-dry with house air supply, being careful not to damage the cones. After the cones are fully dry, replace them in the instrument. Allow for conditioning of the cones with a solution containing all analytes needed.

The orifice should be circular and about 1mm in diameter. Examine the orifice periodically with a magnifier to determine if there are irregularities that may impair instrument performance. DO NOT use a cone with a significantly damaged tip.

8.2.10 Chiller temperature, pressure and water level - The temperature should be regulated at 15 ± 1ºC. Check the current temperature on the chiller to ensure it is within this range. Check the inlet cooling water pressure that must be between 55

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and 60psi. Check to ensure that chiller water level is full. If it is not, fill with Polyclear 30.

8.2.11 Nebulizer - Check the nebulizer to be sure it is clean, the capillary is not clogged and it produces a smooth mist.

8.3 Lighting Torch and Warm-Up: After all pre-start checks pass inspection, perform the following steps:

8.3.1 Torch Ignition - Click on the *Plasma* icon to open the *Instrument* window, and then click on the plasma on button to light the plasma. This takes a little over a minute to complete. (See instrument software guide.)

8.3.2 Warm-up: Instrument is allowed to warm-up 30 minutes. Instrument has a timer to let you know when it is ready to move on to the next step.

8.3.3 Start-up Configuration - Once the analysis tubing is placed in the Agilent tune solution the Start-up configuration can be started. The instrument will then go through Torch Alignment, Axis/Resolution, EM settings, Plasma Correction, Standard Lenses tune, and Performance report.

8.4 Running Samples: After Warm-Up is complete, perform the following steps to collect a dataset.

8.4.1 Tune - Open Tune tab. Switch ISIS valve to tune. Monitor signal to ensure sample is reaching the detector. When the instrument achieves proper counts, stop the monitor and select the “semi auto tune: tab (The instrument performs five replicates of tuning solution.). The measured mass must be as follows:

Agilent:

Agilent monitored masses (No Gas)	Requirement
7	CPS RSD<5%
89	CPS RSD<5%
205	CPS RSD<5%
156/140	CPS Ratio<1.5%
70/140	CPS Ratio<3.0%

Agilent monitored masses (He)	Requirement
59	CPS RSD<5%
89	CPS RSD<5%
51/59	CPS Ratio<3%
75	CPS ~5 or less
78	CPS ~5 or less

8.4.2 Create New Dataset – Open template from the drive. Apply the proper run name for the day (MMDDYYICPMS#).

8.4.3 Enter Sample ID's: Open the routine analysis workspace previously saved. Enter the sample ID’s in the sample template previously created. Enter any necessary dilution factors in the column provided along with both beginning and ending

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volumes. Place all calibration standards, calibration check solutions, samples and QC in the Autosampler according to the template.

8.4.4 For initial and daily operation, calibrate the instrument according to the instrument manufacturer's recommended procedures using mixed calibration standard solutions and the calibration blank (see section 7.5). The concentration of the lowest standard must be at or below the reporting limit. A peristaltic pump must be used to introduce all solutions, samples, and internal standard to the nebulizer (Agilent 7900 uses ISIS-3 pump). To allow adequate time for equilibrium to be reached in the plasma, aspirate all solutions for at least 30 seconds after the solution reaches the plasma before accumulating data. Use the average value from three replicate integration periods of the signal to be correlated to the analyte concentration. Flush the system with the rinse blank for a minimum of 60 seconds between each standard. The calibration line is generated by first order linear regression from a calibration blank and six calibration standards where each element is present in at least three concentration levels. Calibration acceptance criteria are described in section 10.5. For ICV/CCV/CCB/ICB/ICS requirements, frequency, see section 10.0.

NOTE: For Marathon sample analysis, simple linear curve fitting as identified in the instrument regression choices will be utilized when possible.

8.4.5 Begin Analyzing Samples: For Agilent instruments, in the mass hunter software select “sample list” and then choose the “unknown samples” tab. Once here, select “Start editing mode” and begin to add samples + instrument QC in the order desired for analysis. Assign appropriate vial location numbers as well as dilution factors to each sample in the table. Once completed, select “End editing mode” and analysis will begin.

The instrument performs sample analysis by executing 20 mass sweeps per replicate. Three replicates are utilized for an average result which must fall within a 20% RSD for the replicate values. If any sample or QC is found to have a concentration of >5x the RL and >20% RSD it must be evaluated for interference. If a matrix interferent is determined to be the cause, dilute the sample by 5x and re-analyze. Perform further dilutions if necessary.

8.4.6 Monitor Initial QC. Check the calibration blank Summary Report for signs of contamination and the rest of the calibration and initial QC Summary Reports for signs of problems.

NOTE: If analysis will not be complete until after hours, set to shutoff automatically when analysis is complete (Enable automatic shutoff in *Instrument* window. This can be done while the instrument is analyzing samples).

8.4.7 Instrument Shutdown - When batch is complete, MassHunter will auto export all data to the dataset and shut off plasma if selected. Otherwise, select turn off plasma to stop a run immediately. Turn off the computer monitor if it will not be used further that day.

9.0 DATA ANALYSIS AND CALCULATIONS

9.1 Sample data should be reported in units of mg/L for aqueous samples and mg/Kg dry weight for solid samples. The mean of three “reads” from the spectrometer is used to derive sample concentrations.

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9.2 For dissolved aqueous analytes, report the data generated directly from the instrument with compensation for sample dilution. Do not report analyte concentrations below the MDL.

9.3 For total recoverable aqueous analytes, multiply solution analyte concentrations by the dilution factor 0.5 when a 100mL aliquot is used to produce the 50mL final digestate volume, and report data. If a different aliquot volume other than 100mL is used for sample preparation, adjust the dilution factor accordingly. Account for any additional dilution of the prepared sample digestate required to complete the determination of any analytes exceeding 90% or greater of the LDR upper limit. Do not report data below the determined analyte MDL concentration or below an adjusted detection limit reflecting smaller sample aliquots used in processing or additional dilutions required by the analysis.

9.4 For analytes with RLs < 0.01mg/L, round the data values to the thousandth place and report analyte concentrations up to three significant figures. For analytes with RLs >/- 0.01mg/L round the data values to the hundredth place and report analyte concentrations up to three significant figures. Analyte concentrations for solids data should be rounded in a similar manner before dry weight corrections in Section 9.5 are performed.

9.5 For total recoverable analytes in solid samples, round the solution analyte concentrations (mg/L) as instructed in Section 9.4. Report the data up to three significant figures as mg/Kg dry-weight basis unless specified otherwise by the program or data user. Calculate the concentration using the equation below:

$$\text{Sample Conc. (mg/Kg) dry-weight basis} = \frac{C \times V \times D}{W}$$

where: C = Concentration in extract (mg/L)
V = Volume of extract (L, 100mL = 0. 1L)
D = Dilution factor (undiluted = 1)
W = Weight in Kg of sample aliquot extracted (g x 0.001 = Kg)

9.6 Soil samples are reported on a dry weight basis. Soil samples must be processed using the ENV-SOP-MTJL-0178, *Total Solids and/or Percent Moisture*. After a dry weight for each sample has been obtained, the calculations are performed as follows:

$$\% \text{ solids (S)} = \frac{DW}{WW} \times 100$$

where: DW = Sample weight (g) dried
WW = Sample weight (g) before drying

At Pace National, dry weight reporting conversions are performed by the LIMS data system.

9.7 Relative Standard Error (RSE – expressed as a percentage)

$$RSE = 100 \times \sqrt{\sum_{i=1}^{n}\left[\frac{x'_i - x_i}{x_i}\right]^2 \Big/ (n-p)}$$

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where:
x'_i = Measured amount of analyte at the calibration level *i*, in mass or concentration units
x_i = True amount of analyte at calibration level *i*, in mass or concentration units
p = Number of terms in the fitting equation (average – 1, linear = 2, quadratic = 3)

9.8 See the current Quality Assurance Manual for equations associated with common calculations.

10.0 QUALITY CONTROL AND METHOD PERFORMANCE

10.1 All analysts must meet the qualifications specified in ENV-SOP-MTJL-0015, *Technical Training and Personnel Qualifications* before approval to perform this method. Analysts must complete an initial demonstration of proficiency before being approved to perform this method. Continuing proficiency must be demonstrated using proficiency testing, laboratory control sample analysis and/or MDL studies. Method performance is assessed per analyst. Updated method performance records are filed and stored in a central location within the department.

10.2 Use the designated run log to record batch order and standards/reagents used during analysis. See ENV-SOP-MTJL-0014, *Data Handling and Reporting*.

10.3 Batches are defined as sets of 1 - 20 samples for EPA 6020/6020A/6020B and 1 - 10 samples for EPA 200.8. Preparation batch analysis must include the following: 1 method blank, 1 Laboratory Control Sample (LCS), 1 Laboratory Control Sample Duplicate (LCSD), 1 Matrix Spike/Spike Duplicate (MS/MSD) pair. All batch information must be maintained in the preparation documentation assigned to the department.

Note: EPA 200.8 Wastewater samples may be batched in sets of 1-20. If >10 samples are prepared for EPA 200.8 Wastewater, they must include two sets of MS/MSD.

10.4 Supporting Analytical Studies

10.4.1 Instrument Detection Limits (IDL) Studies - IDLs in µg/L can be determined as the mean of the calibration blank results plus three times the standard deviation of seven (7) replicate analyses of the solution. Use zero for the mean if the mean is determined to be a negative value.

IDLs must be verified quarterly or when major instrumentation change occurs.

10.4.1.1 Method 6020B - IDLs in µg/L can be estimated as the mean of the blank result plus three times the standard deviation of 10 replicate analyses of the reagent blank solution. Use zero for the mean if the mean is negative. Each measurement should be performed as though it were a separate analytical sample (i.e., each measurement must be followed by a rinse and/or any other procedure normally performed between the analysis of separate samples). IDLs should be determined at least once using new equipment, after major instrument maintenance such as changing the detector, and/or at a frequency designated by the project. An instrument log book should be kept with the dates and information pertaining to each IDL performed.

10.4.2 Linear Dynamic Range (LDR) Studies – Linear dynamic ranges are established for each instrument to allow for quantitation above the highest level of calibration

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without qualification. ICPMS instruments are known to remain linear at high levels, but each upper limit of linearity is based on the target analyte being measured and the routine instrument operating conditions.

To perform a linear dynamic range study, the instrument must be calibrated normally as used with client field samples. The LDR is determined by the analysis of a minimum of three, but preferably five, different increasing concentrations of standards containing each target analyte across a range. One concentration should be near the expected upper linear range for each analyte. The highest concentration, where the instrument calibration remains linear, is determined when the observed concentration of the increasing standards is no more than 10% below the expected concentration of the analyte. If more than a 10% deviation exists, the instrument is proven to no longer be linear at that value for that analyte. The upper linear range is therefore the next lower concentration of standards used in the determination. Samples quantitated above that upper determined LDR require dilution to quantitate within the proven linear range of the instrument.

LDR studies must be determined initially then verified semi-annually or when major instrumentation change occurs.

10.4.3 Method Detection Limits – See also ENV-SOP-MTJL-0016, *Method Detection Limits (MDL), Limits of Detection (LOD) and Limits of Quantitation (LOQ)*.

MDL studies are required annually or when instrumentation change occurs, such as one in the torch, nebulizer, injector, or plasma conditions. Method detection limit studies are performed on blank matrices most closely matching field sample matrices.

10.4.4 Proficiency Testing (PT) – See also ENV-SOP-MTJL-0022, *Proficiency Testing Program*. Proficiency testing is performed in the metals department for ICPMS in support of environmental analyses. Environmental PTs are performed semi-annually for Water Supply (Safe Drinking Water Act), Water Pollution (Clean Water Act), and soils (RCRA) testing.

10.5 Instrument Tune –The amu of each measured mass must be as follows:

All ICP-MS	Low limit	High limit
Mg 24	23.9	24.1
Mg 25	24.9	25.1
Mg 26	25.9	26.1
In 115	114.9	115.1
Pb 206	205.9	206.1
Pb 207	206.9	207.1
Pb 208	207.9	208.1
Be 9	8.9	9.1
Co 59	58.9	59.1

10.5.1 EPA 200.8 - EPA Method 200.8 requires a minimum of five (5) replicates of the tuning solution yielding a relative standard deviation of <5% of the absolute signal14.3. EPA tune check should be less than 0.75amu at 5% peak height

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10.5.2 **SW-846 6020 & 6020A -** EPA Methods 6020 and 6020A require a minimum of four (4) replicates of the tuning solution yielding a relative standard deviation of <5% of the absolute signal[14.2, 14.4]. EPA tune check should be less than 0.9amu at 10% peak height.

10.6 Initial Calibration - Run a calibration curve on a daily basis that employs a minimum of a calibration blank and six standards where each element is present in at least three of the standard levels. The concentration of the lowest standard must be at or below the reporting limit. Corrective actions for failures can be found in section 11.4.

10.6.1 EPA 200.8 & 6020/6020B - The correlation coefficient for the each analyte in the calibration curve lines must be 0.995 or better for EPA Methods 200.8 and 602014.2, 14.3.

NOTE: For Method 6010D - If a multipoint calibration is used the low standard must be at or below the LLOQ.

10.6.2 **SW-846 6020A -** The correlation coefficient for each analyte in the calibration curve must be 0.998 for EPA 6020A[14.4].

NOTE: For Wisconsin, the unspiked ICSA elements are evaluated to LOQ.

10.7 Method Blank – A method blank is analyzed per each batch of field samples. The results obtained for the method blank must be less than the method detection limit (<1/2 RL for DOD), and not less than 2X the negative RL for all analytes. Corrective actions for failures can be found in section 11.5.

STATE NOTE: For blanks associated with samples originating from West Virginia and analyzed by Method 200.8, blank results should be below the LLOQ for the target analytes being tested; otherwise, corrective action should be taken.
For blanks associated with samples originating from West Virginia and analyzed by Method 6020B, Blanks are generally considered to be acceptable if target analyte concentrations are less than the LLOQ or are less than project-specific requirements.

10.7.1 Method 6020B – The method blank is considered to be acceptable if target analyte concentrations are less than ½ the LLOQ or are less than project-specific requirements.

10.8 Initial Calibration Verification (ICV/ICVLL) - Verify the initial instrument standardization by analyzing appropriate check standards following calibration.

10.8.1 **EPA Methods 6020 & 200.8** - The mid-level ICV standard recovery results must be ±10% of the true value for EPA methods 6020 and 200.8.

Note: For Marathon 200.8 samples the ICV standard recovery results must be ±5% of the true value.

10.8.2 **EPA Method 6020A** - The mid-level ICV standard recovery results must be ±10% of the true value for EPA methods 6020A. The low-level ICV standard recovery results should be within 70-130%.

10.8.3 **EPA Method 6020B** Low-level Readback or Verification - For a multi-point calibration, the low level standard should quantitate to within 80-120% of the true value. For a single point calibration, a standard from the same source as the

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calibration standard and at the LLOQ is analyzed and should recover within 80-120% of the true value.

10.8.4 Method 6010D Mid-level Readback or Verification - For a multi-point calibration, the midlevel standard should quantitate to within 90-110% of the true value. For a single point calibration, a standard from the same source as the calibration standard and at the midpoint of the linear range is analyzed and should recover within 90-110% of the true value.

10.8.5 Corrective actions for failures can be found in section 11.6.

10.9 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) – An LCS/LCSD is analyzed with each batch of samples. The acceptance range for water samples is ±15% of the target concentration for 200.8 and +20% for 6020. If an LCS/LCSD pair is analyzed, the RPD of each analyte must be ≤20%.

10.9.1 **For EPA Method 200.8** – The acceptance range for water samples is ±15% of the target concentration. The RPD for each analyte in the pair must be ≤20%.

10.9.2 **For SW-846 Method 6020/6020A/6020B** – The acceptance range for water samples is ±20% of the target concentration. The RPD for each analyte in the pair must be ≤20%.

10.10 Matrix Spike (MS)/Matrix Spike Duplicate (MSD) – An MS/MSD pair is analyzed with each batch of samples. Acceptance ranges for accuracy of the MS and MSD are ±30% of the target analyte concentration. The RPD of the pair must be ≤20%.

10.10.1 **For EPA Method 200.8** – The acceptance range for water samples is ±30% of the target concentration. The RPD for each analyte in the pair must be ≤20%.

10.10.2 **For SW-846 Method 6020/6020A/6020B** – The acceptance range for water samples is ±25% of the target concentration. The RPD for each analyte in the pair must be ≤20%.

10.11 Continuing Calibration Verification (CCV) –Verify the on-going instrument standardization by analyzing appropriate check standards during the sequence. Instrument calibration acceptability is demonstrated after every 10 samples and at the end of the analytical run using the CCV that must meet the following criteria:

10.11.1 **For SW-846 Method 6020/6020B and EPA Method 200.8** – Continuing Calibration Verification (CCV) recovery must be within +10% of the target concentration. Instrument calibration verification is achieved by analyzing both a CCV standard and a CCB (inst. blank).

10.11.2 **For SW-846 Method 6020A** - Instrument calibration verification for method 6020A is achieved by analyzing both a mid-level CCV standard, a low-level CCV standard, and a CCB (instrument blank). The mid-level Continuing Calibration Verification (CCV) recovery must be within ±10% of the target analyte concentration. The low-level Continuing Calibration Verification (LLCCV) recovery should be within 70-130%.

10.12 Initial/Continuing Calibration Blank (ICB/CCB) – An ICB/CCB is analyzed following each ICV/CCV. The results of each ICB/CCB must be <RL for each analyte being reported or <1/2 RL for DOD.

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NOTE: Calibration blanks analyzed in conjunction with DoD QSM analyses for compliance must be assessed at the established LOD. If the concentration of target analytes is above the LOD, then re-analysis is required or the data must be qualified as contained a possible high bias (see Attachment III).

NOTE: Method 6020B - If a multi-level calibration is used, an ICB is analyzed immediately after the calibration (or after the ICV) and must not contain target analytes above half the LLOQ. If a single point calibration is used, the calibration is forced through the ICB, but a second ICB is analyzed as a check and must not contain target analytes above half the LLOQ. If the ICB consistently has target analyte concentrations greater than half the LLOQ, the LLOQ should be re-evaluated.

Note: West Virginia requires all Calibration Blank results to be <MDL. If the concentration of target analytes is above the MDL, then re-analysis is required or the data must be qualified as contained a possible high bias

10.13 Interference Check Standard (ICSA/ICSAB) – Analyzed at the beginning of the analytical sequence or at least once every 12 hours, acceptance criteria is 80-120%.

10.13.1 Method 6020B - Results for the unspiked elements in the SIC solution should be less than two (2) times the LLOQ. Note that it may not be possible to obtain SIC spiking solutions that are completely free of the unspiked elements. If the presence and concentration of an unspiked element can be confirmed via vendor documentation and/or determination of multiple isotopes of the element in the correct ratios, the concentration actually present may be subtracted from the determined value prior to comparing to the LLOQ limits.

Note: The unspiked elements in the ICSA are not evaluated by the data capture software. The instrument analyst evaluates if the unspiked elements are <2 times the LLOQ for the ICSA

10.14 Post Digestion Spike – One post digestion spike must be analyzed for each batch of samples analyzed per the definition of a batch found in section 10.3. The recovery for the target analyte should be ±25% of true value.

10.14.1 **For SW-846 Method 6020A** - The recovery for the target analyte should be ±20% of true value.

10.14.2 **For SW-846 Method 6020 & 6020**B - The recovery for the target analyte should be ±25% of true value.

10.14.3 **For EPA Method 200.8 –** Post digestion spikes are not required by the published method.

10.15 Serial Dilution - One serial dilution must be analyzed for each batch of samples analyzed per the definition of a batch found in section 10.3.

10.15.1 **For SW-846 Method 6020 & 6020A** - The serial dilution should recover with <10% difference from the parent sample.

10.15.2 **For SW-846 Method 6020** - The recovery for the target analyte should be ±25% of true value.

10.15.3 **For EPA Method 200.8 –** Serial Dilutions are not required by the published method.

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10.15.4 Method 6020B – If the analyte concentration is within the linear range of the instrument and sufficiently high (minimally, a factor of 25 times greater than the LLOQ), an analysis of a 1:5 dilution should agree to within ±20% of the original determination. If not, then a chemical or physical interference effect must be suspected. The matrix spike is often a good choice of sample for the dilution test, since reasonable concentrations of most analytes are present. Elements that fail the dilution test are reported as estimated values.

10.16 Internal Standards

10.16.1 **For Methods 6020A and 6020B -** Internal Standard intensities in the samples must be between 70-130% of the original calibration solution. If the internal standard intensity is not within the 70-130% range, dilute the sample 5X and re-analyze. Repeat the procedure until the sample internal standard intensities fall within the 70-130% window.

10.16.2 **For Methods 200.8 and 6020 -** All internal standard responses for samples must be within 60-120% of the original response of the calibration blank. If the internal standard intensity is not within the 60-120% range, dilute the sample 5X and re-analyze. Repeat the procedure until the sample internal standard intensities fall within the 60-120% window.

10.16.3 The intensity levels of the internal standards for the calibration blank and the interference check standards must agree within 20% of the intensity level of the internal standard of the original calibration solution. If they do not, terminate the analysis, correct the problem, re-calibrate the instrument, verify the new calibration and re-analyze the affected samples.

10.17 Replicate Criteria - The instrument performs sample analysis by executing 100 mass sweeps per replicate. Three replicates are utilized for an average result. The RSD for the replicates must be reviewed to ensure consistency of the scans and to ensure that the sample digestate was accurately sampled. High RSD values can result from low target analyte concentrations and from insufficient uptake of the digestate during the autosampler cycle. If a matrix interferent is determined to be the cause, dilute the sample by 5x and re-analyze. Perform further dilutions, as necessary.

10.18 Reporting Limit Verification (RLV) – The reporting limit verification when analyzed must recover within ±50% of the target concentration for the standard.

STATE NOTE: For all samples analyzed from Minnesota, the reporting limit must be verified at least monthly, with each new initial calibration, or when there has been significant change to the instrument (column replacement, cleaning source, etc.) whichever is more frequent. The reporting limit verification can be performed by either re-injecting the low standard or by re-processing the low standard that was analyzed in the calibration curve. The reporting limit verification (RLV) must recovery within ±40% of the expected concentration. If this criterion is not met, the RLV may be re-analyzed once, instrument maintenance can be performed, a higher concentration standard can be injected, or a new calibration curve must be generated. If a higher concentration standard is utilized, the reporting limit must be raised to the higher level verified.

10.19 Any sample analyte responses that are beyond 90% of the linear dynamic range of the instrument must be diluted and re-analyzed.

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10.20 Lower Limit of Quantitation (LLOQ) – When analyzing samples according to Method 6020B, the LLOQ is initially verified by the analysis of at least seven (7) replicate samples, spiked at the LLOQ and processed through all preparation and analysis steps of the method. The mean recovery and relative standard deviation of these samples provide an initial statement of precision and accuracy at the LLOQ. In most cases the mean recovery should be +/- 35% of the true value and RSD should be <20%. In-house limits may be calculated when sufficient data points exist. Monitoring recovery of LLOQ over time is useful for assessing precision and bias.

10.20.1 Ongoing LLOQ verification, at a minimum, is on a quarterly basis to validate quantitation capability at low analyte concentration levels. This verification may be accomplished either with clean control material (e.g., reagent water, method blanks, Ottawa sand, diatomaceous earth, etc.) or a representative sample matrix (free of target compounds). Optimally, the LLOQ should be less than the desired regulatory action levels based on the stated project-specific requirements.

10.21 If these criteria are not met, corrective actions are found in section 11.0.

11.0 DATA VALIDATION AND CORRECTIVE ACTION

11.1 All data must undergo a primary review by the analyst. The analyst must check the performance of the initial calibration, interference checks, mid-point check standard, continuing calibrations, and blanks to ensure that they meet the criteria of the method. The analyst should review any sample that has quantifiable compounds and make sure that they have been confirmed. The analyst must also verify that reported results are derived from quantitation between the MDL and 90% of the LDR. All calculations must be checked (any dilutions, %solids, etc.). Data must be checked for the presence or absence of appropriate flags. Comments should be noted when data is flagged. Check for carryover (see Section 11.2.8 of this SOP).

11.2 All data must undergo a second analyst review. The analyst checking the data must check the performance of the initial calibration, interference checks, mid-point check standard, continuing calibrations, and blanks to ensure that they meet the criteria of the method.

11.2.1 The analyst should look at any sample that has quantifiable compounds and check the RSD of triplicate spectrometer reads.

11.2.2 Blanks must meet SOP requirements.

11.2.3 Quality control criteria should be checked for the LCS, LCSD, MS, and MSD.

11.2.4 Data must be checked for the presence or absence of appropriate flags. Comments should be noted when data is flagged.

11.2.5 See ENV-SOP-MTJL-0014, *Data Handling and Reporting*.

11.2.6 See ENV-SOP-MTJL-0018, *Corrective and Preventive Action*.

STATE NOTE: For work performed in support of the NC Department of Environment and Natural Resources (15A NCAC 02H .0805 (a) (7) (I)). For target analytes quantitated by ICP or ICPMS, a series of at least three standards must be analyzed along with each group of samples. The concentrations of these standards must bracket the concentration of the

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analytes in the field samples analyzed. Samples with target analyte concentrations above the highest level of calibration must be diluted to quantitate analytes within the calibration range. The use of the dynamic linear range studies to validate analyte/instrument calibration linearity must not be used for NC sample analysis.

11.2.7 Assess carryover in each analysis by evaluating each run for large concentrations (i.e., exceeding the calibration range) of target analytes. If a large concentration detection is identified, then carfully scrutinize sequential analyses for any detected concentrations of this analyte (i.e., potential carryover). When carryover is suspected, a confirmation analysis is required.

11.3 Instrument Tune – The tuning criteria must be met before calibration/verification and any field samples are analyzed. If the tuning criteria fail, re-analyze the tuning sequence once. If the failure persists, prepare a fresh tuning solution, perform instrument adjustments as needed, and re-analyze the solution. If the tuning solution continues to fail, see the department supervisor for assistance.

11.4 Initial Calibration – If the acceptance criteria in section 10.5 are not met, locate and correct the cause and re-analyze the standards until the requirement is met. Corrections can include: re-preparation of the standards, instrument maintenance, manufacturer service, etc. Consult the department supervisor, if needed.

11.5 Method Blank –In most cases where the method blank contains target analyte, the entire sample batch requires re-prep and re-analysis.

STATE NOTE: For West Virginia samples analyzed by Method 200.8, When blank values constitute 10% or more of the analyte level determined for a sample or is 2.2 times the analyte MDL whichever is greater, fresh aliquots of the samples must be prepared and analyzed again for the affected analytes after the source of contamination has been corrected and acceptable LRB values have been obtained.
For West Virginia samples analyzed by Method 6020B, if the method blank fails to meet the necessary acceptance criteria, it should be reanalyzed once. If still unacceptable, then all samples associated with the method blank must be re-prepared and re-analyzed, along with all other appropriate analysis batch QC samples. If the method blank results do not meet the acceptance criteria and reanalysis is not practical, then the laboratory should report the sample results along with the method blank results, and provide a discussion of the potential impact of the contamination on the sample results. However, if an analyte of interest is found in a sample in the batch near its concentration confirmed in the blank, the presence and/or concentration of that analyte should be considered suspect and may require qualification.

STATE NOTE: For Wisconsin samples, the method blank must not contain analytes more negative than the MDL value. If target analytes are more negative than the MDL, the instrument must be recalibrated or a new LOD study performed.

General guidelines for qualifying sample results with regard to method blank quality are as follows:

- If the method blank concentration is less than the MDL and sample results are greater than the RL, then no qualification is required.

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- No qualification is necessary when an analyte is detected in the method blank but not in the associated samples.
- If the concentration in a sample is more than ten times the concentration in the method blank, then no qualification is required.
- If the method blank concentration is greater than the MDL but less than the RL and sample results are greater than the MDL, then qualify associated sample results to indicate that analyte was detected in the method blank.
- If the method blank concentration is greater than the RL, further corrective action and qualification is required. An analyst should consult their supervisor for further instruction.

11.6 Initial Calibration Verification (ICV) – If any analyte is outside of stated criteria, re-analyze the ICV once. If the ICV is still beyond acceptance ranges, corrective action must be taken. Recalibrate the instrument and re-analyze the ICV.

11.7 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) – Failures are indicative of analytical problems. If failures occur, halt analysis, and begin corrective action. Rejected LCS and/or LCSD result in a re-prep and re-analysis of the entire batch.

11.8 Matrix Spike (MS)/Matrix Spike Duplicate (MSD) – Any analyte outside of stated criteria are flagged with J5 or J6.

11.9 Continuing Calibration Verification (CCV) – If a calibration verification standard is not within the acceptable QC criteria and analysis of a second consecutive (immediate) calibration verification fails to produce results within acceptance criteria, corrective actions shall be performed. The laboratory shall demonstrate acceptable performance after the final round of corrective action with two consecutive calibration verifications, or a new initial instrument calibration shall be performed. For Method 200.8 if target in the CCV is outside 15% then the bracketed samples must be re-analyzed after correction action has been done.

11.10 Initial/Continuing Calibration Blank (ICB/CCB) – If an instrument blank contains an amount of target analyte, but all samples are non-detected, the data may be reported with a “B4” flag. If an instrument blank contains an amount of target analyte, but the samples contain analyte at a level that is 10 times the level present in the instrument blank, the data may be reported with a “B5” flag.

11.11 Interference Check Standard (ICSA/ICSAB) – Failures in the ICSA/ICSAB require reanalysis. If the failure persists, review the data for possible interferences, review the background corrections, recalibrate if necessary and reanalyze all samples associated with the initial failure.

11.12 Serial Dilution - If the post spike result is acceptable, no action is taken. If both the post spike and the serial dilution are out, the results are flagged with O1.

11.13 Internal Standards

11.13.1 If the intensity of any internal standard in a sample is outside of the acceptance criteria, a significant matrix effect must be suspected. Ensure that the instrument has not drifted by observing the internal standard intensities in the nearest clean matrix (i.e. calibration blank, method blank, etc.). If the low internal standard intensities are also seen in the nearest blank, terminate the analysis, correct the problem, recalibrate, verify the new calibration and re-analyze the affected

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samples. If drift has not occurred, matrix effects need to be removed by dilution of the affected sample. The sample must be diluted fivefold (1+4) and re-analyzed with the addition of appropriate amounts of internal standards. If the first dilution does not eliminate the problem, this procedure must be repeated until the internal standard intensities in the acceptance criteria. Reported results must be corrected for all dilutions.

11.13.2 Changes in internal standard intensity should not be more than 10% from one sample to the next unless the change is an attenuation that appears to be due to matrix.

11.13.2.1 Samples containing a significant amount of dissolved solids depress the instrument sensitivity. Although the constituents of a sample also play a role, generally the higher the dissolved solids the more the signal is depressed. Samples containing 0.5% solids attenuate the signal by about half. This effect should be approximately the same for internal standards as well. It is normal to observe a sudden decrease in the internal standard intensity for samples known to contain or are suspected of containing significant dissolved solids.

11.13.2.2 Generally, sudden increases in internal standard intensity are observed only after the signal was attenuated by a matrix effect. Should other increases in internal standard intensity be observed, it is likely because the samples are contaminated with the internal standards. This can be recognized because the intensities of the different internal standards do not move proportionately.

11.13.2.3 The internal standard intensities must be checked to see that the above criteria are met. If these criteria are not met, the samples must be reanalyzed. If the reason a sample does not meet these criteria appears to be excessive attenuation due to the matrix, the sample must be diluted and reanalyze.

11.14 Reporting Limit Verification (RLV) – When required, the reporting limit verification must be analyzed. If the acceptance criteria are not met, the RLV may be re-analyzed once, instrument maintenance can be performed, a higher concentration standard can be injected, or a new calibration curve must be generated. If a higher concentration standard is utilized, the reporting limit must be raised to the higher level verified.

METHOD NOTE: For EPA Method 6020A analyses, an RLV must be performed periodically. This RLV must be carried through the entire preparation and analytical procedure. Recoveries must be within ±30% of the expected true value for each analyte being reported using that method.

STATE NOTE: Drinking water samples analyzed using this procedure for compliance cannot be qualified.

12.0 POLLUTION PREVENTION AND WASTE MANAGEMENT

12.1 The EPA requires that laboratory waste management practice to be conducted consistent with all applicable federal and state laws and regulations. Excess reagents, samples and method process wastes must be characterized and disposed of in an acceptable manner. See *ENV-SOP-MTJL-0051, Waste Management Plan.*

12.2 See ENV-SOP-MTJL-0046, *Environmental Sustainability & Pollution Prevention*.

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13.0 METHOD MODIFICATIONS/CLARIFICATIONS

13.1 Not all analytes listed as analyzed in this procedure are approved within the published EPA methods; however sufficient information is present within the laboratory to demonstrate acceptable performance of these analytes using this procedure.

13.2 Modifications to this method are noted in the body of the text as state notes. Compliance analyses performed in conjunction with specific state requirements must be performed as noted within the specific state(s) note listed.

13.3 Adjustments to the concentrations of standards/spiking solutions, standards providers, and quality control are subject to change to better meet client/project/regulatory needs or to improve laboratory method performance.

13.4 If a modification to the procedure is required to analyze a sample beyond those specified in the procedure as state notes, it must be properly documented. Any modification to the method is listed in the test report's case narrative, and the method is reported as modified.

13.5 Superscripts are provided where necessary to indicate the reference in Section 14.0 where the requirement/information can be found. Subscripts noted identify the most frequent/restrictive cases, but requirements may also be included at different frequencies/conditions in other references noted in section 14.0.

14.0 REFERENCES

14.1 Agilent ICP/MS User's Guides.

14.2 *Inductively Coupled Plasma – Mass Spectrometry*, SW-846 Method 6020, Revision 0, September 1994.

14.3 *Inductively Coupled Plasma – Mass Spectrometry*, SW-846 Method 6020A, Revision 1, February 2007.

14.4 *Inductively Coupled Plasma – Mass Spectrometry*, SW-846 Method 6020B, Revision 2, July 2014.

14.5 *Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry*, EPA Method 200.8, Supplement I, Revision 5.4, May 1994.

14.6 *Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry*, EPA Method 200.8, Revision 5.5, October 1999, EPA-821-R-99-017.

14.7 *Chapter 3: Inorganic Analytes*, SW-846, Revision 4, February 2007.

14.8 *Identification of Test Procedures*, 40 CFR Part 136.3.

14.9 *Inorganic Chemical Sampling and Analytical Requirements*, 40 CFR Part 141.23.

14.10 *Department of Defense (DOD) Quality Systems Manual (QSM) for Environmental Laboratories*, Version 5.0, July 2013.

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STANDARD OPERATING PROCEDURE
TITLE: Metals by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) (EPA Methods 6020, 6020A, 6020B & 200.8)
ISSUER: Pace National – Mt. Juliet, Tennessee

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Attachment I: Revision History

Current Version (Pace National):

Date	Description of Revisions
8/25/2020	Technical and quality review and update. Updated header. Revised section 1.4 as well as all subsections of 3.0.

Superseded Versions (ESC Lab Sciences SOP#340390):

Version	Date	Description of Revisions
0	1/18/00	Origination
1	8/22/00	
2	9/10/01	
3	12/6/01	
4	4/11/03	
5	2/9/04	
6	4/16/04	
7	8/3/04	
8	10/15/05	Added batch criteria for 6020 & 200.8 to prep. blank. Deleted definition for QC std. #1 and QC Std. #4. Added criteria for sample duplicate, post spike and serial dilution.
9	11/15/06	
10	10/29/08	Technical and Quality Review and update. Clarified QC corrective actions and standardized waste management language.
11	2/11/09	Technical and Quality Review and update. Clarified QC corrective actions and standardized waste management language. Added state notes. Ohio VAP approved 2/11/09.
12	7/13/11	Technical and Quality Review and update. Revised sections 1.2, 2.6, 2.8, 2.10, 2.11, 2.12, 2.13, 2.16, 2.18, 2.20, 2.22, 5.2, 5.3, 7.1, 7.4, 7.5.7, 8.4.1.2, 8.4.8, 9.7 through 9.10, 11.1 through 11.16, and 12.1; Added sections 2.23 through 2.28, 7.10, 10.4 through 10.19, 13.3 through 13.4 and 14.5; Changed all instrument references from ELAN 6100 to ELAN 9000 per instrument update.
13	5/10/12	Technical and Quality Review and update. Revised sections 1.2, 5.2, 5.3, 7.5.8, 7.5.9, and 11.11; Added sections 1.3.1, 2.29, 2.30, 4.7, 6.6, and 8.2.9: Removed sections 2.26.1, 2.26.2 and state note following section 11.16.
14	11/11/14	Technical and Quality Review and update. Revised sections 1.1, 1.2, 2.5, 2.6, 2.6.1, 2.8.1, 4.5, 5.3, 6.1, 6.2, 6.3, 7.1, 7.3, 7.4, 7.5, 8.2,8.3.1, 8.3.6, 8.4.2, 8.4.8, 8.4.9, 10.3, 11.11, 11.16, 13.1 and 14.1 ; Added sections 1.4, 5.2.1, 5.2.2, 6.9, 10.4, 13.5 and 14.5 through 14.8: Removed section 2.17.

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STANDARD OPERATING PROCEDURE
TITLE: Metals by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) (EPA Methods 6020, 6020A, 6020B & 200.8)
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Version	Date	Description of Revisions
15	2/4/2016	Technical and quality review and update. Header and signature block re-formatting. Revised Sections 1.0, 1.1, 1.2, 1.3.1, 2.8, 3.3, 4.7, 5.2, 6.1, 6.2, 6.3, 7.1, 7.3, 7.4, 7.5, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.5.6, 7.5.7, 7.5.8, 7.5.9, 7.5.10, 7.7, 8.1.1, 8.1.2, 8.2.2, 8.2.3, 8.2.4, 8.2.6, 8.2.8, 8.2.9, 8.2.10, 8.3.1, 8.3.2, 8.3.3, 8.4, 8.4.2 through 8.4.7, 9.6, 9.7, 10.3, 10.7, 10.9, 10.9.2, 10.10.2, 10.12, 10.16, 11.2.7, 11.5, 11.13.1, 11.13.2.2, 11.14, 12.2, and Attachment II. Deleted Sections 2.3 through 2.14, 2.17 through 2.19, 2.22 through 2.24, 2.26 through 2.29, 5.2.1, 5.2.2, 6.6, 7.10, 8.2.3, 8.2.9, 8.2.11, 8.3.4 through 8.3.7, 8.4.1, 8.4.1.1, 8.4.1.2, 8.4.4 through 8.4.6, 9.8 through 9.11, 10.14, 11.11, 11.12, Attachment II,
16	10/27/2016	Technical and Quality review and update. Header and signature block re-formatting. Also, update per SC DHEC correspondence of 6/24/16. Revised Sections 6.2, 7.3, 7.4, 7.5.2, 7.5.3, 7.5.9, 7.6, 7.7, 8.1.1, 10.3, 10.4.2, 10.4.3, 10.5, 10.5.1, 10.5.2, 10.6.1, 10.6.2, 10.7, 10.8.3, 10.9.1, 10.9.2, 10.10.1, 10.10.2, 10.11.1, 10.12, 10.14.2, 10.16, 11.5, 11.9, 11.13.1, 14.1, 14.2, 14.5,14.6, 14.7, 14.8, 14.9, 14.10, and Attachment II Table 2. Added Sections 2.8, 7.5.9.1, 7.5.9.1.1, 7.5.9.1.2, 7.10, 9.7, 10.4.1.1, 10.7.1, 10.8.4, 10.13.1, 10.15.4, 10.20, 10.20.1, 14.3, and 14.4.
17	4/10/2017	Technical and quality review and update. Revised Sections 3.1, 4.4, 7.3, 7.4, 7.5.1, 7.5.3, 7.5.9, 7.7, 8.4.5, 10.3, 10.12, and 10.13.1.
18	11/30/2017	Update in response to A2LA audit finding CAR2872. Updated Section 10.6.2 and Attachment II Table 5. Update in response to ESI audit finding CAR2851. Revised Sections 11.2.1 and added Section 11.2.8.
19	7/27/18	Update in response to WI audit. Updated logo. Added State note to section 11.5

Superseded Version (Pace National):

Date	Description of Revisions
3/10/2019	Technical and quality review and update. Revised sections 1.4, 2.5, 2.8, 5.1.5, 7.2, 7.4, 8.2.3, 8.3.1, 8.3.2, 8.3.3, 8.4.1, 8.4.2, 8.4.4, 8.4.5, 10.13, 10.13.1, 10.20, 14.8 and 14.9.
1/26/2019	Technical and quality review and update. Deleted header, footer and signature bar. Revised sections 1.0, 1.3, 1.3.1, 4.7, 7.1, 8.1.1, 8.4.5, 9.6, 10.1, 10.2, 10.3, 10.4, 10.4.1, 10.4.2, 10.4.3, 10.4.4, 10.5.1, 10.5.2, 10.6.1, 10.8.2, 10.8.3, 10.11.2, 10.12, 10.13, 10.16, 10.17, 10.20, 11.2.6, 11.2.7, 12.1 and 12.2. Revised Table 1.2. Deleted sections 7.3, 7.4, 7.5, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.5.5, 7.5.6, 7.5.7, 7.5.8, 7.5.9, 7.5.9.1, 7.5.9.1.1, 7.5.9.1.2, 7.5.10, 7.6, 7.7, 7.8, 7.9, 7.10, 11.2.2, 11.13.1 and renumbered as necessary. Added sections 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 10.16.1, 10.16.2, 10.16.3 and 11.13.1. Deleted Note below section 11.5. Revised Attachment I. Revised Attachment II sections 4.10, 4.17, 4.19 and corrected numbering in section 4.0
6/19/2019	Added corporate header and footer information. Revised based on LA DW Auditor comments. Revised Sections 5.1.5, 11.9, and Attachment 1. Added Section 1.5.
6/20/2019	Revised holding time statement in Sections 4.3, 4.4, and 4.5 based on LA DW Auditor's comments.
7/9/2019	Added note in section 10.8.1
4/8/2020	Revision in response to West Virginia audit deficiency. Revised Sections 10.7 and 11.5.

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Attachment III: DoD Requirements

1.0 Equipment/Instrument Maintenance

Instrument maintenance must be performed routinely to optimize instrument performance and improve chromatography. Commonly performed maintenance includes changing tubing, changing cones, changing nebulizer tips, changing oil, etc. A new calibration curve must be analyzed following any major maintenance performed on the analytical system.

2.0 Computer Hardware and Software

MassHunter 4.1, Version C.01.01, Agilent Technologies, Inc., 2014.

3.0 Troubleshooting

Table 1. ICP-MS Troubleshooting Guide

Problem	Cause	Treatment
Low Sensitivity	Peristaltic Pump Issues	Adjust pumping rate
	Nebulizer Clogged	Clean or replace nebulizer
	Leaks	Check tube connector and sample lines for leaks
	Cone Changes	Ensure that the diameters and shapes of the holes in cones have not changed.
	Torch	Ensure the torch is positioned correctly
	Mass Axis	Ensure the mass axis is adjusted correctly
	Lens	Make sure the signal changes when the lens voltage is varied.
	Gas Purity	If the sensitivity is acceptable in the no gas mode and is too low in He or H2 mode, the problem may be caused by the purity level of the cell gas
Plasma Does Not Ignite	Spray Chamber	Ensure that samples do not collect in the spray chamber
	Air	Ensure that air is not mixed from connection points.

4.0 Other Requirements

4.1 All hardcopy laboratory notebooks must be reviewed by the Supervisor, or their designee, on a monthly basis.

4.2 If not self-explanatory (e.g., a typo or transposed number), corrections to technical and quality records shall also include a justification for the change.

4.3 A person performing a manual integration must sign and date each manually integrated chromatogram and record the rationale for performing manual integration. Electronic signatures are acceptable.

4.4 The results of calibration and verification of support equipment must be within the specifications required of the application for which this equipment is used or the equipment must be removed from service until repaired. Calibration and verification

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records, including those of established correction factors, must be maintained. In the absence of method-specific requirements, the minimum requirements are as follows:

Table 2. Support Equipment Checks

Performance Check	Frequency	Acceptance Criteria
Balance calibration check [Using two standard weights that bracket the expected mass]	Daily prior to use	Top-loading balance: ±2% or ±0.02g, whichever is greater Analytical balance: ±0.1% or ±0.5 mg, whichever is greater
Verification of standard mass [Using weights traceable to the International System of Units (SI) through a NMI	Every 5 years	Certificate of Calibration from ISO/IEC 17025 accredited calibration laboratory
Monitoring of refrigerator/freezer temperatures	Daily (i.e. 7 days per week) [use MIN/MAX thermometers or data loggers equipped with notification of out of control event capabilities if personnel not available to record daily]	Refrigerators: 0˚C to 6˚C Freezers: ≤-10˚C
Thermometer verification check [Using a thermometer traceable to the SI through an NMI] [Performed at two temperatures that bracket the target temperature(s). Assume linearity between the two bracketing temperatures.] [If only a single temperature is used, at the temperature of use]	Liquid in glass: Before first use and annually Electronic: Before first use and quarterly	Apply correction factors or replace thermometer
Volumetric labware	Class B: By lot before first use Class A and B: Upon evidence of deterioration	Bias: Mean within ±2% of nominal volume Precision: RSD ≤1% of nominal volume (based on 10 replicate measurements)
Non-volumetric labware [Applicable only when used for measuring initial sample volume and final extract/ digestates volume]	By lot before first use or upon evidence of deterioration	Bias: Mean within ±3% of nominal volume Precision: RSD ≤3% of nominal volume (based on 10 replicate measurements)
Mechanical volumetric pipette	Quarterly	Bias: Mean within ±2% of nominal volume Precision: RSD ≤1% of nominal volume (based on minimum of 3 replicate measurements) [Note: for variable volume pipettes, the nominal volume is the volume of use]
Glass microliter syringe	Upon receipt and upon evidence of deterioration	General Certificate of Bias & Precision upon receipt Replace if deterioration is evident

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Table 2. Support Equipment Checks		
Performance Check	**Frequency**	**Acceptance Criteria**
Drying oven temperature check	Daily prior to and after use	Within ±5% of set temperature
Water purification system	Daily prior to use	See method blank criteria given in Section 4.20 of this addendum

4.5 The expiration date of the prepared standard shall not exceed the expiration date of the primary standard. All containers must bear a preparation date.

4.6 To avoid preparing non-representative samples, the laboratory shall not "target" within a relatively small mass range (e.g., 1.00 ± 0.01g) because such targeting will produce non-representative subsamples if the sample has high heterogeneity. The laboratory shall not manipulate the sample material so the sample aliquot weighs exactly 1.00g ± 0.01g, as an example.

4.7 In the absence of project-specific requirements, the minimum standard data qualifiers to be used are:

U Analyte was not detected and is reported as less than the LOD or as defined by the customer. The LOD has been adjusted for any dilution or concentration of the sample.

J The reported result is an estimated value (e.g., matrix interference was observed or the analyte was detected at a concentration outside the quantitation range).

B Blank contamination. The recorded result is associated with a contaminated blank.

N Non-target analyte. The analyte is a tentatively identified compound using mass spectrometry or any non-customer requested compounds that are tentatively identified.

Q One or more quality control criteria failed (e.g., LCS recovery, surrogate spike recovery, or CCV recovery).

Additional data qualifiers may be used, or different letters or symbols to denote the qualifiers listed above, as long as they are appropriately defined and their use is consistent with project-specific requirements (e.g., QSM 5.0, the contract, and project-planning documents).

4.8 If the time of the sample collection is not provided, assume the most conservative time of day. For the purpose of batch processing, the start and stop dates and times of the batch preparation shall be recorded.

4.9 Each preparation method listed on the scope of accreditation must have quarterly LOD/LOQ verifications. However, not all possible combinations of preparation and cleanup techniques are required to have LOD/LOQ verifications. If LOD/LOQ verifications are not performed on all combinations, the laboratory must base the LOD/LOQ verifications on the worst case basis (preparation method with all applicable cleanup steps).

4.10 After each MDL determination, the laboratory must establish the LOD by spiking a quality system matrix at a concentration of at least two (2) times but no greater than four times the MDL. This spike concentration establishes the LOD and the concentration at which

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the LOD shall be verified. It is specific to each suite of analyte, matrix, and method (including sample preparation). The following requirements apply to the initial LOD establishment and to the LOD verifications:

- The apparent signal to noise (S/N) ratio at the LOD must be at least three and the results must meet all method requirements for analyte identification (e.g., ion abundance, second column confirmation, or pattern recognition). For data systems that do not provide a measure of noise, the signal produced by the verification sample must produce a result that is at least three standard deviations greater than the mean method blank concentration. This is initially estimated based on a minimum of four method blank analyses and later established with a minimum of 20 method blank results.
- If the LOD verification fails, then the laboratory must repeat the MDL determination and LOD verification or perform and pass two consecutive LOD verifications at a higher spike concentration and set the LOD at the higher concentration.
- The laboratory shall maintain documentation for all MDL determinations and LOD verifications.
- The DL and LOD must be reported for all analyte-matrix-methods suites, unless it is not applicable to the test or specifically excluded by project requirements.

4.11 The LOD shall be verified quarterly. In situations where methods are setup and used on an infrequent basis, the laboratory may choose to perform LOD verifications on a one per batch basis. All verification data will be in compliance, reported, and available for review.

4.12 For DoD, at a minimum, the LOQ shall be verified quarterly. In situations where methods are setup and used on an infrequent basis, the laboratory may choose to perform LOQ verifications on a one per batch basis.

4.13 All initial instrument calibrations must be verified with a standard obtained from a second manufacturer prior to analyzing any samples. The use of a standard from a second lot obtained from the same manufacturer (independently prepared from different source materials) is acceptable for use as a second source standard. The concentration of the second source standard shall be at or near the midpoint of the calibration range. The acceptance criteria for the initial calibration verification must be at least as stringent as those for the continuing calibration verification.

4.14 Exclusion of calibration points without documented scientifically valid technical justification is not permitted.

4.15 The concentration of the CCV standard shall be greater than the low calibration standard and less than or equal to the midpoint of the calibration range.

4.16 All CCVs analyzed must be evaluated and reported. If a CCV fails, reanalysis or corrective actions must be taken.

- If a CCV fails, the laboratory can immediately analyze two additional consecutive CCVs (immediately is defined as starting a consecutive pair within one hour; no samples can be run between the failed CCV and the two additional CCVs). This approach allows for spurious failures of analytes to be reported without reanalysis of samples. Any corrective actions that change the dynamics of the system (e.g., clip

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column, clean injection port, run blanks) requires that all samples since the last acceptable CCV be reanalyzed.

- Both of these CCVs must meet acceptance criteria in order for the samples to be reported without reanalysis.
- If either of these two CCVs fail or if the laboratory cannot immediately analyze two CCVs, the associated samples cannot be reported and must be reanalyzed.
- Corrective action(s) and recalibration must occur if the above scenario fails. All affected samples since the last acceptable CCV must be reanalyzed.
- Flagging of data for a failed CCV is only appropriate when the affected samples cannot be reanalyzed. The laboratory must notify the client prior to reporting data associated with a failed CCV.

4.17 The results of all MS/MSDs must be evaluated using the same acceptance criteria used for the DoD LCS limits (see Tables 3 and 4) or project limits, if specified. If the specific analyte(s) are not available in the Tables 3 and 4, the laboratory shall use their LCS in-house limits (see the LIMS) as a means of evaluating MS/MSDs. The MS and MSD must be spiked with all reported analytes.

4.18 Surrogate spike results shall be compared with DoD LCS limits (see Tables 3 and 4) or acceptance criteria specified by the client. If these criteria are not available, the laboratory shall compare the results with its in-house statistically established LCS criteria (see the LIMS).

4.19 The method blank shall be considered to be contaminated if:

- The concentration of any target analyte (chemical of concern) in the blank exceeds 1/2 the LOQ and is greater than 1/10th the amount measured in any associated sample, or 1/0th the regulatory limit, whichever is greater;
- The concentration of any common laboratory contaminant in the blank exceeds the LOQ;
- If a method blank is contaminated as described above, then the laboratory shall reprocess affected samples in a subsequent preparation batch, except when sample results are below the LOD. If insufficient sample volume remains for reprocessing, the results shall be reported with appropriate data qualifiers.

4.20 Sporadic Marginal Exceedances are not allowed for target analytes (chemicals of concern as identified by a project) without project-specific approval. Target analytes are considered those few analytes that are critical for the success of a project (such as risk drivers) where sporadic marginal exceedances cannot be allowed. Laboratories should consult with clients whenever long lists of analytes are requested for analysis to determine if marginal exceedances will not be allowed.

4.21 DoD considers the same analyte exceeding the LCS control limit two (2) out of three (3) consecutive LCS to be indicative of non-random behavior, which requires corrective action and reanalysis of the LCS.

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Table 3. LCS Control Limits – Method 6020 Solid Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
7429-90-5	Aluminum	919	101	7.7	78	124
7440-36-0	Antimony	1911	98.2	8.7	72	124
7440-38-2	Arsenic	3686	99.8	6	82	118
7440-39-3	Barium	2598	100.6	5	86	116
7440-41-7	Beryllium	2457	100.3	6.6	80	120
7440-42-8	Boron	581	101.1	9	74	128
7440-43-9	Cadmium	2893	99.6	5.4	84	116
7440-70-2	Calcium	835	102.2	5.4	86	118
7440-47-3	Chromium	2420	100.8	6	83	119
7440-48-4	Cobalt	2005	99.7	5.1	84	115
7440-50-8	Copper	2548	101.3	5.8	84	119
7439-89-6	Iron	1131	102.7	7.1	81	124
7439-92-1	Lead	3228	101	5.7	84	118
7439-93-2	Lithium	162	97.8	7.5	75	120
7439-95-4	Magnesium	868	101.6	7.1	80	123
7439-96-5	Manganese	1830	100.3	5.1	85	116
7439-97-6	Mercury	226	99.9	8.8	74	126
7439-98-7	Molybdenum	1188	98.1	5.1	83	114
7440-02-0	Nickel	2617	101.4	5.8	84	119
7440-09-7	Potassium	803	102.3	5.7	85	119
7782-49-2	Selenium	3104	99.2	6.6	80	119
7440-22-4	Silver	2488	100.1	5.9	83	118
7440-23-5	Sodium	818	102.2	7.7	79	125
7440-24-6	Strontium	676	101.7	8.9	75	129
7440-28-0	Thallium	2589	100.1	5.9	83	118
7440-29-1	Thorium	341	98.4	5.7	81	116
7440-31-5	Tin	886	101.3	6.6	82	121
7440-32-6	Titanium	512	100.2	5.7	83	117
7440-61-1	Uranium	833	101.1	6.1	83	120
7440-62-2	Vanadium	1677	99.1	5.7	82	116
7440-66-6	Zinc	2352	100.1	6.2	82	119

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Table 4. LCS Control Limits – Method 6020 Water Matrix

CAS ID	Analyte	N Records	Mean	Standard Deviation	Lower Control Limit	Upper Control Limit
7429-90-5	Aluminum	3145	100.6	5.4	84	117
7440-36-0	Antimony	5172	100.9	5.3	85	117
7440-38-2	Arsenic	6404	100.1	5.3	84	116
7440-39-3	Barium	4452	99.9	4.8	86	114
7440-41-7	Beryllium	4297	102	6.3	83	121
7440-42-8	Boron	1460	101.5	9.6	73	130
7440-43-9	Cadmium	5699	100.8	4.7	87	115
7440-70-2	Calcium	2085	102.3	5.2	87	118
7440-47-3	Chromium	5569	100.6	5.1	85	116
7440-48-4	Cobalt	3885	100.7	4.7	86	115
7440-50-8	Copper	5092	101.4	5.4	85	118
7439-89-6	Iron	3135	102.4	5.2	87	118
7439-92-1	Lead	6868	101.7	4.5	88	115
7439-93-2	Lithium	461	102.3	8	78	126
7439-95-4	Magnesium	2399	100.4	5.9	83	118
7439-96-5	Manganese	4330	101.1	4.7	87	115
7439-97-6	Mercury	328	97.2	9	70	124
7439-98-7	Molybdenum	2908	99.3	5.4	83	115
7440-02-0	Nickel	5095	100.8	5.3	85	117
7440-09-7	Potassium	2154	101.2	4.7	87	115
7782-49-2	Selenium	5797	100.1	6.7	80	120
7440-22-4	Silver	4956	100.8	5.1	85	116
7440-23-5	Sodium	2313	100.7	5.3	85	117
7440-24-6	Strontium	1170	99.9	5.9	82	118
7440-28-0	Thallium	5352	99.3	5.6	82	116
7440-29-1	Thorium	313	103.7	5.7	87	121
7440-31-5	Tin	1509	100.6	4.8	86	115
7440-32-6	Titanium	1538	98.6	5.3	83	115
7440-33-7	Tungsten	130	103.5	6.2	85	122
7440-61-1	Uranium	1860	103.3	5.4	87	120
7440-62-2	Vanadium	3375	100.5	5	86	115
7440-66-6	Zinc	4253	101	6	83	119

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STANDARD OPERATING PROCEDURE
TITLE: Metals by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) (EPA Methods 6020, 6020A, 6020B & 200.8)
ISSUER: Pace National – Mt. Juliet, Tennessee

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Table 5. Quality Control Requirements – Inorganic Analysis by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Linear Dynamic Range (LDR) or High-level Check Standard	At initial set-up and checked every 6 months with a high standard at the upper limit of the range.	Within ±10% of true value.	Dilute samples within the calibration range, or re-establish/verify the LDR.	Flagging is not appropriate.	Data cannot be reported above the calibration range without an established/passing high-level check standard.
Tuning	Prior to ICAL.	Mass calibration ≤ 0.1 amu from the true value; Resolution < 0.9 amu full width at 10% peak height.	Retune instrument and verify.	Flagging is not appropriate.	No samples shall be analyzed without a valid tune.
Initial Calibration (ICAL) for All Analytes	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, r2 ≥ 0.99.	Correct problem, then repeat ICAL.	Flagging is not appropriate.	Minimum one high standard and a calibration blank. No samples shall be analyzed until ICAL has passed.
Initial Calibration Verification(ICV)	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes, within ± 10% of true value.	Correct problem. Rerun ICV. If that fails, repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed until calibration has been verified with a second source.

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Table 5. Quality Control Requirements – Inorganic Analysis by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	All reported analytes within ± 10% of the true value.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform corrective action(s) and repeat CCV and all associated samples since the last successful CCV. Alternately, recalibrate if necessary; then reanalyze all associated samples since the last acceptable CCV	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable CCV.	Results may not be reported without a valid CCV. Flagging is only appropriate in cases where the samples cannot be reanalyzed.

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Table 5. Quality Control Requirements – Inorganic Analysis by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Low-level Calibration Check Standard (Low Level ICV)	Daily.	All reported analytes within ± 20% of the true value.	Correct problem and repeat ICAL.	Flagging is not appropriate.	No samples shall be analyzed without a valid low-level calibration check standard (LLCCV). LLCCV standard should be less than or equal to the LOQ. If the concentration of the lowest calibration standard is less than or equal to the LOQ, the lowest standard may be re-quantified against the calibration curve as LLCCV. Otherwise, a separate standard must be analyzed as the LLCCV prior to the analysis of any samples.
Internal Standards (IS)	Every field sample, standard and QC sample.	IS intensity in the samples within 30-120% of intensity of the IS in the ICAL blank.	If recoveries are acceptable for QC samples, but not field samples, the field samples may be considered to suffer from a matrix effect. Reanalyze sample at 5-fold dilutions until criteria is met. For failed QC samples, correct problem, and rerun all associated failed field samples.	Flagging is not appropriate.	Samples suffering from matrix effect should be diluted until criteria are met, or an alternate IS should be selected.

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Table 5. Quality Control Requirements – Inorganic Analysis by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Method Blank (MB)	One per preparatory batch.	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample.	Correct problem. If required, reprep and reanalyze MB and all QC samples and field samples processed with the contaminated blank.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply B flag to all results for the specific analyte(s) in all samples in the associated preparatory batch.	Results may not be reported without a valid method blank. Non-detects associated with positive blank infractions may be reported. Sample results > 10X the LOQ associated with negative blanks may be reported. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Initial and Continuing Calibration Blank (ICB/CCB)	Immediately after the ICV and immediately after every CCV.	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample.	ICB: Correct problem and repeat ICV/ICB analysis. If that fails, rerun ICAL. All samples following the last acceptable Calibration Blank must be reanalyzed. CCBs may not be reanalyzed without reanalysis of the associated samples and CCV(s).	Flagging is not appropriate.	Results may not be reported without a valid calibration blank. Non-detects associated with positive blank infractions may be reported. Sample results > 10X the LOQ associated with negative blanks may be reported. For CCB, failures due to carryover may not require an ICAL.

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Table 5. Quality Control Requirements – Inorganic Analysis by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Interference Check Solutions(ICS) (also called Spectral Interference Checks)	After ICAL and prior to sample analysis.	**ICS-A:** Absolute value of concentration for all non-spiked project analytes <1/2 LOQ (unless they are a verified trace impurity from one of the spiked analytes); **ICS-AB**: Within ± 20% of true value.	Terminate analysis, locate and correct problem, reanalyze ICS, reanalyze all samples.	If corrective action fails, apply Q-flag to all results for specific analyte(s) in all samples associated with the failed ICS.	All analytes must be within the LDR. ICS-AB is not needed if instrument can read negative responses.
Laboratory Control Sample(LCS)	One per preparatory batch.	A laboratory must use Table 3 and 4 limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Correct problem, then re-prep and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available.	If reanalysis cannot be performed, data must be qualified and explained in the case narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch.	Must contain all reported analytes. Results may not be reported without a valid LCS. Flagging is only appropriate in cases where the samples cannot be reanalyzed.
Matrix Spike (MS)	One per preparatory batch.	A laboratory must use Table 3 and 4 limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified.	Examine the project-specific requirements. Contact the client as to additional measures to be taken.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	For matrix evaluation only. If MS results are outside the limits, the data shall be evaluated to determine the source(s) of difference (i.e., matrix effect or analytical error).

Pace Analytical®
National Center for Testing & Innovation

STANDARD OPERATING PROCEDURE
TITLE: Metals by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) (EPA Methods 6020, 6020A, 6020B & 200.8)
ISSUER: Pace National – Mt. Juliet, Tennessee

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Table 5. Quality Control Requirements – Inorganic Analysis by Inductively Coupled Plasma/Mass Spectrometry (ICP-MS)

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action	Flagging Criteria	Comments
Matrix Spike Duplicate (MSD) or Matrix Duplicate (MD)	One per preparatory batch.	A laboratory must use Table 3 and 4 limits for batch control if project limits are not specified. If the analyte(s) are not listed, use in-house LCS limits if project limits are not specified. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD).	Examine the project-specific requirements. Contact the client as to additional measure be taken. s to	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	The data shall be evaluated to determine the source of difference. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.
Dilution Test	One per preparatory batch if MS or MSD fails.	Five-fold dilution must agree within ± 10% of the original measurement.	No specific CA, unless required by the project.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	Only applicable for samples with concentrations > 50 X LOQ (prior to dilution). Use along with MS/MSD or PDS data to confirm matrix effects.
Post Digestion Spike (PDS) Addition	One per preparatory batch if MS or MSD fails (using the same sample as used for the MS/MSD if possible).	Recovery within 80-120%.	No specific CA, unless required by the project.	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the case narrative.	Criteria apply for samples with concentrations < 50 X LOQ prior to dilution.
Method of Standard Additions (MSA)	When dilution or post digestion spike fails and if the required by project.	NA.	NA.	NA.	Document use of MSA in the case narrative.

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