Remedial Investigation Work Plan

Snohomish County Airport
C-1 Building and C-1 Hangar
3220 100th Street SW, Suite A
Everett, Washington

for
Snohomish County Airport

September 2, 2022

GeoEngineers
Earth Science + Technology

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File No. 5530-014-01

September 2, 2022

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1.0 INTRODUCTION AND PURPOSE

This Remedial Investigation (RI) Work Plan (Work Plan) describes proposed environmental drilling and sampling to address data gaps and complete characterization for the C-1 Building and C-1 Hangar Properties and surrounding area (Site) to support development of a RI, Feasibility Study (FS) and Cleanup Action Plan (CAP) for the Site. The two properties are located at 3220 100th Street SW in Everett, Washington and are approximately 2.35-acres in size (Figure 1). The C-1 Building Property is developed with an approximately 25,000-square-foot building and an adjacent 12,000-square-foot exterior storage yard, and the C-1 Hangar Property is developed with an approximately 53,000 square-foot airplane hangar.

The Site has been the subject of several environmental investigations since at least 1998. These investigations include a Phase II Environmental Site Assessment (ESA) (AGI 1998), a Soil Investigation (URS 2001) and a combined Phase I and II ESA (HWA 2018). Recently, GeoEngineers completed a vapor intrusion (VI) evaluation in November and December 2020 (GEI 2021a), a Phase II Environmental Site Assessment in March 2021 (GEI 2021b), and a supplemental soil and groundwater investigation in April 2022 (detailed in this Work Plan). The results of the 2018 Phase I and II ESAs and the more recent investigations are summarized in Sections 2.1 through 2.4 below.

The purpose of this Work Plan is to identify the RI data gaps remaining to complete the Site characterization and present the soil and groundwater investigation and sampling plan to address the identified data gaps. The comprehensive results of the Site characterization will be included the RI Report. The Snohomish County Airport plans to complete an RI, FS, and ultimately a CAP for the Site consistent with Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) requirements (Washington Administrative Code [WAC] 173-340).

Paine Field is the recipient of an Integrated Planning Grant (IPG) from Ecology and this scope of services for the RI planning and implementation will be completed under the IPG. The RI scope of services is based on discussions with Andrew Rardin of Paine Field, our prior work at the Site from 2020 through 2022, prior work completed at the Site by others, and our experience with the investigation and cleanup of other airport and industrial facilities under the Ecology MTCA and its implementing regulations.

Objectives for the investigation generally include the following to complete the Site characterization:

- Document the extent of the contaminants of concern (COCs) detected in soil and groundwater during the March 2021 Phase II ESA and the April 2022 Supplemental Investigation at concentrations greater than the MTCA cleanup levels. For the purposes of this RI, the MTCA Method A cleanup levels are being used as preliminary cleanup levels to assess and document the nature and extent of the COCs, and the need for remedial action, until Site cleanup levels are established.
- Evaluate the potential for VI into the C-1 Building in accordance with the Ecology "Guidance for Evaluating Vapor Intrusion in Washington State: Investigation and Remedial Action," updated March 2022 (Ecology 2022a).
- Assess and document groundwater quality, connectivity, and flow direction by installing permanent monitoring wells at the Site.
- Support the development of a conceptual site model (CSM) for the Site that will be used to evaluate the need for and scope of a cleanup action, as warranted.

2.0 PROPERTY HISTORY AND PREVIOUS INVESTIGATION SUMMARY

The C-1 Building was developed in 1956 by Alaska Airlines and used for aircraft engine repair and overhaul. The building was sold to a parent company of Precision Engines in 1962 and continued to be used for aircraft engine repair and overhaul and the manufacture of fuel injection systems by Precision Engines and sister company Precision Airmotive (HWA 2018). The C-1 Building Property is approximately 0.85-acres and consists of one approximately 25,000 square-foot building and an adjacent 12,000-square-foot exterior storage yard. The C-1 Building was occupied by Precision Engines from 1997 until 2020. The building is currently vacant. The C-1 Building Property is listed by Ecology as the Precision Engines LLC site (Cleanup Site ID: 3526; Facility/Site ID: 84613634) with status listed as “cleanup started.”

The C-1 Hangar is located adjacent to the C-1 Building and is approximately 1.5-acres developed with an approximately 53,000-square-foot aircraft hangar and the adjacent covered outdoor space referred to as the Hangar Annex. The C-1 Hangar was last leased to Aviation Technical Services, Inc. (ATS) starting on April 1, 1999. The Hangar Annex was constructed and added to the lease in September 2011, and both leases were terminated on December 31, 2020. During the lease, the space was used for airplane storage, general workshop, and office space. The C-1 Hangar is currently leased to Alaska Airlines for aircraft maintenance activities and is not listed in Ecology’s contaminated sites database.

A summary of relevant environmental investigations completed at the C-1 Building and the adjacent C-1 Hangar is included in the next sections.

2.1. 1986 Preliminary Site Assessment

A site assessment was completed in July 1986 by EPA Region 10 Technical Assistance Team (TAT) in response to a reported complaint related to improper handling and disposal of chemicals by Tramco, Inc., the tenant of the C-1 Hangar (Weston 1986). The assessment discovered that Ecology had responded to reports of an oil spill at the property and had previously observed Tramco employees dumping solvent and paint wastes into the storm sewer systems. A representative of Tramco, Inc. stated to TAT personnel that employees had previously disposed used solvent waste into a drainage ditch and adjacent storm drains at the Tramco (C-1) Hangar prior to the investigation, but that this method of disposal was no longer employed, and that the current practices included placing all wastes into drums for off-site disposal.

Four sediment and three water samples were collected from storm drain catch basins located southeast of the Tramco (C-1) Hangar (see Figure 2) and submitted for chemical analysis for toluene, methylene chloride, benzene, tetrachloroethylene/perchloroethylene (PCE), trichloroethylene (TCE) and metals. Toluene and methyl ethyl ketone and elevated concentrations of metals (antimony, cadmium, chromium, copper, lead, mercury, selenium, silver, thallium, tin and zinc) were detected in the water and sediment sample collected from the storm line servicing the Tramco (C-1) Hangar. Detected concentrations of lead in sediment samples collected from the stormwater catch basins were reportedly between 4 and 60 times higher than published background soil concentrations. One catch basin was observed to receive effluent discharge from a pipe leading toward the C-1 Building (see Figure 2), which was occupied by Precision Airmotive Corporation. The effluent was observed to be milky white/green in appearance and a sample of the effluent from this pipe was found to contain TCE, toluene, methyl ethyl ketone, methylene chloride and benzene. Based on the findings of the investigation, the TAT team recommended routine inspections of the stormwater drainage system and mitigative actions based on the completion of a thorough downstream storm sewer sampling program. Details regarding the completion of additional sampling were not available.

2.2. 1997 and 1998 Phase I and Phase II Environmental Assessments

A Phase I Environmental Assessment (EA) was completed in March 1997 to assess the potential for contamination related to past and present property uses at several locations at Paine Field, including the C-1 Building (AGI 1997). The EA identified surficial petroleum staining in the C-1 Building storage yard and past use of chlorinated solvents and mineral spirits based on review of available building records and the 1986 Site Assessment Report.

A limited Phase 2 EA was conducted by AGI Technologies at the C-1 Building on June 4, 1998 (AGI 1998) based on the findings and recommendations of the 1997 Phase I EA. The purpose of the investigation was to assess soil inside the C-1 Building adjacent to drain lines located inside the building and stormwater conveyance lines that were identified as likely sources of contamination based on the 1986 assessment and the results of the Phase I EA. Due to the presence of utilities within the C-1 Building concrete slab, borings were not completed inside the building. The investigation consisted of drilling two borings; one boring was completed adjacent to the storm drain catch basin located in the storage yard area with one soil sample collected at a depth of 8.5 feet below ground surface (bgs), and one boring was completed at the location of a former solvent UST adjacent to the building (see Figure 2), with two soil samples collected at depths of 4 and 5.5 feet bgs. The UST was reportedly removed in 1991 but no documentation of the UST removal or environmental sampling was identified (HWA 2018). The soil samples were submitted for laboratory chemical analysis of petroleum hydrocarbons and halogenated volatile organic compounds (VOCs). The soil samples collected from the boring completed adjacent to the stormwater catch basin contained TCE at a concentration of 0.015 milligrams per kilogram (mg/kg) and the soil samples collected from a depth of 4 feet bgs within the former UST excavation contained diesel- and oil-range petroleum hydrocarbons at concentrations of 240 mg/kg and 620 mg/kg, respectively. The 1998 report concluded that the presence of TCE adjacent to the storm drain line indicated that solvents were discharged through the storm drain system and that solvent concentrations were likely higher in soil beneath the building. The report recommended additional drilling be completed inside the building once adequate utility locates were performed.

2.3. 2000 and 2001 Subsurface Investigations Inside the C-1 Building

In 2001 Camp Dresser & McKee Inc. (CDM) conducted an indoor air and subsurface soil investigation inside the C-1 Building. The investigation was conducted in response to complaints of air quality in the adjacent Paine Field Airport offices after employees noted chemical smells and frequent signs of illness (CDM 2001). Eighteen soil samples and two soil vapor samples were collected from the Precisions Equipment Room and the adjacent Airport office hallway, and four indoor samples were collected from the hallway and inside Airport offices.

Petroleum hydrocarbons were detected in soil samples collected from depths between 8 and 42 inches below the floor in Precision's Equipment Room/Fire Riser Room at concentrations ranging from 400 mg/kg to 23,000 mg/kg. Sub slab soil vapor samples and indoor air samples contained petroleum hydrocarbons at concentrations between 210 and 220 milligrams per cubic meter (mg/m^3) and between 1.0 and 5.1 mg/m^3, respectively. Laboratory chromatograms show that the petroleum hydrocarbons detected in soil and indoor air matched Soltrol® 170, which was reportedly used by Precision Engines and Precision Airmotive as a calibrating fluid. The chromatogram profile of Soltrol 170 shows the product falls within the C_{12} to C_{15} range and is similar in composition to mineral spirits.

A supplemental soil investigation was completed in 2001 (HWA 2018) to delineate the lateral and vertical extent of soil containing petroleum hydrocarbons/mineral spirits at concentrations exceeding MTCA Method A cleanup levels beneath the Precision Equipment and Fire Riser Rooms. Five soil borings were completed in the mineral spirits-impacted soil area from depths between 2 and 15 feet bgs. Petroleum hydrocarbons/mineral spirits were detected in 4 of 10 soil samples collected at concentrations ranging from 200 to 5,500 mg/kg. The lateral extent of contaminated soil was delineated based on the results of the investigation; however, vertical delineation was not achieved because the deepest sample collected (15 feet bgs) had a detected petroleum concentration of 5,500 mg/kg. Soil was reportedly excavated from the area following the 2001 investigation, but no documentation of the remedial excavation and soil disposal activities was identified (HWA 2018).

2.4. 2018 Phase I and II Environmental Site Assessments

A combined Phase I and II ESA was conducted at the Site between March and May 2018, and the findings and results are presented in the report dated July 10, 2018 (HWA 2018). The Phase I portion of the report summarized previous investigations conducted at the C-1 Hangar and C-1 Building and identified the following recognized environmental conditions (RECs) related to the C-1 Building:

- Historical Aircraft Engine Overhaul – The historical use of the building as an aircraft engine overhaul facility was considered a potential risk to the soil, groundwater, and soil vapor due to the use, handling, and storage of hazardous materials including Soltrol (mineral spirits), ChemStrip 5015 (alkaline lend of solvents and surfactants), TCE, tetrachloroethane (TCA), various oils and calibrating fluids, and residual metals due to sandblasting of machine parts. Spent solvents associated with machine parts cleaning were reportedly stored in the C-1 Building storage yard in 55-gallon drums. Detections of solvent-related VOCs including TCE in environmental samples collected during previous investigations suggested that there were historical hazardous material release(s) to the environment.
- Historical Solvent Underground Storage Tank (UST) – A 1,000-gallon UST used to store solvent was identified as formerly being located in the southeast portion of the storage yard (see Figure 2). The UST was reportedly removed in 1991; however, no documentation of the UST removal or soil sampling was identified.
- Mineral Spirits Above-Ground Storage Tank (AST) – An approximately 800-gallon mineral spirits AST was located near the northeast corner of the storage yard. The AST had secondary containment and no indications of spills or releases were noted during the Phase I site reconnaissance. However, a remedial excavation of mineral oil impacted soil in the 32nd Street right-of-way identified this AST as the likely source of the contamination.
- Inactive Sump – An inactive sump was located in the southwestern portion of the storage area. Significant staining was observed in the vicinity of the sump during the Phase I site reconnaissance.

In addition to the above RECs, the following controlled recognized environmental condition (CREC) was identified:

- Impacted Soil Below the C-1 Building – An investigation conducted in 2001 (URS 2001) confirmed the presence of petroleum hydrocarbon-impacted soil below the concrete slab in the northwest portion of the C-1 Building. The lateral extent of the impacted soil was estimated to be about 250 square feet; however, the vertical extent of the petroleum hydrocarbon impacts was not identified.

The 2018 Phase II ESA investigation scope was established based on the identified RECs and CREC in the Phase I ESA. Phase II ESA sampling was completed in May 2018. The explorations were completed adjacent to features located in the C-1 Building storage yard: former UST excavation, former sump, distilling shed, compressor shed, stormwater catch basin, and the mineral spirits AST. The locations of these features are shown on Figures 2 through 4.

Phase II ESA sampling consisted of drilling six soil borings to depths between 10 and 15 feet bgs and the completion of one hand-auger boring in the C-1 Building storage yard, and installation of six sub-slab soil vapor probes inside the C-1 Building. Nine soil samples were collected from the direct-push and hand auger borings, and six soil vapor samples and one ambient indoor air sample were collected inside the building. Groundwater was encountered in four of the six borings at depths between 4 and 10 feet bgs and grab groundwater samples were collected from temporary wells installed in these borings. Soil and groundwater samples were submitted for laboratory chemical analysis for petroleum hydrocarbons, Resource Control and Recovery Act (RCRA) 8 metals (total and dissolved), and VOCs. Soil vapor and ambient air samples were submitted for analysis of VOCs and gasoline-range petroleum hydrocarbons. The results of the Phase II ESA sampling for each focus area are summarized below.

- **Historical Solvent Underground Storage Tank (UST).** Two soil samples collected from depths of 5 feet bgs within and adjacent to the former UST contained acetone and 1,2-dichlorobenzene and naphthalene at concentrations less than MTCA Method A cleanup levels. The grab groundwater sample collected from the boring within the UST excavation contained vinyl chloride at a concentration of 0.32 micrograms per liter (ug/L), which exceeded the MTCA Method A cleanup level. Chlorobenzene, 2-chlorofotoluene and 1,2-dichlorobenzene were also detected at concentrations less than the MTCA Method A cleanup levels.
- **Inactive Sump.** One soil sample collected from a depth of 3.5 feet bgs contained barium and chromium at concentrations less than applicable MTCA cleanup levels.
- **Distilling and Compressor Sheds.** Oil-range petroleum hydrocarbons were detected in the hand-auger soil sample collected adjacent to the compressor shed at a concentration less than the MTCA Method A cleanup level. No other analytes were detected in soil from this area.
- **Stormwater Catch Basin.** One soil sample collected from a depth of 3 feet bgs adjacent to the northern-most stormwater catch basin (see Figure 2) contained TCE at a concentration of 0.12 mg/kg, which exceeded the MTCA Method A cleanup level. Acetone, vinyl chloride, (trans) 1,2-dichloroethene, (cis) 1,2-dichloroethene, barium, chromium and lead were also detected at concentrations less than applicable MTCA cleanup levels. A grab groundwater sample collected from the boring at this location contained vinyl chloride and TCE at concentrations of 0.38 ug/L and 7 ug/L, which exceeded their respective MTCA cleanup levels. Acetone, chlorobenzene, 2-chlorotoluene, (cis) 1,2-dichloroethene, 1,2,4-trimethylbenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, arsenic, and barium were also detected at concentrations less than applicable cleanup levels.
- **Mineral Spirits Above-Ground Storage Tank (AST).** One soil sample collected from a depth of 3 feet bgs in the vicinity of the mineral spirits AST contained acetone and 2-butanone (MEK) at concentrations less than the MTCA cleanup levels. A grab groundwater sample collected from the boring at this location contained vinyl chloride at a concentration of 0.62 ug/L, which exceeded the MTCA Method A cleanup level. Diesel, benzene, acetone, and 1,2,4-trimethylbenzene were also detected at concentrations less than applicable MTCA cleanup levels.

- **Soil Vapor and Ambient Air Inside C-1 Building.** Four sub-slab soil vapor samples were collected in the vicinity of the former wash tank and trench drain located inside the C-1 Building and two soil vapor samples were collected in the western and northern portions of the building. Outdoor air samples were not collected as part of the investigation. Sub-slab soil vapor and indoor air chemical analytical data were compared to the MTCA Method B soil vapor screening levels and MTCA Method B Indoor Air cleanup levels, both of which are based on residential exposure (also referred to as "unrestricted land use"). VOCs were detected in all six collected soil vapor samples at concentrations exceeding the soil vapor screening level or the indoor air cleanup level. Additionally, gasoline-range petroleum hydrocarbons were detected in all soil vapor samples at concentrations less than applicable screening and cleanup levels. TCE was detected in all collected soil vapor samples at concentrations ranging from 15.1 micrograms per cubic meter (ug/m^3) to 37,000 ug/m^3. Other VOCs detected at concentrations exceeding the MTCA Method B Indoor Air cleanup levels were PCE, TCA, 1,1-dichloroethane, 1,2,4-trimethylbenzene, 1,4-dichlorobenzene, acrolein, benzene, carbon tetrachloride, chloroform, and naphthalene. The highest detected VOC concentrations were from the soil vapor samples collected adjacent to the former wash tank (see Figure 2). Additionally, benzene, carbon tetrachloride, and TCE were detected in the indoor air sample at concentrations exceeding the MTCA Method B Indoor Air cleanup levels.

Based on the results of the investigation, the 2018 Phase II ESA report concluded that the contaminant impacts to environmental media have not been fully characterized.

2.5. 2020 Vapor Intrusion Evaluation

A VI evaluation was conducted at the Site in December 2020. The findings of this evaluation are included in the *C-1 Hangar and C-1 Building Vapor Evaluation Report* (GEI 2021a), dated April 27, 2021 (Appendix A). Twelve sub-slab soil vapor (SV-1 through SV-12), 13 indoor air (IA-1 through IA-13), and two outdoor air samples (OA-1 and OA-2) were collected during the VI evaluation and submitted for chemical analysis for total petroleum hydrocarbons (TPH) and VOCs. Twelve sub-slab soil vapor and seven indoor air samples were collected inside the C-1 Hangar and six indoor air samples were collected in the C-1 Building as shown on Figure 2.

Two soil vapor samples (SV-10 and SV-12) were collected in the C-1 Hangar near the wall abutting the C-1 Building to assess soil vapor in areas closest to the C-1 Building where soil vapor sampling conducted in 2018 identified contaminant concentrations greater than the MTCA Method B soil vapor screening levels. Indoor air samples were collected in areas of the C-1 Building where soil or indoor air samples collected during previous investigations indicated the presence of one or more COCs at concentrations greater than the respective MTCA Method B cleanup levels. Two outdoor air samples were collected at locations upwind and downwind of the C-1 Hangar and C-1 Building at the time of sampling. Ecology guidance allows outdoor air results to be evaluated in conjunction with indoor air sampling to better estimate whether contaminants detected in indoor air are likely, or not likely, due to vapor intrusion (Ecology 2022a). The minimum detected outdoor air sample concentrations for each analyte are subtracted from the indoor air sample results to account for background conditions. Soil vapor samples were not collected from the C-1 Building during the 2020 investigation because the soil vapor data from the previous 2018 investigation were considered representative of current conditions.

For screening purposes, the sub-slab soil vapor sampling results were compared to the MTCA Method B soil vapor screening levels for residential exposure and to the soil vapor screening levels for commercial exposure. Indoor air sample analytical results were evaluated by comparison to the MTCA Method B indoor air cleanup levels for residential exposure and to indoor air screening levels for commercial exposure. The TCE results for the indoor air samples were also compared to the Short-Term Commercial Worker Indoor Air Action Level for TCE published in Ecology Implementation Memo 22 (Ecology 2018d). The tabulated soil vapor and indoor air chemical analytical results are presented in Tables 1 and 2, respectively, and in the report included in Appendix A.

The findings of the 2020 VI Evaluation indicated that the detected concentrations of COCs in indoor air were not greater than the indoor air screening levels for commercial exposure (see Appendix A), which are applicable to commercial uses at the C-1 Building. It should be noted that the report included in Appendix A was published prior to Ecology's March 2022 update to the risk-based screening levels for the Commercial Worker Scenario (Ecology 2022a); a review of the 2020 data relative to the revised commercial worker screening levels indicates that the detected COC concentrations remain protective of commercial uses for the buildings.

Chemical analytical results for sub-slab vapor and indoor and outdoor air samples are presented in Tables 1 and 2, respectively. Following is a summary of sample results for the 2020 VI Evaluation for samples that exceeded applicable screening or cleanup levels.

- TCE was detected in soil vapor at concentrations greater than the MTCA Method B soil vapor screening level for residential exposure in samples SV-10 and SV-12 located in the C-1 Hangar near the wall that adjoins the C-1 Building. TCE was also detected in the indoor air sample (IA-7) collected in this area at a concentration greater than the MTCA Method B indoor air cleanup level for residential exposure. Additionally, TCE was detected in indoor air at five locations (IA-8, IA-10, IA-11, IA-12, and IA-13) inside the C-1 Building at concentrations greater than the MTCA Method B indoor air cleanup level for residential exposure.
- Naphthalene was detected in soil vapor at concentrations greater than the MTCA Method B soil vapor screening level for residential exposure in nine samples (SV-2, SV-3, SV-4, SV-6 through SV-10, and SV-12) collected inside the C-1 Hangar. Naphthalene was detected in indoor air at concentrations greater than the MTCA Method B indoor air cleanup level for residential exposure in six samples (IA-1 through IA-6) collected inside the C-1 Hangar and in one sample (IA-10) collected inside the C-1 Building.
- TPH (the sum of individual petroleum fractions, benzene, toluene, ethylbenzene, xylene and naphthalene) was detected in soil vapor in two samples (SV-6 and SV-12) located inside the C-1 Hangar at concentrations greater than the MTCA Method B soil vapor screening level for residential exposure. TPH was detected in indoor air at concentrations greater than the MTCA Method B indoor air cleanup level for residential exposure in four samples (IA-1, IA-3, IA-4, and IA-6) collected inside the C-1 Hangar and in five samples (IA-9 through IA-13) collected inside the C-1 Building.
- PCE, 1,1-dichloroethane and chloroform were detected in one soil vapor sample (SV-12) located in the C-1 Hangar near the wall abutting the C-1 Building at concentrations greater than the MTCA Method B soil vapor screening level for residential exposure in nine samples.
- Benzene was detected at concentrations greater than the MTCA Method B Indoor Air Cleanup Level for residential exposure in all 13 indoor air samples collected during the 2020 investigation and in both outdoor air samples. 1,1-dichloroethane was detected in indoor air at concentrations greater than the MTCA Method B Indoor Air Cleanup Level for residential exposure in one sample (IA-12) collected in the C-1 Hangar and in one outdoor air sample (OA-2).

- Carbon Tetrachloride was detected at concentrations greater than the MTCA Method B Indoor Air Cleanup Level for residential exposure in 10 indoor air samples (IA-2 through IA-8 and IA-10 through IA-12) and in both outdoor air samples. collected during the 2020 investigation and in both outdoor air samples. 1,1-dichloroethane was detected in indoor air at concentrations greater than the MTCA Method B Indoor Air Cleanup Level for residential exposure in one sample (IA-12) collected in the C-1 Hangar and in one outdoor air sample (OA-2).
- Chloroform was detected at concentrations greater than the MTCA Method B indoor air cleanup level for residential exposure in 7 indoor air samples (IA-7 through IA-13).

Chemical analytical results for air samples collected within the C-1 Building indicate that chloroform, naphthalene, TCE and TPH are present in indoor air at concentrations greater than the respective MTCA Method B indoor air cleanup levels for residential exposure. However, the VI Evaluation findings note that the detected concentrations of these analytes were not greater than the indoor air screening levels for commercial exposure, which are applicable to commercial uses at the C-1 Building.

2.6. 2021 Phase II Environmental Site Assessment and 2022 Supplemental Investigation

A Phase II ESA was conducted in March 2021 to assess potential impacts to soil and groundwater at the Site. The results of the Phase II ESA are presented in the *Phase II Environmental Site Assessment* (GEI 2021b) report, dated June 1, 2021 (Appendix A). Fifteen soil borings (C-1 DP1 through C-1 DP15) were completed in the C-1 Hangar, the C-1 Building and southeast adjacent storage yard to depths of between 7 and 15 feet bgs. Twenty-nine soil samples and four grab groundwater samples were collected from the borings and submitted for chemical analysis for TPH, VOCs, polychlorinated biphenyls (PCBs), and RCRA metals. Of these samples, two soil samples were collected from one boring completed within the C-1 Building while four soil samples and two grab groundwater samples were collected from two borings completed in the storage yard. Soil boring and grab groundwater sampling locations are presented in Figure 3. Boring logs are presented in Appendix B. Soil chemical analytical results are presented in Tables 3 through 5. Groundwater chemical analytical results are presented in Table 6. Following is a summary of chemical analytical results for soil and groundwater samples exceeding applicable cleanup levels.

- TCE was detected in two soil samples collected from depths of 4 and 7 feet bgs from boring C-1 DP15 at concentrations exceeding the MTCA Method A cleanup level. Boring C-1 DP15 was located in the C-1 Building adjacent to the former location of the wash tank (see Figure 2).
- Total arsenic was detected in three grab groundwater samples collected from temporary wells installed in borings C-1 DP2, C-1 DP3 and C-1 DP14 at concentrations exceeding the MTCA Method A cleanup level. Total arsenic was detected in the groundwater sample collected from boring C-1 DP13 at a concentration of 6.62 ug/L, which exceeded the MTCA cleanup level at the time of publication of the report presented in Appendix A; however, the cleanup level for arsenic has recently been revised by Ecology since publication of the report (Ecology 2022b).
- Total chromium and total lead were detected in three grab groundwater samples collected from temporary wells installed in borings C-1 DP2, C-1 DP3 and C-1 DP14 at concentrations exceeding the MTCA Method A cleanup level.

Based on the results of grab groundwater sampling during the 2018 and 2020 Phase II ESAs, further evaluation was needed to assess groundwater conditions at the Site, including the installation of permanent monitoring wells.

2.7. 2022 Supplemental Investigation

A supplemental investigation was conducted in April 2022 to further evaluate soil and groundwater conditions surrounding the C-1 Hangar and C-1 Building by installing permanent monitoring wells. Four soil borings (C-1 HSA1 through C-1 HSA4) were completed to depths of between 16.6 and 25 feet bgs. Three of these borings were drilled in the vicinity of the C-1 Building while the fourth was drilled southwest of the C-1 Hangar (Figure 3). The results of this investigation have not been previously published and are discussed in this RI Work Plan below with the chemical analytical results presented in Tables 3 through 6.

Soil conditions encountered at the Site generally consisted of a fill layer up to approximately 4 to 6 feet thick overlying dense glacial deposits to the total depths explored. The fill consisted of sand with silt or gravel. The fill is underlain by native soil consisting of sand with interbedded silt and varying gravel to the maximum depth explored of 25 feet bgs. Exploration logs are presented in Appendix B.

Groundwater was encountered during drilling at borings C-1 HSA3 and C-1 HSA4 at depths of approximately 12 feet bgs and 4.5 feet bgs, respectively, and the borings were completed as permanent groundwater monitoring wells. Groundwater in monitoring well C-1 HSA4 was observed to recharge quickly with minimal drawdown during low-flow groundwater sampling whereas C-1 HSA3 was observed to recharge slowly following groundwater sampling. The results of the Site investigations, including the detection of COCs in near-by soil and groundwater that were reportedly historically discharged from the C-1 Building to the stormwater conveyance system, suggest that groundwater in the vicinity of monitoring well C-1 HSA4 may be influenced by the adjacent stormwater line. Groundwater was not encountered during drilling of borings C-1 HSA1 and C-1 HSA2.

Eleven soil samples were collected from the four borings and submitted for analysis for TPH, VOCs and RCRA metals. One groundwater sample was collected from each of the two monitoring wells and submitted for analysis for TPH, VOCs, and total and dissolved RCRA metals. Chemical analytical data reports for the 2022 supplemental investigation are presented in Appendix C. A summary of the soil and groundwater analytical results is follows:

- TCE was detected in two soil samples collected from boring C-1 HSA4, located near the storm drain east of the C-1 Building, at depths of 15 feet bgs (0.0022 mg/kg) and 20 feet bgs (0.067 mg/kg). The detected TCE concentration in the soil sample collected from 20 feet bgs exceeded the MTCA Method A cleanup level of 0.03 mg/kg. Toluene, total xylenes, and TCE breakdown products cis-1,2-dichloroethene and trans-1,2-dichloroethene were also detected in one or both soil samples at concentrations less than MTCA Method A cleanup levels.
- 1,2-dichloroethane was detected in soil samples collected from boring C-1 HSA2, located adjacent to the drainpipe connecting the stormwater catch basin to the C-1 Building, at depths of10 and 15 feet bgs. The detected concentrations were less than the MTCA Method A cleanup level.
- The detected metals concentrations in the collected soil samples were consistent with naturally occurring background metals concentrations for Puget Sound (Table 5).
- Vinyl chloride was detected in the groundwater sample collected from monitoring well C-1 HSA4 at a concentration of 0.36 ug/L, which exceeds the MTCA Method A cleanup level of 0.20 ug/L. Diesel-range petroleum hydrocarbons, chlorobenzene and 1,2-dichlorobenzene were also detected in the collected groundwater sample at concentrations less than the MTCA cleanup levels.

- Total arsenic was detected in the groundwater samples collected from monitoring wells C-1 HSA3 and C-1 HSA4 at concentrations of 9.99 and 10.2 ug/L, respectively, which exceed the MTCA Method A cleanup level of 8 ug/L. Dissolved arsenic concentrations in the two collected samples were less than the MTCA cleanup level.

Chemical analytical results for the 2021 Phase II ESA and the 2022 supplemental investigation indicate that TCE-contaminated soil is present beneath the southern portion of the C-1 Building, within the building footprint. Additionally, vinyl chloride was detected at a concentration exceeding the MTCA Method A cleanup level in groundwater from the monitoring well located in the storage yard (C-1 HSA4).

3.0 CONCEPTUAL SITE MODEL (CSM), CONTAMINANTS OF CONCERN AND PRELIMINARY CLEANUP LEVELS

This section presents the preliminary CSM developed for the Site based on the results of the 2020 through 2022 investigations and the results of prior investigations. The CSM will be refined based on the results of the RI.

3.1. Contaminant Sources

The findings of prior investigation have identified the following confirmed or likely contaminant sources:

- Wash tank and trench drain located inside the C-1 Building. These features were observed to be connected to the stormwater conveyance system and used chemicals were reportedly disposed in these features during prior building operations.
- Direct discharge to stormwater catch basins. Prior reports indicate chemicals were historically observed to be discharged directly to the stormwater system.
- Stormwater conveyance system. Chemicals disposed through the storm system likely leaked at one or more locations in the C-1 Building storage yard resulting in vinyl chloride and TCE detections in groundwater near stormwater catch basins.
- Former solvent UST adjacent to the C-1 Hangar. Diesel- and oil-range petroleum hydrocarbons were detected in soil collected from within the UST excavation area footprint.
- Former mineral spirits AST. Diesel-range petroleum hydrocarbons were detected in a 2018 grab groundwater sample collected in the vicinity; the detected concentration was less than the MTCA Method A cleanup level.

3.2. Potential Contaminants of Concern (COCs)

Potential COCs include potentially hazardous or toxic compounds which have a history of use at the Site, or which were detected in environmental media during environmental investigations. Based on the findings of prior investigations and applicable MTCA criteria, the COCs are petroleum hydrocarbons, VOCs and metals.

3.3. Exposure Pathways

Soil vapor to indoor air is considered a complete exposure pathway for the Site based on the detected COC concentrations in soil vapor and indoor air in the C-1 Building during the 2018 investigation and in the C-1

Hangar during the 2020 VI evaluation. Contaminant containing soil is located beneath the paved and/or improved surfaces of the Site, and therefore the direct contact pathway is not complete.

3.3.1. Terrestrial Ecological Evaluation

The Site qualifies for a Terrestrial Ecological Evaluation (TEE) exclusion because the Site meets the conditions of a TEE exclusion under WAC 173-340-7491(1)(b) and (1)(c).

3.4. Cleanup Standards

MTCA Method A cleanup levels for unrestricted land use are considered the preliminary soil and groundwater cleanup levels for the Site until site cleanup levels are established following completion of the RI. The standard point of compliance for soil will be throughout the Site (WAC 173-340-740(6)(f). The standard point of compliance for the groundwater will be throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by Site contaminants. Preliminary indoor air cleanup levels will be the MTCA Method B cleanup levels for indoor air, until the Site cleanup levels are established. The standard point of compliance for air will be throughout the C-1 Hanger and C-1 Building.

4.0 RI FIELD INVESTIGATIONS

This section summarizes the proposed RI sampling plan to address the Site data gaps. The objective of the RI is to complete field investigations and sampling to address data gaps in the Site characterization, support the CSM, and develop an approach for Site cleanup. Field procedures for RI sampling are presented in Appendix D and a Quality Assurance Project Plan (QAPP) is presented as Appendix E. The RI field work Health and Safety Plan is presented as Appendix F.

4.1. Identified Data Gaps

Data gaps identified based on review of available data and the results of the 2020 VI evaluation and the 2021 and 2022 Phase II ESA and Supplemental Investigation are summarized as follows:

- **Soil and groundwater within the C-1 Building footprint.** Soil sampling within the building footprint has consisted of a single boring completed during the 2021 Phase II ESA and the 2001 soil sampling associated with the mineral spirits contaminated soil in the northwestern corner of the building. No evaluation has been completed of groundwater beneath the presumed source area near the south corner of the C-1 Building.
- **TCE and vinyl chloride in soil and groundwater in the C-1 Building storage yard.** Chlorinated solvents were detected in three grab groundwater samples collected from soil borings and one groundwater sample collected from a monitoring well; however, the vertical and lateral extent of TCE and vinyl chloride detected in soil and groundwater in the storage yard has not been documented.
- **Soil and groundwater conditions near the former mineral spirits AST location.** Diesel-range petroleum hydrocarbons were detected in a 2018 grab groundwater sample collected in the vicinity; the detected concentration was less than the MTCA Method A cleanup level, however groundwater in the vicinity of the former AST has not been fully evaluated.
- **Groundwater conditions beneath the C-1 Hangar.** Groundwater was encountered during the 2021 investigation at only one location inside the hangar, near the southern end of the hangar. Groundwater

conditions could not be further evaluated due to refusal during direct-push drilling. Groundwater conditions beneath the hangar and closer to the presumed source area in the C-1 Building have not been evaluated.

- **The vertical extent of mineral spirits-contaminated soil beneath the C-1 Building.** The vertical extent of mineral oil-impacted soil beneath the northeast portion of the C-1 Building has not been evaluated.

The scope of work and sampling plan to complete the RI is described below.

4.2. Field Explorations and Sampling

Thirteen soil borings, including four of the borings to completed as permanent monitoring wells, are planned to further evaluate and document the contaminated soil and groundwater identified from prior investigations at the Site. Soil vapor and indoor/outdoor air samples are not proposed in this RI Work Plan because soil vapor and indoor/outdoor air data was collected for the C-1 Building in 2018 and the C-1 Hangar in 2020, and the data were adequate to document that the soil vapor to indoor air pathway for the Site is complete. Supplemental soil vapor sampling, if needed, will be planned following evaluation of the soil and groundwater data from the sampling proposed in this RI Work Plan.

The media to be sampled, sampling depths, and chemical analytical testing program are described in Section 4.2.4 below. Field procedures associated with drilling, sampling and monitoring well construction are described in Appendix D.

4.2.1. Utility Locates and Borehole Clearance

Prior to drilling activities, an underground utility locate will be performed in the vicinity of the proposed explorations to identify subsurface utilities and/or potential underground physical hazards. The underground utility check will consist of contacting a local utility alert service (One-call) and hiring a private utility locating company to complete a utility locate using conductible tracing and ground penetrating radar technologies. Due to the presence of a network of underground utilities beneath the C-1 Building, we anticipate the utility locate will require approximately one full day to at the Site. The planned boring locations may require adjustment following completion of the utility locate if subsurface conflicts are identified; however, the general location of each boring will be maintained to the extent practical to target the identified data gaps.

4.2.2. Soil Borings

Thirteen soil borings are proposed (C-1 RI1 through C-1 RI13; see Figure 4) to assess soil conditions in areas of the Site that have not been evaluated and to document the lateral and vertical extent of VOC contamination in soil below the southern portion of the C-1 Building and in the C-1 Building storage yard identified during the 2021 Phase II ESA. Soil samples will be collected as described in Appendix D and submitted to an Ecology-accredited laboratory for chemical analysis as described in Section 4.2.4 below.

4.2.3. Groundwater Monitoring Wells

Four permanent groundwater monitoring wells (C-1 RI2, C-1 RI5, C-1 RI12 and C-1 RI13) will be constructed in selected soil borings, as shown on Figure 4, to assess groundwater conditions in areas of the Site that have not been evaluated. Well construction details will be determined at the time of drilling based on the observed depth to groundwater. If groundwater is not encountered during drilling, then a monitoring well may not be installed; if no groundwater is encountered at the time of drilling, the decision to install a well will be based on observations of the soil from the boring and any indications of the potential for seasonal groundwater such as soil redox features or zones of low permeability in the soils that may perch groundwater seasonally.

The casing rim elevation of each new monitoring well will be surveyed relative to North American Vertical Datum of 1988 (NAVD 88). Depth to groundwater measurements will be taken following monitoring well installation and elevations will be calculated to evaluate the groundwater flow direction and gradient at the Site. Groundwater samples will be collected from the new and existing monitoring wells and submitted to an Ecology-accredited laboratory for chemical analysis as presented in Section 4.2.4 below.

4.2.4. Sampling and Analysis Plan

The sampling and analysis plan, including proposed explorations, media and chemicals of concern, proposed chemical analyses, target sampling depths, and sampling rationale for the RI field investigation, is presented in the table below. RI soil samples will be collected from the borings as described below. One round of RI groundwater sampling is anticipated to be completed in the newly constructed monitoring wells following monitoring well construction. RI groundwater sampling will include sampling of the two existing monitoring wells C-1 HSA3 and C-1 HSA4. Future RI groundwater sampling events will be planned based on the results of the first round of RI groundwater sampling and a total of four quarterly RI groundwater sampling events are anticipated.

SAMPLING AND ANALYSIS PLAN (PROPOSED EXPLORATION LOCATIONS SHOWN ON FIGURE 4)

Proposed Explorations (see Figure 4)	Exploration Location	Data Gap and Sampling Rationale	Target Soil Sampling Depths (ft bgs)	Contaminants of Concern (COCs) and Chemical Analyses
C-1 RI1, C-1 RI2 and C-1 RI3	Along the southwestern wall of the C-1 Building. Boring C-1 RI2 to be completed as a monitoring well.	Assess soil and groundwater conditions adjacent to the former location of the wash tank and trench drain.	4, 8, 10	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260 ▪ Metals (RCRA 8) by EPA 6000/7000 series
C-1 RI4 and C-1 RI5	In the northeastern portion of the C-1 Hangar near the wall abutting the C-1 Building	Assess soil and groundwater beneath the C-1 Hangar adjacent to the presumed C-1 Building source area where previous borings met refusal at 4 feet bgs.	4, 8, 10	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260 ▪ Metals (RCRA 8) by EPA 6000/7000 series (Groundwater only)
C-1 RI6 through C-1 RI9	Central portion of C-1 Building	Assess soil beneath the C-1 Building where no soil data exists.	4, 8	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260

Proposed Explorations (see Figure 4)	Exploration Location	Data Gap and Sampling Rationale	Target Soil Sampling Depths (ft bgs)	Contaminants of Concern (COCs) and Chemical Analyses
C-1 RI10	C-1 Building storage yard adjacent to the storm drain	Delineate the vertical extent of TCE detected in soil at this location in 2022 and evaluate the lateral extent of TCE and other VOCs in soil at this location.	20, 25, 30	▪ VOCs by EPA Method 8260
C-1 RI11	Northwest portion of the C-1 Building in the former Precision Equipment Room	Delineate the vertical extent of mineral spirits contaminated soil identified at this location in 2001.	15, 20	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx (mineral spirits)
C-1 RI12 and C-1 RI13	East-southeast portion of and adjacent to the C-1 Building storage yard	Assess soil and groundwater adjacent to the former mineral spirits AST where petroleum was previously detected in groundwater. Assess groundwater conditions where vinyl chloride and TCE have been previously detected in groundwater to the west.	4, 10, 20	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260

5.0 LIMITATIONS

We have prepared this RI Work Plan for the exclusive use of the Snohomish County Airport and their authorized agents and regulatory agencies. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

6.0 REFERENCES

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Table 1

Soil Vapor Sample Chemical Analytical Results

C-1 Hangar and C-1 Building, Paine Field, Snohomish County Airport

C-1 Hangar and Building, Snohomish County Airport
Everett, Washington

		Air-Phase Petroleum Hydrocarbons (μg/m^3)[1]			**Volatile Organic Compounds (μg/m^3)[2]**											
Sample ID	**Sample Date**	**APH C5-C8 Aliphatics**	**APH C9-C12 Aliphatics**	**APH C9-C10 Aromatics**	**1,1,1-Trichloroethane**	**1,1,2,2-Tetrachloroethane**	**1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)**	**1,1,2-Trichloroethane**	**1,1-Dichloroethane**	**1,1-Dichloroethylene**	**1,2,4-Trimethylbenzene**	**1,2-Dibromoethane**	**1,4-Dioxane**	**1-Propene**	**2,2,4-Trimethylpentane**
SV-1	11/30/20	**750 J+**	270 U	140 U	**3.6**	0.76 U	4.2 U	0.30 U	2.2 U	2.2 U	14 U	0.42 U	2.0 U	6.6 U	26 U
SV-2	11/30/20	**380 J+**	**290**	**590**	**8.7**	0.49 U	**8.4**	0.20 U	1.5 U	1.4 U	8.8 U	0.28 U	1.3 U	4.3 U	17 U
SV-3	11/30/20	**2,000 J+**	**310**	**220**	3.1 U	0.78 U	4.4 U	0.31 U	2.3 U	2.3 U	14 U	0.44 U	2.1 U	6.9 U	27 U
SV-4	12/01/20	**3,000 J+**	260 U	130 U	2.9 U	0.73 U	**4.8**	0.29 U	2.1 U	2.1 U	13 U	0.41 U	1.9 U	6.4 U	25 U
SV-5	12/01/20	**370 J+**	**240**	**310**	1.9 U	0.47 U	2.6 U	0.19 U	1.4 U	1.3 U	**11**	0.26 U	1.2 U	4.1 U	16 U
SV-6	12/01/20	**22,000 J+**	**1,800**	**460**	**32**	1.1 U	**340**	0.44 U	3.3 U	3.2 U	**43**	0.62 U	**5.5**	**65**	**40**
SV-7	12/01/20	**2,300 J+**	**390**	**1,400**	3.0 U	0.76 U	**260**	0.30 U	2.2 U	**4.5**	**95**	0.42 U	2.0 U	**100**	26 U
SV-8	12/01/20	**200 J+**	170 U	**180**	1.9 U	0.47 U	2.6 U	0.19 U	1.4 U	1.3 U	8.4 U	0.26 U	1.2 U	4.1 U	16 U
SV-9	12/01/20	**2,400 J+**	**910**	**210**	**6.5**	0.78 U	**54**	0.31 U	2.3 U	2.3 U	**18**	0.44 U	2.1 U	6.9 U	27 U
SV-10	12/01/20	**1,300 J+**	**480**	**220**	3.2 U	0.80 U	**28**	0.32 U	2.3 U	2.3 U	14 U	0.45 U	2.1 U	7.0 U	27 U
SV-11	12/01/20	**1,400 J+**	**510**	150 U	**13**	0.84 U	**16**	0.33 U	2.5 U	2.4 U	15 U	0.47 U	2.2 U	7.3 U	28 U
SV-12	12/01/20	**4,600 J+**	850 U	**800**	**7,900 J**	2.3 U	13 U	**1.8**	**530**	**930**	42 U	1.3 U	6.1 U	20 U	79 U
MTCA Method B Soil Vapor Screening Level [2,3]		NE	NE	NE	76,000	1.4	76,000	3	52	3,000	910	0.14	17	NE	NE

Sample ID	Sample Date	Volatile Organic Compounds (µg/m3)^{2}															
		Acetone	**Acrolein**	**Allyl Chloride (3-Chloropropene)**	**Benzene**	**Butane**	**Carbon Tetrachloride**	**Chloroform**	**cis-1,2-Dichloroethylene**	**Dichlorodifluoromethane**	**Ethanol**	**Ethylbenzene**	**Isopropyl Alcohol**	**Methyl ethyl ketone (MEK)**	**Naphthalene**	**Pentane**	**Tetrachloroethylene**
SV-1	11/30/20	**510 J**	11 U	8.6 U	**2.4**	13 U	1.7 U	0.27 U	2.2 U	2.7 U	**180**	2.4 U	**670 J**	16 U	1.4 U	16 U	37 U
SV-2	11/30/20	**360 J**	7.4 U	5.6 U	**3.7**	**36**	1.1 U	**0.51**	1.4 U	**3.1**	**220 J**	1.6 U	**97**	**11**	**5.5**	**18**	24 U
SV-3	11/30/20	**1,200 J**	12 U	8.9 U	1.8 U	**15**	1.8 U	0.28 U	2.3 U	**3.0**	**150**	**3.1**	**270**	**42**	**4.8**	17 U	39 U
SV-4	12/01/20	**2,000 J**	11 U	8.3 U	1.7 U	13 U	1.7 U	0.26 U	2.1 U	**2.9**	**270 J**	2.3 U	**3,600 J**	16 U	**2.9**	16 U	36 U
SV-5	12/01/20	**410 J**	7.0 U	5.3 U	**2.6**	8.1 U	1.1 U	0.17 U	1.3 U	**2.5**	**210 J**	**7.4**	**120**	10 U	**2.1**	10 U	23 U
SV-6	12/01/20	**2,000 J**	17 U	13 U	2.6 U	**29**	2.5 U	0.40 U	3.2 U	4.0 U	**640 J**	**51**	**1,000 J**	**140**	**6.5**	24 U	**93**
SV-7	12/01/20	**580 J**	11 U	8.6 U	**4.7**	**36**	**7.5**	0.27 U	2.2 U	**3.2**	**400 J**	**27**	**320**	**41**	**31**	**28**	37 U
SV-8	12/01/20	**240 J**	7.0 U	5.3 U	1.1 U	8.1 U	1.1 U	**0.55**	1.3 U	**2.8**	**490 J**	1.5 U	**67**	10 U	**6.7**	10 U	23 U
SV-9	12/01/20	**430 J**	12 U	8.9 U	1.8 U	14 U	1.8 U	0.28 U	2.3 U	2.8 U	**370 J**	**12**	**110**	17 U	**6.2**	17 U	39 U
SV-10	12/01/20	**460 J**	12 U	9.1 U	1.9 U	14 U	1.8 U	0.28 U	2.3 U	2.9 U	**240**	**6.1**	**83**	17 U	**8.8**	17 U	39 U
SV-11	12/01/20	**220**	13 U	9.5 U	1.9 U	15 U	1.9 U	0.30 U	2.4 U	3.0 U	**260**	2.6 U	**200**	18 U	**2.0**	18 U	41 U
SV-12	12/01/20	**190**	35 U	27 U	5.4 U	40 U	5.3 U	**170**	**20**	8.4 U	**150**	7.4 U	150 U	50 U	**12**	50 U	**740**
MTCA Method B Soil Vapor Screening Level ^{2,3}		470,000	0.3	14	11	NE	14	3.6	NE	1,500	NE	15,000	NE	76,000	2.5	NE	320

Sample ID	Sample Date	Volatile Organic Compounds (µg/m3)[2]						
		Tetrahydrofuran	Toluene	Trichloroethylene	Vinyl Bromide	Xylene, m-,p-	Xylene, o-	Total Xylenes[5]
SV-1	11/30/20	1.6 U	100 U	0.59 U	2.4 U	4.8 U	2.4 U	4.8 U
SV-2	11/30/20	1.1 U	68 U	**0.58**	1.6 U	**6.1**	**1.8**	**7.9**
SV-3	11/30/20	**2.5**	110 U	**0.64**	2.5 U	**12**	**3.7**	**15.7**
SV-4	12/01/20	**2.0**	100 U	**0.83**	2.3 U	**6.7**	2.3 U	**6.7**
SV-5	12/01/20	**15**	64 U	**0.37**	1.5 U	**29**	**6.9**	**35.9**
SV-6	12/01/20	**26**	150 U	0.87 U	3.5 U	**180**	**49**	**229**
SV-7	12/01/20	**18**	**390**	**0.74**	2.4 U	**98**	**37**	**135**
SV-8	12/01/20	**1.4**	64 U	**0.38**	1.5 U	**5.6**	**2.2**	**7.8**
SV-9	12/01/20	**2.6**	110 U	**2.8**	2.5 U	**44**	**16**	**60**
SV-10	12/01/20	**13**	110 U	**22**	2.5 U	**24**	**7.7**	**31.7**
SV-11	12/01/20	**7.1**	110 U	0.66 U	2.7 U	**6.4**	**2.6**	**9.0**
SV-12	12/01/20	5.0 U	320 U	**30,000 J**	7.4 U	**17**	7.4 U	**17**
MTCA Method B Soil Vapor Screening Level [2,3]		30,000	76,000	11	2.6	1,500	1,500	1,500

Notes:

[1] Air-phase petroleum hydrocarbons analyzed using Massachusetts Department of Environmental Protection Method MA-APH. Indoor air data

[2] VOCs analyzed using United States Environmental Protection Agency (EPA) Method TO-15, except where noted. Indoor air data are not adjusted to account for contributions from outdoor air. Only VOCs that were detected or with reporting limits greater than the MTCA Method B indoor air cleanup level for residential exposure are listed; all other VOCs are not detected for all samples.

[3] Model Toxics Control Act (MTCA) Method B indoor air cleanup levels for residential exposure are from Ecology's "CLARC Master Spreadsheet.xlsx" dated February 2021. Residential exposure scenario assumes 365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals).

[4] Naphthalene analyzed using EPA Method TO-17.

[5] Sum of m,p-xylene and o-xylene. Where xylenes are non-detect, the highest laboratory reporting limit is shown.

µg/m^{3} = micrograms per cubic meter

NE = not established

U = Constituent not detected above the laboratory reporting limit

J = Estimated concentration

Bold font type indicates the analyte was detected at a concentration greater than the laboratory reporting limit.

for residential exposure.

level for residential exposure.

Table 2

Indoor and Outdoor Air Sample Chemical Analytical Results

C-1 Hangar and C-1 Building, Paine Field, Snohomish County Airport

C-1 Hangar and Building, Snohomish County Airport
Everett, Washington

		Air-Phase Petroleum Hydrocarbons (μg/m^3)^1			Volatile Organic Compounds (μg/m^3)^2											
Sample ID	Sample Date	APH C5-C8 Aliphatics	APH C9-C12 Aliphatics	Air-phase Petroleum Hydrocarbons, C9-C10 Aromatics	1,1,2,2-Tetrachloroethane	1,2-Dibromoethane	1,2-Dichloroethane	1-Propene	Acetone	Acrolein	Allyl Chloride (3-Chloropropene)	Benzene	Benzyl chloride	Butane	Carbon Tetrachloride	Chloroform
IA-1_120120	12/01/20	**45**	**140**	25 U	0.14 U	0.077 U	**0.061**	1.2 U	**7.5**	2.1 U	1.6 U	**0.45**	0.052 U	**3.4**	**0.40**	**0.11**
IA-2_120120	12/01/20	40 U	**130**	25 U	0.14 U	0.077 U	**0.077**	1.2 U	**10**	2.1 U	1.6 U	**0.63**	0.052 U	**3.1**	**0.46**	**0.11**
IA-3_120120	12/01/20	**43**	**180**	25 U	0.14 U	0.077 U	**0.077**	1.2 U	**11**	2.1 U	1.6 U	**0.63**	0.052 U	**4.2**	**0.47**	**0.098**
IA-4_120120	12/01/20	**43**	**130**	25 U	0.14 U	0.077 U	**0.069**	1.2 U	**9.6**	2.1 U	1.6 U	**0.51**	0.052 U	**3.6**	**0.47**	**0.10**
IA-5_120120	12/01/20	40 U	**96**	25 U	0.14 U	0.077 U	**0.077**	1.2 U	**7.6**	2.1 U	1.6 U	**0.65**	0.052 U	**3.9**	**0.44**	**0.11**
IA-6_120120	12/01/20	40 U	**140**	25 U	0.14 U	0.077 U	**0.077**	1.2 U	**10**	2.1 U	1.6 U	**0.58**	0.052 U	**3.8**	**0.46**	**0.10**
IA-7_120120	12/01/20	40 U	50 U	25 U	0.14 U	0.077 U	**0.073**	**1.6**	**6.0**	2.1 U	1.6 U	**0.44**	0.052 U	2.4 U	**0.43**	**0.12**
IA-8_120120	12/01/20	**45**	**90**	25 U	0.14 U	0.077 U	**0.073**	1.2 U	**8.2**	2.1 U	1.6 U	**0.59**	0.052 U	**3.1**	**0.45**	**0.15**
IA-9_120120	12/01/20	**67**	**130**	25 U	0.14 U	0.077 U	**0.073**	1.2 U	**13**	2.1 U	1.6 U	**0.59**	0.052 U	**9.2**	**0.42**	**0.15**
IA-10_120120	12/01/20	**58**	**99**	25 U	0.14 U	0.077 U	**0.081**	1.2 U	**9.7**	2.1 U	1.6 U	**0.63**	0.052 U	**3.6**	**0.48**	**0.22**
IA-11_120120	12/01/20	**42**	**98**	25 U	0.14 U	0.077 U	**0.069**	1.2 U	**9.9**	2.1 U	1.6 U	**0.68**	0.052 U	**3.7**	**0.53**	**0.25**
IA-12_120120	12/01/20	**65**	**72**	25 U	0.14 U	0.077 U	**0.10**	1.2 U	**15**	2.1 U	1.6 U	**0.63**	0.052 U	**4.2**	**0.47**	**0.16**
IA-13_120120	12/01/20	**51**	**100**	25 U	0.14 U	0.077 U	**0.061**	1.2 U	**7.5**	2.1 U	1.6 U	**0.55**	0.052 U	**4.0**	**0.40**	**0.19**
OA-1_120120	12/01/20	40 U	50 U	25 U	0.14 U	0.077 U	**0.073**	1.2 U	**5.0**	2.1 U	1.6 U	**0.42**	0.052 U	2.4 U	**0.47**	**0.093**
OA-2_120120	12/01/20	**59**	**52**	25 U	0.14 U	0.077 U	**0.097**	**4.4**	**37**	2.1 U	1.6 U	**0.59**	0.052 U	2.4 U	**0.52**	**0.098**
MTCA Method B Indoor Air Cleanup Level ^{3}		NE	NE	NE	0.043	0.0042	0.096	NE	14,000	0.0091	0.42	0.32	0.051	NE	0.42	0.11

		Volatile Organic Compounds ($\mu g/m^3$)[2]																	
Sample ID	**Sample Date**	**Dichlorodifluoromethane**	**Ethanol**	**Ethylbenzene**	**Hexachlorobutadiene**	**Hexane**	**Methylene Chloride**	**Naphthalene**	**Naphthalene[4]**	**Pentane**	**Tetrahydrofuran**	**Trichloroethylene**	**Vinyl Bromide**	**Xylene, m-,p-**	**Xylene, o-**	**Total Xylenes[5]**	**Butane**	**Pentane**	**Hexane**
IA-1_120120	12/01/20	**2.4**	7.5 U	0.43 U	0.21 U	**4.0**	60 U	**0.21**	**0.11**	3.0 U	0.29 U	**0.15**	0.44 U	**1.4**	**0.63**	**2.03**	**3.4**	**3.0 U**	**4.0**
IA-2_120120	12/01/20	**2.3**	7.5 U	0.43 U	0.21 U	3.5 U	35 U	**0.18**	**0.11**	3.0 U	0.29 U	**0.14**	0.44 U	**1.6**	**0.72**	**2.32**	**3.1**	**3.0 U**	**3.5 U**
IA-3_120120	12/01/20	**2.7**	7.5 U	0.43 U	0.21 U	**3.6**	65 U	**0.20**	**0.11**	3.0 U	0.29 U	**0.13**	0.44 U	**1.5**	**0.66**	**2.16**	**4.2**	**3.0 U**	**3.6**
IA-4_120120	12/01/20	**2.8**	7.5 U	0.43 U	0.21 U	3.5 U	35 U	**0.27**	**0.10**	3.0 U	0.29 U	**0.13**	0.44 U	**1.5**	**0.66**	**2.16**	**3.6**	**3.0 U**	**3.5 U**
IA-5_120120	12/01/20	**3.0**	**9.8**	0.43 U	0.21 U	3.5 U	35 U	**0.14**	**0.12**	3.0 U	0.29 U	**0.12**	0.44 U	**1.3**	**0.55**	**1.85**	**3.9**	**3.0 U**	**3.5 U**
IA-6_120120	12/01/20	**2.9**	7.5 U	0.43 U	0.21 U	3.5 U	35 U	**0.19**	**0.11**	3.0 U	0.29 U	**0.19**	0.44 U	**1.6**	**0.70**	**2.30**	**3.8**	**3.0 U**	**3.5 U**
IA-7_120120	12/01/20	**2.9**	7.5 U	0.43 U	0.21 U	3.5 U	41 U	**0.057 J**	**0.10**	3.0 U	0.29 U	**1.1**	0.44 U	0.87 U	0.43 U	0.87 U	2.4 U	3.0 U	3.5 U
IA-8_120120	12/01/20	**2.2**	**16**	**0.48**	0.21 U	3.5 U	35 U	**0.094**	**0.12**	**7.4**	**0.31**	**0.37**	0.44 U	**1.7**	**0.66**	**2.36**	**3.1**	**7.4**	**3.5 U**
IA-9_120120	12/01/20	**2.5**	**11**	**0.48**	0.21 U	3.5 U	35 U	**0.13**	**0.15**	**29**	0.29 U	**0.31**	0.44 U	**1.8**	**0.73**	**2.53**	**9.2**	**29**	**3.5 U**
IA-10_120120	12/01/20	**2.9**	**84 J**	**0.60**	0.21 U	3.5 U	40 U	**0.15**	**0.14**	**13**	**0.31**	**0.44**	0.44 U	**2.3**	**0.79**	**3.09**	**3.6**	**13**	**3.5 U**
IA-11_120120	12/01/20	**2.8**	**95 J**	**0.57**	0.21 U	3.5 U	35 U	**0.084**	**0.13**	**12**	0.29 U	**0.41**	0.44 U	**2.1**	**0.77**	**2.87**	**3.7**	**12**	**3.5 U**
IA-12_120120	12/01/20	**2.9**	**37**	**0.46**	0.21 U	**7.3**	110 U	**0.084**	**0.12**	**7.3**	**0.31**	**0.70**	0.44 U	**1.7**	**0.60**	**2.30**	**4.2**	**7.3**	**7.3**
IA-13_120120	12/01/20	**2.5**	**25**	**0.51**	0.21 U	3.5 U	47 U	**0.13**	**0.13**	**7.9**	0.29 U	**0.60**	0.44 U	**1.9**	**0.67**	**2.57**	**4.0**	**7.9**	**3.5 U**
OA-1_120120	12/01/20	**2.9**	7.5 U	0.43 U	0.21 U	3.5 U	35 U	**0.057 J**	**0.061**	3.0 U	0.29 U	0.11 U	0.44 U	0.87 U	0.43 U	0.87 U	2.4 U	3.0 U	3.5 U
OA-2_120120	12/01/20	**3.0**	7.5 U	0.43 U	0.21 U	**3.9**	64 U	**0.079**	**0.058**	3.0 U	0.29 U	0.11 U	0.44 U	**0.91**	0.43 U	**0.91**	**2.4 U**	**3.0 U**	**3.9**
MTCA Method B Indoor Air Cleanup Level[3]		46	NE	460	0.11	320	66	0.074	0.074	NE	910	0.33	0.078	46	46	46	NE	NE	320

Notes:

[1] Air-phase petroleum hydrocarbons analyzed using Massachusetts Department of Environmental Protection Method MA-APH. Indoor air data are not adjusted to account for contributions from outdoor air.

[2] VOCs analyzed using United States Environmental Protection Agency (EPA) Method TO-15, except where noted. Indoor air data are not adjusted to account for contributions from outdoor air. Only VOCs that were detected or with reporting limits greater than the MTCA Method B indoor air cleanup level for residential exposure are listed; all other VOCs are not detected for all samples.

[3] Model Toxics Control Act (MTCA) Method B indoor air cleanup levels for residential exposure are from Ecology's "CLARC Master Spreadsheet.xlsx" dated February 2021. Residential exposure scenario assumes 365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals).

[4] Naphthalene analyzed using EPA Method TO-17.

[5] Sum of m,p-xylene and o-xylene. Where xylenes are non-detect, the highest laboratory reporting limit is shown.

$\mu g/m^3$ = micrograms per cubic meter

established

U = Constituent not detected above the laboratory reporting limit

Bold font type indicates the analyte was detected at a concentration greater than the laboratory reporting limit.

cleanup level for residential exposure.

cleanup level for residential exposure.

Table 3

Soil Chemical Analytical Results[1]

Petroleum Hydrocarbons and BTEX

C-1 Hangar and C-1 Building, Snohomish County Airport
Everett, Washington

Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Field Screening Results[3]		BTEX[4] (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)[6]		
			Headspace Vapors (ppm)	Sheen	Benzene	Toluene	Ethylbenzene	Xylenes[5]	Gasoline Range	Diesel Range	Lube Oil Range
2021 Phase II ESA											
C-1 DP1-3.5	3/31/2021	3.5	3.1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP1-11.0	3/31/2021	11.0	8.9	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP2-5.0	3/31/2021	5.0	3.8	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP2-11.0	3/31/2021	11.0	4.3	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP3-4.0	3/30/2021	4.0	0.7	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP3-7.0	3/30/2021	7.0	1,684	MS	0.005 U	0.005 U	0.005 U	0.01 U	**7.5**	50 U	250 U
C-1 DP4-3.5	3/30/2021	3.5	<1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP4-5.0	3/30/2021	5.0	3.7	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP4-7.0	3/30/2021	7.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP5-3.0	3/30/2021	3.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP5-6.0	3/30/2021	6.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP6-3.0	3/31/2021	3.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP6-6.0	3/31/2021	6.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP7-4.0	3/31/2021	4.0	3.0	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP7-9.0	3/31/2021	9.0	4.6	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP8-4.5	3/31/2021	4.5	1.9	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP8-9.0	3/31/2021	9.0	4.9	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP9-3.0	3/31/2021	3.0	3.4	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP9-7.5	3/31/2021	7.5	4.8	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP10-4.0	3/31/2021	4.0	3.7	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP11-4.0	3/31/2021	4.0	2.6	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP12-3.0	3/31/2021	3.0	2.2	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP12-8.0	3/31/2021	8.0	1.1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP13-2.0	3/30/2021	2.0	2.5	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP13-5.0	3/30/2021	5.0	2.3	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP14-5.0	3/30/2021	5.0	<1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP14-10.0	3/30/2021	10.0	2.3	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP15-4.0	3/30/2021	4.0	218	MS	0.005 U	0.005 U	0.005 U	0.01 U	**51**	50 U	250 U
C-1 DP15-7.0	3/30/2021	7.0	1.9	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
2022 Supplemental Investigation											
C-1 HSA1-5	4/4/2022	5.0	<1	SS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA1-15	4/4/2022	15.0	<1	NS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA2-4	4/4/2022	4.0	<1	NS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA2-10	4/4/2022	10.0	<1	SS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA2-15	4/4/2022	15.0	<1	NS	0.001 U	0.001 U	0.001 U	0.002 U	--	--	--
C-1 HSA3-5	4/5/2022	5.0	<1	NS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA3-10	4/5/2022	10.0	<1	NS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA4-5	4/5/2022	5.0	<1	SS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA4-10	4/5/2022	10.0	<1	MS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA4-15	4/5/2022	15.0	1.5	MS	0.001 U	0.001 U	0.001 U	0.002 U	5 U	50 U	250 U
C-1 HSA4-20	4/5/2022	20.0	<1	SS	0.001 U	**0.0032**	0.001 U	**0.0064**	5 U	50 U	250 U
MTCA Method A Cleanup Level for Unrestricted Land Use					0.03	7	6	9	100[7]	2,000[8]	

Notes:

[1] Chemical analyses performed by Friedman and Bruya, Inc. of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix B.

[2] The approximate sample locations are shown in Figure 2.

[3] Field screening methods are described in Appendix A.

[4] BTEX compounds were analyzed by EPA Method 8260C.

[5] Sum of m,p-xylene and o-xylene. Where xylenes are non-detect, the highest laboratory reporting limit is shown.

[6] Petroleum hydrocarbons analyzed by NWTPH-Gx and NWTPH-Dx.

[7] Cleanup level when benzene is not present.

[8] Cleanup level is the sum of diesel- and oil-range petroleum hydrocarbons.

bgs = below ground surface

mg/kg = milligrams per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

-- = Not analyzed

NS = No sheen

SS = Slight sheen

Bolded value indicates analyte detected at the concentration shown.

Table 4

Soil Chemical Analytical Results[1]

Volatile Organic Compounds (VOCs) and Polychlorinated Biphenyls (PCBs)

C-1 Hangar and C-1 Building, Snohomish County Airport
Everett, Washington

Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	VOCs[3] (mg/kg)														Polychlorinated Biphenyls[4] (mg/kg)
			Tetrachloroethylene (PCE)	Trichloroethylene (TCE)	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloroethane (EDC)	1,1,1-Trichloroethane	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2-Chlorotoluene	
2021 Phase II ESA																	
C-1 DP1-3.5	03/31/21	3.5	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP1-11.0	03/31/21	11.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP2-5.0	03/31/21	5.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP2-11.0	03/31/21	11.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP3-4.0	03/30/21	4.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP3-7.0	03/30/21	7.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP4-3.5	03/30/21	3.5	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP4-5.0	03/30/21	5.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP4-7.0	03/30/21	7.0	0.005 U	0.005 U	0.005 U	0.005 U	**0.013**	0.005 U	0.025 U	0.025 U	**0.027**	0.005 U	**0.022**	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP5-3.0	03/30/21	3.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP5-6.0	03/30/21	6.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP6-3.0	03/31/21	3.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP6-6.0	03/31/21	6.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP7-4.0	03/31/21	4.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP7-9.0	03/31/21	9.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP8-4.5	03/31/21	4.5	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP8-9.0	03/31/21	9.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP9-3.0	03/31/21	3.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP9-7.5	03/31/21	7.5	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP10-4.0	03/31/21	4.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP11-4.0	03/31/21	4.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP12-3.0	03/31/21	3.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP12-8.0	03/31/21	8.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP13-2.0	03/30/21	2.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP13-5.0	03/30/21	5.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP14-5.0	03/30/21	5.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP14-10.0	03/30/21	10.0	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP15-4.0	03/30/21	4.0	**0.028**	**0.620**	0.005 U	0.005 U	0.01 U	**0.04**	**0.038**	**0.055**	0.005 U	**0.04**	0.005 U	**0.65**	**1.7**	**0.052**	0.02 U
C-1 DP15-7.0	03/30/21	7.0	0.005 U	**0.140**	0.005 U	0.005 U	0.01 U	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
2022 Supplemental Investigation																	
C-1 HSA1-5	4/4/2022	5.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA1-15	4/4/2022	15.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA2-4	4/4/2022	4.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA2-10	4/4/2022	10.0	0.001 U	0.001 U	0.001 U	0.002 U	**0.0026**	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA2-15	4/4/2022	15.0	0.001 U	0.001 U	0.001 U	0.002 U	**0.029**	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA3-5	4/5/2022	5.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA3-10	4/5/2022	10.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA4-5	4/5/2022	5.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA4-10	4/5/2022	10.0	0.001 U	0.001 U	0.001 U	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA4-15	4/5/2022	15.0	0.001 U	**0.0022**	**0.0014**	0.002 U	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
C-1 HSA4-20	4/5/2022	20.0	0.001 U	**0.067**	**0.018**	**0.0029**	0.002 U	0.002 U	0.25 U	0.25 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
MTCA Method A or B Cleanup Level for Unrestricted Land Use[5]			0.05	0.03	160	1,600	11	2	NE	34.0	NE	7200	800	NE	190	1600	1

Notes:

[1] Chemical analyses performed by Friedman and Bruya, Inc. of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix B.

[2] The approximate exploration locations are shown in Figure 2.

[3] Volatiles were analyzed by EPA Method 8260D. Only volatiles that were detected are listed; all other volatiles are non-detect for all samples. BTEX results are presented in Table 1.

[4] PCBs analyzed by EPA Method 8082A.

[5] Cleanup level shown is the MTCA Method A cleanup level for unrestricted land use. If no MTCA Method A value is available, the most conservative MTCA Method B cleanup level is presented.

bgs = below ground surface; mg/kg = milligrams per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

-- = Not analyzed; NA = Not available; NE = Not established

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration exceeded the applicable cleanup level.

Table 5

Soil Chemical Analytical Results[1]

Metals

C-1 Hangar and C-1 Building, Snohomish County Airport
Everett, Washington

Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Total Metals[3] (mg/kg)							
			Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
2021 Phase II ESA										
C-1 DP1-3.5	3/31/2021	3.5	**2.69**	**42.7**	1.00 U	**19.1**	**2.0**	1.00 U	1.00 U	1.00 U
C-1 DP1-11.0	3/31/2021	11.0	**2.92**	**50.5**	1.00 U	**65.7**[4]	**2.5**	1.00 U	1.00 U	1.00 U
C-1 DP2-5.0	3/31/2021	5.0	**4.74**	**34.5**	1.00 U	**21.1**	**1.74**	1.00 U	1.00 U	1.00 U
C-1 DP2-11.0	3/31/2021	11.0	**2.31**	**36.0**	1.00 U	**21.1**	**1.69**	1.00 U	1.00 U	1.00 U
C-1 DP3-4.0	3/30/2021	4.0	**2.25**	**26.0**	1.00 U	**23.3**	**4.86**	1.00 U	1.00 U	1.00 U
C-1 DP3-7.0	3/30/2021	7.0	**1.83**	**41.6**	1.00 U	**22.4**	**2.39**	1.00 U	1.00 U	1.00 U
C-1 DP4-3.5	3/30/2021	3.5	**1.78**	**50.1**	1.00 U	**20.3**	**2.14**	1.00 U	1.00 U	1.00 U
C-1 DP4-5.0	3/30/2021	5.0	**2.59**	**44.6**	1.00 U	**21.9**	**2.09**	1.00 U	1.00 U	1.00 U
C-1 DP4-7.0	3/30/2021	7.0	**1.83**	**35.6**	1.00 U	**19.4**	**1.62**	1.00 U	1.00 U	1.00 U
C-1 DP5-3.0	3/30/2021	3.0	**1.79**	**40.5**	1.00 U	**18.0**	**1.71**	1.00 U	1.00 U	1.00 U
C-1 DP5-6.0	3/30/2021	6.0	**2.08**	**48.0**	1.00 U	**24.6**	**2.37**	1.00 U	1.00 U	1.00 U
C-1 DP6-3.0	3/31/2021	3.0	**2.49**	**42.3**	1.00 U	**16.0**	**1.83**	1.00 U	1.00 U	1.00 U
C-1 DP6-6.0	3/31/2021	6.0	**2.63**	**48.0**	1.00 U	**20.0**	**2.13**	1.00 U	1.00 U	1.00 U
C-1 DP7-4.0	3/31/2021	4.0	**3.01**	**40.5**	1.00 U	**18.2**	**1.95**	1.00 U	1.00 U	1.00 U
C-1 DP7-9.0	3/31/2021	9.0	**2.01**	**38.3**	1.00 U	**18.2**	**1.75**	1.00 U	1.00 U	1.00 U
C-1 DP8-4.5	3/31/2021	4.5	**2.1**	**41.0**	1.00 U	**20.4**	**2.05**	1.00 U	1.00 U	1.00 U
C-1 DP8-9.0	3/31/2021	9.0	**2.93**	**47.2**	1.00 U	**18.8**	**2.22**	1.00 U	1.00 U	1.00 U
C-1 DP9-3.0	3/31/2021	3.0	**2.96**	**44.7**	1.00 U	**18.3**	**2.09**	1.00 U	1.00 U	1.00 U
C-1 DP9-7.5	3/31/2021	7.5	**2.36**	**44.2**	1.00 U	**20.8**	**2.36**	1.00 U	1.00 U	1.00 U
C-1 DP10-4.0	3/31/2021	4.0	**3.27**	**43.6**	1.00 U	**19.7**	**2.04**	1.00 U	1.00 U	1.00 U
C-1 DP11-4.0	3/31/2021	4.0	**2.98**	**46.5**	1.00 U	**18.3**	**2.22**	1.00 U	1.00 U	1.00 U
C-1 DP12-3.0	3/31/2021	3.0	**2.97**	**44.9**	1.00 U	**21.5**	**2.31**	1.00 U	1.00 U	1.00 U
C-1 DP12-8.0	3/31/2021	8.0	**3.02**	**39.3**	1.00 U	**21.4**	**2.11**	1.00 U	1.00 U	1.00 U
C-1 DP13-2.0	3/30/2021	2.0	**3.11**	**82.9**	1.00 U	**19.2**	**1.9**	1.00 U	1.00 U	1.00 U
C-1 DP13-5.0	3/30/2021	5.0	**3.35**	**40.7**	1.00 U	**14.7**	**1.59**	1.00 U	1.00 U	1.00 U
C-1 DP14-5.0	3/30/2021	5.0	**3.02**	**68.0**	1.00 U	**22.5**	**2.43**	1.00 U	1.00 U	1.00 U
C-1 DP14-10.0	3/30/2021	10.0	**1.71**	**32.5**	1.00 U	**16.4**	**1.31**	1.00 U	1.00 U	1.00 U
C-1 DP15-4.0	3/30/2021	4.0	**3.33**	**61.4**	1.00 U	**25.8**	**2.44**	1.00 U	1.00 U	1.00 U
C-1 DP15-7.0	3/30/2021	7.0	**3.24**	**56.5**	1.00 U	**19.6**	**2.15**	1.00 U	1.00 U	1.00 U
2022 Supplemental Investigation										
C-1 HSA1-5	4/4/2022	5.0	1.70	46.2	1 U	15.9	1.59	1 U	1 U	1 U
C-1 HSA1-15	4/4/2022	15.0	2.14	48.5	1 U	22.3	2.26	1 U	1 U	1 U
C-1 HSA2-4	4/4/2022	4.0	2.36	43.5	1 U	19.4	2.03	1 U	1 U	1 U
C-1 HSA4-5	4/5/2022	5.0	2.13	52.3	1 U	18.2	1.90	1 U	1 U	1 U
MTCA Method A or B Cleanup Level			20	1,600[5]	2	2,000[5]	250	2	400[5]	400[5]
Naturally occurring background metals in Puget Sound Soils[6]			7	NA	1	48	24	0.07	NA	NA

Notes:

[1] Chemical analyses performed by Friedman and Bruya, Inc. of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix

[2] The approximate exploration locations are shown in Figure 2.

[3] Metals analyzed by EPA Method 6020B.

[4] Sample was analyzed for hexavalent chromium using EPA method 7196; hexavalent chromium was not detected and the cleanup level presented is for chromium III, which is the most common form of chromium.

[5] Cleanup level shown is the most conservative MTCA Method B cleanup level available for protection of groundwater; if no cleanup level is available for protection of groundwater, the MTCA Method B cleanup level for direct contact is shown.

[6] 90th Percentile for natural background soil metals concentrations in Puget Sound region, Department of Ecology, publication #94-115, dated October 1994.

bgs = below ground surface

mg/kg = milligrams per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

NA = Not available

Bolded value indicates analyte has been detected at the concentration shown.

Table 6

Groundwater Chemical Analytical Results[1]

Petroleum Hydrocarbons, VOCs, and Metals

C-1 Hangar and Building, Snohomish County Airport

Everett, Washington

Exploration Identification[2]	Sample Date	Total Petroleum Hydrocarbons[3] (µg/L)			Volatile Organic Compounds[4] (VOCs) (µg/L)				PCBs[5] (µg/L)	Metals[6] (µg/L)															
										Arsenic		Barium		Cadmium		Chromium		Lead		Mercury		Selenium		Silver	
		Gasoline Range	Diesel Range	Motor Oil Range	Vinyl chloride	Chlorobenzene	1,2-Dichlorobenzene	Methylene Chloride		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
2021 Phase II ESA																									
C-1 DP2-033121W	3/31/2021	100 U	50.0 U	250 U	0.2 U	1 U	1 U	**12.0** [7]	0.100 U	**3.48**	**29.5**	**16.7**	**539**	1.00 U	**1.08**	**4.57**	**187**	**1.98**	**24.6**	1.00 U	1.00 U	1.00 U	**1.55**	**6.28**	1.00 U
C-1 DP3-033021W	3/30/2021	100 U	**110**	**330**	0.2 U	1 U	1 U	5.00 U	0.100 U	**2.68**	**34.7**	**8.11**	**752**	1.00 U	**4.46**	**1.41**	**210**	**1.13**	**120**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
C-1 DP13-033121W	3/31/2021	100 U	50.0 U	250 U	0.2 U	1 U	1 U	5.00 U	0.100 U	1.00 U	**6.62**	**14.7**	**129**	1.00 U	1.00 U	1.00 U	**24.7**	1.00 U	**2.99**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
C-1 DP14-033121W	3/31/2021	100 U	50.0 U	250 U	0.2 U	1 U	1 U	5.00 U	0.100 U	**9.53**	**30.8**	**48.3**	**595**	1.00 U	1.00 U	1.00 U	**69.2**	1.00 U	**10.9**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2022 Supplemental Investigation																									
C-1 HSA3	4/21/2022	100 U	50 U	250 U	0.020 U	1.0 U	1.0 U	5 U [8]	--	**7.41**	**9.99**	**65.4**	**71.8**	1.0 U	1.0 U	1.0 U	**2.23**	1.0 U	1.0 U	1.0 U	1.0 U	**3.03**	**3.26**	1.0 U	1.0 U
C-1 HSA4	4/21/2022	100 U	**230**	250 U	**0.36**	**3**	**1.4**	5 U [8]	--	**7.62**	**10.2**	**52.7**	**55.9**	1.0 U	1.0 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.37**	**1.5**	1.0 U	1.0 U
MTCA Method A or B Cleanup Level		1000[9]	500		0.20	160[10]	720[10]	5	0.1	8		3,200[10]		5		50[11]		15		2		80[10]		80[10]	

Notes:

[1] Chemical analyses performed by Friedman & Bruya of Seattle, Washington.

[2] The approximate exploration locations are shown on Figure 2.

[3] Petroleum hydrocarbons analyzed by NWTPH-Gx and NWTPH-Dx.

[4] Volatiles were analyzed by EPA Method 8260C. Only volatiles that were detected or not detected above cleanup levels in one or more samples are presented in this table.

[5] PCBs analyzed by EPA Method 8082A.

[6] Metals analyzed by EPA Method 6020B.

[7] The detected concentration was qualified by the analytical laboratory as the result of laboratory contamination.

[8] The analytical laboratory reported that the calibration results for this analyte were outside of acceptance criteria. The reported value is an estimate.

[9] Cleanup level when no benzene is present.

[10] Cleanup levels are presented for Method B carcinogenic values, which are the most conservative cleanup levels available.

[11] Cleanup levels are presented for Total Chromium.

bgs = below ground surface (pre-construction)

µg/L = micrograms per liter

U = Analyte not detected at a concentration greater than the listed reporting limit.

-- = Not analyzed

NA = Not Available

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration exceeded the applicable cleanup level.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

C-1 Hangar and Building Remedial Investigation Paine Field/Snohomish County Airport Everett, Washington

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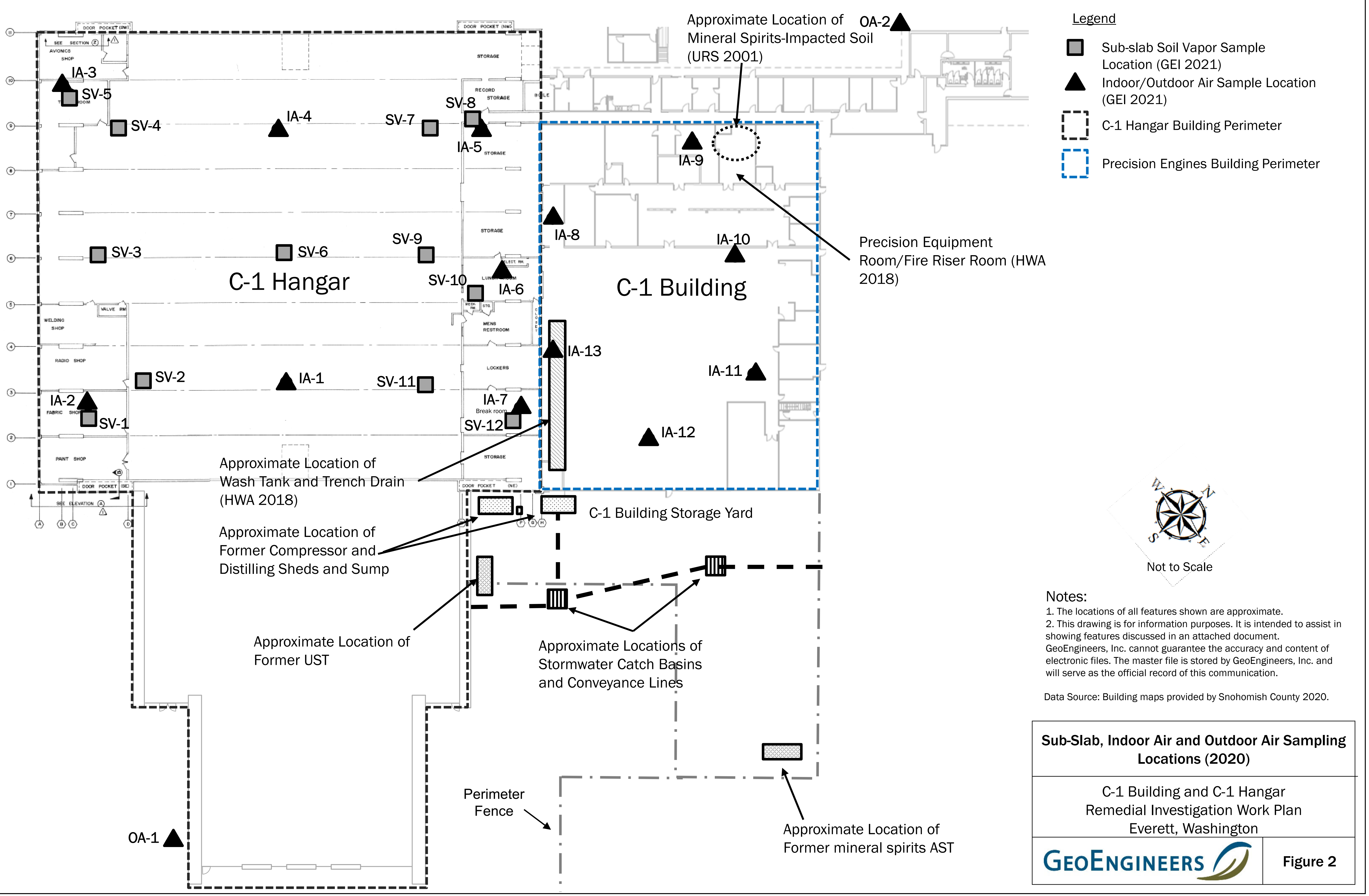
Figure 1

Map Revised: 5/14/2021

Path: \\red\projects\5\553001401\GIS\553001401_F1_VicinityMap.mxd

Office: Tacoma



Notes:

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2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Building maps provided by Snohomish County 2020.

Sub-Slab, Indoor Air and Outdoor Air Sampling Locations (2020)

C-1 Building and C-1 Hangar
Remedial Investigation Work Plan
Everett, Washington

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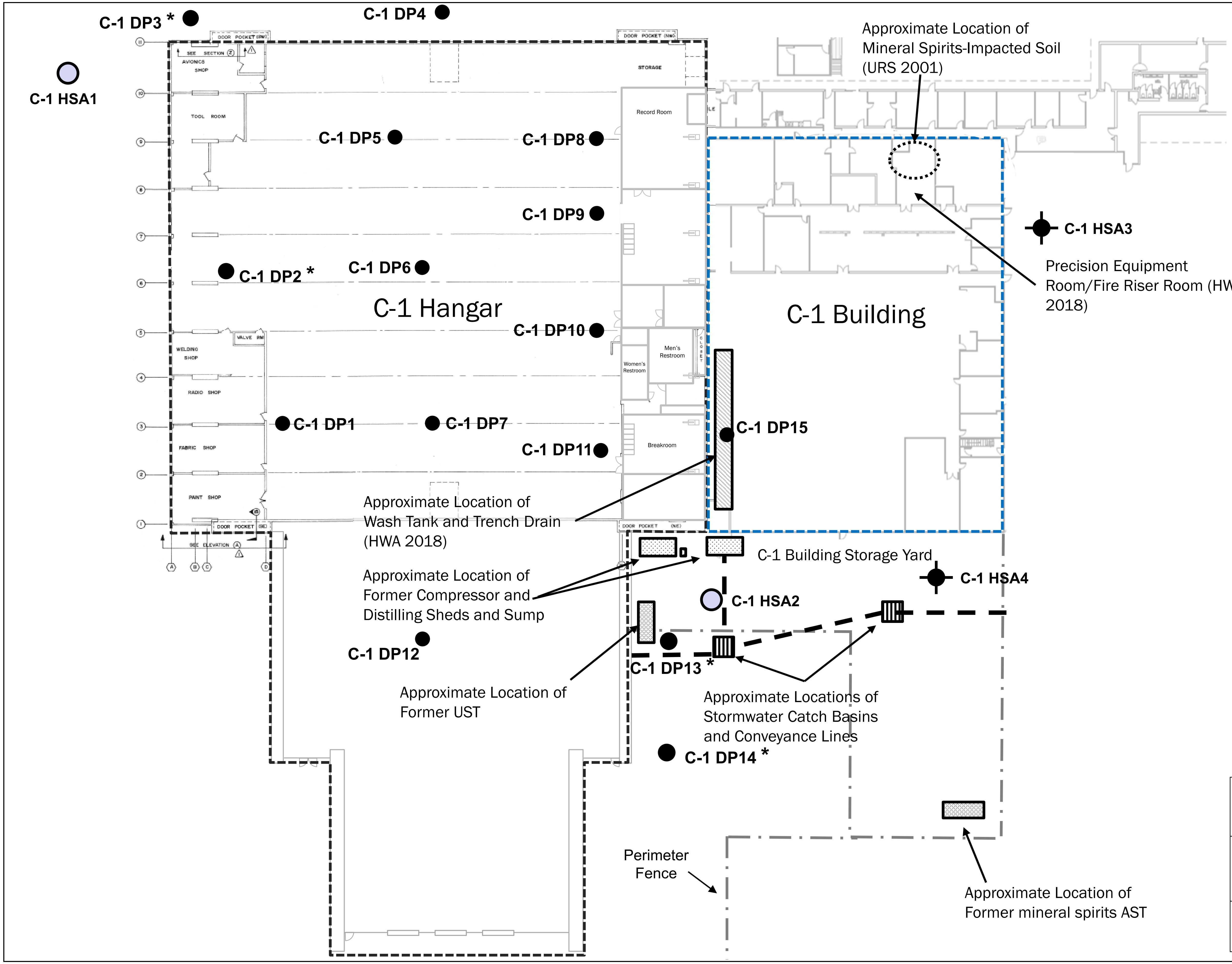
Figure 2



Legend

● Direct Push Boring Location (GEI 2021a) (asterisk indicates that groundwater was encountered, and a grab sample was collected for laboratory analysis [GEI, 2021] .

○ Hollow-Stem Auger Boring Location (GEI 2022)

⊕ Hollow-Stem Auger Boring Completed as Monitoring Well (GEI 2022)

C-1 MW1 *(C-1 HSA3)* Monitoring Well Identification (related boring identification noted in parentheses)

⬚ C-1 Hangar Perimeter

⬚ C-1 Building Perimeter

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

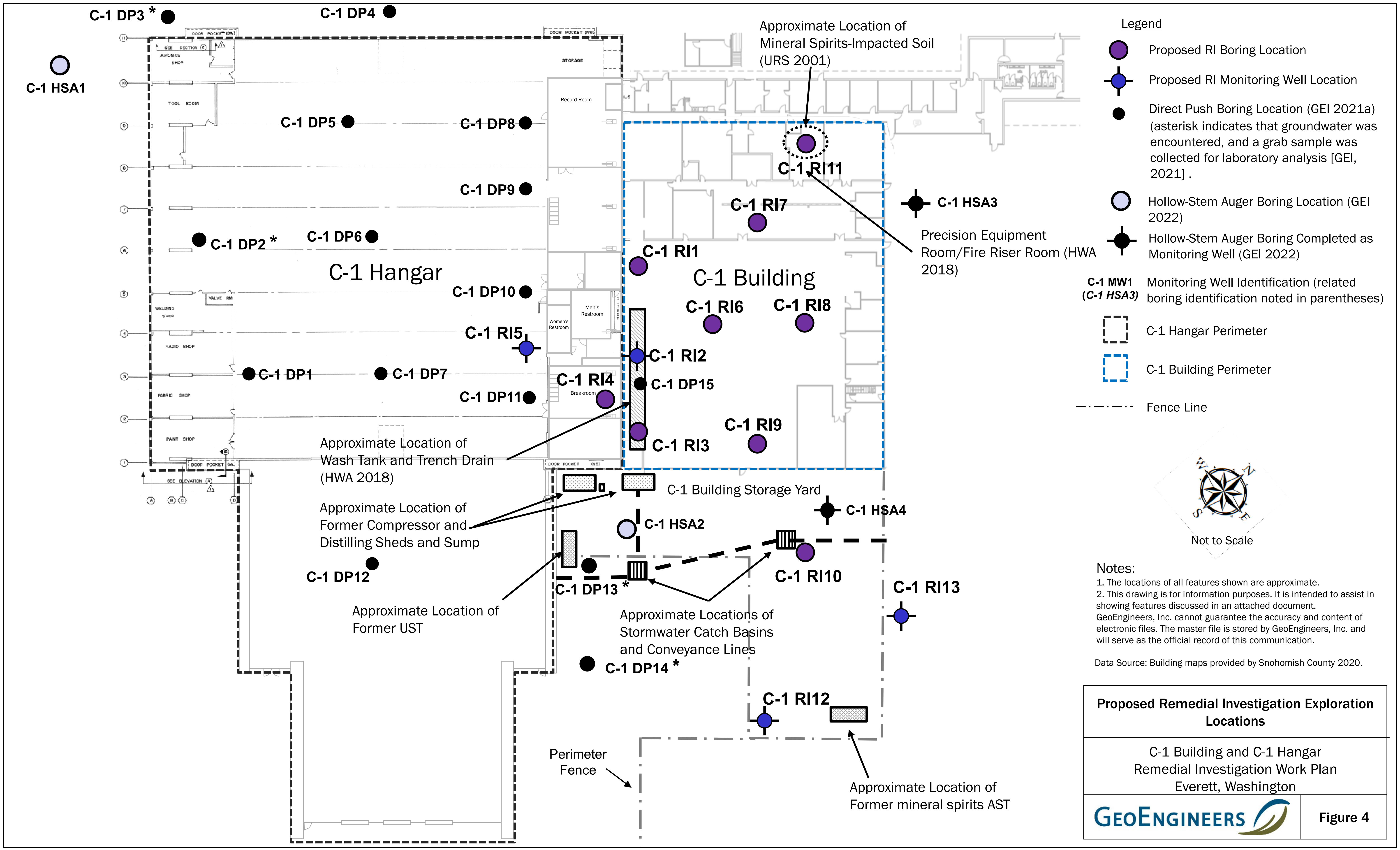
Data Source: Building maps provided by Snohomish County 2020.

Phase II ESA Exploration Locations
(2021 and 2022)

C-1 Building and C-1 Hangar
Remedial Investigation Work Plan
Everett, Washington

GeoEngineers

Figure 3



Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Building maps provided by Snohomish County 2020.

Proposed Remedial Investigation Exploration Locations

C-1 Building and C-1 Hangar
Remedial Investigation Work Plan
Everett, Washington

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Figure 4

5530-014-01

APPENDIX A

2020 VI Evaluation Report and 2021 Phase II ESA Report

GeoEngineers
2101 4th Avenue, Suite 950
Seattle, Washington 98121
206.728.2674

April 27, 2021

Paine Field/Snohomish County Airport
3220 – 100th Street SW, Suite A
Everett, Washington 98204-1303

Attention: Andrew Rardin

Subject: C-1 Hangar and C-1 Building Vapor Intrusion Evaluation – December 2020
Paine Field/Snohomish County Airport
Former ATS Hangar Property and Former Prevision Engines Property
Everett, Washington
File No. 5530-014-00

INTRODUCTION, BACKGROUND AND PURPOSE

This report presents the results of the November and December 2020 focused sub-slab and indoor air vapor intrusion (VI) evaluation for the C-1 Hangar and C-1 Building Properties (site) at Paine Field/Snohomish County Airport (Paine Field) in Everett, Washington (Figure 1). Paine Field is conducting a MTCA-compliant Remedial Investigation (RI) as part of planning for future cleanup of the site through the Washington State Department of Ecology's (Ecology's) Voluntary Cleanup Program (VCP). The VI evaluation is being conducted as part of characterization of the site conditions, and the results will be included in the RI report.

The C-1 Hangar Property is approximately 1.5-acres in area and is developed with an approximately 53,000 square-foot aircraft hangar and an adjacent covered outdoor space. The C-1 Hangar Property was most recently occupied by Aviation Technical Services (ATS). The C-1 Building Property is located adjacent to the east-northeast of the C-1 Hangar and is approximately 0.85-acres and consists of one approximately 25,000 square-foot building and an adjacent 12,000 square-foot exterior storage yard. The C-1 Building Property was most recently occupied by Precision Engines, LLC. The site is shown on Figure 2.

The C-1 Building Property is listed by Ecology as the Precision Engines LLC site (Cleanup Site ID: 3526; Facility/Site ID: 84613634) with status listed as "cleanup started" and has been the subject of investigations and focused remedial actions since at least 1998. The results of the investigations conducted to date have identified the presence of petroleum hydrocarbons, mineral spirits, chlorinated solvents and/or arsenic in soil, groundwater, soil vapor and ambient indoor air at concentrations greater than the applicable MTCA screening/cleanup levels (HWA 2018). The C-1 Hangar Property is not listed in Ecology's contaminated sites database; however, previous investigation findings suggest that contamination in soil, groundwater, and soil vapor may exist at the C-1 Hangar Property.

1.0 VAPOR INTRUSION (VI) EVALUATION

Overview and Scope

The VI evaluation for the site was conducted in accordance with Ecology's "Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action," updated April 2018 (Ecology 2018a) and Ecology's Implementation Memoranda #18, #21 and #22 (Ecology 2018b, 2018c and 2019).

The scope of services for the November and December 2020 VI evaluation was as follows:

- Conduct a physical survey of the C-1 Hangar and C-1 Building characteristics and building interior to identify features relevant to indoor air quality, air circulation, and potential indoor sources for the contaminants of concern.
- Install vapor pins for the sampling of sub-slab soil vapor and collect sub-slab soil vapor samples to help estimate the vapor intrusion contribution to measured indoor air concentrations.
- Collect indoor and background (ambient) outdoor air samples.
- Submit the samples for laboratory analysis for volatile organic compounds (VOCs) and air-phase petroleum hydrocarbons (APH).
- Background (ambient) outdoor air samples were collected, consistent with Ecology guidance, to assist in identifying whether outdoor air may be a source of VOCs or APH if detected in the indoor air samples. Per the guidance, the minimum concentrations of each analyte detected in the outdoor air samples are subtracted from the indoor air sample results account for background conditions. The resulting indoor air concentrations are referred to as the "adjusted indoor air concentrations."
- Interpret the findings of the building survey and the sample analytical data in accordance with Ecology guidance. The VI evaluation was performed, and the conclusions developed, following the Ecology "lines-of-evidence" approach described in Implementation Memorandum #21 (Ecology 2018c). Per Ecology guidance, when adjusted indoor air concentrations are less than applicable air cleanup or screening levels, "it is reasonable to conclude that vapor intrusion is not currently posing a problem requiring action."

Cleanup and Screening Levels

The sub-slab soil vapor sampling results were compared to the Model Toxics Control Act (MTCA) Method B soil vapor screening levels for residential exposure (cancer or non-cancer, whichever is lower) published in Ecology's updated Cleanup Levels and Risk Calculation (CLARC) database (Ecology 2021) and to commercial exposure soil vapor screening levels. The commercial exposure soil vapor screening levels were calculated by dividing the MTCA Method B commercial exposure indoor air screening levels (described below) by the Ecology sub-slab vapor intrusion attenuation factor of 0.03 (see Ecology Implementation Memorandum #21; "Frequently Asked Question No. 3."). Ecology used this same approach to calculate the MTCA Method B soil vapor screening levels. The screening levels are included in Table 1.

Indoor air sample analytical results were evaluated by comparison to the MTCA Method B indoor air cleanup levels for residential exposure and to the MTCA Method B commercial exposure screening levels. The trichloroethylene (TCE) results for the indoor air samples were also compared to the Short-Term Commercial Worker Indoor Air Action Level for TCE published in Ecology Implementation Memo 22 (Ecology 2018d).

The respective cleanup and screening levels are shown in Table 2. The commercial exposure screening levels were calculated according to Ecology Implementation Memorandum #21 (see "Frequently Asked Question No. 17").

A comparison of the exposure assumptions for the MTCA Method B indoor air cleanup levels for residential exposure and for the MTCA Method B indoor air commercial exposure screening levels is included below:

MTCA Method B Indoor Air Cleanup Levels for Residential Exposure	MTCA Method B Indoor Air Commercial Exposure Screening Levels
365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals)	250 days/year, 10 hours/day for 20 years

Building Survey

Ecology guidance for indoor air VI evaluation acknowledges that indoor air quality can be affected by volatiles emitted from materials or products stored indoors (Ecology 2018a). Following Ecology guidance, and before sample collection, GeoEngineers completed a building interior survey on November 30, 2020 to observe and document building conditions and identify potential indoor sources for contaminants to indoor air. The building survey was completed for both the C-1 Hangar Property and the C-1 Building Property. A copy of the completed building survey form is included in Appendix A.

Field Investigation

Utilities and Concrete Survey

Prior to sampling, a subcontracted private utility locate and concrete survey were completed for the proposed sample locations to identify below-grade utilities and determine the thickness of the concrete slab for sample planning purposes. The results of the concrete survey indicate that the concrete floor in the C-1 Hangar is comprised of two or more separate, overlying concrete slabs and ranges between 4 and 16 inches in thickness. A copy of the concrete survey report is included as Appendix B.

Sample Collection

GeoEngineers collected three sub-slab soil vapor samples (SV-1 through SV-3) on November 30, 2020, and nine sub-slab soil vapor samples (SV-4 through SV-12), thirteen indoor air samples (IA-1 through IA-13), and two ambient outdoor air samples (OA-1 and OA-2) on December 1, 2020. The approximate sample locations are shown on Figure 2.

- **Sub-Slab Soil Vapor Samples.** Twelve sub-slab soil vapor samples were collected throughout the C-1 Hangar, with additional sample density on the side of the hangar adjacent to the C-1 Building to assess soil vapor in areas closest to the C-1 Building where previous soil vapor sampling identified contaminant concentrations greater than the MTCA Method B soil vapor screening levels. Sub-slab soil vapor sampling was not conducted in the C-1 Building during the current VI evaluation because sub-slab soil vapor samples were collected in the building during the 2018 investigation(HWA 2018).
- **Indoor Air Samples.**
    - Two indoor air samples were collected from locations within the open space of the C-1 Hangar, and five indoor air samples were collected from locations within perimeter offices and

workshop spaces. The perimeter rooms were previously used for tool storage, as paint/fabric shops, a break room, and for general storage.

  - Four indoor air samples were collected at locations within the open space of the C-1 Building, and two indoor air samples were collected from locations within the segregated shop spaces and office areas. Sample location IA-9 was collected at the location where previous sample analytical results in 2001 indicated total petroleum hydrocarbons (TPH) in soil (URS 2001). Sample location IA-13 was collected at the location where a 2018 indoor air sample indicated concentrations of benzene and TCE greater than the MTCA screening levels (HWA 2018). Three sample locations within the open space of the building (IA-8, IA-11, and IA-12) corresponded to locations where 2018 sub-slab soil vapor samples indicated concentrations of one or more contaminant of concern greater than the MTCA screening levels (HWA 2018).

- **Outdoor Air Samples.** Ecology's Draft VI Guidance indicates that building-specific ambient (outdoor) air samples are to be collected as part of the Tier II VI evaluation at the same time indoor air samples are collected. Outdoor air sample results are used to assess how background outdoor air conditions can influence indoor air quality. Ecology guidance allows outdoor air results to be evaluated in conjunction with indoor air sampling to better estimate whether contaminants detected in indoor air are likely, or not likely, to be due to vapor intrusion (Ecology 2018a). The minimum detected outdoor air sample concentrations for each analyte are subtracted from the indoor air sample results to account for background conditions. The December 2020 outdoor air sample locations were at the north end of the Badging office and at the south end of the C-1 Hangar, both downwind and upwind on the day of sampling.

Weather and Building Conditions

The weather on December 1, 2020, at the time of indoor and outdoor air sampling at the site ranged between 37- and 43-degrees Fahrenheit. Wind speed during the sampling was reported at about 7 miles per hour to the north. Over the three days leading up to the December 1, 2020 sampling, barometric pressures ranged from 29.81 to 30.63 inches of mercury with pressures decreasing slightly over time (Weather Spark, Inc., Snohomish County Airport Station 2020).

Indoor air sampling was conducted under conservative building operational conditions to the extent practicable. The sampling was performed during the day from 8 AM to 4 PM. During this time, the HVAC systems for the buildings were operational, bay doors for both buildings were kept closed, and ingress and egress activities during sampling activities were minimized. The intent was to obtain indoor air samples that were representative of normal conditions, but to reduce potential interferences by collecting samples when few to no building occupants are present and when exterior doors are not regularly opening and closing.

Sampling Procedures

Sampling procedures are described in Appendix A. A summary of the procedures is provided below.

- **Sub-Slab Soil Vapor Samples.** Following utility clearance and determining concrete thickness, soil Vapor Pins™ (Pins) were installed into the concrete flooring. The Pins were capped and allowed to equilibrate with the subsurface soil vapor for a minimum of two hours before sampling. Soil vapor samples were collected from the Pins directly into the laboratory-provided 1-liter vacuum Summa canisters.

- **Indoor and Outdoor Air Samples.** Indoor and outdoor air samples were obtained over an approximately 8-hour period using 6-liter Summa with flow controllers and sorbent tubes connected to personal sampling pumps. Tubing was connected to each canister and sorbent tube to elevate the sample intake into the breathing zone at approximately 3 to 5 feet above the floor surface.

The Summa canister samples were submitted on December 1, 2020 to Friedman and Bruya, Inc. in Seattle, Washington for chemical analysis for petroleum hydrocarbons (C5-C8 Aliphatics, C9-C12 Aliphatics and C9-C10 Aromatics) Massachusetts Department of Environmental Protection (Massachusetts DEP) APH Method, VOCs by United States Environmental Protection Agency (EPA) Method TO-15, and helium (sub-slab soil vapor samples only) by American Society for Testing and Materials (ASTM) Method D1946.

The sorbent tube samples were submitted on December 1, 2020 to Friedman and Bruya, Inc. in Seattle, Washington for chemical analysis for naphthalene by EPA Method TO-17.

Comprehensive laboratory reports are presented in Appendix C.

Chemical Analytical Results

The November and December 2020 sub-slab soil vapor and indoor and outdoor air chemical analytical results for analytes with detected concentrations greater than cleanup or screening levels are presented in Tables 1 and 2, respectively. The indoor air sample results shown in Table 2 are values that have been adjusted to account for influences due to outdoor air (ambient air).[1] The adjustment calculations are consistent with the Ecology Draft VI Guidance (Ecology 2018a).

Chemical analytical results for all analytes are presented in Tables 3 and 4 for sub-slab soil vapor and indoor and outdoor air samples, respectively. The indoor air concentrations in Table 4 were not adjusted for contributions from outdoor air.

Sub-Slab Soil Vapor Results

As shown in Table 1, 1,1-dichloroethane (1,1-DCA), chloroform, naphthalene, tetrachloroethene (PCE), trichloroethylene (TCE), and Total TPH (the sum of individual petroleum fractions, benzene, toluene, ethylbenzene, xylene and naphthalene) were detected in at least one soil vapor sample at a concentration greater than the MTCA Method B soil vapor screening level for residential exposure. Only 1,1-DCA, chloroform, naphthalene, and TCE were detected at concentrations greater than the MTCA Method B soil vapor screening level for commercial exposure.

Indoor Air Sample Results

As shown in Table 2, chloroform, naphthalene, TCE and Total TPH were detected in at least one indoor air sample at a concentration greater than the MTCA Method B indoor air cleanup level for residential exposure. No analytes were detected at concentrations greater than the MTCA Method B indoor air screening level for commercial exposure.

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[1] Two outdoor air samples were obtained (OA-1 and OA-2). As noted in Table 2, the adjusted indoor air concentration equals the raw (or original) indoor air concentration minus the minimum outdoor air concentration.

Benzene and carbon tetrachloride were detected at concentrations greater than the MTCA Method B indoor air cleanup level in the outdoor air samples. Adjusted indoor air concentrations for these two analytes were less than the MTCA Method B indoor air cleanup level.

DISCUSSION AND CONCLUSIONS

The C-1 Hangar and C-1 Building are commercial workspaces; therefore, in accordance with Ecology guidance, the commercial worker screening and action levels are considered appropriate for comparison purposes for this evaluation. Specifically, the November and December 2020 VI results were evaluated relative to the MTCA Method B indoor air and soil vapor commercial exposure screening levels; we also note that the findings were compared to the MTCA Method B indoor air cleanup levels and soil vapor screening levels for residential (unrestricted) exposure.

As noted earlier, adjusted indoor air concentrations are used to conclude whether “vapor intrusion is currently posing a problem requiring action.” Sub-slab soil vapor concentrations are another line of evidence that are used to estimate the vapor intrusion contribution to the concentrations measured in indoor air.

- **Commercial Exposure.** No analytes were detected in indoor air at concentrations greater than the MTCA Method B indoor air screening level for commercial exposure. 1,1-DCA, chloroform, naphthalene, and TCE were detected in soil vapor at concentrations greater than the MTCA Method B soil vapor screening level for commercial exposure.
- **Residential Exposure.** Chloroform, naphthalene, TCE and Total TPH were detected in indoor air at concentrations greater than the MTCA Method B indoor air cleanup level for residential exposure. 1,1-DCA, chloroform, naphthalene, PCE, TCE, and Total TPH were detected in soil vapor at concentrations greater than the MTCA Method B soil vapor screening level for residential exposure.

The presence of chloroform, naphthalene, TCE and Total TPH in soil vapor and indoor air at concentrations greater than residential regulatory criteria indicate that there is a potential pathway for soil vapor to indoor air for the C-1 Hangar and C-1 Buildings. However, while the results indicate that the detected concentrations of these four analytes are greater than the MTCA Method B indoor air cleanup levels for residential exposure, the detected concentrations are not greater than the MTCA Method B indoor air screening levels for commercial exposure which are applicable at this facility. Therefore, based on the results of the November and December 2020 VI evaluation and in accordance with Ecology’s VI guidance, the detected concentrations of chlorinated and petroleum-related VOCs in indoor air at the C-1 Hangar and C-1 Building are less than the applicable regulatory screening levels. The results of the VI evaluation indicate that vapor intrusion is not occurring at levels of regulatory concern for a commercial building, and that the hangar and building are suitable for commercial uses.

LIMITATIONS

We have prepared this letter for the exclusive use of the Snohomish County Airport. No other party may place reliance on the product of our services unless we agree in advance and in writing to such reliance. Our services were provided in accordance with our agreement with the Snohomish County Airport, dated December 24, 2018.

This report is based on conditions that existed at the time our site studies were performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Our interpretations are based on field observations and chemical analytical data from widely spaced sampling locations. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion. Our report, conclusions and interpretations should not be construed as a warranty of contaminant conditions. Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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If you have any questions about this letter, please let us know. Thank you.

Sincerely,
GeoEngineers, Inc.

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Attachments:

Table 1. Soil Vapor Sample Chemical Analytical Results Exceeding MTCA Criteria

Table 2. Indoor and Outdoor Air Sample Chemical Analytical Results Exceeding MTCA Criteria

Table 3. Soil Vapor Sample Chemical Analytical Results (All Analytes)

Table 4. Indoor and Outdoor Air Sample Chemical Analytical Results (All Analytes)

Figure 1. Vicinity Map

Figure 2. Site Plan with Sample Locations

Appendix A. Field Procedures and Building Survey

Appendix B. Concrete Survey Report

Appendix C. Data Validation and Chemical Analytical Laboratory Reports

Table 1

Soil Vapor Sample Chemical Analytical Results Exceeding MTCA Criteria*
C-1 Hangar, Paine Field, Snohomish County Airport
Everett, Washington

Analyte	Method	Units	MTCA Method B Soil Vapor Screening Level for Residential Exposure [2,3]	MTCA Method B Soil Vapor Screening Levels for Commercial Exposure [3,4]	Sample ID and Sample Date [1]											
					SV-1 11/30/20	SV-2 11/30/20	SV-3 11/30/20	SV-4 12/01/20	SV-5 12/01/20	SV-6 12/01/20	SV-7 12/01/20	SV-8 12/01/20	SV-9 12/01/20	SV-10 12/01/20	SV-11 12/01/20	SV-12 12/01/20
1,1-Dichloroethane	EPA-TO-15	µg/m^3	52	270	2.2 U	1.5 U	2.3 U	2.1 U	1.4 U	3.3 U	2.2 U	1.4 U	2.3 U	2.3 U	2.5 U	**530**
Chloroform	EPA-TO-15	µg/m^3	3.6	19	0.27 U	**0.51**	0.28 U	0.26 U	0.17 U	0.40 U	0.27 U	**0.55**	0.28 U	0.28 U	0.30 U	**170**
Naphthalene	EPA-TO-15	µg/m^3	2.5	13	1.4 U	**5.5**	**4.8**	**2.9**	**2.1**	**6.5**	**31**	**6.7**	**6.2**	**8.8**	**2.0**	**12**
Tetrachloroethylene	EPA-TO-15	µg/m^3	320	1,700	37 U	24 U	39 U	36 U	23 U	**93**	37 U	23 U	39 U	39 U	41 U	**740**
Trichloroethylene	EPA-TO-15	µg/m^3	11	110	0.59 U	**0.58**	**0.64**	**0.83**	**0.37**	0.87 U	**0.74**	**0.38**	**2.8**	**22**	0.66 U	**30,000 J**
Total TPH [5]	Calculated	µg/m^3	4,700 [4]	33,000 [4]	**800**	**1,300**	**2,600**	**3,000**	**970**	**25,000**	**4,700**	**390**	**3,600**	**2,000**	**1,900**	**5,400**

Notes:

[1] All constituents analyzed using United States Environmental Protection Agency (EPA) Method TO-15.

[2] Model Toxics Control Act (MTCA) Method B soil vapor screening levels for residential exposure are from Ecology's "CLARC Master Spreadsheet.xlsx" dated August 2020. Residential exposure scenario assumes 365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals).

[3] MTCA Method B soil vapor screening levels for commercial workers assume an exposure scenario of 250 days/year, 10 hours/day for 20 years. See Ecology's Implementation Memorandum #21; "Frequently Asked Question No. 17."

[4] Soil vapor screening levels were calculated by dividing air cleanup or screening levels by Ecology's sub-slab vapor intrusion attenuation factor of 0.03. See Ecology's Implementation Memorandum #21; "Frequently Asked Question No. 3."

[5] Total TPH results were calculated by summing results for individual petroleum fractions, benzene, toluene, ethylbenzene, xylene and napthalene.

µg/m^3 = micrograms per cubic meter

U = Constituent not detected above the laboratory reporting limit

Bold font type indicates the analyte was detected at a concentration greater than the laboratory reporting limit.

Gray shaded value indicates the detected concentration in soil vapor is greater than the MTCA Method B soil vapor screening level for residential exposure.

Orange shading indicates the detected concentration is greater than the MTCA Method B soil vapor screening levels for residential exposrue and commercial workers.

* - Analytes detected with one or more concentration greater than the MTCA screening level.

Table 2

Indoor and Outdoor Air Sample Chemical Analytical Results Exceeding MTCA Criteria
C-1 Hangar and C-1 Building, Paine Field, Snohomish County Airport
Everett, Washington

Analyte	Method	Units	MTCA Method B Indoor Air Cleanup Level for Residential Exposure [2]	MTCA Method B Indoor Air Screening levels for Commercial Exposure [3]	Sample ID and Sample Date [1]													Minimum Outdoor Air
					IA-1 12/01/20	IA-2 12/01/20	IA-3 12/01/20	IA-4 12/01/20	IA-5 12/01/20	IA-6 12/01/20	IA-7 12/01/20	IA-8 12/01/20	IA-9 12/01/20	IA-10 12/01/20	IA-11 12/01/20	IA-12 12/01/20	IA-13 12/01/20	
Benzene	EPA-TO-15	µg/m^3	0.32	1.7	**0.03**	**0.21**	**0.21**	**0.09**	**0.23**	**0.16**	**0.02**	**0.17**	**0.17**	**0.21**	**0.26**	**0.21**	**0.13**	**0.42**
Carbon Tetrachloride	EPA-TO-15	µg/m^3	0.42	2.2	**-0.07**	**-0.01**	**0**	**0**	**-0.03**	**-0.01**	**-0.04**	**-0.02**	**-0.05**	**0.01**	**0.06**	**0**	**-0.07**	**0.47**
Chloroform	EPA-TO-15	µg/m^3	0.11	0.57	**0.017**	**0.017**	**0.005**	**0.007**	**0.017**	**0.007**	**0.027**	**0.057**	**0.057**	**0.127**	**0.157**	**0.067**	**0.097**	**0.093**
Naphthalene	EPA-TO-15	µg/m^3	0.074	0.39	**0.153**	**0.123**	**0.143**	**0.213**	**0.083**	**0.133**	**0**	**0.037**	**0.073**	**0.093**	**0.027**	**0.027**	**0.073**	**0.057**
Naphthalene	EPA-TO-17	µg/m^3	0.074	0.39	**0.052**	**0.052**	**0.052**	**0.042**	**0.062**	**0.052**	**0.042**	**0.062**	**0.092**	**0.082**	**0.072**	**0.062**	**0.072**	**0.058**
Trichloroethylene	EPA-TO-15	µg/m^3	0.33	3.2	**0.15**	**0.14**	**0.13**	**0.13**	**0.12**	**0.19**	**1.1**	**0.37**	**0.31**	**0.44**	**0.41**	**0.70**	**0.60**	0.11 U
Total TPH [4]	Calculated	µg/m^3	140	1,000	**188**	**133**	**226**	**176**	**99**	**143**	**0.54**	**139**	**201**	**162**	**144**	**141**	**155**	**0.481**

Notes:

[1] All constituents analyzed using United States Environmental Protection Agency (EPA) Method TO-15, except where noted. Following Ecology's draft vapor intrusion guidance (Ecology 2018a), indoor air sample results have been adjusted for background contributions using the December 1, 2020 outdoor air sample results.

[2] Model Toxics Control Act (MTCA) Method B indoor air cleanup levels for residential exposure are from Ecology's "CLARC Master Spreadsheet.xlsx" dated February 2021. Residential exposure scenario assumes 365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals).

[3] MTCA Method B indoor air screening levels for commercial workers assume an exposure scenario of 250 days/year, 10 hours/day for 20 years. See Ecology's Implementation Memorandum #21; "Frequently Asked Question No. 17."

[4] Sum of TPH/BTEXN results were calculated by summing results for individual petroleum fractions, benzene, toluene, ethylbenzene, xylene and napthalene.

µg/m^3 = micrograms per cubic meter

U = Constituent not detected above the laboratory reporting limit

Bold font type indicates the analyte was detected at a concentration greater than the laboratory reporting limit.

Gray shaded value indicates the detected concentration in an indoor air sample is greater than the MTCA Method B indoor air cleanup level for residential exposure.

Orange shading indicates the detected concentration is greater than the MTCA Method B indoor air cleanup level for residental exposure and screening level for commercial workers.

* - Analytes detected with one or more concentration greater than the MTCA screening level.

Table 3

Soil Vapor Sample Chemical Analytical Results (All Analytes)

C-1 Hangar, Paine Field, Snohomish County Airport
Everett, Washington

Analyte	MTCA Method B Soil Vapor Screening Level [2,3]	Sample ID and Sample Date [1]											
		SV-1 11/30/20	**SV-2 11/30/20**	**SV-3 11/30/20**	**SV-4 12/01/20**	**SV-5 12/01/20**	**SV-6 12/01/20**	**SV-7 12/01/20**	**SV-8 12/01/20**	**SV-9 12/01/20**	**SV-10 12/01/20**	**SV-11 12/01/20**	**SV-12 12/01/20**
Air-Phase Petroleum Hydrocarbons (APH) (μg/m³) by Method MA-APH													
APH C5-C8 Aliphatics	NE	**750 J+**	**380 J+**	**2,000 J+**	**3,000 J+**	**370 J+**	**22,000 J+**	**2,300 J+**	**200 J+**	**2,400 J+**	**1,300 J+**	**1,400 J+**	**4,600 J+**
APH C9-C12 Aliphatics	NE	270 U	**290**	**310**	260 U	**240**	**1,800**	**390**	170 U	**910**	**480**	**510**	850 U
APH C9-C10 Aromatics	NE	140 U	**590**	**220**	130 U	**310**	**460**	**1,400**	**180**	**210**	**220**	150 U	**800**
Volatile Organic Compounds (μg/m³) by Method EPA TO-15													
1,1,1-Trichloroethane	76,000	**3.6**	**8.7**	3.1 U	2.9 U	1.9 U	**32**	3.0 U	1.9 U	**6.5**	3.2 U	**13**	**7,900 J**
1,1,2,2-Tetrachloroethane	1.4	0.76 U	0.49 U	0.78 U	0.73 U	0.47 U	1.1 U	0.76 U	0.47 U	0.78 U	0.80 U	0.84 U	2.3 U
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	76,000	4.2 U	**8.4**	4.4 U	**4.8**	2.6 U	**340**	**260**	2.6 U	**54**	**28**	**16**	13 U
1,1,2-Trichloroethane	3	0.30 U	0.20 U	0.31 U	0.29 U	0.19 U	0.44 U	0.30 U	0.19 U	0.31 U	0.32 U	0.33 U	**1.8**
1,1-Dichloroethane	52	2.2 U	1.5 U	2.3 U	2.1 U	1.4 U	3.3 U	2.2 U	1.4 U	2.3 U	2.3 U	2.5 U	**530**
1,1-Dichloroethylene	3,000	2.2 U	1.4 U	2.3 U	2.1 U	1.3 U	3.2 U	**4.5**	1.3 U	2.3 U	2.3 U	2.4 U	**930**
1,2,4-Trimethylbenzene	910	14 U	8.8 U	14 U	13 U	**11**	**43**	**95**	8.4 U	**18**	14 U	15 U	42 U
1,2-Dibromoethane	0.14	0.42 U	0.28 U	0.44 U	0.41 U	0.26 U	0.62 U	0.42 U	0.26 U	0.44 U	0.45 U	0.47 U	1.3 U
1,3,5-Trimethylbenzene	900	14 U	8.8 U	14 U	13 U	8.4 U	20 U	**16**	8.4 U	14 U	14 U	15 U	42 U
1,4-Dioxane	17	2.0 U	1.3 U	2.1 U	1.9 U	1.2 U	**5.5**	2.0 U	1.2 U	2.1 U	2.1 U	2.2 U	6.1 U
1-Propene	NE	6.6 U	4.3 U	6.9 U	6.4 U	4.1 U	**65**	**100**	4.1 U	6.9 U	7.0 U	7.3 U	20 U
2,2,4-Trimethylpentane	NE	26 U	17 U	27 U	25 U	16 U	**40**	26 U	16 U	27 U	27 U	28 U	79 U
Acetone	470,000	**510 J**	**360 J**	**1,200 J**	**2,000 J**	**410 J**	**2,000 J**	**580 J**	**240 J**	**430 J**	**460 J**	**220**	**190**
Acrolein	0.3	11 U	7.4 U	12 U	11 U	7.0 U	17 U	11 U	7.0 U	12 U	12 U	13 U	35 U
Allyl Chloride (3-Chloropropene)	14	8.6 U	5.6 U	8.9 U	8.3 U	5.3 U	13 U	8.6 U	5.3 U	8.9 U	9.1 U	9.5 U	27 U
Benzene	11	**2.4**	**3.7**	1.8 U	1.7 U	**2.6**	2.6 U	**4.7**	1.1 U	1.8 U	1.9 U	1.9 U	5.4 U
Butane	NE	13 U	**36**	**15**	13 U	8.1 U	**29**	**36**	8.1 U	14 U	14 U	15 U	40 U
Carbon Tetrachloride	14	1.7 U	1.1 U	1.8 U	1.7 U	1.1 U	2.5 U	**7.5**	1.1 U	1.8 U	1.8 U	1.9 U	5.3 U
Chloroform	3.6	0.27 U	**0.51**	0.28 U	0.26 U	0.17 U	0.40 U	0.27 U	**0.55**	0.28 U	0.28 U	0.30 U	**170**
cis-1,2-Dichloroethylene	NE	2.2 U	1.4 U	2.3 U	2.1 U	1.3 U	3.2 U	2.2 U	1.3 U	2.3 U	2.3 U	2.4 U	**20**
Dichlorodifluoromethane	1,500	2.7 U	**3.1**	**3.0**	**2.9**	**2.5**	4.0 U	**3.2**	**2.8**	2.8 U	2.9 U	3.0 U	8.4 U
Ethanol	NE	**180**	**220 J**	**150**	**270 J**	**210 J**	**640 J**	**400 J**	**490 J**	**370 J**	**240**	**260**	**150**
Ethylbenzene	15,000	2.4 U	1.6 U	**3.1**	2.3 U	**7.4**	**51**	**27**	1.5 U	**12**	**6.1**	2.6 U	7.4 U
Isopropyl Alcohol	NE	**670 J**	**97**	**270**	**3,600 J**	**120**	**1,000 J**	**320**	**67**	**110**	**83**	**200**	150 U
Methyl ethyl ketone (MEK)	76,000	16 U	**11**	**42**	16 U	10 U	**140**	**41**	10 U	17 U	17 U	18 U	50 U
Naphthalene	2.5	1.4 U	**5.5**	**4.8**	**2.9**	**2.1**	**6.5**	**31**	**6.7**	**6.2**	**8.8**	**2.0**	**12**
Pentane	NE	16 U	**18**	17 U	16 U	10 U	24 U	**28**	10 U	17 U	17 U	18 U	50 U
Tetrachloroethylene	320	37 U	24 U	39 U	36 U	23 U	**93**	37 U	23 U	39 U	39 U	41 U	**740**
Tetrahydrofuran	30,000	1.6 U	1.1 U	**2.5**	**2.0**	**15**	**26**	**18**	**1.4**	**2.6**	**13**	**7.1**	5.0 U
Toluene	76,000	100 U	68 U	110 U	100 U	64 U	150 U	**390**	64 U	110 U	110 U	110 U	320 U
Trichloroethylene	11	0.59 U	**0.58**	**0.64**	**0.83**	**0.37**	0.87 U	**0.74**	**0.38**	**2.8**	**22**	0.66 U	**30,000 J**
Vinyl Bromide	2.6	2.4 U	1.6 U	2.5 U	2.3 U	1.5 U	3.5 U	2.4 U	1.5 U	2.5 U	2.5 U	2.7 U	7.4 U
Xylene, m-,p-	1,500	4.8 U	**6.1**	**12**	**6.7**	**29**	**180**	**98**	**5.6**	**44**	**24**	**6.4**	**17**
Xylene, o-	1,500	2.4 U	**1.8**	**3.7**	2.3 U	**6.9**	**49**	**37**	**2.2**	**16**	**7.7**	**2.6**	7.4 U
Total Xylenes	1,500	4.8 U	**7.9**	**16**	**6.7**	**36**	**230**	**140**	**7.8**	**60**	**32**	**9.0**	**17**

Notes:

[1] All constituents analyzed using United States Environmental Protection Agency (EPA) Method TO-15.

[2] Model Toxics Control Act (MTCA) Method B soil vapor screening levels for residential exposure are from Ecology's "CLARC Master Spreadsheet.xlsx" dated February 2021. Residential exposure scenario assumes 365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals).

[3] Soil vapor screening levels were calculated by dividing air cleanup or screening levels by Ecology's sub-slab vapor intrusion attenuation factor of 0.03. See Ecology's Implementation Memorandum #21; "Frequently Asked Question No. 3."

μg/m³ = micrograms per cubic meter

NE = not established

U = Constituent not detected above the laboratory reporting limit

Bold font type indicates the analyte was detected at a concentration greater than the laboratory reporting limit.

Gray shaded value indicates the detected concentration in soil vapor is greater than the MTCA Method B soil vapor screening level for residential exposure.

Blue shading indicates the non-detect concentration was greater than the MTCA Method B soil vapor screening level.

Table 4

Indoor and Outdoor Air Sample Chemical Analytical Results (All Analytes)

C-1 Hangar and C-1 Building, Paine Field, Snohomish County Airport

Everett, Washington

Analyte	MTCA Method B Indoor Air Cleanup Level [2]	Sample ID and Sample Date [1]														
		IA-1_120120 12/01/20	IA-2_120120 12/01/20	IA-3_120120 12/01/20	IA-4_120120 12/01/20	IA-5_120120 12/01/20	IA-6_120120 12/01/20	IA-7_120120 12/01/20	IA-8_120120 12/01/20	IA-9_120120 12/01/20	IA-10_120120 12/01/20	IA-11_120120 12/01/20	IA-12_120120 12/01/20	IA-13_120120 12/01/20	OA-1_120120 12/01/20	OA-2_120120 12/01/20
Air-Phase Petroleum Hydrocarbons (APH) (μg/m^3) by Method MA-APH																
APH C5-C8 Aliphatics	NE	**45**	40 U	**43**	**43**	40 U	40 U	40 U	**45**	**67**	**58**	**42**	**65**	**51**	40 U	**59**
APH C9-C12 Aliphatics	NE	**140**	**130**	**180**	**130**	**96**	**140**	50 U	**90**	**130**	**99**	**98**	**72**	**100**	50 U	**52**
Volatile Organic Compounds (μg/m^3) by Method EPA TO-15 and TO-17																
1,1,2,2-Tetrachloroethane	0.043	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,2-Dibromoethane	0.0042	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U	0.077 U
1,2-Dichloroethane	0.096	**0.061**	**0.077**	**0.077**	**0.069**	**0.077**	**0.077**	**0.073**	**0.073**	**0.073**	**0.081**	**0.069**	**0.10**	**0.061**	**0.073**	**0.097**
1-Propene	NE	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	**1.6**	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	**4.4**
Acetone	14000	**7.5**	**10**	**11**	**9.6**	**7.6**	**10**	**6.0**	**8.2**	**13**	**9.7**	**9.9**	**15**	**7.5**	**5.0**	**37**
Acrolein	0.0091	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Allyl Chloride (3-Chloropropene)	0.42	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U
Benzene	0.32	**0.45**	**0.63**	**0.63**	**0.51**	**0.65**	**0.58**	**0.44**	**0.59**	**0.59**	**0.63**	**0.68**	**0.63**	**0.55**	**0.42**	**0.59**
Benzyl chloride	0.051	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
Butane	NE	**3.4**	**3.1**	**4.2**	**3.6**	**3.9**	**3.8**	2.4 U	**3.1**	**9.2**	**3.6**	**3.7**	**4.2**	**4.0**	2.4 U	2.4 U
Carbon Tetrachloride	0.42	**0.40**	**0.46**	**0.47**	**0.47**	**0.44**	**0.46**	**0.43**	**0.45**	**0.42**	**0.48**	**0.53**	**0.47**	**0.40**	**0.47**	**0.52**
Chloroform	0.11	**0.11**	**0.11**	**0.098**	**0.10**	**0.11**	**0.10**	**0.12**	**0.15**	**0.15**	**0.22**	**0.25**	**0.16**	**0.19**	**0.093**	**0.098**
Dichlorodifluoromethane	46	**2.4**	**2.3**	**2.7**	**2.8**	**3.0**	**2.9**	**2.9**	**2.2**	**2.5**	**2.9**	**2.8**	**2.9**	**2.5**	**2.9**	**3.0**
Ethanol	NE	7.5 U	7.5 U	7.5 U	7.5 U	**9.8**	7.5 U	7.5 U	**16**	**11**	**84 J**	**95 J**	**37**	**25**	7.5 U	7.5 U
Ethylbenzene	460	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	**0.48**	**0.48**	**0.60**	**0.57**	**0.46**	**0.51**	0.43 U	0.43 U
Hexachlorobutadiene	0.11	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Hexane	320	**4.0**	3.5 U	**3.6**	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	3.5 U	**7.3**	3.5 U	3.5 U	**3.9**
Methyl ethyl ketone (MEK)	2300	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	2.9 U	**16**
Methylene Chloride	66	60 U	35 U	65 U	35 U	35 U	35 U	41 U	35 U	35 U	40 U	35 U	110 U	47 U	35 U	64 U
Naphthalene	0.074	**0.21**	**0.18**	**0.20**	**0.27**	**0.14**	**0.19**	**0.057 J**	**0.094**	**0.13**	**0.15**	**0.084**	**0.084**	**0.13**	**0.057 J**	**0.079**
Naphthalene[3]	0.074	**0.11**	**0.11**	**0.11**	**0.10**	**0.12**	**0.11**	**0.10**	**0.12**	**0.15**	**0.14**	**0.13**	**0.12**	**0.13**	**0.061**	**0.058**
Pentane	NE	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	**7.4**	**29**	**13**	**12**	**7.3**	**7.9**	3.0 U	3.0 U
Tetrahydrofuran	910	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	**0.31**	0.29 U	**0.31**	0.29 U	**0.31**	0.29 U	0.29 U	0.29 U
Trichloroethylene	0.33	**0.15**	**0.14**	**0.13**	**0.13**	**0.12**	**0.19**	**1.1**	**0.37**	**0.31**	**0.44**	**0.41**	**0.70**	**0.60**	0.11 U	0.11 U
Vinyl Bromide	0.078	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Xylene, m-,p-	46	**1.4**	**1.6**	**1.5**	**1.5**	**1.3**	**1.6**	0.87 U	**1.7**	**1.8**	**2.3**	**2.1**	**1.7**	**1.9**	0.87 U	**0.91**
Xylene, o-	46	**0.63**	**0.72**	**0.66**	**0.66**	**0.55**	**0.70**	0.43 U	**0.66**	**0.73**	**0.79**	**0.77**	**0.60**	**0.67**	0.43 U	0.43 U
Total Xylenes	46	**2.0**	**2.3**	**2.2**	**2.2**	**1.8**	**2.3**	0.87 U	**2.4**	**2.5**	**3.1**	**2.9**	**2.3**	**2.6**	0.87 U	**0.91**

Notes:

[1] All constituents analyzed using United States Environmental Protection Agency (EPA) Method TO-15, except where noted. Indoor air data are not adjusted to account for contributions from outdoor air.

[2] Model Toxics Control Act (MTCA) Method B indoor air cleanup levels for residential exposure are from Ecology's "CLARC Master Spreadsheet.xlsx" dated February 2021. Residential exposure scenario assumes 365 days/year, 24 hours/day for 30 years (carcinogenic chemicals) or for 6 years (non-carcinogenic chemicals).

[3] Naphthalene analyzed using EPA Method TO-17.

μg/m3 = micrograms per cubic meter

NE = not established

U = Constituent not detected above the laboratory reporting limit

Bold font type indicates the analyte was detected at a concentration greater than the laboratory reporting limit.

Gray shaded value indicates the detected concentration in soil vapor is greater than the MTCA Method B indoor air cleanup level for residential exposure.

Blue shading indicates the non-detect concentration was greater than the MTCA Method B indoor air cleanup level for residential exposure.

Office: Tacoma Path: \\red\projects\5\5530014401\GIS\5530014401_F1_VicinityMap.mxd Map Revised: 2/26/2021

Vicinity Map

C-1 Hangar and C-1 Building
Paine Field/Snohomish County Airport
Everett, Washington

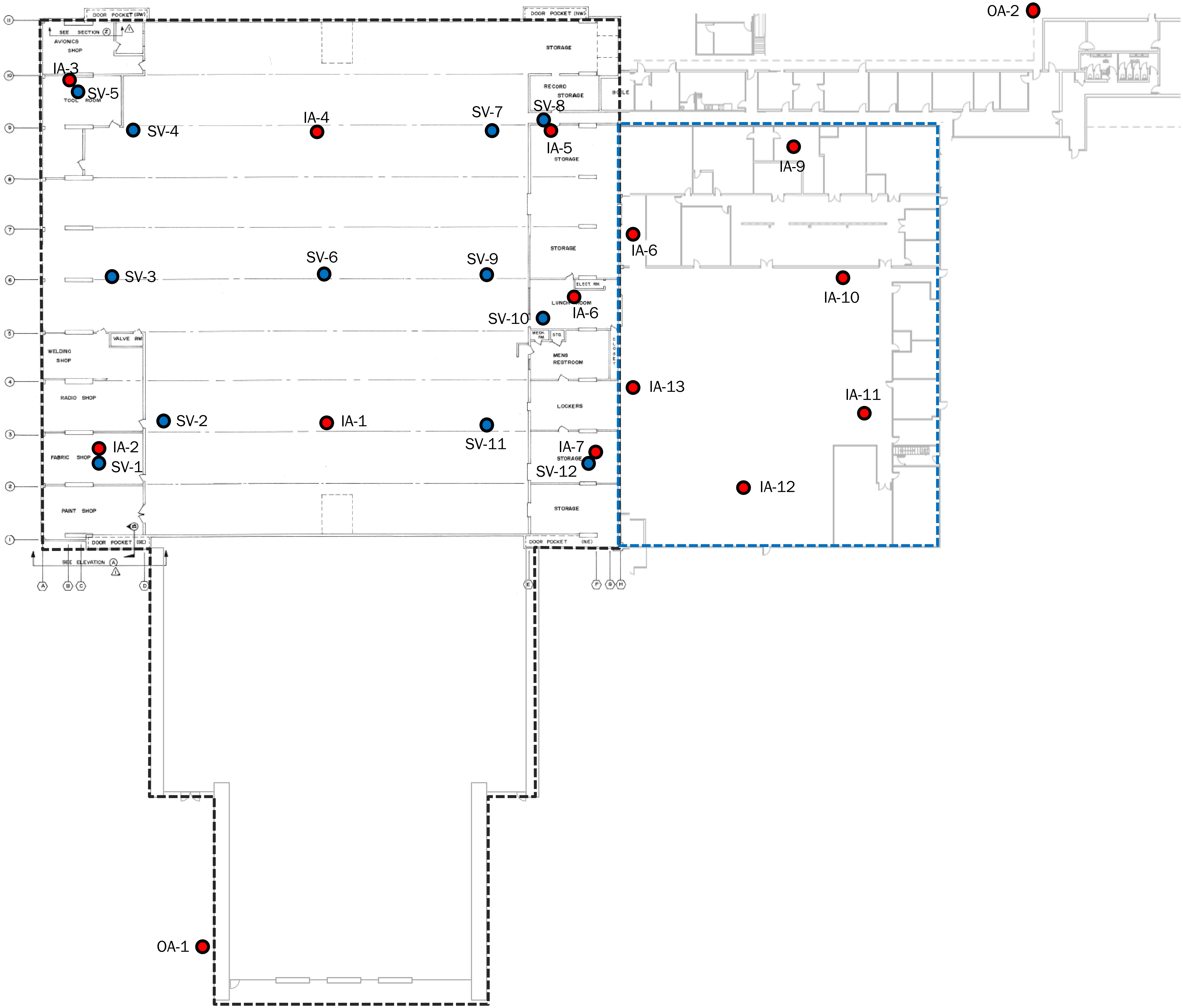
GeoEngineers

Figure 1

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north



Legend

● Sub-slab Soil Vapor Sample Location

● Indoor/Outdoor Air Sample Location

▢ C-1 Hangar Perimeter

▢ C-1 Building Perimeter

Not to Scale

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Building maps provided by Snohomish County 2020.

Site Plan with Sample Locations

C-1 Hangar and C-1 Building
Paine Field/Snohomish County Airport
Everett, Washington

GeoEngineers

Figure 2

APPENDIX A

Field Procedures and Building Survey

APPENDIX A
FIELD PROCEDURES AND BUILDING SURVEY

General

Sub-slab soil vapor, indoor air, and outdoor air samples were collected.

Meteorological Data

Relevant meteorological data that can influence vapor intrusion was recorded prior to and during sampling. Barometric pressure data over a 2-week time span around the sampling event were reviewed, based on data from readily available data sources (e.g., regional weather stations). General weather conditions such as wind speed, snow or ice cover, significant precipitation was noted at the time of sampling based on direct observation (e.g., for snow or ice cover) or readily available data sources (e.g., regional weather stations).

Sub-Slab Soil Vapor Probe Installation

Sub-slab soil vapor samples were collected inside the building using Vapor PinTM sampling devices. The Vapor PinsTM were installed following the manufacturers' standard operating procedures (SOPs) attached to this appendix.

General installation procedures for the sub-slab sampling device were as follows:

- Checked for buried obstacles (pipes, electrical lines, etc.) prior to proceeding. Applied Professional Services, Inc. completed a private utility locate and cleared the sub-slab soil vapor sample locations.
- Set up vacuum to collect drill cuttings.
- Drilled a ⅝-inch-diameter hole through the slab and approximately 1 inch into the underlying soil to form a void.
- Removed the drill bit, brushed the hole with the bottle brush and removed the loose cuttings with the vacuum.
- Placed the lower end of sampling device assembly into the drilled hole. Placed the small hole located in the handle of the extraction/installation tool over the sampling device to protect the barb fitting and cap and tapped the sampling device into place using a dead-blow hammer. Aligned the extraction/installation tool parallel to the sampling device to avoid damaging the barb fitting.
- The silicone sleeve formed a slight bulge between the slab and the sample device shoulder during installation. Placed the protective cap on sampling device to prevent vapor loss prior to sampling.
- Allowed at least 2 hours for the sub-slab soil vapor conditions to equilibrate prior to sampling.

Sub-Slab Soil Vapor Sampling Procedure

The following procedure was followed to collect sub-slab soil vapor samples:

- New fluoropolymer (Teflon®) tubing was connected to the sub-slab soil vapor probe using the barb fitting on the top of the sampling device.
- The tubing (aboveground) was connected to a sampling manifold.

- The sampling manifold was vacuum-tested (shut-in test) by introducing a vacuum to the aboveground portion of the sampling train and checking for loss of vacuum after 5 minutes. If vacuum loss was observed, connections and fittings in the sample train were checked and adjusted followed by another vacuum test. This test was repeated until the sampling train demonstrated that tightness was achieved.
- A tracer gas shroud (clear plastic bag) was placed around the entire sample train (that is, the sub-slab soil vapor probe where it enters the ground surface, the 1-liter Summa canister and associated tubing and manifold).
    - The shroud was charged (filled) with a tracer gas (spec-grade 99.995 percent helium gas) and the tracer gas concentration within the shroud was measured using a hand-held monitor (Dielectric MGD-2002 Multi-Gas Leak Detector). The hand-held monitor is capable of measuring helium in air to a concentration of 0.5 percent) prior to, during and after completion of the sampling event. A Teflon tube with a ball valve was inserted under the shroud to connect with the compressed helium bottle to charge the shroud. This same tube was used to monitor the helium concentration within the shroud periodically throughout the sampling process. The purpose of the periodic monitoring is to make sure helium is in contact with the sample train and the ground surface while the sub-slab vapor sample is collected.
- The sampling train (aboveground and belowground components) was purged using a vacuum purge pump or a multi-gas meter. Purge volumes were calculated based on the flow rate of the purge pump and the volume of the soil vapor probe and sample train. The helium concentration within the sampling train was measured and recorded after purging three sampling train volumes. If the helium concentration in the sample train is greater than or equal to 5 percent of the helium concentration in the shroud, the bentonite seal was re-applied, fittings were tightened, and the previous purging and measurement tests was repeated (Cal-EPA/DTSC 2015).
- The soil vapor samples were obtained using a 1-liter evacuated Summa canister (with approximately 30 inches of mercury vacuum set by the laboratory) and tedlar bag (helium analysis) with a regulated flow rate of less than or equal to approximately 150 milliliters per minute (DTSC/Cal-EPA 2015). The canister was filled with soil vapor for approximately 5 minutes or until a vacuum equivalent of approximately 5 inches of mercury remains in the Summa canister, whichever comes first. The initial and final canister vacuums were recorded on a soil vapor sampling field form. Canisters were then prepared and delivered to the laboratory under chain-of-custody procedures.

Air Sampling Methodology

The following methods were used to collect the indoor air and outdoor air samples.

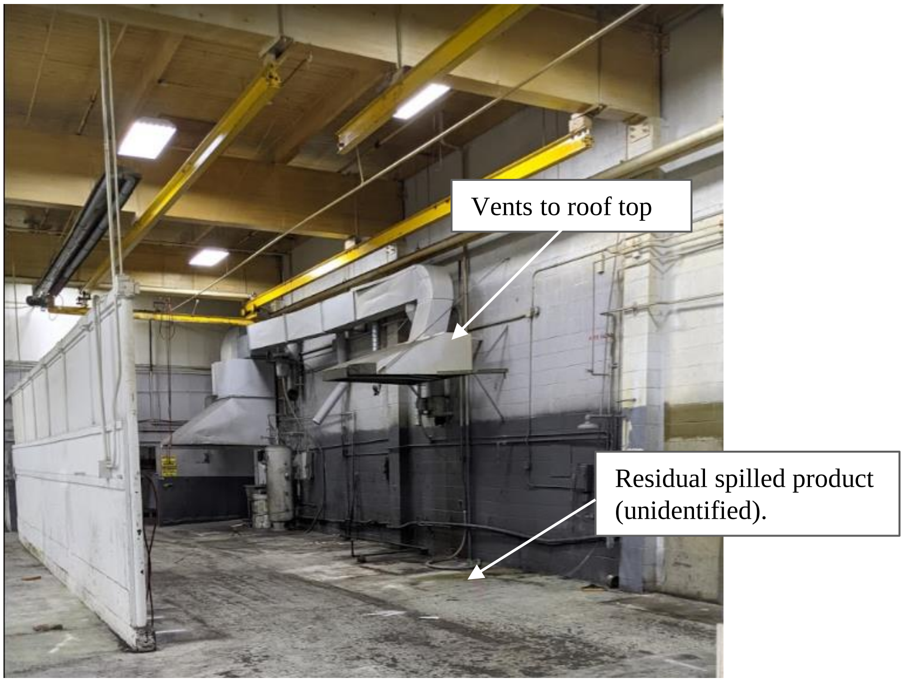
- Indoor and outdoor air samples were obtained at the same time over an 8-hour period using laboratory-prepared evacuated 6-Liter Summa canisters and sorbent tubes (for naphthalene analysis only). Sorbent tube samples were obtained to achieve reporting limits for naphthalene that are less than the MTCA Method B indoor air cleanup level.
- Summa canister samples were obtained using a vacuum gauge and an 8-hour flow controller. Sorbent tube samples were collected using calibrated personal sampling pumps.
- The canisters and sorbent tubes for indoor air samples were placed on the building floor and the sample intakes were situated approximately 4- to 5-feet aboveground to collect samples representative of the breathing zone for future building occupants.

- Initial canister pressure, start date and start time were recorded on a field data form. The inlet valve on the canister was opened to collect the sample. The canisters were filled until a vacuum equivalent of approximately 5 inches of mercury remained in each canister. At that time, the inlet valve was closed and the canister pressure, stop date and stop time were recorded on the field data form. Canisters were then prepared and delivered to the laboratory under chain-of-custody procedures.

- Air sampling using sorbent tubes followed laboratory recommended procedures. Tubing was connected to the sorbent tubes and the calibrated personal sampling pumps. The start date and start time was recorded on the field data form. The pump was calibrated to collect the laboratory recommended volume of air over the 8-hour period. Sorbent tubes were stored and shipped following laboratory recommended procedures and delivered to the laboratory under chain-of-custody procedures for chemical analysis of naphthalene only.

- Outdoor air samples were collected using methodology similar to the indoor air sampling described above. Outdoor samples were collected upwind of the building, based on meteorological observations at the time of sampling, and on the building roof above the showroom/office areas adjacent to the HVAC intake.

- Indoor air sampling was conducted under conservative (i.e., “worst case”) conditions as recommended by Ecology guidance. Specifically, windows were kept closed and ingress and egress activities were minimized to the extent possible during sampling. As noted previously, indoor air samples were collected prior to building occupancy; however, the HVAC system operated for approximately 1 week prior and during the sampling period as if the building were occupied to maintain normal indoor air temperatures. The intent was to obtain indoor air samples that are representative of normal conditions, but sample when few to no building occupants are present and few windows and exterior doors are opening and closing, to reduce potential interferences.



Photograph 1. Inside C-1 Building at sample location IA-13 along the shared wall with C-1 Hangar to the south. Multiple hood vents are present with adjoining roof outlets as viewed in Photograph 2.

Photograph 2. C-1 Building roof vents above the equipment workshop area. Small metal shed attached to building also pictured.

Building Survey Photographs

C-1 Hangar and C-1 Building
Paine Field/Snohomish County Airport
Everett, Washington

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Figure A-1

Photograph 3. Floor drain identified in C-1 Building near in office areas near sample location IA-9. No strong odors were observed.

Photograph 4. Main workshop area in C-1 Building with view of 2nd floor office space. Sample location for IA-12. Roll up garage doors lead to outdoor, gated parking lot.

Building Survey Photographs

C-1 Hangar and C-1 Building
Paine Field/Snohomish County Airport
Everett, Washington

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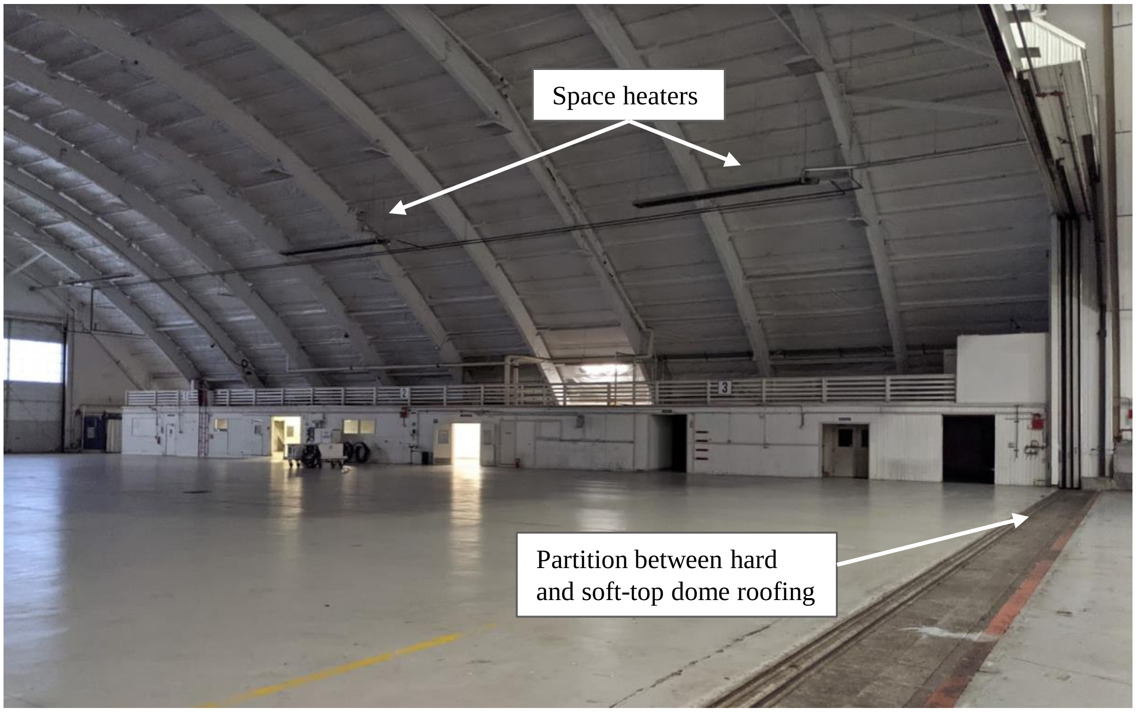
Figure A-2

5530-014-00

Photograph 5. C-1 Hangar offices located on west-southwest side of building. Sample locations SS-1, -2, -3, IA-2, and DP-2 were located in this area.



Photograph 6. North side of C-1 Hangar with internal office spaces, workshops, restrooms, and breakrooms pictured.

Building Survey Photographs

C-1 Hangar and C-1 Building
Paine Field/Snohomish County Airport
Everett, Washington

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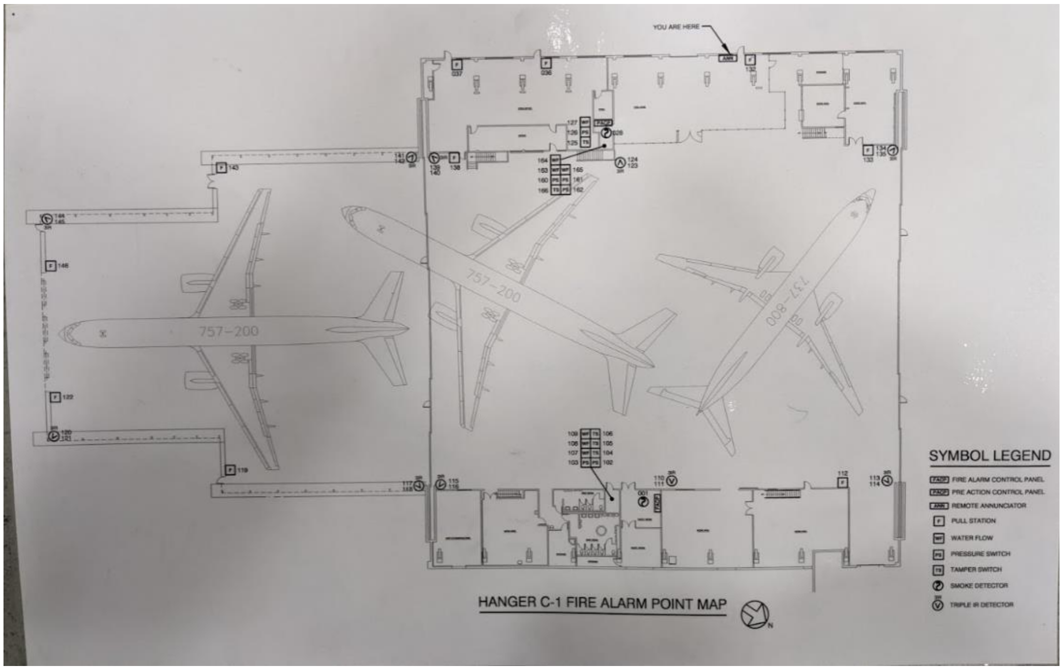
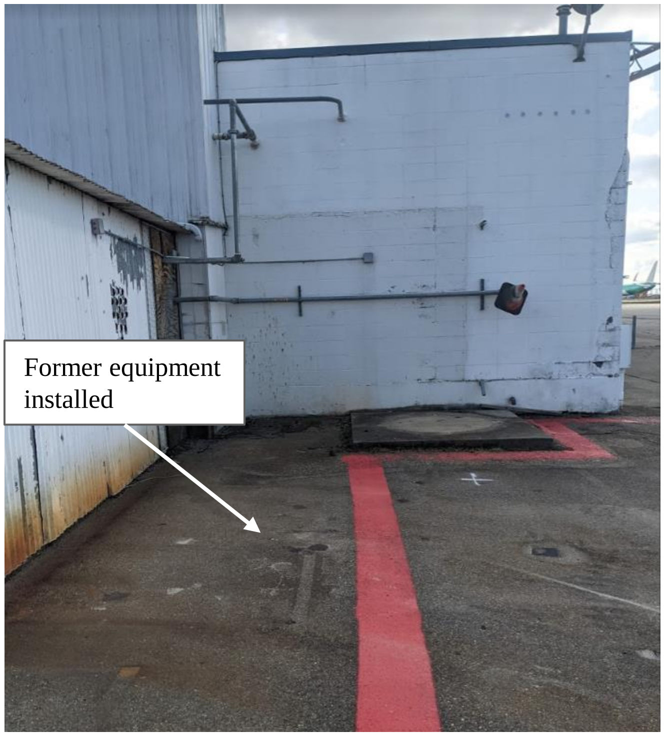
Figure A-3



Photograph 7. C-1 Hangar layout posted at fire alarm service point.



Photograph 8. Exterior corner at west end of C-1 Hangar. Metal-sided workshop imaged on left with outlines of former equipment anchored to asphalt.

Building Survey Photographs

C-1 Hangar and C-1 Building
Paine Field/Snohomish County Airport
Everett, Washington

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Figure A-4

C-1 BUILDING SURVEY FORM

This form must be completed for each building involved in indoor air testing.

Preparer's Name __Katy Atakturk________________ Date/Time Prepared _11/30/2020_________

Preparer's Affiliation __Environmental Consultant___________ Phone No.___(206)419-4290_____

Purpose of Investigation__Environmental Investigation________________________________

1. OCCUPANT:

Interviewed: Y / [✓ N]

Last Name: _________________________ First Name: _________________________

Address: ____

County: _________________

Home Phone: ____________________ Office Phone: ____________________

Number of Occupants/persons at this location _______ Age of Occupants ______________________

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: [✓ Y] / N

Last Name: ____Rardin_____________________ First Name: ___Andrew_________________

Address: ____(On Site)____

County: _Snohomish_________________

Home Phone: ____________________ Office Phone: ____________________

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential [✓ Commercial]/Multi-use Other: _________________

If the property is residential, type? (Circle appropriate response)

2-Family
3-Family
Raised Ranch
Split Level
Colonial
Cape Cod
Contemporary
Mobile Home
Duplex
Apartment House
Townhouses/Condos
Modular
Other:_______________

If multiple units, how many? ________

If the property is commercial, type?

Business Type(s) __Aviation company_(former tenant); vacant at time of investigation

Does it include residences (i.e., multi-use)? Y / [✓ N] If yes, how many? ______

Other characteristics:

Number of floors_2_ Building age______

Is the building insulated? [✓ Y] / N How air tight? Tight / [✓ Average] / Not Tight

4. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

Above grade construction: wood frame [✓ concrete] stone brick

Foundation type: crawlspace [✓ slab-on-grade] other _______________

Foundation walls: poured [✓ block] stone other ________

Foundation walls: unsealed [✓ sealed] sealed with ________________

If building has a crawlspace, please answer the following questions:

1) Does the crawlspace have air vents leading out of the house or building? Y / N
2) **Crawl space vents:** always open always closed open/closed based on season
3) **Crawlspace floor:** N/A dirt concrete other ________
4) Is the crawlspace lined with a plastic liner (vapor barrier)? Y / N
5) **Position of the liner:** On ground Attached to floor joist Attached to foundation
6) **Condition of liner:** whole partial torn
7) **Crawlspace is:** wet damp dry moldy

If house or building is slab-on-grade, please answer the following questions:

1) **Concrete floor:** unsealed [✓ sealed] sealed with ________________
2) **Concrete floor:** [✓ uncovered covered] covered with _Vinyl tiling and uncovered____

If the house or building has a sump, please answer the following questions:

1) **Water in sump?** Y / N / [✓ not applicable]
2) **Sump lined?** Y / N / [✓ not applicable] lined with ________________

Lowest level depth below grade: ________(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Cracks in concrete are prevalent in the workshop space. Occasional drains are present through out the workshop. Utility Ports are sparse but present in the workshop and office space.

5. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in the house or building: (circle all that apply – note primary)

[✓ Hot air circulation]
Space Heaters
Electric baseboard
Heat pump
Stream radiation
Wood stove
Hot water baseboard
Radiant floor
Outdoor wood boiler
Other ___________

The primary type of fuel used is:

Natural Gas
Electric
Wood
Fuel Oil
Propane
Coal
Kerosene
Solar

Domestic hot water tank fueled by: Natural gas

Where is Boiler/furnace/air conditioning located: Equipment Shop and Janitor room first floor office space.

Are there air distribution ducts present? [✓ Y] / N

Describe the air intakes (where applicable), supply and cold air return ductwork, and their condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

Air intake vents observed at parking lot on NE side of building and gated parking lot on SE side of building in okay condition. Chemical hood vents present in the workshop space along the C-1 Hangar wall in dirty condition. Spilled substance observed on surface near air vent with moderate odor.

6. OCCUPANCY

Is lowest level occupied? Full-time Occasionally Seldom [✓ Almost Never]

Level General Use of Each Floor (e.g., family room, store, laundry, workshop, storage)

1st Floor Equipment workshop and office space.

2nd Floor Office space only

7. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? [✓ Y] / N

b. Does the garage have a separate heating unit? Y / N / [✓ NA]

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) [✓ Y] / N / NA
Please specify Aviation engine workshop

d. Has the building ever had a fire? Y / N When?__________________

e. Is a kerosene or unvented gas space heater present? Y / N Where? ________________

f. Is there a workshop or hobby/craft area? [✓ Y] / N Where & Type? 1st floor

g. Is there smoking in the building? Y / [✓ N] How frequently? _____________

h. Have cleaning products been used recently? Y / [✓ N] When & Type? _______________

i. Have cosmetic products been used recently? Y / [✓ N] When & Type? _________________

j. Has painting/staining been done in the last 6 months? Y / [✓ N] Where & When? ________________

k. Is there new carpet, drapes or other textiles? Y / [✓ N] Where & When? ________________

l. Have air fresheners been used recently? Y / [✓ N] When & Type? _________________

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?_____________

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?_____________

o. Is there a clothes dryer? Y / [✓ N] If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / [✓ N] When & Type?_________________

Are there odors in the house or building? [✓ Y] / N

If yes, please describe: Yes, solvent and/or petroleum odors in workshop.

Do any of the house or building occupants use solvents at work? [✓ Y] / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? Aviation engine solvents used by former tenant

If yes, are their clothes washed at work? Y / [✓ N]

Do any of the house or building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) [✓ No]
Yes, use dry-cleaning infrequently (monthly or less) [✓ Unknown]
Yes, work at a dry-cleaning service

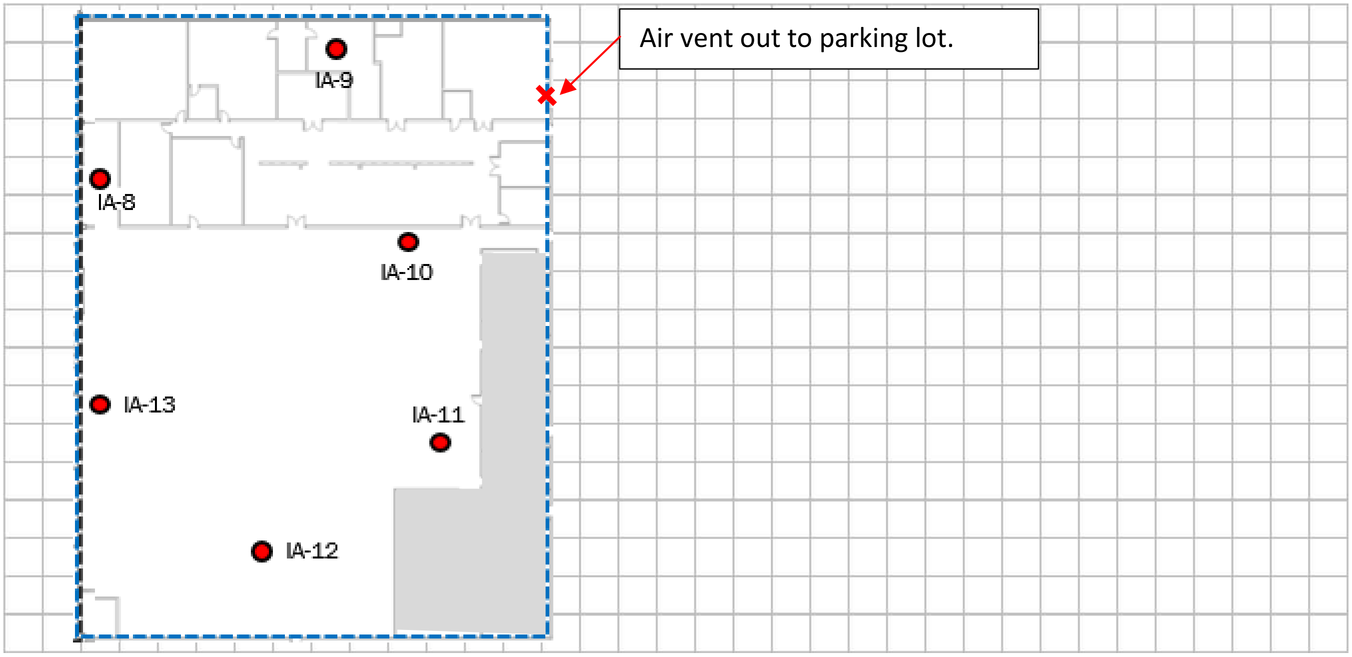
Is there a radon mitigation system for the house/building? Y / [✓ N] Date of Installation: __________

Is the system active or passive? Active/Passive

8. FLOOR PLANS

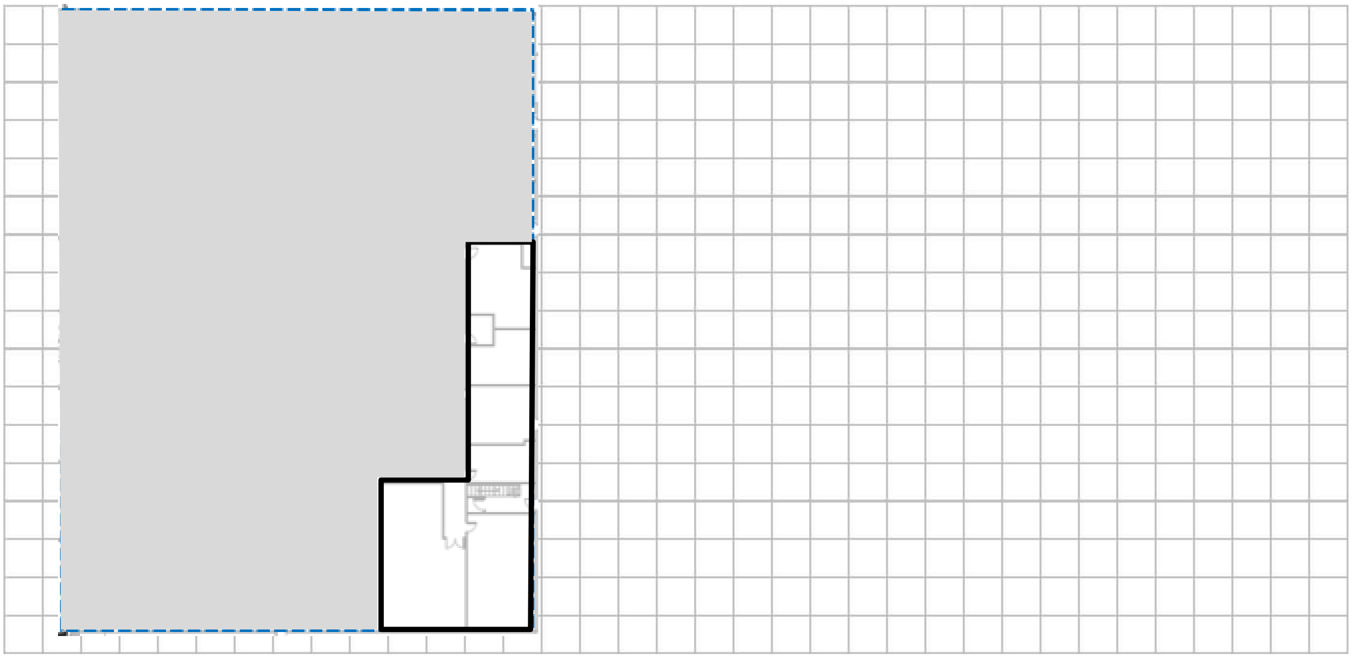
Draw a plan view sketch of the basement and first floor of the house/building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the house/building does not have a basement, please note.

First Floor:



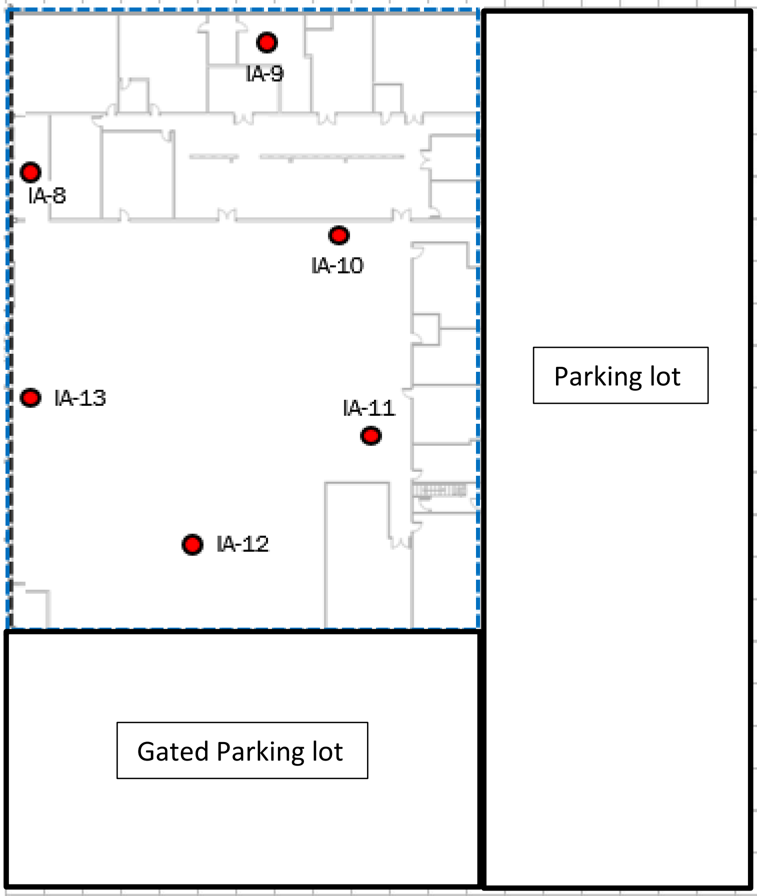
Air vent out to parking lot.

Second Floor:



9. OUTDOOR PLOT (Draw a sketch of the area surrounding the house/building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.)

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



10. PRODUCT INVENTORY FORM Make & Model of field instrument used: Not available. Space is vacant.

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description*	Comments	PID Reading
NA			

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)** ** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

C-1 HANGAR SURVEY FORM

This form must be completed for each building involved in indoor air testing.

Preparer's Name __Katy Atakturk________________ Date/Time Prepared _11/30/2020_________

Preparer's Affiliation __Environmental Consultant___________ Phone No.___(206)419-4290_____

Purpose of Investigation__Environmental Investigation_______________________________

1. OCCUPANT:

Interviewed: Y / [✓ N]

Last Name: _________________________ First Name: _________________________

Address: ____

County: _________________

Home Phone: ____________________ Office Phone: ____________________

Number of Occupants/persons at this location _______ Age of Occupants ______________________

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: [✓ Y] / N

Last Name: ____Rardin_____________________ First Name: ___Andrew_________________

Address: ____(On Site)____

County: _Snohomish________________

Home Phone: ____________________ Office Phone: ____________________

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential [✓ Commercial]/Multi-use Other: _________________

If the property is residential, type? (Circle appropriate response)

2-Family
Raised Ranch
Cape Cod
Duplex
Modular
3-Family
Split Level
Contemporary
Apartment House
Other:_______________
Colonial
Mobile Home
Townhouses/Condos

If multiple units, how many? ________

If the property is commercial, type?

Business Type(s) Aviation Hangar

Does it include residences (i.e., multi-use)? Y / [✓ N] If yes, how many? ______

Other characteristics:

Number of floors 2 Building age______

Is the building insulated? [✓ Y] / N How air tight? Tight / [✓ Average] / Not Tight

4. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

Above grade construction: [✓ wood frame] [✓ concrete] stone brick

Foundation type: crawlspace [✓ slab-on-grade] other _______________

Foundation walls: poured [✓ block] stone other ________

Foundation walls: unsealed [✓ sealed] sealed with ________________

If building has a crawlspace, please answer the following questions:

8) Does the crawlspace have air vents leading out of the house or building? Y / N

9) **Crawl space vents:** always open always closed open/closed based on season

10) **Crawlspace floor:** N/A dirt concrete other ________

11) Is the crawlspace lined with a plastic liner (vapor barrier)? Y / N

12) **Position of the liner:** On ground Attached to floor joist Attached to foundation

13) **Condition of liner:** whole partial torn

14) **Crawlspace is:** wet damp dry moldy

If house or building is slab-on-grade, please answer the following questions:

3) **Concrete floor:** unsealed [✓ sealed] sealed with ________________

4) **Concrete floor:** [✓ uncovered covered] covered with Vinyl tiling and uncovered

If the house or building has a sump, please answer the following questions:

3) **Water in sump?** [✓ Y] / N / not applicable

4) **Sump lined?** Y / N / not applicable lined with ________________

Lowest level depth below grade: 1.5 (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Break room sink along shared wall with C-1 building. Trench stormwater drains throughout hangar space (2 indoors) and 1 immediately outdoors. No visible cracks in concrete of hangar space.

5. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in the house or building: (circle all that apply – note primary)

Hot air circulation   Heat pump   Hot water baseboard
[✓ Space Heaters]   Stream radiation   Radiant floor
Electric baseboard   Wood stove   Outdoor wood boiler   Other ____________

The primary type of fuel used is:

Natural Gas   Fuel Oil   Kerosene
[✓ Electric]   Propane   Solar
Wood   Coal

Domestic hot water tank fueled by: Natural gas

Where is Boiler/furnace/air conditioning located: Not identified.

Are there air distribution ducts present? [✓ Y] / N

Describe the air intakes (where applicable), supply and cold air return ductwork, and their condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

Air ducts observed above office buildings within hangar running to exterior of hangar to SE end of building by soft-top hangar transition in good shape.

6. OCCUPANCY

Is lowest level occupied?   Full-time   Occasionally   Seldom   [✓ Almost Never]

Level General Use of Each Floor (e.g., family room, store, laundry, workshop, storage)

1st Floor Hangar, workshops, and office space.

2nd Floor Office space only

7. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / [✓ N]

b. Does the garage have a separate heating unit? Y / N / [✓ NA]

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) [✓ Y] / N / NA Please specify Planes when in use

d. Has the building ever had a fire? Y / N When? __________________

e. Is a kerosene or unvented gas space heater present? Y / [✓ N] Where? _________________

f. Is there a workshop or hobby/craft area? [✓ Y] / N Where & Type? 1st floor workshops in N corner

g. Is there smoking in the building? Y / [✓ N] How frequently? ______________

h. Have cleaning products been used recently? Y / [✓ N] When & Type? _______________

i. Have cosmetic products been used recently? Y / [✓ N] When & Type? _________________

j. Has painting/staining been done in the last 6 months? Y / [✓ N] Where & When? ________________

k. Is there new carpet, drapes or other textiles? Y / [✓ N] Where & When? ________________

l. Have air fresheners been used recently? Y / [✓ N] When & Type? _________________

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?_____________

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?_____________

o. Is there a clothes dryer? Y / [✓ N] If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / [✓ N] When & Type?__________________

Are there odors in the house or building? Y / [✓ N]

If yes, please describe: ____

Do any of the house or building occupants use solvents at work? [✓ Y] / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? Paint workshop and general workshop spaces

If yes, are their clothes washed at work? Y / [✓ N]

Do any of the house or building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) [✓ No]

Yes, use dry-cleaning infrequently (monthly or less) Unknown

Yes, work at a dry-cleaning service

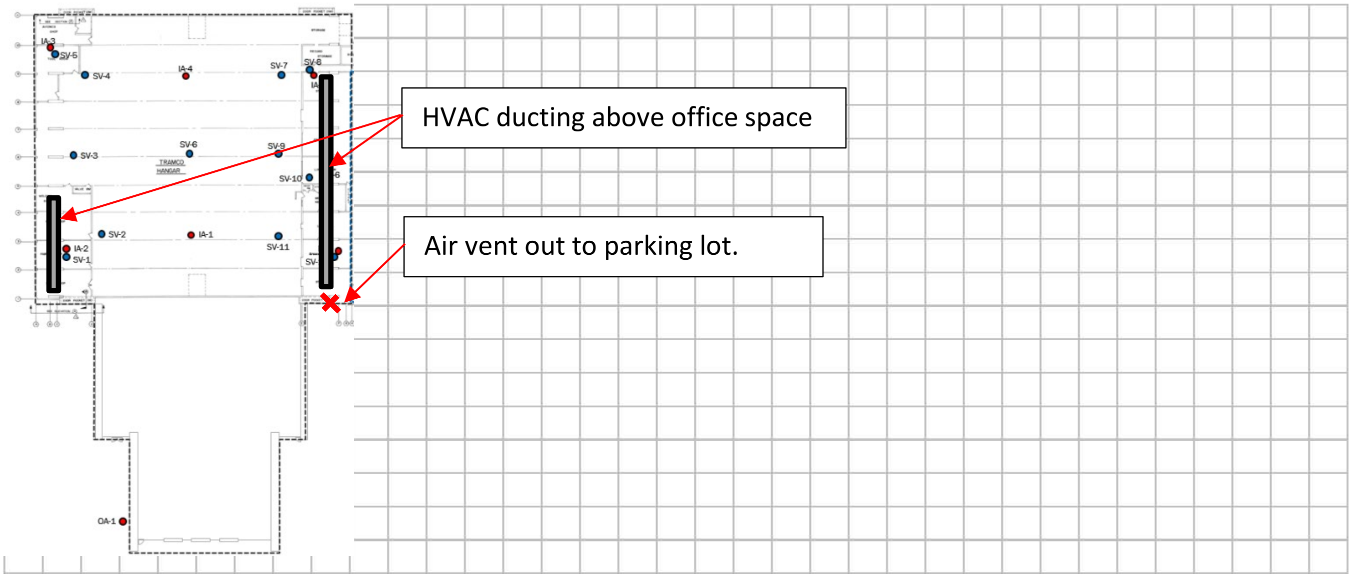
Is there a radon mitigation system for the house/building? Y / [✓ N] Date of Installation: __________

Is the system active or passive? Active/Passive

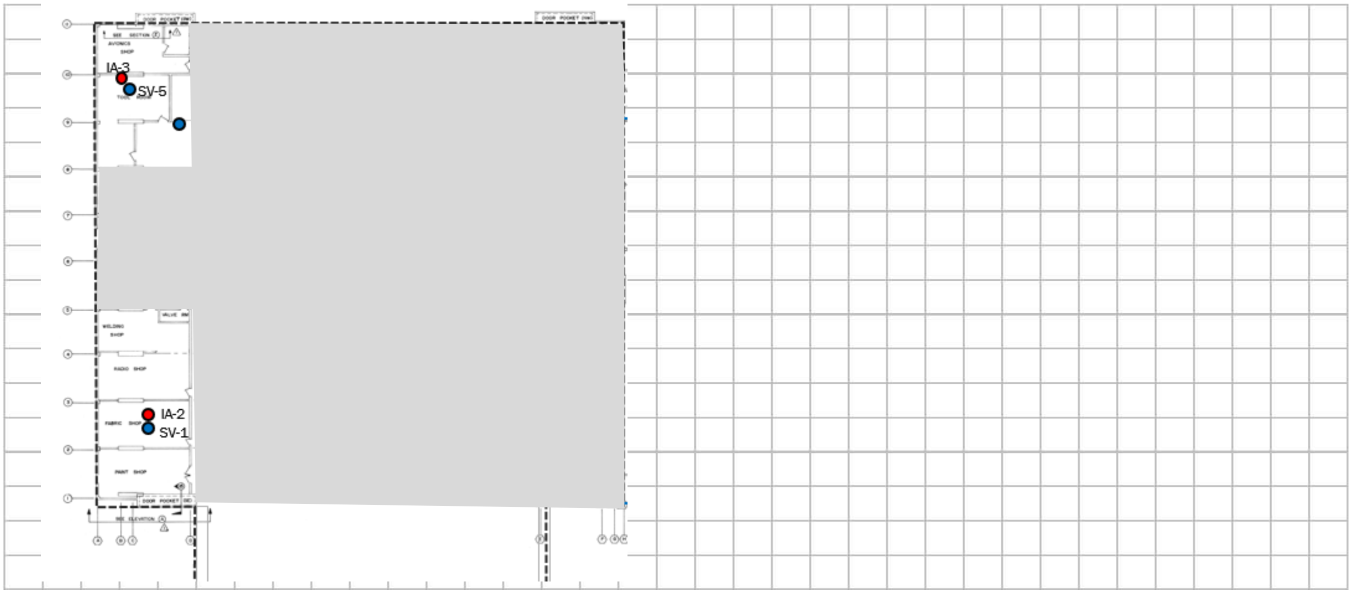
8. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the house/building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the house/building does not have a basement, please note.

First Floor:

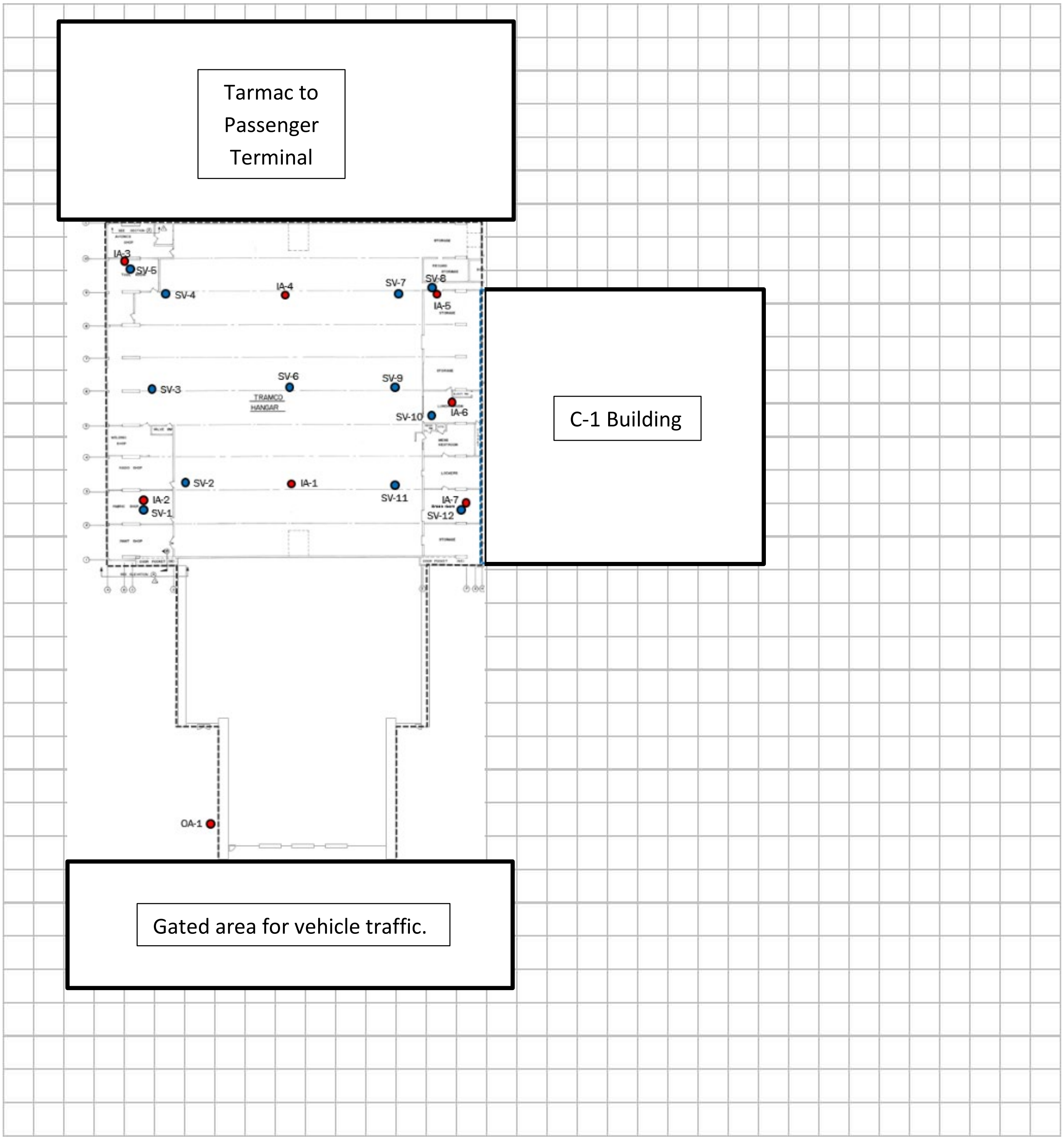


Second Floor:



9. OUTDOOR PLOT (Draw a sketch of the area surrounding the house/building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.)

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



10. PRODUCT INVENTORY FORM Make & Model of field instrument used: Not available. Space is vacant.

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description*	Comments	PID Reading
NA			

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)** ** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

APPENDIX B

Concrete Survey Report

UNDERGROUND UTILITY DETECTION
& INSPECTION SERVICES

Concrete Scanning Report

Project:
3220 100th St SW
Everett, WA 98204

Prepared For:
Geo Engineers

Prepared By:
C-N-I Locates Ltd.
EM & GPR Technicians
PO Box 7740
Bonney Lake, WA 98391
Ph: 253-826-1177 Fax: 253-826-2232

INTRODUCTION

C-N-I Locates Ltd. was hired by Geo Engineers to concrete scan the reinforcement in 12 areas for avoidance for vapor pin installations throughout the Western half of an aircraft hangar.

GEOPHYSICAL METHODOLOGY AND EQUIPMENT

The Geophysical Survey Systems SIR 3000 Concrete Scanner with the 2000 MHz palm antenna was used to identify the variations in subsurface conditions that indicate a significant change in material.

GPR is a non-destructive geophysical device used for subsurface exploration and operates by transmitting an electromagnetic pulse from an antenna into the ground and then capturing the partial reflections from subsurface layers. Any other material of carried density will either speed up the signal creating a hyperbola trail. This is similar to a rock in a creek, the water bends around the rock leaving a tail wake.

SITE AREA

The work area consisted of 12 locations that were adjusted based on varying slab conditions inside the Western half of the hangar. The hangar in question presented unique conditions with layers of concrete constructed on top of the initial slab at different times.

ANALYSES / INTERPRETATIONS AND FINDINGS

The hangar, most likely due to it's age, presented unique scanning conditions. The hangar appeared to have been renovated at one point in time, with some areas having new concrete and reinforcement placed directly on top of the original slab, potentially up to 14" of new concrete in some areas.

This made determining the slab depth with certainty very difficult and in some areas impossible, resulting in some areas having to be adjusted to new locations. As can be seen in the images below, the slab depth varies widely from location to location and an unusual separation layer can be seen at one of the reinforcement mats in certain locations.

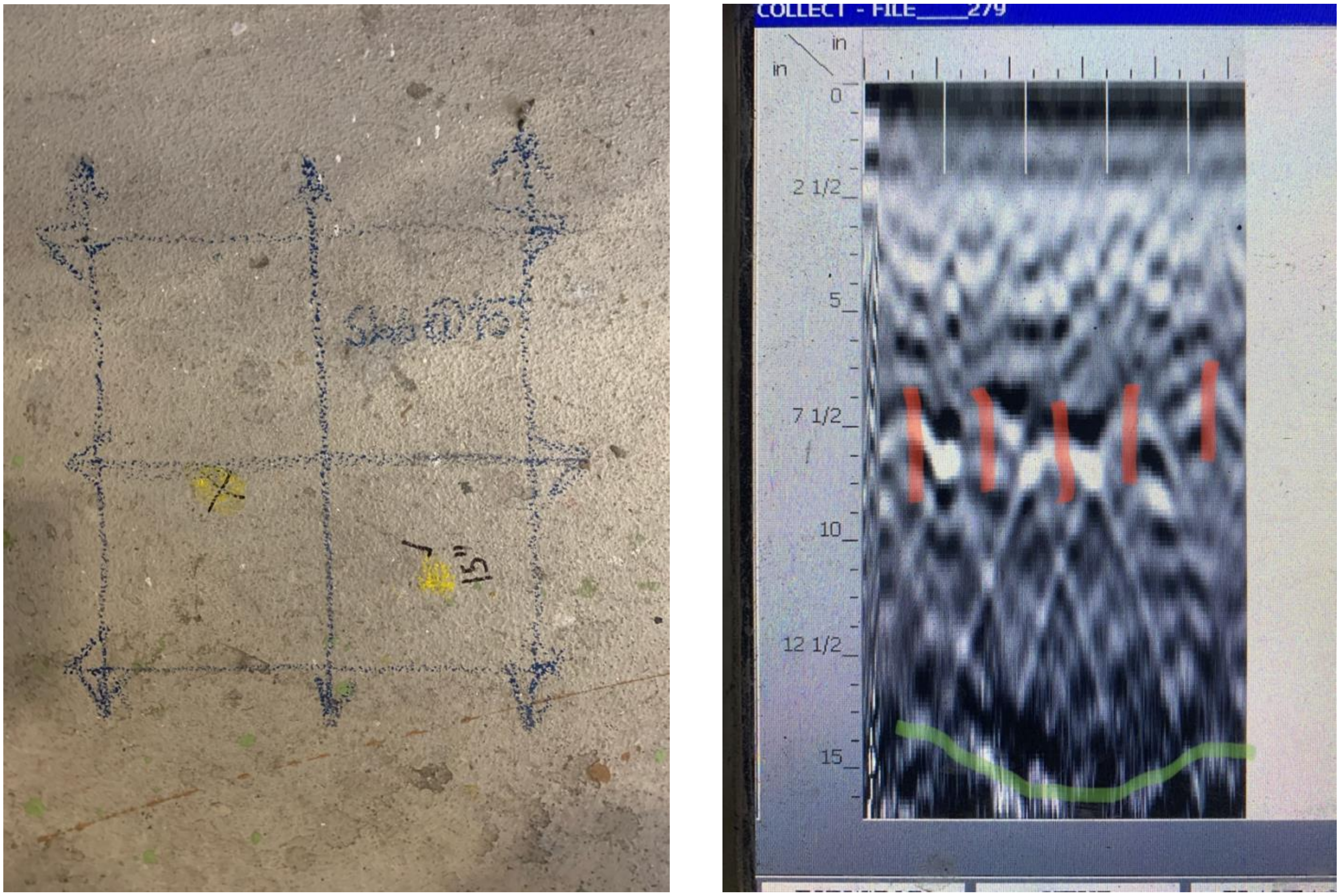
However, despite all of the difficulties in determining the slab depth, the reinforcement was otherwise fairly standard and unremarkable with a regular pattern throughout the hangar.

Pictures Below….

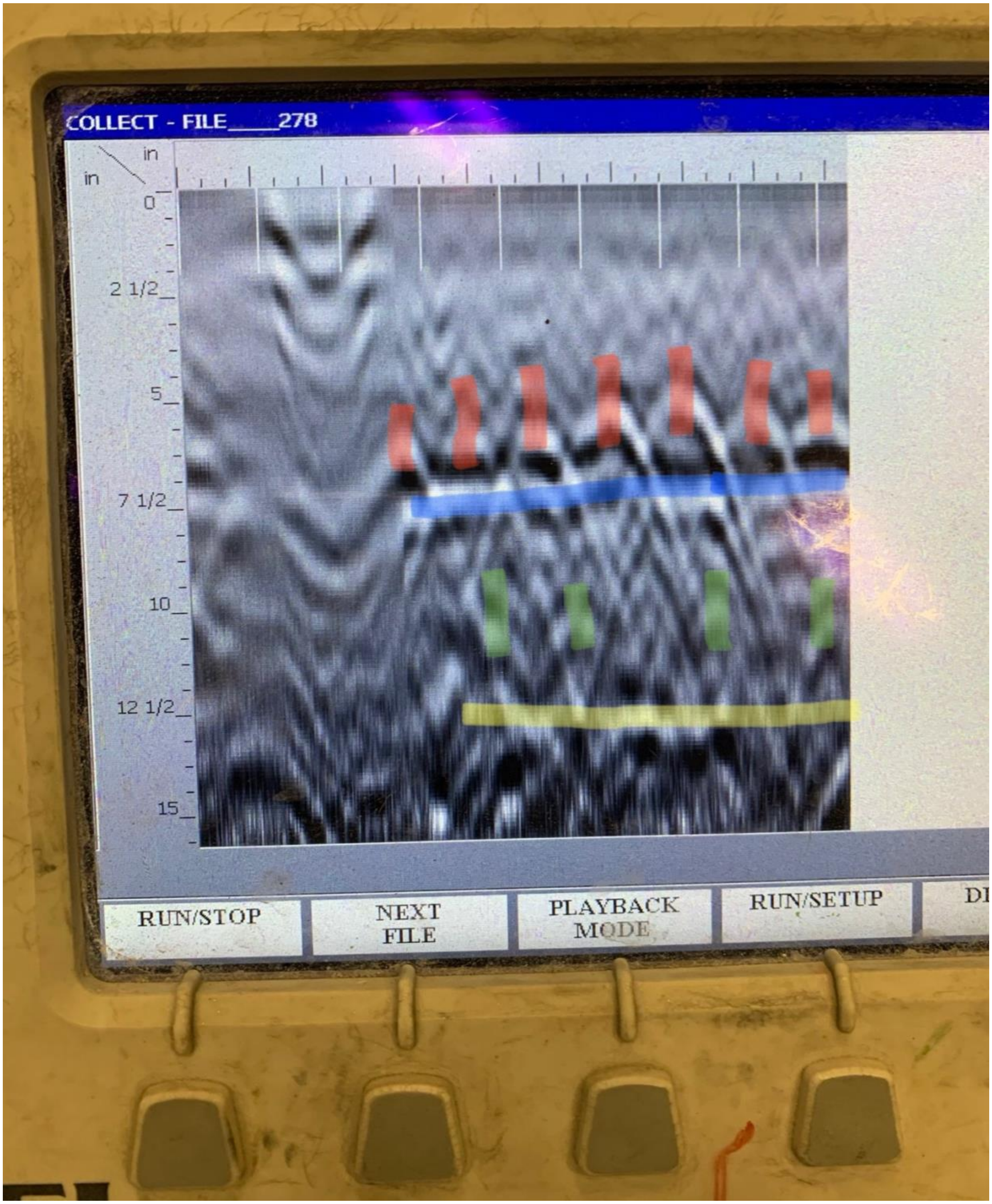
"IT'S A JUNGLE OUT THERE."

PO BOX 7740 ◆ BONNEY LAKE, WA 98391
TOLL FREE: 1-877-826-1177 ◆ PHONE: 253-826-1177 ◆ FAX: 253-826-2232
VISIT OUR WEBSITE AT: WWW.CNILOCATES.COM OR E-MAIL US AT: INFO@CNILOCATES.COM

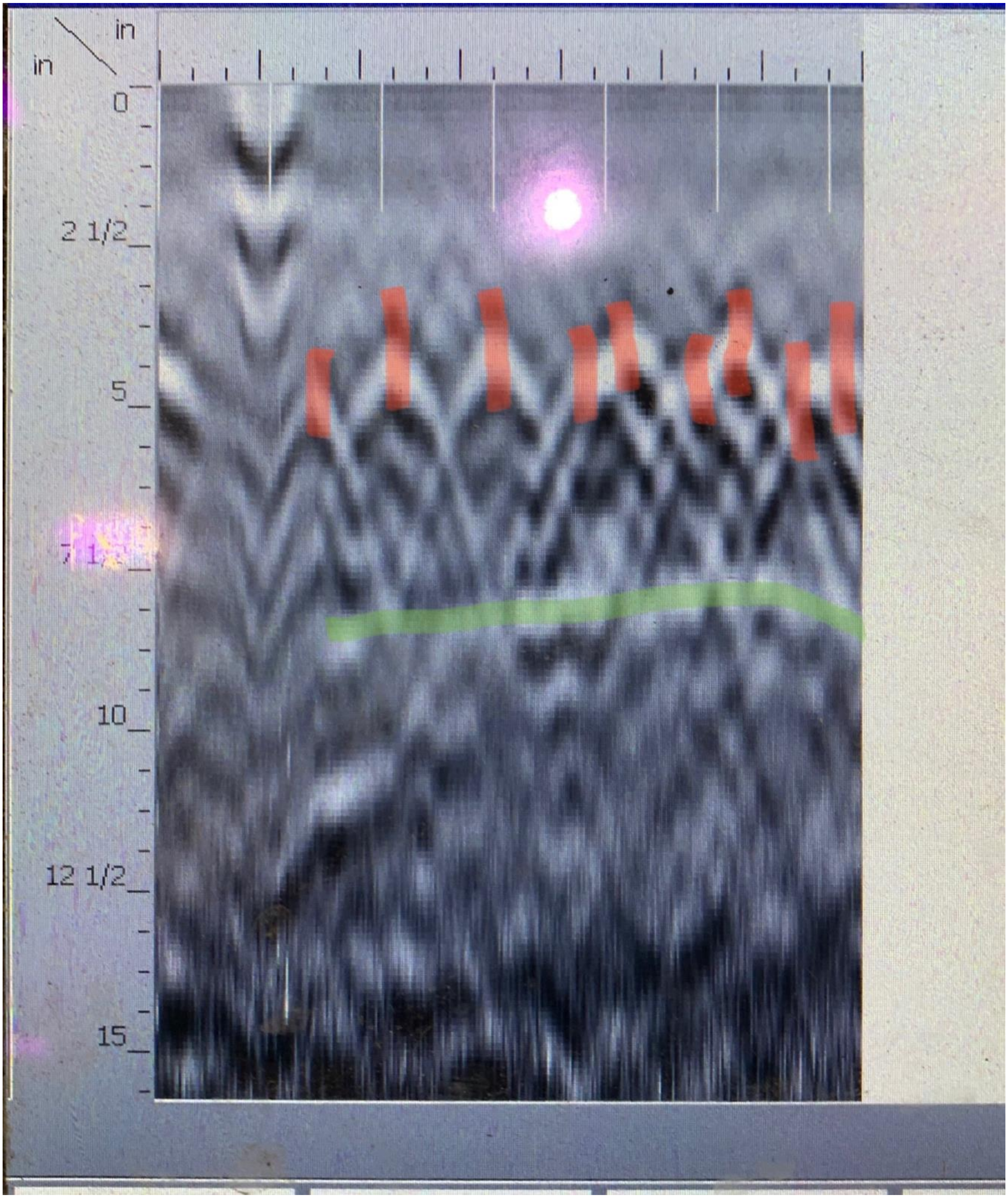
GPR ◆ METALIC LINE DETECTION ◆ NON-METALLIC PIPE DETECTION ◆ VIDEO PIPE INSPECTION ◆ ELECTRICAL FAULT DETECTION
LEAK DETECTION ◆ MAGNETIC DETECTION ◆ UTILITY DESIGN SURVEYS ◆ CONTRACT LOCATING ◆ STRURCTURAL & CONCRETE IMAGING



Highlighted in green on the right is a representation of the lower limit of the scan, i.e. the lowest point in which the frequency of radio pulses can penetrate. In red, rebar matting at 7”. This is a good example of the difficulties encountered in the area in trying to determine slab depth as the depth here appears to be very near the edge of the scan limit.



Highlighted in yellow is the base of the original slab. In green is the reinforcement of the original slab, barely visible. In blue is presumed to be a separation layer between the two pours. In red is the top reinforcement mat.



Highlighted in red is a layer of reinforcement in an area that was not renovated, you can see to the right of the scan where the two mats double at the beginning of a new reinforcement mat. In green, the bottom of the slab is clearly visible at 8".

APPENDIX C
Data Validation and Chemical Analytical Laboratory Reports

GeoEngineers

Data Validation Report

2101 4th Avenue, Suite 950, Seattle, Washington 98121, Telephone: 206.239.3242, Fax: 206.728.2732 www.geoengineers.com

Project: Snohomish County Airports – Paine Field C-1 Hangar and Building Regulatory Support
November/December 2020 Samples

GEI File No: 05530-014-00

Date: December 16, 2020

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Guidance on Environmental Data Verification and Validation (EPA-240-R-02-004, USEPA 2002) and Guidance for Labeling Validated Analytical Data for Superfund Use (EPA-R-541-08-005; USEPA 2009) of chemical analytical data from the analyses of air samples collected as part of the November 2020 soil vapor intrusion sampling event, and the associated laboratory and field quality control (QC) samples. The samples were obtained from the Paine Field C-1 Hanger and Building in Everett, Washington.

OBJECTIVE AND QUALITY CONTROL ELEMENTS

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with Petroleum Vapor Intrusion (PVI): Updated Screening Levels, Cleanup Levels, and Assessing PVI Threats to Future Buildings # 18 (Ecology 2018), guidance in the USEPA Contract Laboratory Program *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2017), and USEPA Methods TO-15 and TO-17 (USEPA 1999), as appropriate, for the GC/MS analyses of Summa cannisters. Data usability was assessed by determining if:

- The samples were analyzed using well-defined and acceptable methods that provide detection and reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

In accordance with the Field Sampling Plan, ATS Hangar Shop_GEI Proposed VI, IA and DP Locations (GeoEngineers 2020), the data validation included review of the following QC elements:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times
- Surrogate Recoveries
- Method Blanks
- Matrix Spikes/Matrix Spike Duplicates

- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Field Duplicates (FDs)
- Reporting Limits

VALIDATED SAMPLE DELIVERY GROUPS

This data validation summary included review of the sample delivery groups (SDGs) listed below in Table 1.

Table 1: Summary of Validated Sample Delivery Groups

Laboratory SDG	Samples Validated
012022	IA-1_120120, IA-2_120120, IA-3_120120, IA-4_120120, IA-5_120120, IA-6_120120, IA-7_120120, IA-8_120120, IA-9_120120, IA-10_120120, IA-11_120120, IA-12_120120, IA-13_120120, OA-1_120120, OA-2_120120, SV-1_113020, SV-2_113020, SV-3_113020, SV-4_113020, SV-5_113020, SV-6_113020, SV-7_113020, SV-8_113020, SV-9_113020, SV-10_113020, SV-11_113020, SV-12_113020
012023 Naphthalene ONLY	IA-1_120120, IA-2_120120, IA-3_120120, IA-4_120120, IA-5_120120, IA-6_120120, IA-7_120120, IA-8_120120, IA-9_120120, IA-10_120120, IA-11_120120, IA-12_120120, IA-13_120120, OA-1_120120, OA-2_120120

CHEMICAL ANALYSIS PERFORMED

Friedman & Bruya, Inc. (FBI) located in Seattle, Washington, performed laboratory analysis on the air samples using the following methods:

- Air-phase Petroleum Hydrocarbons by Massachusetts Department of Environmental Protection as Footnoted in Ecology 2018 document
- Volatile Organic Compounds (VOCs) by Modified EPA Method TO-15 using GC/MS in full scan mode; and EPA Method TO-17 using GC/MS in full scan mode.
- Helium by Modified ASTM Method D-1946 using GC/TCD.

DATA VALIDATION SUMMARY

The results for each of the QC elements are summarized below.

DATA PACKAGE COMPLETENESS

FBI analyzed the air samples evaluated as part of this data validation. The laboratory provided all required deliverables for the data validation. The laboratory followed adequate corrective action processes and all identified anomalies were discussed in the case narrative.

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. All COC documentation parameters were met.

Holding Times

The holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection.

Established holding times were met for the requested analyses.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are added to all samples, standards and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added at a known concentration and percent recoveries are calculated following analysis.

All surrogate recoveries for field samples were within the laboratory control limits.

Method Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. Method blanks were analyzed with each batch of samples, at a frequency of 1 per 20 samples.

For the sample batches, method blanks were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in the method blanks; however, the laboratory noted in the case narrative that the samples below may have been affected by method blank contamination.

SDG 012022: The positive results for methylene chloride in the Samples IA-1_120120, IA-3_120120, IA-7_120120, IA-10_120120, IA-12_120120, IA-13_120120, OA-2_120120 were qualified as not detected (U) because of possible method blank contamination. The reporting limits were also raised to the levels of reported concentrations by the laboratory.

Matrix Spikes/Matrix Spike Duplicates (MS/MSD)

The laboratory did not perform any MS/MSD sample sets because the air sampling methods obtain measurements of accuracy and precision from the laboratory control sample/laboratory control sample duplicate sample set.

Laboratory Control Samples/Laboratory Control Sample Duplicates

A laboratory control sample (LCS) is a blank sample that is spiked with a known amount of analyte and then analyzed. An LCS is similar to an MS, but without the possibility of matrix interference. As there is no actual sample matrix (such as soil or groundwater) in the analysis, the analytical expectations for accuracy and precision are usually more rigorous and qualification would apply to all samples in the batch, instead of the parent sample only.

Laboratory control sample analyses should be performed once per analytical batch or every 20 field samples, whichever is more frequent. The recovery criteria for laboratory control samples are specified in the laboratory documents, as are the relative percent difference (RPD) control limits for LCS/LCSD sample sets.

The frequency requirements were met for all analyses, and the percent recovery and RPD values were within the proper control limits.

Laboratory Duplicates

Internal laboratory duplicate samples were analyzed along with the reviewed sample batches. The duplicate samples were analyzed for the same parameters as the associated parent samples. Precision is determined by calculating the RPD between each pair of samples. The RPD control limit is 30 percent for all parameters, unless one or more of the samples has a result that is less than five times the lowest reporting limits. In this case, the absolute difference is used to measure precision instead of the RPD. The absolute difference control limit in air samples is equivalent to the lowest reporting limit of the parent and duplicate samples.

The frequency requirements were met for all analyses, and the RPD and absolute difference values were within the proper control limits.

Field Duplicates (FDs)

No field duplicates were planned or used for this sampling event.

Reporting Limits and Miscellaneous

SDG 012022:

(TO-15): The sample concentrations of several target analytes (ethanol, acetone, 1,1,1-Trichloroethane, isopropyl alcohol, trichloroethylene) exceeded the linear calibration range of the instrument. The positive results of one or more of these analytes were qualified as estimated (J) in Samples IA-10_120120, IA-11_120120, SV-1_113020, SV-2_113020, SV-3_113020, SV-4_113020, SV-5_113020, SV-6_113020, SV-7_113020, SV-8_113020, SV-9_113020, SV-10_113020, and SV-12_113020.

(MA-APH): The sample concentration of APH EC5-8 Aliphatic range in Sample SV-6_113020 exceeded the linear calibration range of the instrument. The positive result of this aliphatic range was qualified as estimated (J) in Sample SV-6_113020.

Also, the chromatographic patterns for APH EC5-8 Aliphatic range in all of the ‘SV’ samples did not adequately match the standard chromatography used in the initial calibration standards for the instrument. The positive results for this hydrocarbon range in the Soil Vapor samples were found to be biased high and qualified as estimated (J+) in these samples.

OVERALL ASSESSMENT

As was determined by this data validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was acceptable, as demonstrated by the internal laboratory duplicates RPD and absolute difference values.

Data were qualified as not-detected because of Method Blank contamination.

Data were qualified as estimated because of analytes exceeding the linear calibration range of the instrument, and chromatography not matching the calibration standards.

The data, as qualified, are considered acceptable for the intended use.

REFERENCES

U.S. Environmental Protection Agency (USEPA). 1999. "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, 2nd edition," EPA-625-R-96-010b. January 1999.

U.S. Environmental Protection Agency (USEPA). 2002. "Guidance on Environmental Data Verification and Data Validation," EPA-240-R-02-004. November 2002.

U.S. Environmental Protection Agency (USEPA). 2009. "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA). 2017. "Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review," EPA-540-R-2017-002. January 2017.

FRIEDMAN & BRUYA, INC.

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December 11, 2020

Jacob Letts, Project Manager
GeoEngineers, Inc
1101 Fawcett Ave 200
Tacoma, WA 98402

Dear Mr Letts:

Included are the results from the testing of material submitted on December 1, 2020 from the C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022 project. There are 74 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GNR1211R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 1, 2020 by Friedman & Bruya, Inc. from the GeoEngineers, Inc C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	GeoEngineers, Inc
012022 -01	IA-1_120120
012022 -02	IA-2_120120
012022 -03	IA-3_120120
012022 -04	IA-4_120120
012022 -05	IA-5_120120
012022 -06	IA-6_120120
012022 -07	IA-7_120120
012022 -08	IA-8_120120
012022 -09	IA-9_120120
012022 -10	IA-10_120120
012022 -11	IA-11_120120
012022 -12	IA-12_120120
012022 -13	IA-13_120120
012022 -14	OA-1_120120
012022 -15	OA-2_120120
012022 -16	SV-1_113020
012022 -17	SV-2_113020
012022 -18	SV-3_113020
012022 -19	SV-4_120120
012022 -20	SV-5_120120
012022 -21	SV-6_120120
012022 -22	SV-7_120120
012022 -23	SV-8_120120
012022 -24	SV-9_120120
012022 -25	SV-10_120120
012022 -26	SV-11_120120
012022 -27	SV-12_120120

CASE NARRATIVE (continued)

APH (air) - Analysis Method MA-APH
Non-petroleum compounds identified in the air phase hydrocarbon ranges were subtracted per the MA-APH method.

The APH EC5-8 aliphatics concentration in sample SV-6_120120 exceeded the calibration range of the instrument. The data were flagged accordingly. All quality control requirements were acceptable.

The APH EC5-8 concentrations reported in the SV samples (012022-16 through 012022-27) show the presence of a possible non-petroleum interferent. The compound was tentatively identified as 1-butanol. The GC/MS tentative identification quality score did not meet the method criteria for subtraction. Affected concentrations were reported with an x qualifier.

Volatiles (air) - Analysis Method TO-15
The concentration of several analytes exceeded the calibration range of the instrument. The data were flagged accordingly. All quality control requirements were acceptable.

The methylene chloride concentrations present in the IA and OA samples (012022-01 through 012022-15) were flagged as possibly due to laboratory contamination.

Helium (air) - Analysis Method ASTM D1946
All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-1_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-01
Date Analyzed:	12/04/20	Data File:	120420.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	45
APH EC9-12 aliphatics	140
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-2_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-02
Date Analyzed:	12/04/20	Data File:	120422.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	130
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-3_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-03
Date Analyzed:	12/04/20	Data File:	120423.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	103	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	43
APH EC9-12 aliphatics	180
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-4_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-04
Date Analyzed:	12/04/20	Data File:	120424.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	111	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	43
APH EC9-12 aliphatics	130
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-5_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-05
Date Analyzed:	12/05/20	Data File:	120425.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	88	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	96
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-6_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-06
Date Analyzed:	12/05/20	Data File:	120426.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	140
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-7_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-07
Date Analyzed:	12/05/20	Data File:	120427.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	104	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	<50
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-8_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-08
Date Analyzed:	12/05/20	Data File:	120428.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	45
APH EC9-12 aliphatics	90
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-9_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-09
Date Analyzed:	12/05/20	Data File:	120429.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	111	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	67
APH EC9-12 aliphatics	130
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-10_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-10
Date Analyzed:	12/05/20	Data File:	120430.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	58
APH EC9-12 aliphatics	99
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-11_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-11
Date Analyzed:	12/05/20	Data File:	120431.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	118	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	42
APH EC9-12 aliphatics	98
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-12_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-12
Date Analyzed:	12/05/20	Data File:	120432.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	86	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	65
APH EC9-12 aliphatics	72
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	IA-13_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-13
Date Analyzed:	12/05/20	Data File:	120433.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	104	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	51
APH EC9-12 aliphatics	100
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	OA-1_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-14
Date Analyzed:	12/05/20	Data File:	120434.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	<50
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	OA-2_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-15
Date Analyzed:	12/05/20	Data File:	120435.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	112	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	59
APH EC9-12 aliphatics	52
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-1_113020	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-16 1/5.5
Date Analyzed:	12/03/20	Data File:	120311.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	750 x
APH EC9-12 aliphatics	<270
APH EC9-10 aromatics	<140

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-2_113020	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-17 1/3.6
Date Analyzed:	12/03/20	Data File:	120313.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	91	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	380 x
APH EC9-12 aliphatics	290
APH EC9-10 aromatics	590

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-3_113020	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-18 1/5.7
Date Analyzed:	12/03/20	Data File:	120314.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	2,000 x
APH EC9-12 aliphatics	310
APH EC9-10 aromatics	220

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-4_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-19 1/5.3
Date Analyzed:	12/03/20	Data File:	120315.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	109	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	3,000 x
APH EC9-12 aliphatics	<260
APH EC9-10 aromatics	<130

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-5_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-20 1/3.4
Date Analyzed:	12/03/20	Data File:	120316.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	97	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	370 x
APH EC9-12 aliphatics	240
APH EC9-10 aromatics	310

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-6_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-21 1/8.1
Date Analyzed:	12/03/20	Data File:	120317.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	89	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	22,000 ve x
APH EC9-12 aliphatics	1,800
APH EC9-10 aromatics	460

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-7_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-22 1/5.5
Date Analyzed:	12/03/20	Data File:	120318.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	112	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	2,300 x
APH EC9-12 aliphatics	390
APH EC9-10 aromatics	1,400

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-8_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-23 1/3.4
Date Analyzed:	12/03/20	Data File:	120319.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	200 x
APH EC9-12 aliphatics	<170
APH EC9-10 aromatics	180

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-9_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-24 1/5.7
Date Analyzed:	12/03/20	Data File:	120320.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	103	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	2,400 x
APH EC9-12 aliphatics	910
APH EC9-10 aromatics	210

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-10_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-25 1/5.8
Date Analyzed:	12/03/20	Data File:	120321.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	1,300 x
APH EC9-12 aliphatics	480
APH EC9-10 aromatics	220

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-11_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-26 1/6.1
Date Analyzed:	12/03/20	Data File:	120322.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	1,400 x
APH EC9-12 aliphatics	510
APH EC9-10 aromatics	<150

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SV-12_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-27 1/17
Date Analyzed:	12/03/20	Data File:	120323.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	4,600 x
APH EC9-12 aliphatics	<850
APH EC9-10 aromatics	800

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Method Blank	Client:	GeoEngineers, Inc
Date Received:	Not Applicable	Project:	5531-014-01, F&BI 012022
Date Collected:	Not Applicable	Lab ID:	00-2756 MB
Date Analyzed:	12/04/20	Data File:	120419.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	85	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	<50
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Method Blank	Client:	GeoEngineers, Inc
Date Received:	Not Applicable	Project:	5531-014-01, F&BI 012022
Date Collected:	Not Applicable	Lab ID:	00-2554 MB
Date Analyzed:	12/03/20	Data File:	120310.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	104	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<40
APH EC9-12 aliphatics	<50
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-1_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-01
Date Analyzed:	12/04/20	Data File:	120420.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	90	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.4	0.49	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.4	1.4	Trichloroethene	0.15	0.028
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	7.5	3.2	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	60 lc	17 lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.4	0.33
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.63	0.14
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	4.0	1.1	Bromoform	<2.1	<0.2
Chloroform	0.11	0.022	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.061	0.015	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.40	0.063	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.45	0.14	Naphthalene	0.21	0.04
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-2_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-02
Date Analyzed:	12/04/20	Data File:	120422.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	88	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.3	0.47	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.1	1.3	Trichloroethene	0.14	0.026
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	10	4.3	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.6	0.36
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.72	0.17
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.11	0.022	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.077	0.019	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.46	0.073	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.63	0.20	Naphthalene	0.18	0.034
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-3_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-03
Date Analyzed:	12/04/20	Data File:	120423.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.7	0.54	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	4.2	1.8	Trichloroethene	0.13	0.024
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	11	4.7	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	65 lc	19 lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.5	0.34
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.66	0.15
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	3.6	1.0	Bromoform	<2.1	<0.2
Chloroform	0.098	0.020	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.077	0.019	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.47	0.075	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.63	0.20	Naphthalene	0.2	0.038
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-4_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-04
Date Analyzed:	12/04/20	Data File:	120424.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.8	0.56	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.6	1.5	Trichloroethene	0.13	0.024
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	9.6	4.1	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.5	0.35
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.66	0.15
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.10	0.021	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.069	0.017	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.47	0.075	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.51	0.16	Naphthalene	0.27	0.052
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-5_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-05
Date Analyzed:	12/05/20	Data File:	120425.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	84	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	3.0	0.60	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.9	1.6	Trichloroethene	0.12	0.022
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	9.8	5.2	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	7.6	3.2	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.3	0.30
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.55	0.13
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.11	0.022	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.077	0.019	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.44	0.070	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.65	0.20	Naphthalene	0.14	0.026
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-6_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-06
Date Analyzed:	12/05/20	Data File:	120426.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	93	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.9	0.59	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.8	1.6	Trichloroethene	0.19	0.035
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	10	4.3	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.6	0.37
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.70	0.16
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.10	0.021	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.077	0.019	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.46	0.073	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.58	0.18	Naphthalene	0.19	0.037
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-7_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-07
Date Analyzed:	12/05/20	Data File:	120427.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	1.6	0.91	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.9	0.59	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	<2.4	<1	Trichloroethene	1.1	0.20
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	6.0	2.5	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	41 lc	12 lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	<0.87	<0.2
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	<0.43	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.12	0.024	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.073	0.018	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.43	0.069	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.44	0.14	Naphthalene	<0.057 j	<0.011 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-8_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-08
Date Analyzed:	12/05/20	Data File:	120428.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.2	0.44	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.1	1.3	Trichloroethene	0.37	0.068
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	16	8.5	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	7.4	2.5	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	8.2	3.5	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.48	0.11
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.7	0.40
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.66	0.15
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.15	0.031	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	0.31	0.10	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.073	0.018	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.45	0.072	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.59	0.18	Naphthalene	0.094 j	0.018 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-9_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-09
Date Analyzed:	12/05/20	Data File:	120429.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.5	0.50	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	9.2	3.9	Trichloroethene	0.31	0.057
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	11	5.9	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	29	9.8	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	13	5.6	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.48	0.11
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.8	0.42
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.73	0.17
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.15	0.030	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.073	0.018	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.42	0.067	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.59	0.18	Naphthalene	0.13	0.025
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-10_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-10
Date Analyzed:	12/05/20	Data File:	120430.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.9	0.58	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.6	1.5	Trichloroethene	0.44	0.081
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	84 ve	44 ve	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	13	4.3	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	9.7	4.1	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.60	0.14
Methylene chloride	40 lc	12 lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	2.3	0.52
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.79	0.18
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.22	0.045	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	0.31	0.10	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.081	0.020	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.48	0.076	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.63	0.20	Naphthalene	0.15	0.028
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-11_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-11
Date Analyzed:	12/05/20	Data File:	120431.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	113	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.8	0.58	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	3.7	1.6	Trichloroethene	0.41	0.076
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	95 ve	50 ve	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	12	4.1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	9.9	4.2	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.57	0.13
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	2.1	0.48
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.77	0.18
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.25	0.052	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.069	0.017	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.53	0.084	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.68	0.21	Naphthalene	0.084 j	0.016 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-12_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-12
Date Analyzed:	12/05/20	Data File:	120432.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	83	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.9	0.59	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	4.2	1.8	Trichloroethene	0.70	0.13
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	37	19	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	7.3	2.5	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	15	6.5	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.46	0.10
Methylene chloride	110 ve lc	32 ve lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.7	0.38
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.60	0.14
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	7.3	2.1	Bromoform	<2.1	<0.2
Chloroform	0.16	0.033	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	0.31	0.11	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.10	0.025	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.47	0.075	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.63	0.20	Naphthalene	0.084 j	0.016 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	IA-13_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-13
Date Analyzed:	12/05/20	Data File:	120433.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.5	0.51	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	4.0	1.7	Trichloroethene	0.60	0.11
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	25	13	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	7.9	2.7	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	7.5	3.1	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.51	0.12
Methylene chloride	47 lc	13 lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.9	0.44
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.67	0.15
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.19	0.038	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.061	0.015	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.40	0.063	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.55	0.17	Naphthalene	0.13	0.024
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	OA-1_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-14
Date Analyzed:	12/05/20	Data File:	120434.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.9	0.58	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	<2.4	<1	Trichloroethene	<0.11	<0.02
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	5.0	2.1	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	<0.87	<0.2
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	<0.43	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.093	0.019	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.073	0.018	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.47	0.074	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.42	0.13	Naphthalene	<0.057 j	<0.011 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	OA-2_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-15
Date Analyzed:	12/05/20	Data File:	120435.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	107	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	4.4	2.6	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	3.0	0.60	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	<2.4	<1	Trichloroethene	<0.11	<0.02
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	37	16	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	64 lc	19 lc	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	0.91	0.21
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	<0.43	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	3.9	1.1	Bromoform	<2.1	<0.2
Chloroform	0.098	0.020	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	16	5.4	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.097	0.024	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	0.52	0.082	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.59	0.18	Naphthalene	0.079 j	0.015 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-1_113020	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-16 1/5.5
Date Analyzed:	12/03/20	Data File:	120311.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<6.6	<3.8	1,2-Dichloropropane	<1.3	<0.28
Dichlorodifluoromethane	<2.7	<0.55	1,4-Dioxane	<2	<0.55
Chloromethane	<20	<9.9	2,2,4-Trimethylpentane	<26	<5.5
F-114	<3.8	<0.55	Methyl methacrylate	<23	<5.5
Vinyl chloride	<1.4	<0.55	Heptane	<23	<5.5
1,3-Butadiene	<0.24	<0.11	Bromodichloromethane	<0.37	<0.055
Butane	<13	<5.5	Trichloroethene	<0.59	<0.11
Bromomethane	<13	<3.3	cis-1,3-Dichloropropene	<2.5	<0.55
Chloroethane	<15	<5.5	4-Methyl-2-pentanone	<23	<5.5
Vinyl bromide	<2.4	<0.55	trans-1,3-Dichloropropene	<2.5	<0.55
Ethanol	180	97	Toluene	<100	<27
Acrolein	<11	<4.9	1,1,2-Trichloroethane	<0.3	<0.055
Pentane	<16	<5.5	2-Hexanone	<23	<5.5
Trichlorofluoromethane	<12	<2.2	Tetrachloroethene	<37	<5.5
Acetone	510 ve	210 ve	Dibromochloromethane	<0.47	<0.055
2-Propanol	670 ve	270 ve	1,2-Dibromoethane (EDB)	<0.42	<0.055
1,1-Dichloroethene	<2.2	<0.55	Chlorobenzene	<2.5	<0.55
trans-1,2-Dichloroethene	<2.2	<0.55	Ethylbenzene	<2.4	<0.55
Methylene chloride	<190	<55	1,1,2,2-Tetrachloroethane	<0.76	<0.11
t-Butyl alcohol (TBA)	<67	<22	Nonane	<29	<5.5
3-Chloropropene	<8.6	<2.7	Isopropylbenzene	<14	<2.7
CFC-113	<4.2	<0.55	2-Chlorotoluene	<28	<5.5
Carbon disulfide	<34	<11	Propylbenzene	<14	<2.7
Methyl t-butyl ether (MTBE)	<9.9	<2.7	4-Ethyltoluene	<14	<2.7
Vinyl acetate	<39	<11	m,p-Xylene	<4.8	<1.1
1,1-Dichloroethane	<2.2	<0.55	o-Xylene	<2.4	<0.55
cis-1,2-Dichloroethene	<2.2	<0.55	Styrene	<4.7	<1.1
Hexane	<19	<5.5	Bromoform	<11	<1.1
Chloroform	<0.27	<0.055	Benzyl chloride	<0.28	<0.055
Ethyl acetate	<40	<11	1,3,5-Trimethylbenzene	<14	<2.7
Tetrahydrofuran	<1.6	<0.55	1,2,4-Trimethylbenzene	<14	<2.7
2-Butanone (MEK)	<16	<5.5	1,3-Dichlorobenzene	<3.3	<0.55
1,2-Dichloroethane (EDC)	<0.22	<0.055	1,4-Dichlorobenzene	<1.3	<0.21
1,1,1-Trichloroethane	3.6	0.65	1,2-Dichlorobenzene	<3.3	<0.55
Carbon tetrachloride	<1.7	<0.28	1,2,4-Trichlorobenzene	<4.1	<0.55
Benzene	2.4	0.74	Naphthalene	<1.4	<0.28
Cyclohexane	<38	<11	Hexachlorobutadiene	<1.2	<0.11

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-2_113020	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-17 1/3.6
Date Analyzed:	12/03/20	Data File:	120313.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	87	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<4.3	<2.5	1,2-Dichloropropane	<0.83	<0.18
Dichlorodifluoromethane	3.1	0.62	1,4-Dioxane	<1.3	<0.36
Chloromethane	<13	<6.5	2,2,4-Trimethylpentane	<17	<3.6
F-114	<2.5	<0.36	Methyl methacrylate	<15	<3.6
Vinyl chloride	<0.92	<0.36	Heptane	<15	<3.6
1,3-Butadiene	<0.16	<0.072	Bromodichloromethane	<0.24	<0.036
Butane	36	15	Trichloroethene	0.58	0.11
Bromomethane	<8.4	<2.2	cis-1,3-Dichloropropene	<1.6	<0.36
Chloroethane	<9.5	<3.6	4-Methyl-2-pentanone	<15	<3.6
Vinyl bromide	<1.6	<0.36	trans-1,3-Dichloropropene	<1.6	<0.36
Ethanol	220 ve	110 ve	Toluene	<68	<18
Acrolein	<7.4	<3.2	1,1,2-Trichloroethane	<0.2	<0.036
Pentane	18	6.1	2-Hexanone	<15	<3.6
Trichlorofluoromethane	<8.1	<1.4	Tetrachloroethene	<24	<3.6
Acetone	360 ve	150 ve	Dibromochloromethane	<0.31	<0.036
2-Propanol	97	39	1,2-Dibromoethane (EDB)	<0.28	<0.036
1,1-Dichloroethene	<1.4	<0.36	Chlorobenzene	<1.7	<0.36
trans-1,2-Dichloroethene	<1.4	<0.36	Ethylbenzene	<1.6	<0.36
Methylene chloride	<130	<36	1,1,2,2-Tetrachloroethane	<0.49	<0.072
t-Butyl alcohol (TBA)	<44	<14	Nonane	<19	<3.6
3-Chloropropene	<5.6	<1.8	Isopropylbenzene	<8.8	<1.8
CFC-113	8.4	1.1	2-Chlorotoluene	<19	<3.6
Carbon disulfide	<22	<7.2	Propylbenzene	<8.8	<1.8
Methyl t-butyl ether (MTBE)	<6.5	<1.8	4-Ethyltoluene	<8.8	<1.8
Vinyl acetate	<25	<7.2	m,p-Xylene	6.1	1.4
1,1-Dichloroethane	<1.5	<0.36	o-Xylene	1.8	0.41
cis-1,2-Dichloroethene	<1.4	<0.36	Styrene	<3.1	<0.72
Hexane	<13	<3.6	Bromoform	<7.4	<0.72
Chloroform	0.51	0.10	Benzyl chloride	<0.19	<0.036
Ethyl acetate	<26	<7.2	1,3,5-Trimethylbenzene	<8.8	<1.8
Tetrahydrofuran	<1.1	<0.36	1,2,4-Trimethylbenzene	<8.8	<1.8
2-Butanone (MEK)	11	3.9	1,3-Dichlorobenzene	<2.2	<0.36
1,2-Dichloroethane (EDC)	<0.15	<0.036	1,4-Dichlorobenzene	<0.83	<0.14
1,1,1-Trichloroethane	8.7	1.6	1,2-Dichlorobenzene	<2.2	<0.36
Carbon tetrachloride	<1.1	<0.18	1,2,4-Trichlorobenzene	<2.7	<0.36
Benzene	3.7	1.2	Naphthalene	5.5	1.0
Cyclohexane	<25	<7.2	Hexachlorobutadiene	<0.77	<0.072

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-3_113020	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-18 1/5.7
Date Analyzed:	12/03/20	Data File:	120314.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	93	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<6.9	<4	1,2-Dichloropropane	<1.3	<0.28
Dichlorodifluoromethane	3.0	0.60	1,4-Dioxane	<2.1	<0.57
Chloromethane	<21	<10	2,2,4-Trimethylpentane	<27	<5.7
F-114	<4	<0.57	Methyl methacrylate	<23	<5.7
Vinyl chloride	<1.5	<0.57	Heptane	<23	<5.7
1,3-Butadiene	<0.25	<0.11	Bromodichloromethane	<0.38	<0.057
Butane	15	6.1	Trichloroethene	0.64	0.12
Bromomethane	<13	<3.4	cis-1,3-Dichloropropene	<2.6	<0.57
Chloroethane	<15	<5.7	4-Methyl-2-pentanone	<23	<5.7
Vinyl bromide	<2.5	<0.57	trans-1,3-Dichloropropene	<2.6	<0.57
Ethanol	150	79	Toluene	<110	<28
Acrolein	<12	<5.1	1,1,2-Trichloroethane	<0.31	<0.057
Pentane	<17	<5.7	2-Hexanone	<23	<5.7
Trichlorofluoromethane	<13	<2.3	Tetrachloroethene	<39	<5.7
Acetone	1,200 ve	500 ve	Dibromochloromethane	<0.49	<0.057
2-Propanol	270	110	1,2-Dibromoethane (EDB)	<0.44	<0.057
1,1-Dichloroethene	<2.3	<0.57	Chlorobenzene	<2.6	<0.57
trans-1,2-Dichloroethene	<2.3	<0.57	Ethylbenzene	3.1	0.71
Methylene chloride	<200	<57	1,1,2,2-Tetrachloroethane	<0.78	<0.11
t-Butyl alcohol (TBA)	<69	<23	Nonane	<30	<5.7
3-Chloropropene	<8.9	<2.8	Isopropylbenzene	<14	<2.8
CFC-113	<4.4	<0.57	2-Chlorotoluene	<30	<5.7
Carbon disulfide	<36	<11	Propylbenzene	<14	<2.8
Methyl t-butyl ether (MTBE)	<10	<2.8	4-Ethyltoluene	<14	<2.8
Vinyl acetate	<40	<11	m,p-Xylene	12	2.8
1,1-Dichloroethane	<2.3	<0.57	o-Xylene	3.7	0.85
cis-1,2-Dichloroethene	<2.3	<0.57	Styrene	<4.9	<1.1
Hexane	<20	<5.7	Bromoform	<12	<1.1
Chloroform	<0.28	<0.057	Benzyl chloride	<0.3	<0.057
Ethyl acetate	<41	<11	1,3,5-Trimethylbenzene	<14	<2.8
Tetrahydrofuran	2.5	0.84	1,2,4-Trimethylbenzene	<14	<2.8
2-Butanone (MEK)	42	14	1,3-Dichlorobenzene	<3.4	<0.57
1,2-Dichloroethane (EDC)	<0.23	<0.057	1,4-Dichlorobenzene	<1.4	<0.22
1,1,1-Trichloroethane	<3.1	<0.57	1,2-Dichlorobenzene	<3.4	<0.57
Carbon tetrachloride	<1.8	<0.28	1,2,4-Trichlorobenzene	<4.2	<0.57
Benzene	<1.8	<0.57	Naphthalene	4.8	0.92
Cyclohexane	<39	<11	Hexachlorobutadiene	<1.2	<0.11

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-4_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-19 1/5.3
Date Analyzed:	12/03/20	Data File:	120315.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	105	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<6.4	<3.7	1,2-Dichloropropane	<1.2	<0.26
Dichlorodifluoromethane	2.9	0.58	1,4-Dioxane	<1.9	<0.53
Chloromethane	<20	<9.5	2,2,4-Trimethylpentane	<25	<5.3
F-114	<3.7	<0.53	Methyl methacrylate	<22	<5.3
Vinyl chloride	<1.4	<0.53	Heptane	<22	<5.3
1,3-Butadiene	<0.23	<0.11	Bromodichloromethane	<0.36	<0.053
Butane	<13	<5.3	Trichloroethene	0.83	0.15
Bromomethane	<12	<3.2	cis-1,3-Dichloropropene	<2.4	<0.53
Chloroethane	<14	<5.3	4-Methyl-2-pentanone	<22	<5.3
Vinyl bromide	<2.3	<0.53	trans-1,3-Dichloropropene	<2.4	<0.53
Ethanol	270 ve	140 ve	Toluene	<100	<26
Acrolein	<11	<4.8	1,1,2-Trichloroethane	<0.29	<0.053
Pentane	<16	<5.3	2-Hexanone	<22	<5.3
Trichlorofluoromethane	<12	<2.1	Tetrachloroethene	<36	<5.3
Acetone	2,000 ve	820 ve	Dibromochloromethane	<0.45	<0.053
2-Propanol	3,600 ve	1,500 ve	1,2-Dibromoethane (EDB)	<0.41	<0.053
1,1-Dichloroethene	<2.1	<0.53	Chlorobenzene	<2.4	<0.53
trans-1,2-Dichloroethene	<2.1	<0.53	Ethylbenzene	<2.3	<0.53
Methylene chloride	<180	<53	1,1,2,2-Tetrachloroethane	<0.73	<0.11
t-Butyl alcohol (TBA)	<64	<21	Nonane	<28	<5.3
3-Chloropropene	<8.3	<2.6	Isopropylbenzene	<13	<2.6
CFC-113	4.8	0.63	2-Chlorotoluene	<27	<5.3
Carbon disulfide	<33	<11	Propylbenzene	<13	<2.6
Methyl t-butyl ether (MTBE)	<9.6	<2.6	4-Ethyltoluene	<13	<2.6
Vinyl acetate	<37	<11	m,p-Xylene	6.7	1.5
1,1-Dichloroethane	<2.1	<0.53	o-Xylene	<2.3	<0.53
cis-1,2-Dichloroethene	<2.1	<0.53	Styrene	<4.5	<1.1
Hexane	<19	<5.3	Bromoform	<11	<1.1
Chloroform	<0.26	<0.053	Benzyl chloride	<0.27	<0.053
Ethyl acetate	<38	<11	1,3,5-Trimethylbenzene	<13	<2.6
Tetrahydrofuran	2.0	0.68	1,2,4-Trimethylbenzene	<13	<2.6
2-Butanone (MEK)	<16	<5.3	1,3-Dichlorobenzene	<3.2	<0.53
1,2-Dichloroethane (EDC)	<0.21	<0.053	1,4-Dichlorobenzene	<1.3	<0.2
1,1,1-Trichloroethane	<2.9	<0.53	1,2-Dichlorobenzene	<3.2	<0.53
Carbon tetrachloride	<1.7	<0.26	1,2,4-Trichlorobenzene	<3.9	<0.53
Benzene	<1.7	<0.53	Naphthalene	2.9	0.56
Cyclohexane	<36	<11	Hexachlorobutadiene	<1.1	<0.11

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-5_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-20 1/3.4
Date Analyzed:	12/03/20	Data File:	120316.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	93	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<4.1	<2.4	1,2-Dichloropropane	<0.79	<0.17
Dichlorodifluoromethane	2.5	0.50	1,4-Dioxane	<1.2	<0.34
Chloromethane	<13	<6.1	2,2,4-Trimethylpentane	<16	<3.4
F-114	<2.4	<0.34	Methyl methacrylate	<14	<3.4
Vinyl chloride	<0.87	<0.34	Heptane	<14	<3.4
1,3-Butadiene	<0.15	<0.068	Bromodichloromethane	<0.23	<0.034
Butane	<8.1	<3.4	Trichloroethene	0.37	0.068
Bromomethane	<7.9	<2	cis-1,3-Dichloropropene	<1.5	<0.34
Chloroethane	<9	<3.4	4-Methyl-2-pentanone	<14	<3.4
Vinyl bromide	<1.5	<0.34	trans-1,3-Dichloropropene	<1.5	<0.34
Ethanol	210 ve	110 ve	Toluene	<64	<17
Acrolein	<7	<3.1	1,1,2-Trichloroethane	<0.19	<0.034
Pentane	<10	<3.4	2-Hexanone	<14	<3.4
Trichlorofluoromethane	<7.6	<1.4	Tetrachloroethene	<23	<3.4
Acetone	410 ve	170 ve	Dibromochloromethane	<0.29	<0.034
2-Propanol	120	48	1,2-Dibromoethane (EDB)	<0.26	<0.034
1,1-Dichloroethene	<1.3	<0.34	Chlorobenzene	<1.6	<0.34
trans-1,2-Dichloroethene	<1.3	<0.34	Ethylbenzene	7.4	1.7
Methylene chloride	<120	<34	1,1,2,2-Tetrachloroethane	<0.47	<0.068
t-Butyl alcohol (TBA)	<41	<14	Nonane	<18	<3.4
3-Chloropropene	<5.3	<1.7	Isopropylbenzene	<8.4	<1.7
CFC-113	<2.6	<0.34	2-Chlorotoluene	<18	<3.4
Carbon disulfide	<21	<6.8	Propylbenzene	<8.4	<1.7
Methyl t-butyl ether (MTBE)	<6.1	<1.7	4-Ethyltoluene	<8.4	<1.7
Vinyl acetate	<24	<6.8	m,p-Xylene	29	6.8
1,1-Dichloroethane	<1.4	<0.34	o-Xylene	6.9	1.6
cis-1,2-Dichloroethene	<1.3	<0.34	Styrene	<2.9	<0.68
Hexane	<12	<3.4	Bromoform	<7	<0.68
Chloroform	<0.17	<0.034	Benzyl chloride	<0.18	<0.034
Ethyl acetate	<25	<6.8	1,3,5-Trimethylbenzene	<8.4	<1.7
Tetrahydrofuran	15	5.1	1,2,4-Trimethylbenzene	11	2.2
2-Butanone (MEK)	<10	<3.4	1,3-Dichlorobenzene	<2	<0.34
1,2-Dichloroethane (EDC)	<0.14	<0.034	1,4-Dichlorobenzene	<0.79	<0.13
1,1,1-Trichloroethane	<1.9	<0.34	1,2-Dichlorobenzene	<2	<0.34
Carbon tetrachloride	<1.1	<0.17	1,2,4-Trichlorobenzene	<2.5	<0.34
Benzene	2.6	0.81	Naphthalene	2.1	0.41
Cyclohexane	<23	<6.8	Hexachlorobutadiene	<0.73	<0.068

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-6_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-21 1/8.1
Date Analyzed:	12/03/20	Data File:	120317.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	85	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	65	38	1,2-Dichloropropane	<1.9	<0.4
Dichlorodifluoromethane	<4	<0.81	1,4-Dioxane	5.5	1.5
Chloromethane	<30	<15	2,2,4-Trimethylpentane	40	8.7
F-114	<5.7	<0.81	Methyl methacrylate	<33	<8.1
Vinyl chloride	<2.1	<0.81	Heptane	<33	<8.1
1,3-Butadiene	<0.36	<0.16	Bromodichloromethane	<0.54	<0.081
Butane	29	12	Trichloroethene	<0.87	<0.16
Bromomethane	<19	<4.9	cis-1,3-Dichloropropene	<3.7	<0.81
Chloroethane	<21	<8.1	4-Methyl-2-pentanone	<33	<8.1
Vinyl bromide	<3.5	<0.81	trans-1,3-Dichloropropene	<3.7	<0.81
Ethanol	640 ve	340 ve	Toluene	<150	<40
Acrolein	<17	<7.3	1,1,2-Trichloroethane	<0.44	<0.081
Pentane	<24	<8.1	2-Hexanone	<33	<8.1
Trichlorofluoromethane	<18	<3.2	Tetrachloroethene	93	14
Acetone	2,000 ve	830 ve	Dibromochloromethane	<0.69	<0.081
2-Propanol	1,000 ve	410 ve	1,2-Dibromoethane (EDB)	<0.62	<0.081
1,1-Dichloroethene	<3.2	<0.81	Chlorobenzene	<3.7	<0.81
trans-1,2-Dichloroethene	<3.2	<0.81	Ethylbenzene	51	12
Methylene chloride	<280	<81	1,1,2,2-Tetrachloroethane	<1.1	<0.16
t-Butyl alcohol (TBA)	<98	<32	Nonane	<42	<8.1
3-Chloropropene	<13	<4	Isopropylbenzene	<20	<4
CFC-113	340	45	2-Chlorotoluene	<42	<8.1
Carbon disulfide	<50	<16	Propylbenzene	<20	<4
Methyl t-butyl ether (MTBE)	<15	<4	4-Ethyltoluene	<20	<4
Vinyl acetate	<57	<16	m,p-Xylene	180	43
1,1-Dichloroethane	<3.3	<0.81	o-Xylene	49	11
cis-1,2-Dichloroethene	<3.2	<0.81	Styrene	<6.9	<1.6
Hexane	<29	<8.1	Bromoform	<17	<1.6
Chloroform	<0.4	<0.081	Benzyl chloride	<0.42	<0.081
Ethyl acetate	<58	<16	1,3,5-Trimethylbenzene	<20	<4
Tetrahydrofuran	26	8.8	1,2,4-Trimethylbenzene	43	8.7
2-Butanone (MEK)	140	46	1,3-Dichlorobenzene	<4.9	<0.81
1,2-Dichloroethane (EDC)	<0.33	<0.081	1,4-Dichlorobenzene	<1.9	<0.31
1,1,1-Trichloroethane	32	5.9	1,2-Dichlorobenzene	<4.9	<0.81
Carbon tetrachloride	<2.5	<0.4	1,2,4-Trichlorobenzene	<6	<0.81
Benzene	<2.6	<0.81	Naphthalene	6.5	1.2
Cyclohexane	<56	<16	Hexachlorobutadiene	<1.7	<0.16

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-7_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-22 1/5.5
Date Analyzed:	12/03/20	Data File:	120318.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	108	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	100	59	1,2-Dichloropropane	<1.3	<0.28
Dichlorodifluoromethane	3.2	0.65	1,4-Dioxane	<2	<0.55
Chloromethane	<20	<9.9	2,2,4-Trimethylpentane	<26	<5.5
F-114	<3.8	<0.55	Methyl methacrylate	<23	<5.5
Vinyl chloride	<1.4	<0.55	Heptane	<23	<5.5
1,3-Butadiene	<0.24	<0.11	Bromodichloromethane	<0.37	<0.055
Butane	36	15	Trichloroethene	0.74	0.14
Bromomethane	<13	<3.3	cis-1,3-Dichloropropene	<2.5	<0.55
Chloroethane	<15	<5.5	4-Methyl-2-pentanone	<23	<5.5
Vinyl bromide	<2.4	<0.55	trans-1,3-Dichloropropene	<2.5	<0.55
Ethanol	400 ve	210 ve	Toluene	390	100
Acrolein	<11	<4.9	1,1,2-Trichloroethane	<0.3	<0.055
Pentane	28	9.5	2-Hexanone	<23	<5.5
Trichlorofluoromethane	<12	<2.2	Tetrachloroethene	<37	<5.5
Acetone	580 ve	250 ve	Dibromochloromethane	<0.47	<0.055
2-Propanol	320	130	1,2-Dibromoethane (EDB)	<0.42	<0.055
1,1-Dichloroethene	4.5	1.1	Chlorobenzene	<2.5	<0.55
trans-1,2-Dichloroethene	<2.2	<0.55	Ethylbenzene	27	6.1
Methylene chloride	<190	<55	1,1,2,2-Tetrachloroethane	<0.76	<0.11
t-Butyl alcohol (TBA)	<67	<22	Nonane	<29	<5.5
3-Chloropropene	<8.6	<2.7	Isopropylbenzene	<14	<2.7
CFC-113	260	33	2-Chlorotoluene	<28	<5.5
Carbon disulfide	<34	<11	Propylbenzene	<14	<2.7
Methyl t-butyl ether (MTBE)	<9.9	<2.7	4-Ethyltoluene	<14	<2.7
Vinyl acetate	<39	<11	m,p-Xylene	98	22
1,1-Dichloroethane	<2.2	<0.55	o-Xylene	37	8.5
cis-1,2-Dichloroethene	<2.2	<0.55	Styrene	<4.7	<1.1
Hexane	<19	<5.5	Bromoform	<11	<1.1
Chloroform	<0.27	<0.055	Benzyl chloride	<0.28	<0.055
Ethyl acetate	<40	<11	1,3,5-Trimethylbenzene	16	3.3
Tetrahydrofuran	18	5.9	1,2,4-Trimethylbenzene	95	19
2-Butanone (MEK)	41	14	1,3-Dichlorobenzene	<3.3	<0.55
1,2-Dichloroethane (EDC)	<0.22	<0.055	1,4-Dichlorobenzene	<1.3	<0.21
1,1,1-Trichloroethane	<3	<0.55	1,2-Dichlorobenzene	<3.3	<0.55
Carbon tetrachloride	7.5	1.2	1,2,4-Trichlorobenzene	<4.1	<0.55
Benzene	4.7	1.5	Naphthalene	31	5.9
Cyclohexane	<38	<11	Hexachlorobutadiene	<1.2	<0.11

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-8_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-23 1/3.4
Date Analyzed:	12/03/20	Data File:	120319.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<4.1	<2.4	1,2-Dichloropropane	<0.79	<0.17
Dichlorodifluoromethane	2.8	0.56	1,4-Dioxane	<1.2	<0.34
Chloromethane	<13	<6.1	2,2,4-Trimethylpentane	<16	<3.4
F-114	<2.4	<0.34	Methyl methacrylate	<14	<3.4
Vinyl chloride	<0.87	<0.34	Heptane	<14	<3.4
1,3-Butadiene	<0.15	<0.068	Bromodichloromethane	<0.23	<0.034
Butane	<8.1	<3.4	Trichloroethene	0.38	0.071
Bromomethane	<7.9	<2	cis-1,3-Dichloropropene	<1.5	<0.34
Chloroethane	<9	<3.4	4-Methyl-2-pentanone	<14	<3.4
Vinyl bromide	<1.5	<0.34	trans-1,3-Dichloropropene	<1.5	<0.34
Ethanol	490 ve	260 ve	Toluene	<64	<17
Acrolein	<7	<3.1	1,1,2-Trichloroethane	<0.19	<0.034
Pentane	<10	<3.4	2-Hexanone	<14	<3.4
Trichlorofluoromethane	<7.6	<1.4	Tetrachloroethene	<23	<3.4
Acetone	240 ve	100 ve	Dibromochloromethane	<0.29	<0.034
2-Propanol	67	27	1,2-Dibromoethane (EDB)	<0.26	<0.034
1,1-Dichloroethene	<1.3	<0.34	Chlorobenzene	<1.6	<0.34
trans-1,2-Dichloroethene	<1.3	<0.34	Ethylbenzene	<1.5	<0.34
Methylene chloride	<120	<34	1,1,2,2-Tetrachloroethane	<0.47	<0.068
t-Butyl alcohol (TBA)	<41	<14	Nonane	<18	<3.4
3-Chloropropene	<5.3	<1.7	Isopropylbenzene	<8.4	<1.7
CFC-113	<2.6	<0.34	2-Chlorotoluene	<18	<3.4
Carbon disulfide	<21	<6.8	Propylbenzene	<8.4	<1.7
Methyl t-butyl ether (MTBE)	<6.1	<1.7	4-Ethyltoluene	<8.4	<1.7
Vinyl acetate	<24	<6.8	m,p-Xylene	5.6	1.3
1,1-Dichloroethane	<1.4	<0.34	o-Xylene	2.2	0.51
cis-1,2-Dichloroethene	<1.3	<0.34	Styrene	<2.9	<0.68
Hexane	<12	<3.4	Bromoform	<7	<0.68
Chloroform	0.55	0.11	Benzyl chloride	<0.18	<0.034
Ethyl acetate	<25	<6.8	1,3,5-Trimethylbenzene	<8.4	<1.7
Tetrahydrofuran	1.4	0.46	1,2,4-Trimethylbenzene	<8.4	<1.7
2-Butanone (MEK)	<10	<3.4	1,3-Dichlorobenzene	<2	<0.34
1,2-Dichloroethane (EDC)	<0.14	<0.034	1,4-Dichlorobenzene	<0.79	<0.13
1,1,1-Trichloroethane	<1.9	<0.34	1,2-Dichlorobenzene	<2	<0.34
Carbon tetrachloride	<1.1	<0.17	1,2,4-Trichlorobenzene	<2.5	<0.34
Benzene	<1.1	<0.34	Naphthalene	6.7	1.3
Cyclohexane	<23	<6.8	Hexachlorobutadiene	<0.73	<0.068

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-9_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-24 1/5.7
Date Analyzed:	12/03/20	Data File:	120320.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<6.9	<4	1,2-Dichloropropane	<1.3	<0.28
Dichlorodifluoromethane	<2.8	<0.57	1,4-Dioxane	<2.1	<0.57
Chloromethane	<21	<10	2,2,4-Trimethylpentane	<27	<5.7
F-114	<4	<0.57	Methyl methacrylate	<23	<5.7
Vinyl chloride	<1.5	<0.57	Heptane	<23	<5.7
1,3-Butadiene	<0.25	<0.11	Bromodichloromethane	<0.38	<0.057
Butane	<14	<5.7	Trichloroethene	2.8	0.52
Bromomethane	<13	<3.4	cis-1,3-Dichloropropene	<2.6	<0.57
Chloroethane	<15	<5.7	4-Methyl-2-pentanone	<23	<5.7
Vinyl bromide	<2.5	<0.57	trans-1,3-Dichloropropene	<2.6	<0.57
Ethanol	370 ve	200 ve	Toluene	<110	<28
Acrolein	<12	<5.1	1,1,2-Trichloroethane	<0.31	<0.057
Pentane	<17	<5.7	2-Hexanone	<23	<5.7
Trichlorofluoromethane	<13	<2.3	Tetrachloroethene	<39	<5.7
Acetone	430 ve	180 ve	Dibromochloromethane	<0.49	<0.057
2-Propanol	110	43	1,2-Dibromoethane (EDB)	<0.44	<0.057
1,1-Dichloroethene	<2.3	<0.57	Chlorobenzene	<2.6	<0.57
trans-1,2-Dichloroethene	<2.3	<0.57	Ethylbenzene	12	2.7
Methylene chloride	<200	<57	1,1,2,2-Tetrachloroethane	<0.78	<0.11
t-Butyl alcohol (TBA)	<69	<23	Nonane	<30	<5.7
3-Chloropropene	<8.9	<2.8	Isopropylbenzene	<14	<2.8
CFC-113	54	7.0	2-Chlorotoluene	<30	<5.7
Carbon disulfide	<36	<11	Propylbenzene	<14	<2.8
Methyl t-butyl ether (MTBE)	<10	<2.8	4-Ethyltoluene	<14	<2.8
Vinyl acetate	<40	<11	m,p-Xylene	44	10
1,1-Dichloroethane	<2.3	<0.57	o-Xylene	16	3.6
cis-1,2-Dichloroethene	<2.3	<0.57	Styrene	<4.9	<1.1
Hexane	<20	<5.7	Bromoform	<12	<1.1
Chloroform	<0.28	<0.057	Benzyl chloride	<0.3	<0.057
Ethyl acetate	<41	<11	1,3,5-Trimethylbenzene	<14	<2.8
Tetrahydrofuran	2.6	0.87	1,2,4-Trimethylbenzene	18	3.6
2-Butanone (MEK)	<17	<5.7	1,3-Dichlorobenzene	<3.4	<0.57
1,2-Dichloroethane (EDC)	<0.23	<0.057	1,4-Dichlorobenzene	<1.4	<0.22
1,1,1-Trichloroethane	6.5	1.2	1,2-Dichlorobenzene	<3.4	<0.57
Carbon tetrachloride	<1.8	<0.28	1,2,4-Trichlorobenzene	<4.2	<0.57
Benzene	<1.8	<0.57	Naphthalene	6.2	1.2
Cyclohexane	<39	<11	Hexachlorobutadiene	<1.2	<0.11

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-10_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-25 1/5.8
Date Analyzed:	12/03/20	Data File:	120321.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	92	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<7	<4.1	1,2-Dichloropropane	<1.3	<0.29
Dichlorodifluoromethane	<2.9	<0.58	1,4-Dioxane	<2.1	<0.58
Chloromethane	<22	<10	2,2,4-Trimethylpentane	<27	<5.8
F-114	<4.1	<0.58	Methyl methacrylate	<24	<5.8
Vinyl chloride	<1.5	<0.58	Heptane	<24	<5.8
1,3-Butadiene	<0.26	<0.12	Bromodichloromethane	<0.39	<0.058
Butane	<14	<5.8	Trichloroethene	22	4.1
Bromomethane	<14	<3.5	cis-1,3-Dichloropropene	<2.6	<0.58
Chloroethane	<15	<5.8	4-Methyl-2-pentanone	<24	<5.8
Vinyl bromide	<2.5	<0.58	trans-1,3-Dichloropropene	<2.6	<0.58
Ethanol	240	130	Toluene	<110	<29
Acrolein	<12	<5.2	1,1,2-Trichloroethane	<0.32	<0.058
Pentane	<17	<5.8	2-Hexanone	<24	<5.8
Trichlorofluoromethane	<13	<2.3	Tetrachloroethene	<39	<5.8
Acetone	460 ve	190 ve	Dibromochloromethane	<0.49	<0.058
2-Propanol	83	34	1,2-Dibromoethane (EDB)	<0.45	<0.058
1,1-Dichloroethene	<2.3	<0.58	Chlorobenzene	<2.7	<0.58
trans-1,2-Dichloroethene	<2.3	<0.58	Ethylbenzene	6.1	1.4
Methylene chloride	<200	<58	1,1,2,2-Tetrachloroethane	<0.8	<0.12
t-Butyl alcohol (TBA)	<70	<23	Nonane	<30	<5.8
3-Chloropropene	<9.1	<2.9	Isopropylbenzene	<14	<2.9
CFC-113	28	3.6	2-Chlorotoluene	<30	<5.8
Carbon disulfide	<36	<12	Propylbenzene	<14	<2.9
Methyl t-butyl ether (MTBE)	<10	<2.9	4-Ethyltoluene	<14	<2.9
Vinyl acetate	<41	<12	m,p-Xylene	24	5.5
1,1-Dichloroethane	<2.3	<0.58	o-Xylene	7.7	1.8
cis-1,2-Dichloroethene	<2.3	<0.58	Styrene	<4.9	<1.2
Hexane	<20	<5.8	Bromoform	<12	<1.2
Chloroform	<0.28	<0.058	Benzyl chloride	<0.3	<0.058
Ethyl acetate	<42	<12	1,3,5-Trimethylbenzene	<14	<2.9
Tetrahydrofuran	13	4.6	1,2,4-Trimethylbenzene	<14	<2.9
2-Butanone (MEK)	<17	<5.8	1,3-Dichlorobenzene	<3.5	<0.58
1,2-Dichloroethane (EDC)	<0.23	<0.058	1,4-Dichlorobenzene	<1.4	<0.22
1,1,1-Trichloroethane	<3.2	<0.58	1,2-Dichlorobenzene	<3.5	<0.58
Carbon tetrachloride	<1.8	<0.29	1,2,4-Trichlorobenzene	<4.3	<0.58
Benzene	<1.9	<0.58	Naphthalene	8.8	1.7
Cyclohexane	<40	<12	Hexachlorobutadiene	<1.2	<0.12

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-11_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-26 1/6.1
Date Analyzed:	12/03/20	Data File:	120322.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	88	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<7.3	<4.3	1,2-Dichloropropane	<1.4	<0.3
Dichlorodifluoromethane	<3	<0.61	1,4-Dioxane	<2.2	<0.61
Chloromethane	<23	<11	2,2,4-Trimethylpentane	<28	<6.1
F-114	<4.3	<0.61	Methyl methacrylate	<25	<6.1
Vinyl chloride	<1.6	<0.61	Heptane	<25	<6.1
1,3-Butadiene	<0.27	<0.12	Bromodichloromethane	<0.41	<0.061
Butane	<15	<6.1	Trichloroethene	<0.66	<0.12
Bromomethane	<14	<3.7	cis-1,3-Dichloropropene	<2.8	<0.61
Chloroethane	<16	<6.1	4-Methyl-2-pentanone	<25	<6.1
Vinyl bromide	<2.7	<0.61	trans-1,3-Dichloropropene	<2.8	<0.61
Ethanol	260	140	Toluene	<110	<30
Acrolein	<13	<5.5	1,1,2-Trichloroethane	<0.33	<0.061
Pentane	<18	<6.1	2-Hexanone	<25	<6.1
Trichlorofluoromethane	<14	<2.4	Tetrachloroethene	<41	<6.1
Acetone	220	93	Dibromochloromethane	<0.52	<0.061
2-Propanol	200	80	1,2-Dibromoethane (EDB)	<0.47	<0.061
1,1-Dichloroethene	<2.4	<0.61	Chlorobenzene	<2.8	<0.61
trans-1,2-Dichloroethene	<2.4	<0.61	Ethylbenzene	<2.6	<0.61
Methylene chloride	<210	<61	1,1,2,2-Tetrachloroethane	<0.84	<0.12
t-Butyl alcohol (TBA)	<74	<24	Nonane	<32	<6.1
3-Chloropropene	<9.5	<3	Isopropylbenzene	<15	<3
CFC-113	16	2.1	2-Chlorotoluene	<32	<6.1
Carbon disulfide	<38	<12	Propylbenzene	<15	<3
Methyl t-butyl ether (MTBE)	<11	<3	4-Ethyltoluene	<15	<3
Vinyl acetate	<43	<12	m,p-Xylene	6.4	1.5
1,1-Dichloroethane	<2.5	<0.61	o-Xylene	2.6	0.61
cis-1,2-Dichloroethene	<2.4	<0.61	Styrene	<5.2	<1.2
Hexane	<22	<6.1	Bromoform	<13	<1.2
Chloroform	<0.3	<0.061	Benzyl chloride	<0.32	<0.061
Ethyl acetate	<44	<12	1,3,5-Trimethylbenzene	<15	<3
Tetrahydrofuran	7.1	2.4	1,2,4-Trimethylbenzene	<15	<3
2-Butanone (MEK)	<18	<6.1	1,3-Dichlorobenzene	<3.7	<0.61
1,2-Dichloroethane (EDC)	<0.25	<0.061	1,4-Dichlorobenzene	<1.5	<0.23
1,1,1-Trichloroethane	13	2.5	1,2-Dichlorobenzene	<3.7	<0.61
Carbon tetrachloride	<1.9	<0.3	1,2,4-Trichlorobenzene	<4.5	<0.61
Benzene	<1.9	<0.61	Naphthalene	2.0	0.38
Cyclohexane	<42	<12	Hexachlorobutadiene	<1.3	<0.12

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SV-12_120120	Client:	GeoEngineers, Inc
Date Received:	12/01/20	Project:	5531-014-01, F&BI 012022
Date Collected:	12/01/20	Lab ID:	012022-27 1/17
Date Analyzed:	12/03/20	Data File:	120323.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	88	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<20	<12	1,2-Dichloropropane	<3.9	<0.85
Dichlorodifluoromethane	<8.4	<1.7	1,4-Dioxane	<6.1	<1.7
Chloromethane	<63	<31	2,2,4-Trimethylpentane	<79	<17
F-114	<12	<1.7	Methyl methacrylate	<70	<17
Vinyl chloride	<4.3	<1.7	Heptane	<70	<17
1,3-Butadiene	<0.75	<0.34	Bromodichloromethane	<1.1	<0.17
Butane	<40	<17	Trichloroethene	30,000 ve	5,600 ve
Bromomethane	<40	<10	cis-1,3-Dichloropropene	<7.7	<1.7
Chloroethane	<45	<17	4-Methyl-2-pentanone	<70	<17
Vinyl bromide	<7.4	<1.7	trans-1,3-Dichloropropene	<7.7	<1.7
Ethanol	150	77	Toluene	<320	<85
Acrolein	<35	<15	1,1,2-Trichloroethane	1.8	0.32
Pentane	<50	<17	2-Hexanone	<70	<17
Trichlorofluoromethane	<38	<6.8	Tetrachloroethene	740	110
Acetone	190	78	Dibromochloromethane	<1.4	<0.17
2-Propanol	<150	<59	1,2-Dibromoethane (EDB)	<1.3	<0.17
1,1-Dichloroethene	930	240	Chlorobenzene	<7.8	<1.7
trans-1,2-Dichloroethene	<6.7	<1.7	Ethylbenzene	<7.4	<1.7
Methylene chloride	<590	<170	1,1,2,2-Tetrachloroethane	<2.3	<0.34
t-Butyl alcohol (TBA)	<210	<68	Nonane	<89	<17
3-Chloropropene	<27	<8.5	Isopropylbenzene	<42	<8.5
CFC-113	<13	<1.7	2-Chlorotoluene	<88	<17
Carbon disulfide	<110	<34	Propylbenzene	<42	<8.5
Methyl t-butyl ether (MTBE)	<31	<8.5	4-Ethyltoluene	<42	<8.5
Vinyl acetate	<120	<34	m,p-Xylene	17	3.9
1,1-Dichloroethane	530	130	o-Xylene	<7.4	<1.7
cis-1,2-Dichloroethene	20	5.0	Styrene	<14	<3.4
Hexane	<60	<17	Bromoform	<35	<3.4
Chloroform	170	35	Benzyl chloride	<0.88	<0.17
Ethyl acetate	<120	<34	1,3,5-Trimethylbenzene	<42	<8.5
Tetrahydrofuran	<5	<1.7	1,2,4-Trimethylbenzene	<42	<8.5
2-Butanone (MEK)	<50	<17	1,3-Dichlorobenzene	<10	<1.7
1,2-Dichloroethane (EDC)	<0.69	<0.17	1,4-Dichlorobenzene	<4	<0.65
1,1,1-Trichloroethane	7,900 ve	1,400 ve	1,2-Dichlorobenzene	<10	<1.7
Carbon tetrachloride	<5.3	<0.85	1,2,4-Trichlorobenzene	<13	<1.7
Benzene	<5.4	<1.7	Naphthalene	12	2.2
Cyclohexane	<120	<34	Hexachlorobutadiene	<3.6	<0.34

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	GeoEngineers, Inc
Date Received:	Not Applicable	Project:	5531-014-01, F&BI 012022
Date Collected:	Not Applicable	Lab ID:	00-2756 MB
Date Analyzed:	12/04/20	Data File:	120419.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	81	70	130

	Concentration			Concentration	
Compounds:	ug/m3	ppbv	Compounds:	ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	<0.49	<0.1	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	<2.4	<1	Trichloroethene	<0.11	<0.02
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	<4.8	<2	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	<0.87	<0.2
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	<0.43	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	<0.049	<0.01	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	<0.31	<0.05	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	<0.32	<0.1	Naphthalene	<0.26	<0.05
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.057 j	<0.011 j

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	GeoEngineers, Inc
Date Received:	Not Applicable	Project:	5531-014-01, F&BI 012022
Date Collected:	Not Applicable	Lab ID:	00-2554 MB
Date Analyzed:	12/03/20	Data File:	120310.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

Compounds:	Concentration ug/m3	ppbv	Compounds:	Concentration ug/m3	ppbv
Propene	<1.2	<0.7	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	<0.49	<0.1	1,4-Dioxane	<0.36	<0.1
Chloromethane	<3.7	<1.8	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.044	<0.02	Bromodichloromethane	<0.067	<0.01
Butane	<2.4	<1	Trichloroethene	<0.11	<0.02
Bromomethane	<2.3	<0.6	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<2.1	<0.9	1,1,2-Trichloroethane	<0.055	<0.01
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	<4.8	<2	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<35	<10	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.6	<0.5	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	<0.87	<0.2
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	<0.43	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	<0.049	<0.01	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01	1,4-Dichlorobenzene	<0.23	<0.038
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	<0.31	<0.05	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	<0.32	<0.1	Naphthalene	<0.26	<0.05
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022
Date Extracted: 12/08/20
Date Analyzed: 12/08/20

RESULTS FROM THE ANALYSIS OF AIR SAMPLES FOR HELIUM USING METHOD ASTM D1946

Results Reported as % Helium

Sample ID Laboratory ID	Helium
SV-1_113020 012022-16	<0.6
SV-2_113020 012022-17	<0.6
SV-3_113020 012022-18	<0.6
SV-4_120120 012022-19	<0.6
SV-5_120120 012022-20	<0.6
SV-6_120120 012022-21	<0.6
SV-7_120120 012022-22	<0.6
SV-8_120120 012022-23	<0.6
SV-9_120120 012022-24	<0.6
SV-10_120120 012022-25	<0.6
SV-11_120120 012022-26	<0.6

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022
Date Extracted: 12/08/20
Date Analyzed: 12/08/20

RESULTS FROM THE ANALYSIS OF AIR SAMPLES FOR HELIUM USING METHOD ASTM D1946

Results Reported as % Helium

Sample ID Laboratory ID	Helium
SV-12_120120 012022-27	<0.6
Method Blank 00-2803 MB	<0.6

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD MA-APH

Laboratory Code: 012022-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
APH EC5-8 aliphatics	ug/m3	45	46	2
APH EC9-12 aliphatics	ug/m3	140	160	13
APH EC9-10 aromatics	ug/m3	<25	<25	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
APH EC5-8 aliphatics	ug/m3	67	79	70-130
APH EC9-12 aliphatics	ug/m3	67	104	70-130
APH EC9-10 aromatics	ug/m3	67	96	70-130

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD MA-APH

Laboratory Code: 012022-16 1/5.5 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
APH EC5-8 aliphatics	ug/m3	750	890	17
APH EC9-12 aliphatics	ug/m3	<270	280	nm
APH EC9-10 aromatics	ug/m3	<140	<140	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
APH EC5-8 aliphatics	ug/m3	67	83	70-130
APH EC9-12 aliphatics	ug/m3	67	102	70-130
APH EC9-10 aromatics	ug/m3	67	99	70-130

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 012022-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Propene	ug/m3	<1.2	<1.2	nm
Dichlorodifluoromethane	ug/m3	2.4	2.9	19
Chloromethane	ug/m3	<3.7	<3.7	nm
F-114	ug/m3	<0.7	<0.7	nm
Vinyl chloride	ug/m3	<0.26	<0.26	nm
1,3-Butadiene	ug/m3	<0.044	<0.044	nm
Butane	ug/m3	3.4	4.8	34 vo
Bromomethane	ug/m3	<2.3	<2.3	nm
Chloroethane	ug/m3	<2.6	<2.6	nm
Vinyl bromide	ug/m3	<0.44	<0.44	nm
Ethanol	ug/m3	<7.5	<7.5	nm
Acrolein	ug/m3	<2.1	<2.1	nm
Pentane	ug/m3	<3	<3	nm
Trichlorofluoromethane	ug/m3	<2.2	<2.2	nm
Acetone	ug/m3	7.5	11	38 vo
2-Propanol	ug/m3	<8.6	<8.6	nm
1,1-Dichloroethene	ug/m3	<0.4	<0.4	nm
trans-1,2-Dichloroethene	ug/m3	<0.4	<0.4	nm
Methylene chloride	ug/m3	60	81	30
t-Butyl alcohol (TBA)	ug/m3	<12	<12	nm
3-Chloropropene	ug/m3	<1.6	<1.6	nm
CFC-113	ug/m3	<0.77	<0.77	nm
Carbon disulfide	ug/m3	<6.2	<6.2	nm
Methyl t-butyl ether (MTBE)	ug/m3	<1.8	<1.8	nm
Vinyl acetate	ug/m3	<7	<7	nm
1,1-Dichloroethane	ug/m3	<0.4	<0.4	nm
cis-1,2-Dichloroethene	ug/m3	<0.4	<0.4	nm
Hexane	ug/m3	4.0	4.6	14
Chloroform	ug/m3	0.11	0.11	0
Ethyl acetate	ug/m3	<7.2	<7.2	nm
Tetrahydrofuran	ug/m3	<0.29	<0.29	nm
2-Butanone (MEK)	ug/m3	<2.9	<2.9	nm
1,2-Dichloroethane (EDC)	ug/m3	0.061	0.077	23
1,1,1-Trichloroethane	ug/m3	<0.55	<0.55	nm
Carbon tetrachloride	ug/m3	0.40	0.43	7
Benzene	ug/m3	0.45	0.53	16
Cyclohexane	ug/m3	<6.9	<6.9	nm
1,2-Dichloropropane	ug/m3	<0.23	<0.23	nm
1,4-Dioxane	ug/m3	<0.36	<0.36	nm
2,2,4-Trimethylpentane	ug/m3	<4.7	<4.7	nm

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 012022-01 (Duplicate) (continued)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Methyl methacrylate	ug/m3	<4.1	<4.1	nm
Heptane	ug/m3	<4.1	<4.1	nm
Bromodichloromethane	ug/m3	<0.067	<0.067	nm
Trichloroethene	ug/m3	0.15	0.19	24
cis-1,3-Dichloropropene	ug/m3	<0.45	<0.45	nm
4-Methyl-2-pentanone	ug/m3	<4.1	<4.1	nm
trans-1,3-Dichloropropene	ug/m3	<0.45	<0.45	nm
Toluene	ug/m3	<19	<19	nm
1,1,2-Trichloroethane	ug/m3	<0.055	<0.055	nm
2-Hexanone	ug/m3	<4.1	<4.1	nm
Tetrachloroethene	ug/m3	<6.8	<6.8	nm
Dibromochloromethane	ug/m3	<0.085	<0.085	nm
1,2-Dibromoethane (EDB)	ug/m3	<0.077	<0.077	nm
Chlorobenzene	ug/m3	<0.46	<0.46	nm
Ethylbenzene	ug/m3	<0.43	<0.43	nm
1,1,2,2-Tetrachloroethane	ug/m3	<0.14	<0.14	nm
Nonane	ug/m3	<5.2	<5.2	nm
Isopropylbenzene	ug/m3	<2.5	<2.5	nm
2-Chlorotoluene	ug/m3	<5.2	<5.2	nm
Propylbenzene	ug/m3	<2.5	<2.5	nm
4-Ethyltoluene	ug/m3	<2.5	<2.5	nm
m,p-Xylene	ug/m3	1.4	1.7	19
o-Xylene	ug/m3	0.63	0.73	15
Styrene	ug/m3	<0.85	<0.85	nm
Bromoform	ug/m3	<2.1	<2.1	nm
Benzyl chloride	ug/m3	<0.052	<0.052	nm
1,3,5-Trimethylbenzene	ug/m3	<2.5	<2.5	nm
1,2,4-Trimethylbenzene	ug/m3	<2.5	<2.5	nm
1,3-Dichlorobenzene	ug/m3	<0.6	<0.6	nm
1,4-Dichlorobenzene	ug/m3	<0.23	<0.23	nm
1,2-Dichlorobenzene	ug/m3	<0.6	<0.6	nm
1,2,4-Trichlorobenzene	ug/m3	<0.74	<0.74	nm
Naphthalene	ug/m3	<0.26	<0.26	nm
Hexachlorobutadiene	ug/m3	<0.21	<0.21	nm

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Propene	ug/m3	23	113	70-130
Dichlorodifluoromethane	ug/m3	67	109	70-130
Chloromethane	ug/m3	28	117	70-130
F-114	ug/m3	94	108	70-130
Vinyl chloride	ug/m3	35	118	70-130
1,3-Butadiene	ug/m3	30	105	70-130
Butane	ug/m3	32	99	70-130
Bromomethane	ug/m3	52	100	70-130
Chloroethane	ug/m3	36	95	70-130
Vinyl bromide	ug/m3	59	114	70-130
Ethanol	ug/m3	25	85	70-130
Acrolein	ug/m3	31	123	70-130
Pentane	ug/m3	40	99	70-130
Trichlorofluoromethane	ug/m3	76	103	70-130
Acetone	ug/m3	32	109	70-130
2-Propanol	ug/m3	33	104	70-130
1,1-Dichloroethene	ug/m3	54	106	70-130
trans-1,2-Dichloroethene	ug/m3	54	98	70-130
Methylene chloride	ug/m3	94	91	70-130
t-Butyl alcohol (TBA)	ug/m3	41	108	70-130
3-Chloropropene	ug/m3	42	93	70-130
CFC-113	ug/m3	100	99	70-130
Carbon disulfide	ug/m3	42	94	70-130
Methyl t-butyl ether (MTBE)	ug/m3	49	101	70-130
Vinyl acetate	ug/m3	48	115	70-130
1,1-Dichloroethane	ug/m3	55	109	70-130
cis-1,2-Dichloroethene	ug/m3	54	102	70-130
Hexane	ug/m3	48	83	70-130
Chloroform	ug/m3	66	100	70-130
Ethyl acetate	ug/m3	49	101	70-130
Tetrahydrofuran	ug/m3	40	95	70-130
2-Butanone (MEK)	ug/m3	40	120	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	99	70-130
1,1,1-Trichloroethane	ug/m3	74	99	70-130
Carbon tetrachloride	ug/m3	85	99	70-130
Benzene	ug/m3	43	95	70-130
Cyclohexane	ug/m3	46	92	70-130
1,2-Dichloropropane	ug/m3	62	96	70-130
1,4-Dioxane	ug/m3	49	105	70-130
2,2,4-Trimethylpentane	ug/m3	63	99	70-130

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample (continued)

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Methyl methacrylate	ug/m3	55	106	70-130
Heptane	ug/m3	55	103	70-130
Bromodichloromethane	ug/m3	90	106	70-130
Trichloroethene	ug/m3	73	106	70-130
cis-1,3-Dichloropropene	ug/m3	61	109	70-130
4-Methyl-2-pentanone	ug/m3	55	106	70-130
trans-1,3-Dichloropropene	ug/m3	61	96	70-130
Toluene	ug/m3	51	103	70-130
1,1,2-Trichloroethane	ug/m3	74	107	70-130
2-Hexanone	ug/m3	55	101	70-130
Tetrachloroethene	ug/m3	92	113	70-130
Dibromochloromethane	ug/m3	120	120	70-130
1,2-Dibromoethane (EDB)	ug/m3	100	128	70-130
Chlorobenzene	ug/m3	62	126	70-130
Ethylbenzene	ug/m3	59	113	70-130
1,1,2,2-Tetrachloroethane	ug/m3	93	110	70-130
Nonane	ug/m3	71	106	70-130
Isopropylbenzene	ug/m3	66	110	70-130
2-Chlorotoluene	ug/m3	70	110	70-130
Propylbenzene	ug/m3	66	112	70-130
4-Ethyltoluene	ug/m3	66	110	70-130
m,p-Xylene	ug/m3	120	113	70-130
o-Xylene	ug/m3	59	112	70-130
Styrene	ug/m3	58	108	70-130
Bromoform	ug/m3	140	118	70-130
Benzyl chloride	ug/m3	70	118	70-130
1,3,5-Trimethylbenzene	ug/m3	66	110	70-130
1,2,4-Trimethylbenzene	ug/m3	66	115	70-130
1,3-Dichlorobenzene	ug/m3	81	117	70-130
1,4-Dichlorobenzene	ug/m3	81	107	70-130
1,2-Dichlorobenzene	ug/m3	81	108	70-130
1,2,4-Trichlorobenzene	ug/m3	100	83	70-130
Naphthalene	ug/m3	71	88	70-130
Hexachlorobutadiene	ug/m3	140	112	70-130

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 012022-16 1/5.5 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Propene	ug/m3	<6.6	<6.6	nm
Dichlorodifluoromethane	ug/m3	<2.7	<2.7	nm
Chloromethane	ug/m3	<20	<20	nm
F-114	ug/m3	<3.8	<3.8	nm
Vinyl chloride	ug/m3	<1.4	<1.4	nm
1,3-Butadiene	ug/m3	<0.24	<0.24	nm
Butane	ug/m3	<13	<13	nm
Bromomethane	ug/m3	<13	<13	nm
Chloroethane	ug/m3	<15	<15	nm
Vinyl bromide	ug/m3	<2.4	<2.4	nm
Ethanol	ug/m3	180	190	5
Acrolein	ug/m3	<11	<11	nm
Pentane	ug/m3	<16	<16	nm
Trichlorofluoromethane	ug/m3	<12	<12	nm
Acetone	ug/m3	510	500	2
2-Propanol	ug/m3	670	670	0
1,1-Dichloroethene	ug/m3	<2.2	<2.2	nm
trans-1,2-Dichloroethene	ug/m3	<2.2	<2.2	nm
Methylene chloride	ug/m3	<190	<190	nm
t-Butyl alcohol (TBA)	ug/m3	<67	<67	nm
3-Chloropropene	ug/m3	<8.6	<8.6	nm
CFC-113	ug/m3	<4.2	<4.2	nm
Carbon disulfide	ug/m3	<34	<34	nm
Methyl t-butyl ether (MTBE)	ug/m3	<9.9	<9.9	nm
Vinyl acetate	ug/m3	<39	<39	nm
1,1-Dichloroethane	ug/m3	<2.2	<2.2	nm
cis-1,2-Dichloroethene	ug/m3	<2.2	<2.2	nm
Hexane	ug/m3	<19	<19	nm
Chloroform	ug/m3	<0.27	<0.27	nm
Ethyl acetate	ug/m3	<40	<40	nm
Tetrahydrofuran	ug/m3	<1.6	<1.6	nm
2-Butanone (MEK)	ug/m3	<16	<16	nm
1,2-Dichloroethane (EDC)	ug/m3	<0.22	<0.22	nm
1,1,1-Trichloroethane	ug/m3	3.6	3.5	3
Carbon tetrachloride	ug/m3	<1.7	<1.7	nm
Benzene	ug/m3	2.4	2.3	4
Cyclohexane	ug/m3	<38	<38	nm
1,2-Dichloropropane	ug/m3	<1.3	<1.3	nm
1,4-Dioxane	ug/m3	<2	<2	nm
2,2,4-Trimethylpentane	ug/m3	<26	<26	nm

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 012022-16 1/5.5 (Duplicate) (continued)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Methyl methacrylate	ug/m3	<23	<23	nm
Heptane	ug/m3	<23	<23	nm
Bromodichloromethane	ug/m3	<0.37	<0.37	nm
Trichloroethene	ug/m3	<0.59	<0.59	nm
cis-1,3-Dichloropropene	ug/m3	<2.5	<2.5	nm
4-Methyl-2-pentanone	ug/m3	<23	<23	nm
trans-1,3-Dichloropropene	ug/m3	<2.5	<2.5	nm
Toluene	ug/m3	<100	<100	nm
1,1,2-Trichloroethane	ug/m3	<0.3	<0.3	nm
2-Hexanone	ug/m3	<23	<23	nm
Tetrachloroethene	ug/m3	<37	<37	nm
Dibromochloromethane	ug/m3	<0.47	<0.47	nm
1,2-Dibromoethane (EDB)	ug/m3	<0.42	<0.42	nm
Chlorobenzene	ug/m3	<2.5	<2.5	nm
Ethylbenzene	ug/m3	<2.4	<2.4	nm
1,1,2,2-Tetrachloroethane	ug/m3	<0.76	<0.76	nm
Nonane	ug/m3	<29	<29	nm
Isopropylbenzene	ug/m3	<14	<14	nm
2-Chlorotoluene	ug/m3	<28	<28	nm
Propylbenzene	ug/m3	<14	<14	nm
4-Ethyltoluene	ug/m3	<14	<14	nm
m,p-Xylene	ug/m3	<4.8	<4.8	nm
o-Xylene	ug/m3	<2.4	<2.4	nm
Styrene	ug/m3	<4.7	<4.7	nm
Bromoform	ug/m3	<11	<11	nm
Benzyl chloride	ug/m3	<0.28	<0.28	nm
1,3,5-Trimethylbenzene	ug/m3	<14	<14	nm
1,2,4-Trimethylbenzene	ug/m3	<14	<14	nm
1,3-Dichlorobenzene	ug/m3	<3.3	<3.3	nm
1,4-Dichlorobenzene	ug/m3	<1.3	<1.3	nm
1,2-Dichlorobenzene	ug/m3	<3.3	<3.3	nm
1,2,4-Trichlorobenzene	ug/m3	<4.1	<4.1	nm
Naphthalene	ug/m3	<1.4	<1.4	nm
Hexachlorobutadiene	ug/m3	<1.2	<1.2	nm

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Propene	ug/m3	23	94	70-130
Dichlorodifluoromethane	ug/m3	67	94	70-130
Chloromethane	ug/m3	28	82	70-130
F-114	ug/m3	94	79	70-130
Vinyl chloride	ug/m3	35	80	70-130
1,3-Butadiene	ug/m3	30	82	70-130
Butane	ug/m3	32	78	70-130
Bromomethane	ug/m3	52	84	70-130
Chloroethane	ug/m3	36	78	70-130
Vinyl bromide	ug/m3	59	89	70-130
Ethanol	ug/m3	25	70	70-130
Acrolein	ug/m3	31	95	70-130
Pentane	ug/m3	40	114	70-130
Trichlorofluoromethane	ug/m3	76	101	70-130
Acetone	ug/m3	32	97	70-130
2-Propanol	ug/m3	33	98	70-130
1,1-Dichloroethene	ug/m3	54	110	70-130
trans-1,2-Dichloroethene	ug/m3	54	103	70-130
Methylene chloride	ug/m3	94	99	70-130
t-Butyl alcohol (TBA)	ug/m3	41	111	70-130
3-Chloropropene	ug/m3	42	110	70-130
CFC-113	ug/m3	100	104	70-130
Carbon disulfide	ug/m3	42	102	70-130
Methyl t-butyl ether (MTBE)	ug/m3	49	101	70-130
Vinyl acetate	ug/m3	48	113	70-130
1,1-Dichloroethane	ug/m3	55	114	70-130
cis-1,2-Dichloroethene	ug/m3	54	108	70-130
Hexane	ug/m3	48	98	70-130
Chloroform	ug/m3	66	110	70-130
Ethyl acetate	ug/m3	49	128	70-130
Tetrahydrofuran	ug/m3	40	114	70-130
2-Butanone (MEK)	ug/m3	40	115	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	110	70-130
1,1,1-Trichloroethane	ug/m3	74	105	70-130
Carbon tetrachloride	ug/m3	85	100	70-130
Benzene	ug/m3	43	102	70-130
Cyclohexane	ug/m3	46	93	70-130
1,2-Dichloropropane	ug/m3	62	89	70-130
1,4-Dioxane	ug/m3	49	95	70-130
2,2,4-Trimethylpentane	ug/m3	63	93	70-130

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample (continued)

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Methyl methacrylate	ug/m3	55	98	70-130
Heptane	ug/m3	55	96	70-130
Bromodichloromethane	ug/m3	90	98	70-130
Trichloroethene	ug/m3	73	98	70-130
cis-1,3-Dichloropropene	ug/m3	61	100	70-130
4-Methyl-2-pentanone	ug/m3	55	101	70-130
trans-1,3-Dichloropropene	ug/m3	61	85	70-130
Toluene	ug/m3	51	96	70-130
1,1,2-Trichloroethane	ug/m3	74	98	70-130
2-Hexanone	ug/m3	55	88	70-130
Tetrachloroethene	ug/m3	92	97	70-130
Dibromochloromethane	ug/m3	120	101	70-130
1,2-Dibromoethane (EDB)	ug/m3	100	101	70-130
Chlorobenzene	ug/m3	62	124	70-130
Ethylbenzene	ug/m3	59	110	70-130
1,1,2,2-Tetrachloroethane	ug/m3	93	112	70-130
Nonane	ug/m3	71	109	70-130
Isopropylbenzene	ug/m3	66	113	70-130
2-Chlorotoluene	ug/m3	70	114	70-130
Propylbenzene	ug/m3	66	117	70-130
4-Ethyltoluene	ug/m3	66	111	70-130
m,p-Xylene	ug/m3	120	116	70-130
o-Xylene	ug/m3	59	114	70-130
Styrene	ug/m3	58	112	70-130
Bromoform	ug/m3	140	121	70-130
Benzyl chloride	ug/m3	70	115	70-130
1,3,5-Trimethylbenzene	ug/m3	66	113	70-130
1,2,4-Trimethylbenzene	ug/m3	66	117	70-130
1,3-Dichlorobenzene	ug/m3	81	116	70-130
1,4-Dichlorobenzene	ug/m3	81	107	70-130
1,2-Dichlorobenzene	ug/m3	81	108	70-130
1,2,4-Trichlorobenzene	ug/m3	100	80	70-130
Naphthalene	ug/m3	71	84	70-130
Hexachlorobutadiene	ug/m3	140	111	70-130

Date of Report: 12/11/20
Date Received: 12/01/20
Project: C-1 Hangar & Precision Reg Support (SNO-CO) PO 5531-014-01, F&BI 012022

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR HELIUM USING METHOD ASTM D1946

Laboratory Code: 011481-01 (Duplicate)

Analyte	Sample Result (%)	Duplicate Result (%)	Relative Percent Difference	Acceptance Criteria
Helium	<0.6	<0.6	nm	0-20

Laboratory Code: 012022-20 (Duplicate)

Analyte	Sample Result (%)	Duplicate Result (%)	Relative Percent Difference	Acceptance Criteria
Helium	<0.6	<0.6	nm	0-20

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

012022

SAMPLE CHAIN OF CUSTODY ME 12-01-20

Page # 1 of 4

Report To Jacob Letts
Company GEI
Address 2101 4th Ave Suite 950
City, State, ZIP Seattle, WA 98121
Phone ____ Email JLetts@geoengineerscom

SAMPLERS (*signature*)

PROJECT NAME & ADDRESS	PO #
C-1 Hangar & Precision Reg. Support (NO-CO)	5531-014-01
NOTES:	INVOICE TO

TURNAROUND TIME
☑ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Default: Clean after 3 days
☐ Archive (Fee may apply)

SAMPLE INFORMATION / ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
IA-1_120120	01	20546	—	[✓ IA] / SG	12/1/20	30	811	5	1622	X			X			
IA-2_120120	02	21437	—	[✓ IA] / SG		30	806	6	1637	X			X			
IA-3_120120	03	18572	—	[✓ IA] / SG		30	823	6	1626	X			X			
IA-4_120120	04	23229	—	[✓ IA] / SG		30	820	6	1633	X			X			
IA-5_120120	05	32100	—	[✓ IA] / SG		30	830	5	1615	X			X			
IA-6_120120	06	18562	—	[✓ IA] / SG		29	834	7	1648	X			X			
IA-7_120120	07	18566	—	[✓ IA] / SG		28	843	8	1651	X			X			
IA-8_120120	08	23230	6607	[✓ IA] / SG		30	851	10	1609	X			X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044 EMB

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atkturk	GEI	12/1/20	1845
Received by:	BISRAT TADESSE	FBI	12/1/20	1845
Relinquished by:				
Received by:				

FORMS\COC\COCTO-15.DOC

Samples received at 6 °C

012022

SAMPLE CHAIN OF CUSTODY ME 12-01-20

Page # 2 of 4

Report To Jacob Letts
Company
Address
City, State, ZIP See Pg 1
Phone Email

SAMPLERS (*signature*) KRA

PROJECT NAME & ADDRESS
GHangar & Precision Reg. Support (SNOCO)

PO # 5531-04-01

NOTES:

INVOICE TO

TURNAROUND TIME
☑ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Default: Clean after 3 days
☐ Archive (Fee may apply)

SAMPLE INFORMATION

										ANALYSIS REQUESTED					
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium	Notes
IA-9_120120	09	18577	7845	[✓ IA] / SG	12/1/20	30	845	11	1606	X			X		
IA-10_120120	10	20543	7850	[✓ IA] / SG		30	840	9	1605	X			X		
IA-11_120120	11	23231	7848	[✓ IA] / SG		30	824	8	1600	X			X		
IA-12_120120	12	18568	7870	[✓ IA] / SG		30	901	9	1616	X			X		
IA-13_120120	13	21453	7871	[✓ IA] / SG		30	855	8	1614	X			X		
OA-1_120120	14	23233	—	[✓ IA] / SG		30	921	8	1642	X			X		
OA-2_120120	15	18569	7847	[✓ IA] / SG		30	912	9	1630	X			X		
SV-1_113020	16	3312	230	IA / [✓ SG]	11/30/20	30	1340	5	1347	X			X	X	

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Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Ataturk	GEI	12/1/20	1845
Received by:	BISRAT TADESSE	FBI	12/1/20	1845
Relinquished by:				
Received by:				

FORMS\COC\COCTO-15.DOC

Samples received at 16 °C

012022 [redacted]

SAMPLE CHAIN OF CUSTODY ME

12-01-20 [redacted]

Page # 3 of 4

Report To J. Letts
Company
Address See pg 1
City, State, ZIP
Phone Email

SAMPLERS (*signature*) 4URA

PROJECT NAME & ADDRESS	PO #
C-1 Hangar & Precision Reg Support (SNO-CO)	5531-014-01
NOTES:	INVOICE TO

TURNAROUND TIME
☑ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Default: Clean after 3 days
☐ Archive (Fee may apply)

SAMPLE INFORMATION										ANALYSIS REQUESTED						
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	MA-APH	Helium		Notes
SV-2_113020	17	3311	228	IA / [✓ SG]	11/30/20	29	1442	5	1448	X			X	X		
SV-3_113020	18	3674	240	IA / [✓ SG]	11/30/20	30	1506	5	1513	X			X	X		
SV-4_120120	19	2432	222	IA / [✓ SG]	12/01/20	30	1040	5	1046	X			X	X		
SV-5_120120	20	3251	221	IA / [✓ SG]		30	1057	5	1103	X			X	X		
SV-6_120120	21	3664	281	IA / [✓ SG]		30	1114	5	1120	X			X	X		
SV-7_120120	22	3667	220	IA / [✓ SG]		30	1135	5	1140	X			X	X		
SV-8_120120	23	3260	224	IA / [✓ SG]		30	1157	5	1203	X			X	X		
SV-9_120120	24	2294	225	IA / [✓ SG]	↓	30	1232	5	1238	X			X	X		

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Seattle, WA 98119-2029
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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Katy A	Katy Ataktuk	GEI	12/1/20	1845
Received by:	BISRAT TADESSE	FBI	12/1/20	1845
Relinquished by:				
Received by:				

FORMS\COC\COCTO-15.DOC

Samples received at 16 °C

[redacted] 012022

SAMPLE CHAIN OF CUSTODY ME

12-01-20 [redacted]

Report To J. Letts
Company
Address Seepj 1.
City, State, ZIP
Phone Email

SAMPLERS (*signature*) KRA

PROJECT NAME & ADDRESS C-1 Hangar & Precision Reg. Support (SNO-CO)

PO # 5531-014-01

NOTES:

INVOICE TO

Page # 4 of 4

TURNAROUND TIME
☑ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Default: Clean after 3 days
☐ Archive (Fee may apply)

SAMPLE INFORMATION										ANALYSIS REQUESTED						
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
SV-10_120120	25	4176 PB 12/2	204	IA / [✓ SG]	12/1/20	29	1331	5	1337	X			X	X		
SV-11_120120	26	3388	203	IA / [✓ SG]	↓	27	1425	5	1431	X			X	X		
SV-12_120120	27	3254	206	IA / [✓ SG]		29	1514	4	1520	X			X	X		
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												

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Seattle, WA 98119-2029
Ph. (206) 285-8282
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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Ataktürk	GEI	12/1/20	1845
Received by:	BISRAT TADESSE	FBI	12/1/20	1845
Relinquished by:				
Received by:				

FORMS\COC\COCTO-15.DOC

Samples received at 16 °C

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 012022 **CLIENT** GeoEngineers **INITIALS/ DATE:** R 12/01/20

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 16 °C

Were samples received on ice/cold packs? ☐ YES ☑ NO

How did samples arrive?
☑ Over the Counter
☐ Picked up by F&BI
☐ FedEx/UPS/GSO

Number of days samples have been sitting prior to receipt at laboratory 0-1 days

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO
*or other representative documents, letters, and/or shipping memos

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Is the following information provided on the COC* ? (explain "no" answer below)

Sample ID's ☑ Yes ☐ No
Date Sampled ☑ Yes ☐ No
Time Sampled ☑ Yes ☐ No
# of Containers ☑ Yes ☐ No
Relinquished ☑ Yes ☐ No
Requested analysis ☑ Yes ☐ No

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? (explain "no" answer below) ☑ YES ☐ NO

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

Air Samples: Were any additional canisters received? ☐ NA ☑ YES ☐ NO

If Yes, number of unused 1L canisters ____
number of unused 6L canisters 1 (Can ID: 20549)

Explain "no" items from above (use the back if needed)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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fbi@isomedia.com
www.friedmanandbruya.com

December 14, 2020

Jacob Letts, Project Manager
GeoEngineers
2101 4th Ave, Suite 950
Seattle, WA 98121

Dear Mr Letts:

Included are the results from the testing of material submitted on December 1, 2020 from the C-1 Hangar&Precision Reg. Support (SNO-CO) PO 5530-014-01, F&BI 012023 project. There are 19 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GNR1214R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 1, 2020 by Friedman & Bruya, Inc. from the GeoEngineers C-1 Hangar&Precision Reg. Support (SNO-CO) PO 5530-014-01, F&BI 012023 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	GeoEngineers
012023 -01	IA-1_120120
012023 -02	IA-2_120120
012023 -03	IA-3_120120
012023 -04	IA-4_120120
012023 -05	IA-5_120120
012023 -06	IA-6_120120
012023 -07	IA-7_120120
012023 -08	IA-8_120120
012023 -09	IA-9_120120
012023 -10	IA-10_120120
012023 -11	IA-11_120120
012023 -12	IA-12_120120
012023 -13	IA-13_120120
012023 -14	OA-1_120120
012023 -15	OA-2_120120

Naphthalene (air) - Analysis Method TO-17

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-1_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-01 1/0.047
Date Analyzed:	12/08/20	Data File:	120819.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.11

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-2_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-02 1/0.034
Date Analyzed:	12/08/20	Data File:	120820.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.11

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-3_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-03 1/0.035
Date Analyzed:	12/08/20	Data File:	120821.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.11

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-4_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-04 1/0.036
Date Analyzed:	12/08/20	Data File:	120822.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.10

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-5_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-05 1/0.038
Date Analyzed:	12/08/20	Data File:	120823.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.12

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-6_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-06 1/0.039
Date Analyzed:	12/09/20	Data File:	120824.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.11

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-7_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-07 1/0.041
Date Analyzed:	12/09/20	Data File:	120825.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.10

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-8_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-08 1/0.039
Date Analyzed:	12/09/20	Data File:	120826.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.12

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-9_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-09 1/0.038
Date Analyzed:	12/09/20	Data File:	120827.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.15

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-10_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-10 1/0.038
Date Analyzed:	12/09/20	Data File:	120828.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.14

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-11_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-11 1/0.036
Date Analyzed:	12/09/20	Data File:	120829.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.13

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-12_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-12 1/0.040
Date Analyzed:	12/09/20	Data File:	120830.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.12

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	IA-13_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-13 1/0.039
Date Analyzed:	12/09/20	Data File:	120831.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.13

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	OA-1_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-14 1/0.043
Date Analyzed:	12/09/20	Data File:	120832.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.061

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	OA-2_120120	Client:	GeoEngineers
Date Received:	12/01/20	Project:	5530-014-01, F&BI 012023
Date Collected:	12/01/20	Lab ID:	012023-15 1/0.041
Date Analyzed:	12/09/20	Data File:	120833.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	0.058

Analysis For Volatile Compounds By Method TO-17

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	5530-014-01, F&BI 012023
Date Collected:	Not Applicable	Lab ID:	00-2765 mb
Date Analyzed:	12/08/20	Data File:	120810.D
Matrix:	Air	Instrument:	GCMS10
Units:	ug/m3	Operator:	bat

Compounds:	Concentration ug/m3
Naphthalene	<1

Date of Report: 12/14/20
Date Received: 12/01/20
Project: C-1 Hangar&Precision Reg. Support (SNO-CO) PO 5530-014-01, F&BI 012023

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-17

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Naphthalene	ng/tube	50	101	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

012023

SAMPLE CHAIN OF CUSTODY ME 12-01-20

Page # 1 of 2 CI2

Report To Jacob Letts
Company GeoEngineers
Address 2101 4th Ave suite 950
City, State, ZIP Seattle, WA 98121
Phone ________ Email JLetts@geoengineers.com

SAMPLERS (*signature*)

PROJECT NAME G1 Hangar & Precision Reg. Support (SND-CO)

PO # 5530-014-01

REMARKS

INVOICE TO

TURNAROUND TIME
☑ Standard Turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Archive Samples
☐ Other

Sample Name	Lab ID	Tube ID	Collection Information Sample Date	Pre-Flow Rate	Post-Flow Rate	Start Time	End Time	(L) Volume Sampled	TO-17 Analytes Requested Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	TPH-DRO	2-Propanol		Notes
1A-1_120120	01	311365	12/1/20	100	100	~~811~~ 925	1300	21.5					X				
1A-2_120120	02	309148		100	100	806	1303	29.7					X				
1A-3_120120	03	311347		100	100	823	1306	28.3					X				
1A-4_120120	04	322155		100	100	820	1256	27.6					X				
1A-5_120120	05	311344		100	100	830	1254	26.4					X				
1A-6_120120	06	309141		100	100	834	1252	25.8					X				
1A-7_120120	07	322173		100	100	843	1245	24.2					X				
1A-8_120120	08	311345		100	100	851	1310	25.9					X				
1A-9_120120	09	322157	↓	100	100	845	1305	26.0					X				

AP
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Katy Atakturk	GEI	12/1/20	1845
Received by:		BISRAT TADESSE	FBI	12/1/20	1845
Relinquished by:					
Received by:					

Samples received at 4 °C

012023

SAMPLE CHAIN OF CUSTODY ME

12-01-20

C12

Page # 2 of 2

Report To Jacob Letts

Company GEI

Address See pg 1.

City, State, ZIP

Phone

Email JLetts@geiengineers.com

SAMPLERS (*signature*)

PROJECT NAME	PO #
C-1 Hangar & Precision Reg. support (SNO-CO)	5530-014-01
REMARKS	INVOICE TO

TURNAROUND TIME
☑ Standard Turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Archive Samples
☐ Other

Sample Name	Lab ID	Tube ID	Collection Information					(L)	TO-17 Analytes Requested								Notes
			Sample Date	Pre-Flow Rate	Post-Flow Rate	Start Time	End Time	Volume Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	TPH-DRO	2-Propanol		
1A-10_120120	10	435241	12/1/20	100	100	840	1302	26.2					X				
1A-11_120120	11	453004	↓	100	100	824	1258	27.4					X				
1A-12_120120	12	333885		100	100	901	1312	25.1					X				
1A-13_120120	13	311363		100	100	855	1310	25.5					X				
0A-1_120120	14	309143		100	100	921	1311	23.0					X				
0A-2_120120	15	333889		100	100	912	1318	24.6					X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Katy A	Katy Ataleturk	GEI	12/1/20	1845
Received by:	BISRAT TADESSE	FBI	12/1/20	1845
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 012023 CLIENT Geo Engineers INITIALS/DATE: R 12/01/20

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 4 °C

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☑ Over the Counter
☐ Picked up by F&BI
☐ FedEx/UPS/GSO

Number of days samples have been sitting prior to receipt at laboratory 0 days

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO
*or other representative documents, letters, and/or shipping memos

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Is the following information provided on the COC* ? (explain "no" answer below)

Sample ID's	☑ Yes	☐ No	# of Containers	☑ Yes	☐ No
Date Sampled	☑ Yes	☐ No	Relinquished	☑ Yes	☐ No
Time Sampled	☑ Yes	☐ No	Requested analysis	☑ Yes	☐ No

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? (explain "no" answer below) ☑ YES ☐ NO

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

Air Samples: Were any additional canisters received? ☐ NA ~~☐ YES~~ AMB 12/2 ☑ NO

If Yes, number of unused 1L canisters ______

number of unused 6L canisters ______

Explain "no" items from above (use the back if needed)

2 extra tubes not used

Phase II Environmental Site Assessment

Snohomish County Airport – C-1 Hangar and C1 Building
3220 -- 100th Street SW, Suite A
Everett, Washington

for
Snohomish County Airport

June 1, 2021

GeoEngineers
Earth Science + Technology

Phase II Environmental Site Assessment

Snohomish County Airport – C-1 Hangar and C1 Building
3220 – 100th Street SW, Suite A
Everett, Washington

for
Snohomish County Airport

June 1, 2021

GeoEngineers

1101 Fawcett Ave, Suite 200
Tacoma, Washington 98402
253.383.4940

Phase II Environmental Site Assessment

Snohomish County Airport – C-1 Hangar and C-1 Building
3220 100th Street SW
Everett, Washington

File No. 5530-014-01

June 1, 2021

Prepared for:

Snohomish County Airport
3220 – 100th Street SW, Suite A
Everett, Washington 98204-1303

Attention: Andrew Rardin

Prepared by:

GeoEngineers, Inc.
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Jacob Letts, LG, LHG
Project Manager

Tim Syverson, LHG
Associate Environmental Geologist

State of Washington
901
Licensed Geologist
Timothy L. Syverson

June 1, 2021

KRA:JML:TS:lw:leh

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APPENDICES

1.0 INTRODUCTION

This report presents the results of the Phase II Environmental Site Assessment (ESA) completed in May 2021 for the Snohomish County Airport at Paine Field's C-1 Hangar and C-1 Building (Site) located at 3200 – 100th Street SW in Everett, Washington (Figure 1). The purpose of the Phase II ESA was to evaluate soil and groundwater conditions at the C-1 Hangar and C-1 Building properties, including locations where contaminants of concern were detected in soil vapor during the Vapor Intrusion (VI) Evaluation completed in 2020 (GeoEngineers, 2021), in accordance with applicable Model Toxics Control Act (MTCA) regulatory criteria and guidance. The building layout and Phase II ESA sample locations are shown on Figure 2.

The C-1 Hangar is approximately 1.5-acres and developed with an approximately 53,000 square-foot aircraft hangar and adjacent covered outdoor space referenced as the Hangar Annex. The C-1 Hangar was last leased to Aviation Technical Services, Inc. (ATS) starting on April 1, 1999. The Hangar Annex was constructed and added to the lease in September 2011, and both leases were terminated on December 31, 2020. The space was used for airplane storage, general workshop, and office spaces during the time of the lease. The C-1 Hangar Property is not listed in Ecology's contaminated sites database.

The C-1 Building property is located adjacent to the C-1 Hangar and is approximately 0.85-acres and consists of one approximately 25,000 square-foot building and an adjacent 12,000 square-foot exterior storage yard. The C-1 Building was last occupied by Precision Engines starting in 1997. The C-1 Building Property is listed by Ecology as the Precision Engines LLC site (Cleanup Site ID: 3526; Facility/Site ID: 84613634) with status listed as "cleanup started" and has been the subject of investigations and focused remedial actions since at least 1998 (AGI, 1998; URS, 2001; HWA, 2018). The C-1 Building is currently vacant with remnant equipment left in place from the previous tenants (i.e., HVAC infrastructure such as vent hoods, general plumbing fixtures, and work benches).

2.0 POTENTIAL CHEMICALS OF CONCERN AND SCREENING LEVELS

Based on the findings of prior investigations and applicable MTCA criteria, the chemicals of concern (COCs) identified for evaluation during this Phase II ESA included petroleum hydrocarbons, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and metals. The media evaluated for the Phase II ESA were soil and groundwater. MTCA Method A cleanup levels for unrestricted land use were used for screening purposes for the Phase II ESA; published values for natural background metals concentrations in Puget Sound soils were also used for comparison purposes. Where no MTCA Method A values exist, Method B cleanup levels were used when available. The corresponding MTCA cleanup levels are presented in Tables 1 through 4. The MTCA cleanup levels are considered appropriate and conservative screening levels for the purpose of this Phase II ESA to evaluate and document Site conditions and assess the potential need for further action relative to protection of human health and the environment. Final applicable cleanup standards will be determined in accordance with MTCA requirements including consideration of the historical and current industrial setting and use of the Site.

3.0 PHASE II ESA SCOPE OF SERVICES

A total of 15 explorations (soil borings [C-1 DP-1 through DP-15]) were completed in March 2021 to assess potential impacts to soil and groundwater at the Site. In addition, a focused geophysical (i.e., ground-penetrating radar [GPR]) survey was conducted to assess the potential presence of underground utilities and other potential physical obstructions at the selected sample locations.

The Phase II ESA scope included the following:

1. Communications with Paine Field relative to project background, Site access, and schedule.
2. Prepare a sampling and analysis plan (SAP) and site health and safety plan prior to the start of field work and submit to the County for review and comment.
3. Mark proposed exploration locations and notify service providers to mark utilities in the vicinity of the proposed exploration locations. Subcontract a private utility locate service to locate underground utilities on the property using GPR technologies.
4. Subcontract a concrete coring company to core 4-inch holes in the C-1 Hangar and C-1 Building concrete slabs at each exploration location.
5. Observe direct-push drilling of 15 borings to depths up to 15 feet or to refusal and obtain continuous core soil samples.
6. Field screen soil samples from the borings for evidence of petroleum hydrocarbons and VOCs using visual, water sheen and headspace vapor screening methods. Visually classify the samples in general accordance with ASTM D 2488 and maintain a detailed log of each boring.
7. Submit selected soil samples for laboratory chemical analysis for the following analyses: gasoline-range total petroleum hydrocarbons by NWTPH-Gx (including mineral spirits); diesel- and heavy oil-range total petroleum hydrocarbons by NWTPH-Dx Method; VOCs by EPA 8260; PCBs by EPA 8082; and metals (RCRA 8) by EPA Method 6000/7000 series.
8. Collect grab groundwater samples from the direct-push borings if sufficient groundwater is encountered during drilling. Submit groundwater samples for the following analyses: gasoline-range total petroleum hydrocarbons by NWTPH-Gx (including mineral spirits); diesel- and heavy oil-range total petroleum hydrocarbons by NWTPH-Dx Method; VOCs by EPA 8260; PCBs by EPA 8082; and total and dissolved metals (RCRA 8) by EPA Method 6000/7000 series.
9. Observe the restoration of the concrete slab by the subcontracted concrete coring company.
10. Temporarily store investigation-derived wastes on site pending characterization and appropriate off-site disposal at a permitted facility.

4.0 PHASE II ESA FINDINGS

4.1. General

The Phase II ESA investigation was conducted in March 2021. The focused GPR survey was completed on March 29, 2021 prior to concrete coring and exploratory drilling. The Phase II ESA explorations consisted of 15 direct push explorations completed at the approximate locations shown on Figure 2 on March 30 and 31, 2021. A representative of GeoEngineers observed and documented subsurface conditions during drilling and obtained soil and groundwater samples for field screening and chemical analysis. Exploration and sampling field procedures and the exploration logs are presented in Appendix A.

4.2. Focused Concrete Survey

C-N-I Locates, Ltd. performed the focused GPR survey to identify possible underground piping, rebar, and estimate concrete thickness for coring purposes. Each proposed boring location was also cleared for conductible utilities using a hand-held radio detector prior to concrete coring and drilling activities.

No GPR responses indicative of subsurface structures were observed in the survey areas. The only GPR response observed in this area was attributed to a subsurface stormwater drain that is portrayed on historic utility maps.

4.3. Phase II Environmental Site Assessment

Direct-push borings C-1 DP-1 through DP-15 were completed on March 30 and 31, 2021. Two borings (C-1 DP-10 and DP-11) were completed to approximately 4 feet below ground surface (bgs); the remaining borings hit refusal at depths ranging between 7 and 15 feet bgs. Soil and groundwater conditions encountered in the explorations are described below. The exploration locations were targeted based on the findings of prior investigations and distributed to assess the footprint of the property. Phase II ESA field procedures are described in Appendix A. Copies of the chemical analytical laboratory reports are provided in Appendix C. The following matrix presents the soil and groundwater sampling and analysis rationale for the Phase II ESA.

Direct Push (DP) Boring ID	General Description of Exploration Location	Sampling Rationale	Contaminants of Concern (COCs) and Chemical Analyses
C-1 DP-1 through DP-4	Western portion of the Site within the C-1 Hangar.	Evaluate soil and groundwater where COCs were detected in soil vapor in 2020 and adjacent to a storm drain and compressor shed north of the C-1 Hangar.	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260 ▪ Metals (MTCA 5) by EPA 6000/7000 series ▪ PCBs by EPA Method 8082
C-1 DP-5 through DP-11	Central C-1 Hangar spatially distributed locations.	Evaluate soil and groundwater in areas where COCs were detected in soil vapor in 2020 and for lateral coverage across the central and eastern portion of the C-1 Hangar.	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260 ▪ Metals (MTCA 5) by EPA 6000/7000 series ▪ PCBs by EPA Method 8082
C-1 DP-12 through DP-14	Southeast portion of the Site downgradient of C-1 Building	Evaluate soil and groundwater in the Hangar Annex and in outside areas adjacent to locations where COCs were detected in soil and/or groundwater outside the C-1 Building.	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260 ▪ Metals (MTCA 5) by EPA 6000/7000 series ▪ PCBs by EPA Method 8082
C-1 DP-15	Northeastern portion of the Site within C-1 Building footprint	Evaluate soil and groundwater in the area where COCs were detected in soil vapor at the C-1 Building (HWA, 2018).	▪ Petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx ▪ VOCs by EPA Method 8260 ▪ Metals (MTCA 5) by EPA 6000/7000 series ▪ PCBs by EPA Method 8082

4.3.1. Soil Conditions

Soil conditions encountered at the Site generally consisted of a fill layer up to approximately 4 to 10 feet thick overlying dense glacial deposits to the total depths explored. The fill consisted of sand, silty sand or sand with silt, with varying amounts of gravel. The fill is underlain by native soil consisting of sand with interbedded silt and varying gravel to the maximum depth explored of 15 feet bgs. Exploration logs are presented in Appendix A.

4.3.2. Groundwater Conditions

At locations where groundwater was encountered (only in borings C-1 DP2, C-1 DP3, C-1 DP13, and C-1 DP14), a grab groundwater sample was collected for laboratory chemical analysis as part of a screening-level evaluation of groundwater quality beneath the Site. No evidence of groundwater was observed in the remaining borings. Based on available information, the area/regional groundwater flow direction at the Site is to the west toward Puget Sound (HWA, 2018), and the occurrence and flow of shallow perched water varies locally.

4.4. Soil Field Screening

Soil from the explorations was field screened for physical evidence of petroleum hydrocarbons and VOCs using visual, water sheen and headspace vapor screening methods. In general field screening did not indicate evidence of potential contamination with the exception of soil headspace measurements using a photoionizing detector (PID) at varying depths in 2 of the 15 explorations (C-1 DP-4 and DP-15). Soil samples that exhibited possible field screening evidence of potential contamination were selected for chemical analysis. Field screening results are shown on the exploration logs and field screening results for samples that were chemically analyzed are presented in Table 1.

4.5. Soil Chemical Analytical Results

Twenty-nine soil samples from the Phase II ESA explorations were submitted for laboratory chemical analysis for petroleum hydrocarbons, VOCs, PCBs, and RCRA metals. The only soil sample locations with detected concentrations of COCs exceeding the applicable MTCA Cleanup Levels (C-1 DP-15-4 and -7) are shown on Figure 2. A summary of the soil analytical data is presented below and the data are included in Tables 1 through 3.

4.5.1. Petroleum Hydrocarbons and BTEX (Table 1)

- Gasoline-range total petroleum hydrocarbons were detected in 2 of 29 soil samples obtained from the western portion of the C-1 Hangar and from within the C-1 Building at concentrations of 7.50 and 51.0 milligrams per kilogram [mg/kg]. The detected gasoline-range total petroleum hydrocarbons were all less than the MTCA cleanup level of 100 mg/kg when benzene is not present. Benzene, toluene, ethylbenzene, and xylenes (BTEX) were not detected at concentrations greater than the laboratory reporting limits in any of the soil samples.
- Diesel- and Heavy oil-range total petroleum hydrocarbons were not detected at concentrations greater than the laboratory reporting limits in any of soil samples.

4.5.2. VOCs and PCBs (Table 2)

- Trichloroethylene (TCE) was detected in soil samples from C-1 DP-15, located within the C-1 Building, at depths of 4 feet and 7 feet bgs. The detected concentrations in the two samples were 0.140 and 0.620, and both exceed the MTCA Method B Cleanup Level of 0.03 mg/kg.
- Tetrachloroethylene (PCE) was detected in the soil sample from C-1 DP-15 at 4 feet bgs at a concentration of 0.0280 mg/kg, which is less than the MTCA Method B Cleanup Level of 0.05 mg/kg.
- The following VOCs were detected in the sample from C-1 DP-15 at 4 feet bgs at concentrations less than the MTCA Method A or B Cleanup Levels: 1,1,1-Trichloroethane, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, and 2-Chlorotoluene.
- The following VOCs were detected in the sample from C-1 DP-4 at 7 feet bgs at concentrations less than the MTCA Method A or B Cleanup Levels: 1,2,4-Trimethylbenzene, 1,2-Dichloroethane, and 1,3,5-Trimethylbenzene.

4.5.3. Metals (Table 3)

- Arsenic, barium, chromium, and lead were detected in all 29 soil samples at concentrations less than the MTCA Method A or B cleanup levels and the detected concentrations were generally near or below naturally occurring background metals concentrations in Puget Sound Soils (Ecology, 1994). The soil sample from C-1 DP-1 at 11 feet bgs, contained a chromium concentration of 65.7 mg/kg, which is approximately 1.4 times the natural background concentration in Puget Sound Soils; a follow-up analysis was completed for hexavalent chromium, which was not detected in the sample.
- Cadmium, mercury, selenium, and silver were not detected at concentrations greater than the laboratory reporting limits in the 29 soil samples analyzed.

4.6. Groundwater Chemical Analytical Results (Table 4)

Grab groundwater samples were collected from the four boring (C-1 DP-2, C-1 DP-3, C-1 DP-13, and C-1 DP-14) where groundwater was encountered during drilling. The grab groundwater samples were collected using low-flow sampling methods and submitted for laboratory chemical analysis for the following: petroleum hydrocarbons, VOCs, PCBs, and Total and Dissolved RCRA metals. A summary of COCs detected in groundwater is presented below and in Table 4. The detected concentrations of COCs in groundwater exceeding the applicable MTCA Cleanup Levels are shown on Figure 2.

- Diesel- and heavy oil-range total petroleum hydrocarbons were detected at concentrations greater than the laboratory reporting limits in the groundwater sample obtained from boring C-1 DP-3 at concentrations of 110 micrograms per liter (µg/L) and 330 µg/L, respectively. The detected concentrations were less than the MTCA Method A cleanup levels for diesel and heavy oil (500 µg/L).
- VOCs were not detected in any of the groundwater samples at concentrations greater than the laboratory reporting limits with the exception of Methylene Chloride, which was detected in the groundwater sample obtained from boring C-1 DP2; however, the detection of methylene chloride in this sample was the result of laboratory contamination, as qualified by the analytical laboratory (Appendix A).

- Dissolved arsenic was detected in the groundwater sample from boring C-1 DP14 at a concentration of 9.53 µg/L, which exceeds the MTCA Method B cleanup level of 5 µg/L. Total arsenic concentrations exceeded the MTCA Method B cleanup level in all four groundwater grab samples with concentrations ranging from 6.62 to 34.7 µg/L; however, turbidity levels were greater than 100 NTU in each sample, which is common for grab samples collected of shallow perched groundwater.
- Total chromium was detected in the groundwater samples collected from borings C-1 DP-2, C-1 DP-3, and C-1 DP14 at concentrations ranging from 69.2 to 210 µg/L, which exceed the MTCA Method B cleanup level of 50 µg/L.
- Total lead was detected in the groundwater samples obtained from borings C-1 DP-2 and C-1 DP-3 at concentrations of 24.6 and 120 µg/L, which exceed the MTCA Method B cleanup level of 15 µg/L.

5.0 LIMITATIONS

This report has been prepared for use by Snohomish County Airport and their authorized agents. This report may be provided to regulatory agencies for review. No third parties should place legal reliance on this report. GeoEngineers has performed this Phase II ESA in accordance with the scope and limitations of our Agreement with Snohomish County dated February 2, 2021. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix C titled “Report Limitations and Guidelines for Use” for additional information pertaining to use of this report.

6.0 REFERENCES

AGI Technologies (AGI), 1998. Findings Update, Phase 2 Environmental Site Assessment, Precision Aviation Products Corporation, dated August 31, 1998.

GeoEngineers, 2021. “C-1 Hangar and C-1 Building Vapor Evaluation Report – December 2020” prepared for Snohomish County Airport, dated April 27, 2021.

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Table 1

Soil Chemical Analytical Results[1]

Petroleum Hydrocarbons and BTEX

C-1 Hangar and Building, Snohomish County Airport
Everett, Washington

Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Field Screening Results[3]		BTEX[4] (mg/kg)				Total Petroleum Hydrocarbons (mg/kg)[6]		
			Headspace Vapors (ppm)	Sheen	Benzene	Toluene	Ethylbenzene	Xylenes[5]	Gasoline Range	Diesel Range	Lube Oil Range
C-1 DP1-3.5	3/31/2021	3.5	3.1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP1-11.0	3/31/2021	11.0	8.9	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP2-5.0	3/31/2021	5.0	3.8	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP2-11.0	3/31/2021	11.0	4.3	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP3-4.0	3/30/2021	4.0	0.7	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP3-7.0	3/30/2021	7.0	1,684	MS	0.005 U	0.005 U	0.005 U	0.01 U	**7.5**	50 U	250 U
C-1 DP4-3.5	3/30/2021	3.5	<1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP4-5.0	3/30/2021	5.0	3.7	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP4-7.0	3/30/2021	7.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP5-3.0	3/30/2021	3.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP5-6.0	3/30/2021	6.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP6-3.0	3/31/2021	3.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP6-6.0	3/31/2021	6.0	<1	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP7-4.0	3/31/2021	4.0	3.0	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP7-9.0	3/31/2021	9.0	4.6	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP8-4.5	3/31/2021	4.5	1.9	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP8-9.0	3/31/2021	9.0	4.9	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP9-3.0	3/31/2021	3.0	3.4	NS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP9-7.5	3/31/2021	7.5	4.8	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP10-4.0	3/31/2021	4.0	3.7	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP11-4.0	3/31/2021	4.0	2.6	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP12-3.0	3/31/2021	3.0	2.2	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP12-8.0	3/31/2021	8.0	1.1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP13-2.0	3/30/2021	2.0	2.5	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP13-5.0	3/30/2021	5.0	2.3	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP14-5.0	3/30/2021	5.0	<1	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP14-10.0	3/30/2021	10.0	2.3	MS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
C-1 DP15-4.0	3/30/2021	4.0	218	MS	0.005 U	0.005 U	0.005 U	0.01 U	**51**	50 U	250 U
C-1 DP15-7.0	3/30/2021	7.0	1.9	SS	0.005 U	0.005 U	0.005 U	0.01 U	5 U	50 U	250 U
MTCA Method A Cleanup Level for Unrestricted Land Use					0.03	7	6	9	100[7]	2,000[8]	

Notes:

[1] Chemical analyses performed by Friedman and Bruya, Inc. of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix B.

[2] The approximate sample locations are shown in Figure 2.

[3] Field screening methods are described in Appendix A.

[4] BTEX compounds were analyzed by EPA Method 8260C.

[5] Sum of m,p-xylene and o-xylene. Where xylenes are non-detect, the highest laboratory reporting limit is shown.

[6] Petroleum hydrocarbons analyzed by NWTPH-Gx and NWTPH-Dx.

[7] Cleanup level when benzene is not present.

[8] Cleanup level is the sum of diesel- and oil-range petroleum hydrocarbons.

bgs = below ground surface

mg/kg = milligrams per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

NS = No sheen

SS = Slight sheen

MS = Moderate sheen

ppm = parts per million

Bolded value indicates analyte detected at the concentration shown.

Table 2

Soil Chemical Analytical Results[1]

Volatile Organic Compounds (VOCs) and Polychlorinated Biphenyls (PCBs)

C-1 Hangar and Building, Snohomish County Airport
Everett, Washington

Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	VOCs[3] (mg/kg)												Polychlorinated Biphenyls[4] (mg/kg)
			1,1,1-Trichloroethane	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dichlorobenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	2-Chlorotoluene	Tetrachloroethylene (PCE)	Trichloroethylene (TCE)	
C-1 DP1-3.5	03/31/21	3.5	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP1-11.0	03/31/21	11.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP2-5.0	03/31/21	5.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP2-11.0	03/31/21	11.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP3-4.0	03/30/21	4.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP3-7.0	03/30/21	7.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP4-3.5	03/30/21	3.5	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP4-5.0	03/30/21	5.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP4-7.0	03/30/21	7.0	0.005 U	0.025 U	0.025 U	**0.027**	0.005 U	**0.013**	**0.022**	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP5-3.0	03/30/21	3.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP5-6.0	03/30/21	6.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP6-3.0	03/31/21	3.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP6-6.0	03/31/21	6.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP7-4.0	03/31/21	4.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP7-9.0	03/31/21	9.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP8-4.5	03/31/21	4.5	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP8-9.0	03/31/21	9.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP9-3.0	03/31/21	3.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP9-7.5	03/31/21	7.5	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP10-4.0	03/31/21	4.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP11-4.0	03/31/21	4.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP12-3.0	03/31/21	3.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP12-8.0	03/31/21	8.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP13-2.0	03/30/21	2.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP13-5.0	03/30/21	5.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP14-5.0	03/30/21	5.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP14-10.0	03/30/21	10.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.02 U
C-1 DP15-4.0	03/30/21	4.0	**0.04**	**0.038**	**0.055**	0.005 U	**0.04**	0.01 U	0.005 U	**0.65**	**1.7**	**0.052**	**0.028**	**0.620**	0.02 U
C-1 DP15-7.0	03/30/21	7.0	0.005 U	0.025 U	0.025 U	0.005 U	0.005 U	0.01 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	**0.140**	0.02 U
MTCA Method A or B Cleanup Level for Unrestricted Land Use[5]			2	NE	34.0	NE	7200	11	800	NE	190	1600	0.05	0.03	1

Notes:

[1] Chemical analyses performed by Friedman and Bruya, Inc. of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix B.

[2] The approximate exploration locations are shown in Figure 2.

[3] Volatiles were analyzed by EPA Method 8260C. Only volatiles that were detected are listed; all other volatiles are non-detect for all samples. BTEX results are presented in Table 1.

[4] PCBs analyzed by EPA Method 8082A.

[5] Cleanup level shown is the MTCA Method A cleanup level for unrestricted land use. If no MTCA Method A value is available, the most conservative MTCA Method B cleanup level is presented.

bgs = below ground surface

mg/kg = milligrams per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

NA = Not available

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration exceeded the applicable cleanup level.

Table 3

Soil Chemical Analytical Results[1]

Metals

C-1 Hangar and Building, Snohomish County Airport
Everett, Washington

Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Total Metals[3] (mg/kg)							
			Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
C-1 DP1-3.5	3/31/2021	3.5	**2.69**	**42.7**	1.00 U	**19.1**	**2.0**	1.00 U	1.00 U	1.00 U
C-1 DP1-11.0	3/31/2021	11.0	**2.92**	**50.5**	1.00 U	**65.7** [4]	**2.5**	1.00 U	1.00 U	1.00 U
C-1 DP2-5.0	3/31/2021	5.0	**4.74**	**34.5**	1.00 U	**21.1**	**1.74**	1.00 U	1.00 U	1.00 U
C-1 DP2-11.0	3/31/2021	11.0	**2.31**	**36.0**	1.00 U	**21.1**	**1.69**	1.00 U	1.00 U	1.00 U
C-1 DP3-4.0	3/30/2021	4.0	**2.25**	**26.0**	1.00 U	**23.3**	**4.86**	1.00 U	1.00 U	1.00 U
C-1 DP3-7.0	3/30/2021	7.0	**1.83**	**41.6**	1.00 U	**22.4**	**2.39**	1.00 U	1.00 U	1.00 U
C-1 DP4-3.5	3/30/2021	3.5	**1.78**	**50.1**	1.00 U	**20.3**	**2.14**	1.00 U	1.00 U	1.00 U
C-1 DP4-5.0	3/30/2021	5.0	**2.59**	**44.6**	1.00 U	**21.9**	**2.09**	1.00 U	1.00 U	1.00 U
C-1 DP4-7.0	3/30/2021	7.0	**1.83**	**35.6**	1.00 U	**19.4**	**1.62**	1.00 U	1.00 U	1.00 U
C-1 DP5-3.0	3/30/2021	3.0	**1.79**	**40.5**	1.00 U	**18.0**	**1.71**	1.00 U	1.00 U	1.00 U
C-1 DP5-6.0	3/30/2021	6.0	**2.08**	**48.0**	1.00 U	**24.6**	**2.37**	1.00 U	1.00 U	1.00 U
C-1 DP6-3.0	3/31/2021	3.0	**2.49**	**42.3**	1.00 U	**16.0**	**1.83**	1.00 U	1.00 U	1.00 U
C-1 DP6-6.0	3/31/2021	6.0	**2.63**	**48.0**	1.00 U	**20.0**	**2.13**	1.00 U	1.00 U	1.00 U
C-1 DP7-4.0	3/31/2021	4.0	**3.01**	**40.5**	1.00 U	**18.2**	**1.95**	1.00 U	1.00 U	1.00 U
C-1 DP7-9.0	3/31/2021	9.0	**2.01**	**38.3**	1.00 U	**18.2**	**1.75**	1.00 U	1.00 U	1.00 U
C-1 DP8-4.5	3/31/2021	4.5	**2.1**	**41.0**	1.00 U	**20.4**	**2.05**	1.00 U	1.00 U	1.00 U
C-1 DP8-9.0	3/31/2021	9.0	**2.93**	**47.2**	1.00 U	**18.8**	**2.22**	1.00 U	1.00 U	1.00 U
C-1 DP9-3.0	3/31/2021	3.0	**2.96**	**44.7**	1.00 U	**18.3**	**2.09**	1.00 U	1.00 U	1.00 U
C-1 DP9-7.5	3/31/2021	7.5	**2.36**	**44.2**	1.00 U	**20.8**	**2.36**	1.00 U	1.00 U	1.00 U
C-1 DP10-4.0	3/31/2021	4.0	**3.27**	**43.6**	1.00 U	**19.7**	**2.04**	1.00 U	1.00 U	1.00 U
C-1 DP11-4.0	3/31/2021	4.0	**2.98**	**46.5**	1.00 U	**18.3**	**2.22**	1.00 U	1.00 U	1.00 U
C-1 DP12-3.0	3/31/2021	3.0	**2.97**	**44.9**	1.00 U	**21.5**	**2.31**	1.00 U	1.00 U	1.00 U
C-1 DP12-8.0	3/31/2021	8.0	**3.02**	**39.3**	1.00 U	**21.4**	**2.11**	1.00 U	1.00 U	1.00 U
C-1 DP13-2.0	3/30/2021	2.0	**3.11**	**82.9**	1.00 U	**19.2**	**1.9**	1.00 U	1.00 U	1.00 U
C-1 DP13-5.0	3/30/2021	5.0	**3.35**	**40.7**	1.00 U	**14.7**	**1.59**	1.00 U	1.00 U	1.00 U
C-1 DP14-5.0	3/30/2021	5.0	**3.02**	**68.0**	1.00 U	**22.5**	**2.43**	1.00 U	1.00 U	1.00 U
C-1 DP14-10.0	3/30/2021	10.0	**1.71**	**32.5**	1.00 U	**16.4**	**1.31**	1.00 U	1.00 U	1.00 U
C-1 DP15-4.0	3/30/2021	4.0	**3.33**	**61.4**	1.00 U	**25.8**	**2.44**	1.00 U	1.00 U	1.00 U
C-1 DP15-7.0	3/30/2021	7.0	**3.24**	**56.5**	1.00 U	**19.6**	**2.15**	1.00 U	1.00 U	1.00 U
MTCA Method A or B Cleanup Level			20	1,600 [5]	2	2,000 [5]	250	2	400 [5]	400 [5]
Naturally occurring background metals in Puget Sound Soils[6]			7	NA	1	48	24	0.07	NA	NA

Notes:

[1] Chemical analyses performed by Friedman and Bruya, Inc. of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix B.

[2] The approximate exploration locations are shown in Figure 2.

[3] Metals analyzed by EPA Method 6020B.

[4] Sample was analyzed for hexavalent chromium using EPA method 7196; hexavalent chromium was not detected and the cleanup level presented is for chromium III, which is the most common form of chromium.

[5] Cleanup level shown is the most conservative MTCA Method B cleanup level available for protection of groundwater; if no cleanup level is available for protection of groundwater, the MTCA Method B cleanup level for direct contact is shown.

[6] 90th Percentile for natural background soil metals concentrations in Puget Sound region, Department of Ecology, publication #94-115, dated October 1994.

bgs = below ground surface

mg/kg = milligrams per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

NA = Not available

Bolded value indicates analyte has been detected at the concentration shown.

Table 4

Groundwater Chemical Analytical Results[1]

Petroleum Hydrocarbons, VOCs, PCBs and Metals

C-1 Hangar and Building, Snohomish County Airport
Everett, Washington

Exploration Identification[2]	Sample Date	Total Petroleum Hydrocarbons[3] (µg/L)			Volatile Organic Compounds[4] (VOCs) (µg/L)	PCBs[5] (µg/L)	Dissolved Metals[6] (µg/L)															
							Arsenic		Barium		Cadmium		Chromium		Lead		Mercury		Selenium		Silver	
		Gasoline Range	Diesel Range	Lube Oil Range	Methylene Chloride		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
C-1 DP2-033121W	3/31/2021	100 U	50.0 U	250 U	**12.0** [7]	0.100 U	**3.48**	**29.5**	**16.7**	**539**	1.00 U	**1.08**	**4.57**	**187**	**1.98**	**24.6**	1.00 U	1.00 U	1.00 U	**1.55**	**6.28**	1.00 U
C-1 DP3-033021W	3/30/2021	100 U	**110**	**330**	5.00 U	0.100 U	**2.68**	**34.7**	**8.11**	**752**	1.00 U	**4.46**	**1.41**	**210**	**1.13**	**120**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
C-1 DP13-033121W	3/31/2021	100 U	50.0 U	250 U	5.00 U	0.100 U	1.00 U	**6.62**	**14.7**	**129**	1.00 U	1.00 U	1.00 U	**24.7**	1.00 U	**2.99**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
C-1 DP14-033121W	3/31/2021	100 U	50.0 U	250 U	5.00 U	0.100 U	**9.53**	**30.8**	**48.3**	**595**	1.00 U	1.00 U	1.00 U	**69.2**	1.00 U	**10.9**	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
MTCA Method A or B Cleanup Level		1,000 [8]	500		5	0.1	5		3,200 [9]		5		50 [10]		15		2		80 [9]		80 [9]	

Notes:

[1] Chemical analyses performed by Friedman & Bruya of Seattle, Washington. Chemical analytical laboratory reports are included in Appendix B.

[2] The approximate exploration locations are shown in Figure 2.

[3] Petroleum hydrocarbons analyzed by NWTPH-Gx and NWTPH-Dx.

[4] Volatiles were analyzed by EPA Method 8260C. Only volatiles that were detected or not detected above cleanup levels in one or more samples are presented in this table. TCE, PCE and vinyl chloride were not detected in the samples.

[5] PCBs analyzed by EPA Method 8082A.

[6] Metals analyzed by EPA Method 6020B.

[7] The detected concentration was qualified by the analytical laboratory as the result of laboratory contamination.See Appendix B.

[8] Cleanup level when no benzene is present.

[9] Cleanup levels are presented for Method B carcinogenic values, which are the most conservative cleanup levels available.

[10] Cleanup levels are presented for Total Chromium.

bgs = below ground surface (pre-construction)

µg/L = micrograms per liter

U = Analyte not detected at a concentration greater than the listed reporting limit.

NA = Not Available

Bolded value indicates analyte detected at the concentration shown.

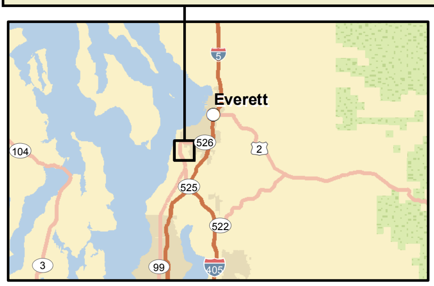
Gray shaded value indicates the detected concentration exceeded the applicable cleanup level.

FIGURES

Map Revised: 5/14/2021

Path: \\red\projects\5\553001401\GIS\553001401_F1_VicinityMap.mxd

Office: Tacoma



Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

C-1 Hangar and C-1 Building Phase II ESA
Paine Field/Snohomish County Airport
Everett, Washington

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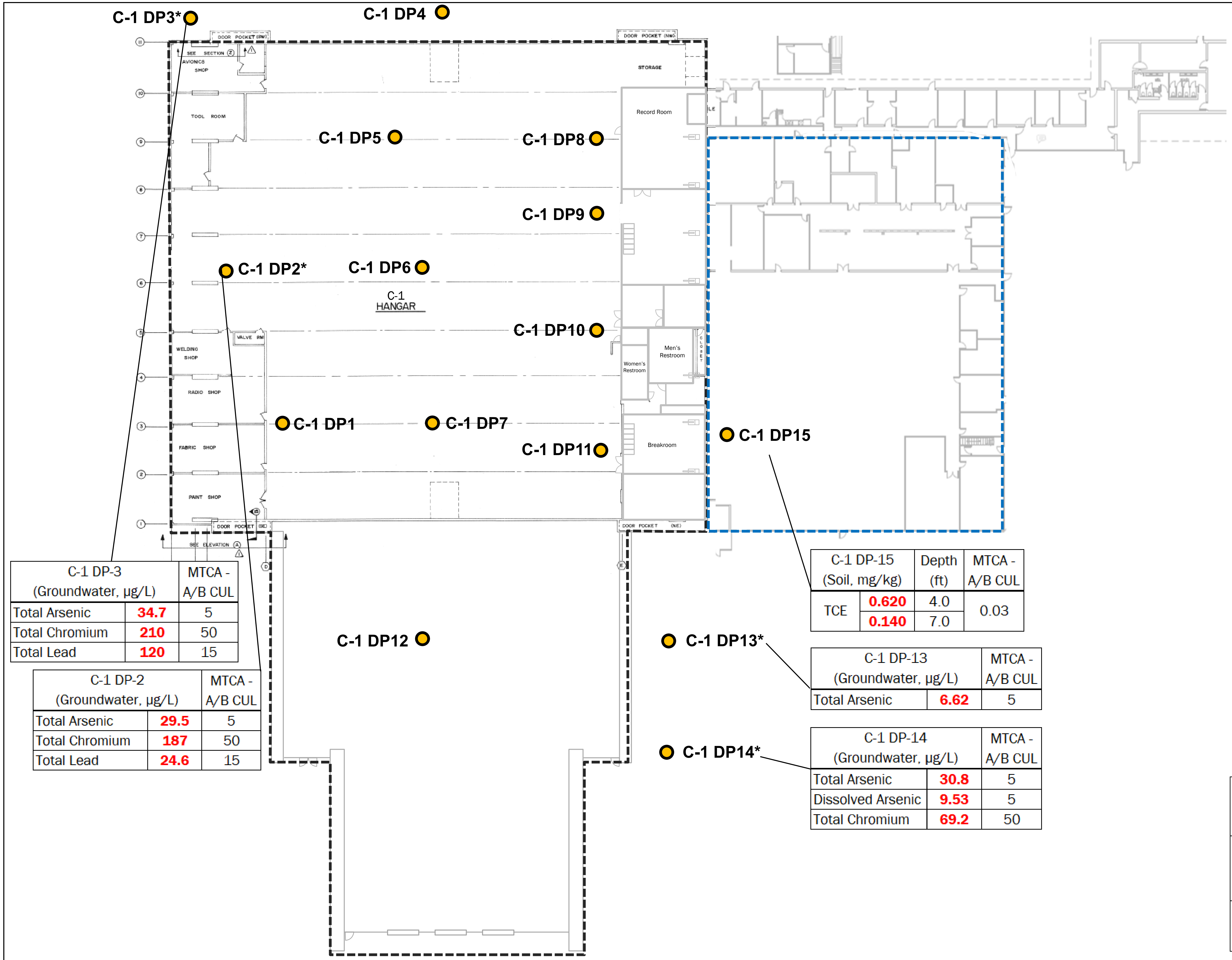
Figure 1



C-1 DP-3 (Groundwater, µg/L)		MTCA - A/B CUL
Total Arsenic	**34.7**	5
Total Chromium	**210**	50
Total Lead	**120**	15

C-1 DP-2 (Groundwater, µg/L)		MTCA - A/B CUL
Total Arsenic	**29.5**	5
Total Chromium	**187**	50
Total Lead	**24.6**	15

C-1 DP-15 (Soil, mg/kg)		Depth (ft)	MTCA - A/B CUL
TCE	**0.620**	4.0	0.03
	0.140	7.0	

C-1 DP-13 (Groundwater, µg/L)		MTCA - A/B CUL
Total Arsenic	**6.62**	5

C-1 DP-14 (Groundwater, µg/L)		MTCA - A/B CUL
Total Arsenic	**30.8**	5
Dissolved Arsenic	**9.53**	5
Total Chromium	**69.2**	50

Legend

● Direct Push Boring Location (GEI, 2021)

C-1 DP3* Sample Identification (asterisk indicates that groundwater was encountered; a grab sample was collected for laboratory analysis [GEI, 2021] at all locations where groundwater was encountered)

⬚ C-1 Hangar Perimeter

⬚ C-1 Building Perimeter

Sample identification (Media, units)

C-1 DP-15 (Soil, mg/kg)		Depth (ft)	MTCA - A/B CUL
TCE	**0.620**	4.0	0.03
	0.140	7.0	

MTCA Method A or B cleanup level

Sample depth (soil only)

Contaminant concentration

Red highlighted concentrations indicate the detected concentration exceeded the MTCA Method A or B cleanup level for listed contaminant of concern.

Not to Scale

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Building maps provided by Snohomish County 2020.

Site Plan with Soil and Groundwater Sample Results Exceeding MTCA Cleanup Levels

Snohomish County Phase II ESA
C-1 Hangar and C-1 Building
Everett, Washington

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Figure 2

5530-014-01

APPENDIX A
Field Procedures and Exploration Logs

APPENDIX A
FIELD PROCEDURES AND EXPLORATION LOGS

Underground Utility Locate

Prior to drilling activities, an underground utility locate was conducted in the area of the proposed boring locations to identify subsurface utilities and/or potential underground physical hazards. The underground utility check consisted of contacting a local utility alert service (1-call) and hiring a private utility locating service to use conductible and GPR technologies.

Soil Sampling

The Phase II Environmental Site Assessment (ESA) was completed using direct-push drilling equipment operated by Cascade Drilling of Woodinville, Washington. Continuous soil cores were obtained from the direct push borings using 1.5-inch diameter, 4-foot-long stainless steel sampler rods driven with a pneumatic hammer. The borings extended to depths ranging between approximately 4 and 15 feet below ground surface (bgs). Soil samples were collected in clean, plastic 1.5-inch diameter disposable liners. Soil samples were collected from the center of backhoe bucket using new disposable gloves.

A representative from our staff observed and classified the soil encountered during explorations. Soil in the explorations was visually classified in general accordance with ASTM International (ASTM) D 2488-94. The exploration logs are presented in Figures A-2 through A-16. A portion of each sample was placed in laboratory-prepared sample jars for possible chemical analysis. The remaining portion of each sample was used for field screening.

Selected samples from the borings were submitted for chemical analysis based on field screening results. The soil samples were placed in a cooler with ice for transport to Friedman and Bruya, Inc. laboratory in Seattle, Washington. Standard chain-of-custody procedures were followed in transporting the soil samples to the laboratory.

Drill cuttings and decontamination/purge water generated during drilling activities were temporarily stored at the Site in 55-gallon drums at a location designated by the property owner pending waste characterization and transportation for off-site disposal.

Sample Identification Scheme

Each soil sample obtained during the investigation was identified by a unique sample designation. The sample designation was documented in the field report and exploration log, and included on the sample container label and laboratory chain-of-custody. The soil sample designation scheme is as follows:

- Direct-push borings: Boring number C-1 DP-1 etc., followed by the depth from which the soil sample was collected, to the nearest 0.1 foot. For example, sample C-1 DP-1-12.5 is from boring number DP-1 from a depth of 12.5 feet bgs.

Groundwater Sample Collection and Handling

Discrete groundwater samples were obtained at the time of drilling by pushing an approximately 1.25-inch diameter stainless steel rod approximately two feet below the water table. The steel rod was then pulled back to expose a temporary stainless steel screen.

Groundwater samples were collected from the temporary wells using a peristaltic pump with dedicated Teflon tubing at low-flow sampling rates. The groundwater was pumped at approximately 0.5 liter per minute until the water purged clear if adequate groundwater volume was available, after which samples were collected at a flow rate of approximately 0.5 liter per minute (low-flow). Purging generated wastewater which was drummed and temporarily stored on the property pending off-site disposal.

Groundwater samples were transferred directly from the tubing outlet to laboratory-prepared sample containers. New nitrile gloves were worn when collecting each groundwater sample. The sample containers were filled completely and placed in a cooler with ice pending transport to the analytical laboratory. Sample labels were completed for each sample. Chain-of-custody procedures were followed in transporting the samples to the laboratory.

Field Screening of Soil Samples

Soil samples obtained from the borings were screened in the field for evidence of contamination using: (1) visual examination; (2) sheen screening and (3) vapor headspace screening with a photoionization detector (PID). The results of headspace and sheen screening are included in the boring logs and in Table 1 for soil samples tested by chemical analysis.

Visual screening consists of inspecting the soil for stains indicative of petroleum-related contamination. Visual screening is generally more effective when contamination is related to heavy petroleum hydrocarbons, such as motor oil or hydraulic oil, or when hydrocarbon concentrations are high. Sheen screening and headspace vapor screening are more sensitive methods that have been effective in detecting contamination at concentrations less than regulatory cleanup guidelines. Sheen screening involves placing soil in a pan of water and observing the water surface for signs of sheen. Sheen classifications are as follows:

No Sheen (NS):	No visible sheen on water surface.
Slight Sheen (SS):	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly.
Moderate Sheen (MS):	Light to heavy sheen, may have some color/iridescence; spread is irregular to flowing; few remaining areas of no sheen on water surface.
Heavy Sheen (HS):	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a PID is inserted in the bag and the instrument measures the concentration of combustible vapor in the air removed from the sample headspace. The PID measures concentrations in ppm (parts per million) and is calibrated to isobutylene. The PID is designed to quantify combustible gas and organic vapor concentrations up to 2,500 ppm. A lower threshold of significance of 1 ppm was used in this application. Field screening results are Site-specific and vary with soil type, soil moisture content, temperature, and type of contaminant.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	○	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
			○	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	⁘	SW	WELL-GRADED SANDS, GRAVELLY SANDS
			░	SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	SM	SILTY SANDS, SAND - SILT MIXTURES
			▨	SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	▥	ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
			▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			⁞	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▮	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
			▨	CH	INORGANIC CLAYS OF HIGH PLASTICITY
			▨	OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			‿	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
■	AC	Asphalt Concrete
▨	CC	Cement Concrete
●	CR	Crushed Rock/ Quarry Spalls
⁘	SOD	Sod/Forest Duff
░	TS	Topsoil

Groundwater Contact

▼ Measured groundwater level in exploration, well, or piezometer

▼ Measured free product in well or piezometer

Graphic Log Contact

— Distinct contact between soil strata

/ Approximate contact between soil strata

Material Description Contact

— Contact between geologic units

– – – – Contact between soil of the same geologic unit

Sampler Symbol Descriptions

▯ 2.4-inch I.D. split barrel

☒ Standard Penetration Test (SPT)

■ Shelby tube

☰ Piston

◧ Direct-Push

◫ Bulk or grab

▥ Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

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Figure A-1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 15	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
Drilling Method	Direct-Push				
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA Recovered (in)	Blows/foot	Sample Name Testing	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0	36			CC	Approximately 8 inches of portland concrete cement			
					SP-SM	Brown fine to coarse sand with silt and occasional gravel (loose, moist) (fill)			
				C-1 DP1-3.5			SS	3.1	
	5	60							
					SM	Dark gray silty sand with occasional gravel (medium dense, moist) (native)			
							SS	3.5	
	10	60							
				C-1 DP1-11			MS	8.9	
						Becomes dry			
							NS	<1	
	15								

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-1

GeoEngineers

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-2
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 15	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		See "Remarks" section for groundwater observed	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36					CC	Approximately 8 inches of portland concrete cement			
								SP	Brown sand with occasional gravel (loose, moist) (fill)			
	5		36			C-1 DP2-5.0				SS	3.8	
								SM	Dark gray silty sand with occasional gravel (medium dense, moist) (native)			
	10		60									
						C-1 DP2-11			Becomes wet	MS	4.3	Groundwater observed at approximately 11 feet below ground surface during drilling Groundwater sample collected on 3/31/21. (turbidity >1,000 NTU)
										SS	1.9	
	15											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-2

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-3
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 10	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: N/A	Drilling Equipment: Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	See "Remarks" section for groundwater observed

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36					AC	Approximately 3 inches of asphalt concrete pavement			
								SP-SM	Dark brown sand with silt (loose, dry) (fill)			
								SP	Light brown sand with gravel (loose, wet) (fill)			Groundwater observed at approximately 4 feet below ground surface during drilling Groundwater sample collected on 3/30/21. (turbidity >100 NTU)
			60			C-1 DP3-4.0				MS	<1	
	5											
									Becomes medium dense			
						C-1 DP3-7.0		SM	Gray silty sand with occasional gravel (dense, moist) (native)	MS	1084	
										NS	<1	
	10											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-3

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-4
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 7	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
Drilling Method	Direct-Push				
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	FIELD DATA: Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample	FIELD DATA: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							AC	Approximately 4 inches of asphalt concrete pavement			
						C-1 DP4-3.5		SP-SM	Gray sand with silt and gravel (loose, dry) (fill?)	SS	<1	
								SP-SM	Brown sand with silt and gravel (loose, dry) (fill?)			
	5					C-1 DP4-5.0		SP	Gray-brown sand with silt (medium dense, moist) (fill?)	MS	3.7	
						C-1 DP4-7.0		SM	Dark gray silty sand with gravel (dense, moist) (native)	NS	<1	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-4

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-5
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 8	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum: Undetermined

Hammer Data: N/A

Drilling Equipment: Geoprobe (7822DT)

Easting (X) Northing (Y):

System Datum:

Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					SP	Light brown fine to coarse sand (loose, dry) (fill)			
										NS	<1	
						C-1 DP5-3.0		SP-SM	Gray sand with silt (medium dense, moist) (native?)	NS	<1	
	5		36									
						C-1 DP5-6.0				NS	<1	
								SM	Gray silty sand with occasional gravel (dense, moist) (native)	NS	<1	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-5

GeoEngineers

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-6
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 9	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA Interval	FIELD DATA Recovered (in)	FIELD DATA Blows/foot	FIELD DATA Collected Sample	FIELD DATA Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 12 inches of portland concrete cement			
								SP-SM	Brown sand with silt and occasional subrounded gravel (loose, dry) (fill)			
						C-1 DP6-3.0				NS	<1	
										NS	<1	
	5		48					SP-SM	Gray sand with silt and occasional angular gravel (medium dense, dry) (native)			
						C-1 DP6-6.0				NS	<1	
										NS	<1	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-6

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 9	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum — Undetermined	Hammer Data — N/A	Drilling Equipment — Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 8 inches of portland concrete cement			
								SP	Brown fine to coarse sand with mottled red stain with occasional gravel (loose, moist) (fill)			
						C-1 DP7-4.0		SP-SM	Dark gray-brown sand with silt and occasional gravel (loose to medium dense, moist) (native?)	SS	3.0	
	5		48									
									Becomes medium dense			
						C-1 DP7-9.0				SS	4.6	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-7

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-8
Sheet 1 of 1

Date:4/29/21 Path:P:\5\5530014\GINT\553001401.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 9	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0	█	60					CC	Approximately 8 inches of portland concrete cement			
		█						SP	Brown fine to coarse sand with occasional rounded gravel (loose, dry) (fill)	NS	1.0	
		█						SP-SM	Brown fine to coarse sand with silt and occasional gravel (loose, dry) (fill?)			
		█			↕	C-1 DP8-4.5				NS	1.9	
	5	█	48									
		█						SP-SM	Dark brown fine to coarse sand with silt and occasional gravel (medium dense, moist) (fill?)	SS	4.9	
		█			↕	C-1 DP8-9.0						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-8

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-9
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 10	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A	Drilling Equipment Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration
Notes:		

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 8 inches of portland concrete cement			
								SP	Light brown sand with occasional gravel (loose, dry) (fill)			
						C-1 DP9-3.0				NS	3.4	
	5		60					SP-SM	Brown fine to coarse sand with silt and occasional gravel (loose, moist) (fill?)			
						C-1 DP9-7.5				SS	4.8	
								SM	Dark gray silty fine to coarse sand with occasional gravel (medium dense, moist) (native)			
										SS	<1	
	10											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-9

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Drilled	Start 3/31/2021 End 3/31/2021	Total Depth (ft) 4	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: N/A	Drilling Equipment: Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		48					CC	Approximately 6 inches of portland concrete cement			
								SP-SM	Brown fine to coarse sand with silt and occasional gravel (medium dense, dry) (fill)	SS	4.0	
	4					C-1 DP10-4.0		SM	Dark gray silty fine to coarse sand with occasional gravel (medium dense, dry) (native)	SS	3.7	

Boring terminated at approximately 4 feet below ground surface due to refusal on hard ground

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-10

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-11
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 4	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
Drilling Method	Direct-Push				
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							CC	Portland concrete cement			
								SP-SM	Brown sand with silt (loose, dry) (fill)	NS	1.3	
								SP-SM	Brown sand with silt and occasional gravel (medium dense, moist) (fill)			
										SS	2.6	
	4					C-1 DP11-4.0						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-11

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-12
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 9.5	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
Drilling Method	Direct-Push				

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: N/A	Drilling Equipment: Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					AC	Approximately 8 inches of asphalt concrete pavement			
								SP	Brown sand with occasional gravel (loose, dry) (fill)	NS	1.7	
						C-1 DP12-3.0		SP-SM	Brown with mottled red coloring fine to coarse sand with silt and occasional gravel (medium dense, moist) (fill)	SS	2.2	
	5		54									
						C-1 DP12-8.0				SS	1.1	
								SM	Dark gray silty sand with occasional gravel (medium dense, moist) (native)	NS	1.0	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-12

GeoEngineers

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-13
Sheet 1 of 1

Drilled Start 3/30/2021 End 3/30/2021	Total Depth (ft) 10	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A		Drilling Equipment Geoprobe (7822DT)	
Easting (X) Northing (Y)	System Datum		See "Remarks" section for groundwater observed	
Notes:				

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Approximately 6 inches of asphalt concrete pavement			
								SP	Brown sand with occasional gravel (loose, dry) (fill)			
					↕	C-1 DP13-2.0				SS	2.5	
												Groundwater observed at approximately 4 feet below ground surface during drilling Groundwater sample collected on 3/31/21. (turbidity >1,000 NTU)
									Becomes wet			
	5		60		↕	C-1 DP13-5.0				SS	2.3	
									Becomes medium dense	NS	<1	
									Gray silty sand (dense, moist) (native)	NS	<1	
	10											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-13

GeoEngineers

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-14
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 15	Logged By KRA Checked By
Driller	Holocene Drilling, Inc.		Drilling Method	Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment: Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		See "Remarks" section for groundwater observed

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36					AC	Approximately 6 inches of asphalt concrete pavement			
								SP-SM	Dark brown fine to coarse sand with silt (loose, moist) (fill)			
								SP	Gray sand with occasional gravel (loose, moist) (fill?)			
	5		60			C-1 DP14-5.0				SS	<1	
								SP	Brown sand with gravel (loose, wet) (fill?)			
	10		60			C-1 DP14-10.0				MS	2.3	Groundwater observed at approximately 10 feet below ground surface during drilling Groundwater sample collected on 3/31/21. (turbidity >1,000 NTU)
								SM	Dark gray silt with sand (dense, moist) (native)			
										NS	<1	
	15											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-14

GeoEngineers

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-15
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 7	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
					Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A	Drilling Equipment Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 6 inches of portland concrete cement			
								SP-SM	Brown silt with fine to coarse sand and occasional gravel (medium dense, moist) (fill)			
						C-1 DP15-4.0				MS	218	
	5		24									
						C-1 DP15-7.0				SS	1.9	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Date:4/29/21 Path:P:\5\5530014\GINT\553001401.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Log of Boring C-1 DP-15

GEOENGINEERS

Project: Snohomish County - C-1 Hangar and C-1 Building Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-16
Sheet 1 of 1

APPENDIX B

Laboratory Chemical Analytical Data Report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 19, 2021

Jacob Letts, Project Manager
GeoEngineers
2101 4th Avenue, Suite 150
Seattle, WA 98121

Dear Mr Letts:

Included is the amended report from the testing of material submitted on March 31, 2021 from the Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585 project. Per your request, the reporting limits for several 8260D volatile organic compounds in water were lowered and a qualifier was added to the methylene chloride detection in sample C-1 DP2-033121w.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GNR0409R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
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April 9, 2021

Jacob Letts, Project Manager
GeoEngineers
2101 4th Avenue, Suite 150
Seattle, WA 98121

Dear Mr Letts:

Included are the results from the testing of material submitted on March 31, 2021 from the Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585 project. There are 153 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GNR0409R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 31, 2021 by Friedman & Bruya, Inc. from the GeoEngineers Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	GeoEngineers
103585 -01	C-1 DP4-3.5
103585 -02	C-1 DP4-5.0
103585 -03	C-1 DP4-7.0
103585 -04	C-1 DP3-4.0
103585 -05	C-1 DP3-7.0
103585 -06	C-1 DP3-033021w
103585 -07	C-1 DP5-3.0
103585 -08	C-1 DP5-6.0
103585 -09	C-1 DP15-4.0
103585 -10	C-1 DP15-7.0
103585 -11	C-1 DP14-5.0
103585 -12	C-1 DP14-10.0
103585 -13	C-1 DP13-2.0
103585 -14	C-1 DP13-5.0
103585 -15	C-1 DP13-033121w
103585 -16	C-1 DP14-033121w
103585 -17	C-1 DP8-4.5
103585 -18	C-1 DP8-9.0
103585 -19	C-1 DP9-3.0
103585 -20	C-1 DP9-7.5
103585 -21	C-1 DP10-4.0
103585 -22	C-1 DP11-4.0
103585 -23	C-1 DP2-5.0
103585 -24	C-1 DP2-11.0
103585 -25	C-1 DP1-3.5
103585 -26	C-1 DP1-11.0
103585 -27	C-1 DP2-033121w
103585 -28	C-1 DP7-4.0
103585 -29	C-1 DP7-9.0
103585 -30	C-1 DP12-3.0
103585 -31	C-1 DP12-8.0
103585 -32	C-1 DP6-3.0
103585 -33	C-1 DP6-6.0
103585 -34	Trip Blank 1
103585 -35	Trip Blank 2
103585 -36	Trip Blank 3

CASE NARRATIVE (continued)

Laboratory ID	GeoEngineers
103585 -37	Trip Blank 4
103585 -38	Trip Blank 5

Gasoline by NWTPH-Gx (water)

All quality control requirements were acceptable.

Diesel and Motor Oil by NWTPH-Dx (water)

All quality control requirements were acceptable.

VOCs by 8260D (water)

All quality control requirements were acceptable.

PCBs by 8082A (water)

All quality control requirements were acceptable.

Total Metals by 6020B (water)

All quality control requirements were acceptable.

Dissolved Metals by 6020B (water)

A 6020B internal standard failed the acceptance criteria for sample C-1 DP14-033121w. The sample was diluted and reanalyzed with acceptable results. Both data sets were reported. All other quality control requirements were acceptable.

Gasoline by NWTPH-Gx (soil)

All quality control requirements were acceptable.

Diesel and Motor Oil by NWTPH-Dx (soil)

All quality control requirements were acceptable.

VOCs by 8260D (soil)

The 8260D matrix spike and matrix spike duplicate failed the relative percent difference for several compounds. The analytes were not detected therefore the data were acceptable. All other quality control requirements were acceptable.

PCBs by 8082A (soil)

For PCB samples analyzed on GC9, the time of analysis in the EQUIS electronic data file is inaccurate due to a software error. All quality control requirements were acceptable.

Total Metals by 6020B (soil)

All quality control requirements were acceptable.

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/01/21
Date Analyzed: 04/02/21, 04/05/21 and 04/06/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
C-1 DP4-3.5 103585-01	<5	75
C-1 DP4-5.0 103585-02	<5	73
C-1 DP4-7.0 103585-03	<5	75
C-1 DP3-4.0 103585-04	<5	75
C-1 DP3-7.0 103585-05	7.5	79
C-1 DP5-3.0 103585-07	<5	73
C-1 DP5-6.0 103585-08	<5	77
C-1 DP15-4.0 103585-09	51	78
C-1 DP15-7.0 103585-10	<5	65
C-1 DP14-5.0 103585-11	<5	69
C-1 DP14-10.0 103585-12	<5	72

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/01/21
Date Analyzed: 04/02/21, 04/05/21 and 04/06/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
C-1 DP13-2.0 103585-13	<5	65
C-1 DP13-5.0 103585-14	<5	67
C-1 DP8-4.5 103585-17	<5	68
C-1 DP8-9.0 103585-18	<5	67
C-1 DP9-3.0 103585-19	<5	64
C-1 DP9-7.5 103585-20	<5	68
C-1 DP10-4.0 103585-21	<5	68
C-1 DP11-4.0 103585-22	<5	61
C-1 DP2-5.0 103585-23	<5	71
C-1 DP2-11.0 103585-24	<5	69
C-1 DP1-3.5 103585-25	<5	63

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/01/21
Date Analyzed: 04/02/21, 04/05/21 and 04/06/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
C-1 DP1-11.0 103585-26	<5	62
C-1 DP7-4.0 103585-28	<5	62
C-1 DP7-9.0 103585-29	<5	64
C-1 DP12-3.0 103585-30	<5	63
C-1 DP12-8.0 103585-31	<5	60
C-1 DP6-3.0 103585-32	<5	68
C-1 DP6-6.0 103585-33	<5	66
Method Blank 01-598 MB	<5	71
Method Blank 01-599 MB	<5	69

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/05/21
Date Analyzed: 04/06/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
C-1 DP3-033021w 103585-06	<100	89
C-1 DP13-033121w 103585-15	<100	88
C-1 DP14-033121w 103585-16	<100	87
C-1 DP2-033121w 103585-27	<100	88
Method Blank 01-601 MB	<100	90

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/01/21
Date Analyzed: 04/01/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
C-1 DP4-3.5 103585-01	<50	<250	101
C-1 DP4-5.0 103585-02	<50	<250	101
C-1 DP4-7.0 103585-03	<50	<250	103
C-1 DP3-4.0 103585-04	<50	<250	89
C-1 DP3-7.0 103585-05	<50	<250	88
C-1 DP5-3.0 103585-07	<50	<250	91
C-1 DP5-6.0 103585-08	<50	<250	96
C-1 DP15-4.0 103585-09	<50	<250	91
C-1 DP15-7.0 103585-10	<50	<250	100
C-1 DP14-5.0 103585-11	<50	<250	102

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/01/21
Date Analyzed: 04/01/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID	Diesel Range	Motor Oil Range	Surrogate (% Recovery)
Laboratory ID	(C_{10}-C_{25})	(C_{25}-C_{36})	(Limit 53-144)
C-1 DP14-10.0 103585-12	<50	<250	103
C-1 DP13-2.0 103585-13	<50	<250	102
C-1 DP13-5.0 103585-14	<50	<250	103
C-1 DP8-4.5 103585-17	<50	<250	99
C-1 DP8-9.0 103585-18	<50	<250	91
C-1 DP9-3.0 103585-19	<50	<250	90
C-1 DP9-7.5 103585-20	<50	<250	92
C-1 DP10-4.0 103585-21	<50	<250	100
C-1 DP11-4.0 103585-22	<50	<250	100
C-1 DP2-5.0 103585-23	<50	<250	102

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/01/21
Date Analyzed: 04/01/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
C-1 DP2-11.0 103585-24	<50	<250	89
C-1 DP1-3.5 103585-25	<50	<250	89
C-1 DP1-11.0 103585-26	<50	<250	90
C-1 DP7-4.0 103585-28	<50	<250	100
C-1 DP7-9.0 103585-29	<50	<250	101
C-1 DP12-3.0 103585-30	<50	<250	91
C-1 DP12-8.0 103585-31	<50	<250	99
C-1 DP6-3.0 103585-32	<50	<250	103
C-1 DP6-6.0 103585-33	<50	<250	100
Method Blank 01-772 MB	<50	<250	99
Method Blank 01-774 MB	<50	<250	90

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585
Date Extracted: 04/02/21
Date Analyzed: 04/02/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
C-1 DP3-033021w 103585-06	110 x	330	49
C-1 DP13-033121w 103585-15	<50	<250	118
C-1 DP14-033121w 103585-16	<50	<250	82
C-1 DP2-033121w 103585-27	<50	<250	ip
Method Blank 01-778 MB	<50	<250	128

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 DP3-033021w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-06
Date Analyzed:	04/05/21	Data File:	103585-06.131
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	2.68
Barium	8.11
Cadmium	<1
Chromium	1.41
Lead	1.13
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 DP13-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-15
Date Analyzed:	04/05/21	Data File:	103585-15.132
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	14.7
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 DP14-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-16
Date Analyzed:	04/05/21	Data File:	103585-16.133
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	9.53
Barium	48.3
Cadmium	<1
Chromium	<1 J
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 DP14-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-16 x5
Date Analyzed:	04/06/21	Data File:	103585-16 x5.081
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 DP2-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-27
Date Analyzed:	04/05/21	Data File:	103585-27.134
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.48
Barium	16.7
Cadmium	<1
Chromium	4.57
Lead	1.98
Mercury	<1
Selenium	<1
Silver	6.28

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	I1-215 mb
Date Analyzed:	04/05/21	Data File:	I1-215 mb.085
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP3-033021w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/08/21	Lab ID:	103585-06
Date Analyzed:	04/08/21	Data File:	103585-06.044
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	4.46
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP3-033021w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-06 x20
Date Analyzed:	04/06/21	Data File:	103585-06 x20.085
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	34.7
Barium	752
Chromium	210
Lead	120

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP13-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-15
Date Analyzed:	04/05/21	Data File:	103585-15.147
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Barium	129
Cadmium	<1
Lead	2.99
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP13-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-15 x10
Date Analyzed:	04/06/21	Data File:	103585-15 x10.086
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	6.62
Chromium	24.7

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP14-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-16
Date Analyzed:	04/05/21	Data File:	103585-16.148
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	<1
Lead	10.9
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP14-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-16 x10
Date Analyzed:	04/05/21	Data File:	103585-16 x10.121
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	30.8
Barium	595
Chromium	69.2

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP2-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-27
Date Analyzed:	04/05/21	Data File:	103585-27.149
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Cadmium	1.08
Lead	24.6
Mercury	<1
Selenium	1.55
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP2-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	103585-27 x10
Date Analyzed:	04/05/21	Data File:	103585-27 x10.122
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	29.5
Barium	539
Chromium	187

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/05/21	Lab ID:	I1-214 mb
Date Analyzed:	04/05/21	Data File:	I1-214 mb.083
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<0.2
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/08/21	Lab ID:	I1-220 mb2
Date Analyzed:	04/08/21	Data File:	I1-220 mb2.037
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP4-3.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-01
Date Analyzed:	04/02/21	Data File:	103585-01.061
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.78
Barium	50.1
Cadmium	<1
Chromium	20.3
Lead	2.14
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP4-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-02
Date Analyzed:	04/02/21	Data File:	103585-02.064
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.59
Barium	44.6
Cadmium	<1
Chromium	21.9
Lead	2.09
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP4-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-03
Date Analyzed:	04/02/21	Data File:	103585-03.068
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.83
Barium	35.6
Cadmium	<1
Chromium	19.4
Lead	1.62
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP3-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-04
Date Analyzed:	04/02/21	Data File:	103585-04.071
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.25
Barium	26.0
Cadmium	<1
Chromium	23.3
Lead	4.86
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP3-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-05
Date Analyzed:	04/02/21	Data File:	103585-05.072
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.83
Barium	41.6
Cadmium	<1
Chromium	22.4
Lead	2.39
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP5-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-07
Date Analyzed:	04/02/21	Data File:	103585-07.073
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.79
Barium	40.5
Cadmium	<1
Chromium	18.0
Lead	1.71
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP5-6.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-08
Date Analyzed:	04/02/21	Data File:	103585-08.074
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.08
Barium	48.0
Cadmium	<1
Chromium	24.6
Lead	2.37
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP15-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-09
Date Analyzed:	04/02/21	Data File:	103585-09.075
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.33
Barium	61.4
Cadmium	<1
Chromium	25.8
Lead	2.44
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP15-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-10
Date Analyzed:	04/02/21	Data File:	103585-10.076
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.24
Barium	56.5
Cadmium	<1
Chromium	19.6
Lead	2.15
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP14-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-11
Date Analyzed:	04/02/21	Data File:	103585-11.077
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.02
Barium	68.0
Cadmium	<1
Chromium	22.5
Lead	2.43
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP14-10.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-12
Date Analyzed:	04/02/21	Data File:	103585-12.078
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.71
Barium	32.5
Cadmium	<1
Chromium	16.4
Lead	1.31
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP13-2.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-13
Date Analyzed:	04/05/21	Data File:	103585-13.093
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.11
Barium	82.9
Cadmium	<1
Chromium	19.2
Lead	1.90
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP13-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-14
Date Analyzed:	04/05/21	Data File:	103585-14.094
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.35
Barium	40.7
Cadmium	<1
Chromium	14.7
Lead	1.59
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP8-4.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-17
Date Analyzed:	04/05/21	Data File:	103585-17.095
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.10
Barium	41.0
Cadmium	<1
Chromium	20.4
Lead	2.05
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP8-9.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-18
Date Analyzed:	04/05/21	Data File:	103585-18.096
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.93
Barium	47.2
Cadmium	<1
Chromium	18.8
Lead	2.22
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP9-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-19
Date Analyzed:	04/05/21	Data File:	103585-19.097
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.96
Barium	44.7
Cadmium	<1
Chromium	18.3
Lead	2.09
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP9-7.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-20
Date Analyzed:	04/05/21	Data File:	103585-20.098
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.36
Barium	44.2
Cadmium	<1
Chromium	20.8
Lead	2.36
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP10-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-21
Date Analyzed:	04/05/21	Data File:	103585-21.099
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.27
Barium	43.6
Cadmium	<1
Chromium	19.7
Lead	2.04
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP11-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-22
Date Analyzed:	04/05/21	Data File:	103585-22.100
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.98
Barium	46.5
Cadmium	<1
Chromium	18.3
Lead	2.22
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP2-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-23
Date Analyzed:	04/05/21	Data File:	103585-23.101
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	4.74
Barium	34.5
Cadmium	<1
Chromium	21.1
Lead	1.74
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP2-11.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-24
Date Analyzed:	04/05/21	Data File:	103585-24.102
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.31
Barium	36.0
Cadmium	<1
Chromium	21.1
Lead	1.69
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP1-3.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-25
Date Analyzed:	04/05/21	Data File:	103585-25.112
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.69
Barium	42.7
Cadmium	<1
Chromium	19.1
Lead	2.00
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP1-11.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-26
Date Analyzed:	04/05/21	Data File:	103585-26.113
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.92
Barium	50.5
Cadmium	<1
Chromium	65.7
Lead	2.50
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP7-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-28
Date Analyzed:	04/05/21	Data File:	103585-28.114
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.01
Barium	40.5
Cadmium	<1
Chromium	18.2
Lead	1.95
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP7-9.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-29
Date Analyzed:	04/05/21	Data File:	103585-29.115
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.01
Barium	38.3
Cadmium	<1
Chromium	18.2
Lead	1.75
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP12-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-30
Date Analyzed:	04/02/21	Data File:	103585-30.170
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.97
Barium	44.9
Cadmium	<1
Chromium	21.5
Lead	2.31
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP12-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-30
Date Analyzed:	04/05/21	Data File:	103585-30.125
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP12-8.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-31
Date Analyzed:	04/02/21	Data File:	103585-31.171
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.02
Barium	39.3
Cadmium	<1
Chromium	21.4
Lead	2.11
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP12-8.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-31
Date Analyzed:	04/05/21	Data File:	103585-31.126
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Mercury	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP6-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-32
Date Analyzed:	04/05/21	Data File:	103585-32.127
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.49
Barium	42.3
Cadmium	<1
Chromium	16.0
Lead	1.83
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 DP6-6.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-33
Date Analyzed:	04/05/21	Data File:	103585-33.128
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.63
Barium	48.0
Cadmium	<1
Chromium	20.0
Lead	2.13
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	I1-209 mb2
Date Analyzed:	04/02/21	Data File:	I1-209 mb2.037
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	I1-211 mb
Date Analyzed:	04/02/21	Data File:	I1-211 mb.059
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP4-3.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-01 1/0.5
Date Analyzed:	04/01/21	Data File:	040127.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	84	118
Toluene-d8	96	86	117
4-Bromofluorobenzene	98	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP4-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-02 1/0.5
Date Analyzed:	04/01/21	Data File:	040128.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	84	118
Toluene-d8	92	86	117
4-Bromofluorobenzene	109	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP4-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-03 1/0.5
Date Analyzed:	04/01/21	Data File:	040129.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	84	118
Toluene-d8	102	86	117
4-Bromofluorobenzene	111	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	0.022
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	0.013	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	0.027
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP3-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-04 1/0.5
Date Analyzed:	04/01/21	Data File:	040130.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	84	118
Toluene-d8	96	86	117
4-Bromofluorobenzene	103	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP3-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-05 1/0.5
Date Analyzed:	04/01/21	Data File:	040131.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	84	118
Toluene-d8	103	86	117
4-Bromofluorobenzene	102	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP5-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-07 1/0.5
Date Analyzed:	04/01/21	Data File:	040132.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	84	118
Toluene-d8	94	86	117
4-Bromofluorobenzene	112	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP5-6.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-08 1/0.5
Date Analyzed:	04/01/21	Data File:	040133.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	84	118
Toluene-d8	103	86	117
4-Bromofluorobenzene	108	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP15-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-09 1/0.5
Date Analyzed:	04/01/21	Data File:	040114.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	84	118
Toluene-d8	102	86	117
4-Bromofluorobenzene	97	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	0.028
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	0.052
1,1,1-Trichloroethane	0.040	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	0.62	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	0.65
Bromodichloromethane	<0.01	1,4-Dichlorobenzene	1.7
Dibromomethane	<0.025	1,2-Dichlorobenzene	0.040
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	0.055
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	0.038
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP15-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-10 1/0.5
Date Analyzed:	04/02/21	Data File:	040224.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	84	118
Toluene-d8	100	86	117
4-Bromofluorobenzene	102	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	0.14	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP14-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-11 1/0.5
Date Analyzed:	04/01/21	Data File:	040116.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	84	118
Toluene-d8	104	86	117
4-Bromofluorobenzene	97	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP14-10.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-12 1/0.5
Date Analyzed:	04/01/21	Data File:	040117.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	84	118
Toluene-d8	103	86	117
4-Bromofluorobenzene	103	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP13-2.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-13 1/0.5
Date Analyzed:	04/01/21	Data File:	040118.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	89	84	118
Toluene-d8	93	86	117
4-Bromofluorobenzene	107	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP13-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-14 1/0.5
Date Analyzed:	04/01/21	Data File:	040119.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	84	118
Toluene-d8	103	86	117
4-Bromofluorobenzene	104	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP8-4.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-17 1/0.5
Date Analyzed:	04/01/21	Data File:	040120.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	84	118
Toluene-d8	91	86	117
4-Bromofluorobenzene	108	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP8-9.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-18 1/0.5
Date Analyzed:	04/01/21	Data File:	040121.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	84	118
Toluene-d8	101	86	117
4-Bromofluorobenzene	109	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP9-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-19 1/0.5
Date Analyzed:	04/01/21	Data File:	040122.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	112	84	118
Toluene-d8	100	86	117
4-Bromofluorobenzene	111	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP9-7.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-20 1/0.5
Date Analyzed:	04/01/21	Data File:	040134.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	113	84	118
Toluene-d8	101	86	117
4-Bromofluorobenzene	108	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP10-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-21 1/0.5
Date Analyzed:	04/01/21	Data File:	040135.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	113	84	118
Toluene-d8	105	86	117
4-Bromofluorobenzene	101	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP11-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-22 1/0.5
Date Analyzed:	04/02/21	Data File:	040136.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	116	84	118
Toluene-d8	101	86	117
4-Bromofluorobenzene	94	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP2-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-23 1/0.5
Date Analyzed:	04/02/21	Data File:	040137.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	84	118
Toluene-d8	101	86	117
4-Bromofluorobenzene	105	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP2-11.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-24 1/0.5
Date Analyzed:	04/02/21	Data File:	040138.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	84	118
Toluene-d8	92	86	117
4-Bromofluorobenzene	105	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP1-3.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-25 1/0.5
Date Analyzed:	04/02/21	Data File:	040139.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	90	84	118
Toluene-d8	95	86	117
4-Bromofluorobenzene	113	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP1-11.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-26 1/0.5
Date Analyzed:	04/02/21	Data File:	040140.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	84	118
Toluene-d8	101	86	117
4-Bromofluorobenzene	106	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP7-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-28 1/0.5
Date Analyzed:	04/02/21	Data File:	040141.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	90	84	118
Toluene-d8	92	86	117
4-Bromofluorobenzene	111	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP7-9.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-29 1/0.5
Date Analyzed:	04/02/21	Data File:	040142.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	88	84	118
Toluene-d8	93	86	117
4-Bromofluorobenzene	115	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP12-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-30 1/0.5
Date Analyzed:	04/02/21	Data File:	040143.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	84	118
Toluene-d8	102	86	117
4-Bromofluorobenzene	105	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP12-8.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-31 1/0.5
Date Analyzed:	04/02/21	Data File:	040144.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	87	84	118
Toluene-d8	93	86	117
4-Bromofluorobenzene	108	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP6-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-32 1/0.5
Date Analyzed:	04/02/21	Data File:	040145.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	84	118
Toluene-d8	100	86	117
4-Bromofluorobenzene	104	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP6-6.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-33 1/0.5
Date Analyzed:	04/02/21	Data File:	040146.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	90	84	118
Toluene-d8	99	86	117
4-Bromofluorobenzene	100	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	01-679 mb 1/0.5
Date Analyzed:	04/01/21	Data File:	040125.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	108	84	118
Toluene-d8	94	86	117
4-Bromofluorobenzene	102	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	01-756 mb 1/0.5
Date Analyzed:	04/01/21	Data File:	040126.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	86	84	118
Toluene-d8	93	86	117
4-Bromofluorobenzene	109	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.05	1,3-Dichloropropane	<0.025
Chloromethane	<0.05	Tetrachloroethene	<0.005
Vinyl chloride	<0.005	Dibromochloromethane	<0.025
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.05	Chlorobenzene	<0.005
Trichlorofluoromethane	<0.05	Ethylbenzene	<0.005
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.005
1,1-Dichloroethene	<0.005	m,p-Xylene	<0.01
Hexane	<0.025	o-Xylene	<0.005
Methylene chloride	<0.5	Styrene	<0.005
Methyl t-butyl ether (MTBE)	<0.005	Isopropylbenzene	<0.005
trans-1,2-Dichloroethene	<0.005	Bromoform	<0.005
1,1-Dichloroethane	<0.005	n-Propylbenzene	<0.005
2,2-Dichloropropane	<0.005	Bromobenzene	<0.005
cis-1,2-Dichloroethene	<0.005	1,3,5-Trimethylbenzene	<0.005
Chloroform	<0.01	1,1,2,2-Tetrachloroethane	<0.025
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.025
1,2-Dichloroethane (EDC)	<0.01	2-Chlorotoluene	<0.005
1,1,1-Trichloroethane	<0.005	4-Chlorotoluene	<0.005
1,1-Dichloropropene	<0.005	tert-Butylbenzene	<0.005
Carbon tetrachloride	<0.005	1,2,4-Trimethylbenzene	<0.005
Benzene	<0.005	sec-Butylbenzene	<0.005
Trichloroethene	<0.005	p-Isopropyltoluene	<0.005
1,2-Dichloropropane	<0.005	1,3-Dichlorobenzene	<0.005
Bromodichloromethane	<0.025	1,4-Dichlorobenzene	<0.005
Dibromomethane	<0.025	1,2-Dichlorobenzene	<0.005
4-Methyl-2-pentanone	<0.5	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.005	1,2,4-Trichlorobenzene	<0.025
Toluene	<0.005	Hexachlorobutadiene	<0.025
trans-1,3-Dichloropropene	<0.005	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.005	1,2,3-Trichlorobenzene	<0.025
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP3-033021w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-06
Date Analyzed:	04/02/21	Data File:	040216.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	85	117
Toluene-d8	94	88	112
4-Bromofluorobenzene	113 vo	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<0.01 j
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<0.072 j
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.6	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<0.13 j
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<0.7	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP13-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-15
Date Analyzed:	04/02/21	Data File:	040217.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	85	117
Toluene-d8	97	88	112
4-Bromofluorobenzene	114 vo	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<0.01 j
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<0.072 j
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.6	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<0.13 j
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<0.7	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP14-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-16
Date Analyzed:	04/02/21	Data File:	040218.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	85	117
Toluene-d8	93	88	112
4-Bromofluorobenzene	112 vo	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<0.01 j
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<0.072 j
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.6	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<0.13 j
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<0.7	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	C-1 DP2-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-27
Date Analyzed:	04/02/21	Data File:	040219.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	110	85	117
Toluene-d8	94	88	112
4-Bromofluorobenzene	110	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<0.01 j
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	12 lc	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<0.072 j
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.6	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<0.13 j
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<0.7	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Trip Blank 1	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/02/21	Lab ID:	103585-34
Date Analyzed:	04/02/21	Data File:	040215.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	85	117
Toluene-d8	94	88	112
4-Bromofluorobenzene	105	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<0.01 j
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<0.072 j
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.6	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<0.13 j
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<0.7	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID: Method Blank
Date Received: Not Applicable
Date Extracted: 04/02/21
Date Analyzed: 04/02/21
Matrix: Water
Units: ug/L (ppb)

Client: GeoEngineers
Project: Snohomish C-1 Hangar 5530-014-01
Lab ID: 01-757 mb
Data File: 040211.D
Instrument: GCMS4
Operator: JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	86	113
Toluene-d8	97	88	114
4-Bromofluorobenzene	99	88	112

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10 ca	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<0.01 j
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<0.072 j
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.6	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<0.13 j
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<0.7	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP4-3.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-01 1/6
Date Analyzed:	04/02/21	Data File:	040206.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	60	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP4-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-02 1/6
Date Analyzed:	04/02/21	Data File:	040218.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	70	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP4-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-03 1/6
Date Analyzed:	04/02/21	Data File:	040217.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	67	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP3-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-04 1/6
Date Analyzed:	04/02/21	Data File:	040207.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	59	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP3-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-05 1/6
Date Analyzed:	04/02/21	Data File:	040208.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	59	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP5-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-07 1/6
Date Analyzed:	04/02/21	Data File:	040209.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	55	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP5-6.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-08 1/6
Date Analyzed:	04/02/21	Data File:	040210.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	48	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP15-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-09 1/6
Date Analyzed:	04/02/21	Data File:	040216.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	62	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP15-7.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-10 1/6
Date Analyzed:	04/02/21	Data File:	040211.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	55	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP14-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-11 1/6
Date Analyzed:	04/02/21	Data File:	040212.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	47	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP14-10.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-12 1/6
Date Analyzed:	04/02/21	Data File:	040222.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	60	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP13-2.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-13 1/6
Date Analyzed:	04/02/21	Data File:	040213.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	100	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP13-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-14 1/6
Date Analyzed:	04/02/21	Data File:	040205.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	73	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP8-4.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-17 1/6
Date Analyzed:	04/02/21	Data File:	040206.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	75	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP8-9.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-18 1/6
Date Analyzed:	04/02/21	Data File:	040215.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	53	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP9-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-19 1/6
Date Analyzed:	04/02/21	Data File:	040216.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	59	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP9-7.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-20 1/6
Date Analyzed:	04/02/21	Data File:	040217.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	52	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP10-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-21 1/6
Date Analyzed:	04/02/21	Data File:	040215.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	62	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP11-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-22 1/6
Date Analyzed:	04/02/21	Data File:	040221.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	52	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP2-5.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-23 1/6
Date Analyzed:	04/02/21	Data File:	040207.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	51	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP2-11.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-24 1/6
Date Analyzed:	04/02/21	Data File:	040208.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	60	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP1-3.5	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-25 1/6
Date Analyzed:	04/02/21	Data File:	040209.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	74	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP1-11.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-26 1/6
Date Analyzed:	04/02/21	Data File:	040218.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	58	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP7-4.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-28 1/6
Date Analyzed:	04/02/21	Data File:	040219.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	57	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP7-9.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-29 1/6
Date Analyzed:	04/02/21	Data File:	040220.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	64	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP12-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-30 1/6
Date Analyzed:	04/02/21	Data File:	040210.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	68	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP12-8.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-31 1/6
Date Analyzed:	04/02/21	Data File:	040211.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	71	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP6-3.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-32 1/6
Date Analyzed:	04/02/21	Data File:	040212.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	76	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP6-6.0	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	103585-33 1/6
Date Analyzed:	04/02/21	Data File:	040213.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	71	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	01-751 mb2 1/6
Date Analyzed:	04/02/21	Data File:	040204.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	81	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/01/21	Lab ID:	01-773 mb 1/6
Date Analyzed:	04/02/21	Data File:	040204.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	79	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP3-033021w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/06/21	Lab ID:	103585-06
Date Analyzed:	04/06/21	Data File:	040613.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	25	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP13-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/06/21	Lab ID:	103585-15
Date Analyzed:	04/06/21	Data File:	040614.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	43	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP14-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/06/21	Lab ID:	103585-16
Date Analyzed:	04/06/21	Data File:	040615.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	35	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	C-1 DP2-033121w	Client:	GeoEngineers
Date Received:	03/31/21	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/06/21	Lab ID:	103585-27
Date Analyzed:	04/06/21	Data File:	040616.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	8 ip	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	Snohomish C-1 Hangar 5530-014-01
Date Extracted:	04/06/21	Lab ID:	01-791 mb
Date Analyzed:	04/06/21	Data File:	040606.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	35	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 103585-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	mg/kg (ppm)	20	<5	100	105	50-150	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	105	71-131

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 103585-33 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 104046-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	120	130	8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	101	69-134

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 103585-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	94	86	64-133	9

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	88	58-147

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 103585-24 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	92	96	64-133	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	96	58-147

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	108	108	63-142	0

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 104029-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	112	109	75-125	3
Barium	ug/L (ppb)	50	9.89	98	95	75-125	3
Cadmium	ug/L (ppb)	5	<1	96	96	75-125	0
Chromium	ug/L (ppb)	20	1.70	97	97	75-125	0
Lead	ug/L (ppb)	10	<1	91	90	75-125	1
Mercury	ug/L (ppb)	5	<1	91	93	75-125	2
Selenium	ug/L (ppb)	5	<1	115	112	75-125	3
Silver	ug/L (ppb)	5	<1	91	89	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	102	80-120
Barium	ug/L (ppb)	50	97	80-120
Cadmium	ug/L (ppb)	5	99	80-120
Chromium	ug/L (ppb)	20	97	80-120
Lead	ug/L (ppb)	10	98	80-120
Mercury	ug/L (ppb)	5	97	80-120
Selenium	ug/L (ppb)	5	102	80-120
Silver	ug/L (ppb)	5	92	80-120

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 104043-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	2.36	102	101	75-125	1
Barium	ug/L (ppb)	50	39.2	105	105	75-125	0
Cadmium	ug/L (ppb)	5	<1	97	97	75-125	0
Chromium	ug/L (ppb)	20	1.12	101	101	75-125	0
Lead	ug/L (ppb)	10	<1	85	85	75-125	0
Mercury	ug/L (ppb)	5	<1	89	90	75-125	1
Selenium	ug/L (ppb)	5	2.92	112	107	75-125	5
Silver	ug/L (ppb)	5	<1	85	84	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	103	80-120
Barium	ug/L (ppb)	50	98	80-120
Cadmium	ug/L (ppb)	5	100	80-120
Chromium	ug/L (ppb)	20	99	80-120
Lead	ug/L (ppb)	10	99	80-120
Mercury	ug/L (ppb)	5	100	80-120
Selenium	ug/L (ppb)	5	105	80-120
Silver	ug/L (ppb)	5	94	80-120

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	93	93	80-120	0
Barium	ug/L (ppb)	50	101	100	80-120	1
Cadmium	ug/L (ppb)	5	102	101	80-120	1
Chromium	ug/L (ppb)	20	105	104	80-120	1
Lead	ug/L (ppb)	10	94	94	80-120	0
Mercury	ug/L (ppb)	5	95	96	80-120	1
Selenium	ug/L (ppb)	5	102	97	80-120	5
Silver	ug/L (ppb)	5	92	91	80-120	1

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 103552-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	88	83	75-125	6
Barium	mg/kg (ppm)	50	33.7	129 b	114 b	75-125	12 b
Cadmium	mg/kg (ppm)	10	<5	96	95	75-125	1
Chromium	mg/kg (ppm)	50	14.4	101	101	75-125	0
Lead	mg/kg (ppm)	50	13.7	113	97	75-125	15
Mercury	mg/kg (ppm	5	<5	95	84	75-125	12
Selenium	mg/kg (ppm)	5	<5	84	84	75-125	0
Silver	mg/kg (ppm)	10	<5	87	87	75-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	92	80-120
Barium	mg/kg (ppm)	50	104	80-120
Cadmium	mg/kg (ppm)	10	103	80-120
Chromium	mg/kg (ppm)	50	113	80-120
Lead	mg/kg (ppm)	50	98	80-120
Mercury	mg/kg (ppm)	5	99	80-120
Selenium	mg/kg (ppm)	5	92	80-120
Silver	mg/kg (ppm)	10	96	80-120

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 103585-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.54	97	101	75-125	4
Barium	mg/kg (ppm)	50	29.2	127 b	128 b	75-125	1 b
Cadmium	mg/kg (ppm)	10	<1	106	102	75-125	4
Chromium	mg/kg (ppm)	50	14.7	113	111	75-125	2
Lead	mg/kg (ppm)	50	1.18	94	91	75-125	3
Mercury	mg/kg (ppm	5	<1	96	93	75-125	3
Selenium	mg/kg (ppm)	5	<1	97	91	75-125	6
Silver	mg/kg (ppm)	10	<1	99	93	75-125	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	91	80-120
Barium	mg/kg (ppm)	50	103	80-120
Cadmium	mg/kg (ppm)	10	101	80-120
Chromium	mg/kg (ppm)	50	111	80-120
Lead	mg/kg (ppm)	50	98	80-120
Mercury	mg/kg (ppm)	5	91	80-120
Selenium	mg/kg (ppm)	5	96	80-120
Silver	mg/kg (ppm)	10	96	80-120

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 103339-29 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	1	<0.5	5 vo	4 vo	10-142	22 vo
Chloromethane	mg/kg (ppm)	1	<0.5	21	21	10-126	0
Vinyl chloride	mg/kg (ppm)	1	<0.005	19	18	10-138	5
Bromomethane	mg/kg (ppm)	1	<0.5	52	38	10-163	31 vo
Chloroethane	mg/kg (ppm)	1	<0.5	30	28	10-176	7
Trichlorofluoromethane	mg/kg (ppm)	1	<0.5	17	15	10-176	12
Acetone	mg/kg (ppm)	5	<5	57	53	10-163	7
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	36	33	10-160	9
Hexane	mg/kg (ppm)	1	<0.25	14	12	10-137	15
Methylene chloride	mg/kg (ppm)	1	<0.5	53	50	10-156	6
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1	<0.05	54	50	21-145	8
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	41	39	14-137	5
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	45	42	19-140	7
2,2-Dichloropropane	mg/kg (ppm)	1	<0.05	47	42	10-158	11
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	48	45	25-135	6
Chloroform	mg/kg (ppm)	1	<0.05	50	47	21-145	6
2-Butanone (MEK)	mg/kg (ppm)	5	<0.5	56	54	19-147	4
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	52	51	12-160	2
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	44	41	10-156	7
1,1-Dichloropropene	mg/kg (ppm)	1	<0.05	44	40	17-140	10
Carbon tetrachloride	mg/kg (ppm)	1	<0.05	43	40	9-164	7
Benzene	mg/kg (ppm)	1	<0.03	49	46	29-129	6
Trichloroethene	mg/kg (ppm)	1	<0.02	48	46	21-139	4
1,2-Dichloropropane	mg/kg (ppm)	1	<0.05	50	47	30-135	6
Bromodichloromethane	mg/kg (ppm)	1	<0.05	47	46	23-155	2
Dibromomethane	mg/kg (ppm)	1	<0.05	53	51	23-145	4
4-Methyl-2-pentanone	mg/kg (ppm)	5	<0.5	58	56	24-155	4
cis-1,3-Dichloropropene	mg/kg (ppm)	1	<0.05	52	49	28-144	6
Toluene	mg/kg (ppm)	1	<0.05	55	53	35-130	4
trans-1,3-Dichloropropene	mg/kg (ppm)	1	<0.05	52	51	26-149	2
1,1,2-Trichloroethane	mg/kg (ppm)	1	<0.05	58	55	10-205	5
2-Hexanone	mg/kg (ppm)	5	<0.5	61	58	15-166	5
1,3-Dichloropropane	mg/kg (ppm)	1	<0.05	57	56	31-137	2
Tetrachloroethene	mg/kg (ppm)	1	<0.025	53	50	20-133	6
Dibromochloromethane	mg/kg (ppm)	1	<0.05	51	49	28-150	4
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1	<0.05	57	56	28-142	2
Chlorobenzene	mg/kg (ppm)	1	<0.05	59	56	32-129	5
Ethylbenzene	mg/kg (ppm)	1	<0.05	56	52	32-137	7
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1	<0.05	55	50	31-143	10
m,p-Xylene	mg/kg (ppm)	2	<0.1	58	53	34-136	9
o-Xylene	mg/kg (ppm)	1	<0.05	57	54	33-134	5
Styrene	mg/kg (ppm)	1	<0.05	56	53	35-137	6
Isopropylbenzene	mg/kg (ppm)	1	<0.05	54	51	31-142	6
Bromoform	mg/kg (ppm)	1	<0.05	50	47	21-156	6
n-Propylbenzene	mg/kg (ppm)	1	<0.05	55	52	23-146	6
Bromobenzene	mg/kg (ppm)	1	<0.05	60	57	34-130	5
1,3,5-Trimethylbenzene	mg/kg (ppm)	1	<0.05	57	53	18-149	7
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1	<0.05	61	55	28-140	10
1,2,3-Trichloropropane	mg/kg (ppm)	1	<0.05	60	57	25-144	5
2-Chlorotoluene	mg/kg (ppm)	1	<0.05	57	54	31-134	5
4-Chlorotoluene	mg/kg (ppm)	1	<0.05	57	54	31-136	5
tert-Butylbenzene	mg/kg (ppm)	1	<0.05	57	52	30-137	9
1,2,4-Trimethylbenzene	mg/kg (ppm)	1	<0.05	56	52	10-182	7
sec-Butylbenzene	mg/kg (ppm)	1	0.051	58	52	23-145	11
p-Isopropyltoluene	mg/kg (ppm)	1	<0.05	57	51	21-149	11
1,3-Dichlorobenzene	mg/kg (ppm)	1	<0.05	60	56	30-131	7
1,4-Dichlorobenzene	mg/kg (ppm)	1	<0.05	60	56	29-129	7
1,2-Dichlorobenzene	mg/kg (ppm)	1	<0.05	58	56	31-132	4
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1	<0.5	49	50	11-161	2
1,2,4-Trichlorobenzene	mg/kg (ppm)	1	<0.25	54	48	22-142	12
Hexachlorobutadiene	mg/kg (ppm)	1	<0.25	53	47	10-142	12
Naphthalene	mg/kg (ppm)	1	<0.05	56	53	14-157	6
1,2,3-Trichlorobenzene	mg/kg (ppm)	1	<0.25	55	50	20-144	10

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	mg/kg (ppm)	1	42	10-146
Chloromethane	mg/kg (ppm)	1	56	27-133
Vinyl chloride	mg/kg (ppm)	1	57	22-139
Bromomethane	mg/kg (ppm)	1	75	38-114
Chloroethane	mg/kg (ppm)	1	59	9-163
Trichlorofluoromethane	mg/kg (ppm)	1	68	10-196
Acetone	mg/kg (ppm)	5	75	52-141
1,1-Dichloroethene	mg/kg (ppm)	1	88	47-128
Hexane	mg/kg (ppm)	1	74	43-142
Methylene chloride	mg/kg (ppm)	1	88	10-184
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1	91	60-123
trans-1,2-Dichloroethene	mg/kg (ppm)	1	88	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	85	68-115
2,2-Dichloropropane	mg/kg (ppm)	1	85	52-170
cis-1,2-Dichloroethene	mg/kg (ppm)	1	90	72-127
Chloroform	mg/kg (ppm)	1	89	66-120
2-Butanone (MEK)	mg/kg (ppm)	5	84	30-197
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	92	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	86	62-131
1,1-Dichloropropene	mg/kg (ppm)	1	88	69-128
Carbon tetrachloride	mg/kg (ppm)	1	90	60-139
Benzene	mg/kg (ppm)	1	91	71-118
Trichloroethene	mg/kg (ppm)	1	91	63-121
1,2-Dichloropropane	mg/kg (ppm)	1	89	72-127
Bromodichloromethane	mg/kg (ppm)	1	85	57-126
Dibromomethane	mg/kg (ppm)	1	91	62-123
4-Methyl-2-pentanone	mg/kg (ppm)	5	95	45-145
cis-1,3-Dichloropropene	mg/kg (ppm)	1	92	67-122
Toluene	mg/kg (ppm)	1	99	66-126
trans-1,3-Dichloropropene	mg/kg (ppm)	1	95	72-132
1,1,2-Trichloroethane	mg/kg (ppm)	1	100	64-115
2-Hexanone	mg/kg (ppm)	5	97	33-152
1,3-Dichloropropane	mg/kg (ppm)	1	98	72-130
Tetrachloroethene	mg/kg (ppm)	1	100	72-114
Dibromochloromethane	mg/kg (ppm)	1	93	55-121
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1	100	74-132
Chlorobenzene	mg/kg (ppm)	1	103	76-111
Ethylbenzene	mg/kg (ppm)	1	97	64-123
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1	96	64-121
m,p-Xylene	mg/kg (ppm)	2	100	78-122
o-Xylene	mg/kg (ppm)	1	99	77-124
Styrene	mg/kg (ppm)	1	99	74-126
Isopropylbenzene	mg/kg (ppm)	1	95	76-127
Bromoform	mg/kg (ppm)	1	91	56-132
n-Propylbenzene	mg/kg (ppm)	1	96	74-124
Bromobenzene	mg/kg (ppm)	1	102	72-122
1,3,5-Trimethylbenzene	mg/kg (ppm)	1	96	76-126
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1	94	56-143
1,2,3-Trichloropropane	mg/kg (ppm)	1	95	61-137
2-Chlorotoluene	mg/kg (ppm)	1	96	74-121
4-Chlorotoluene	mg/kg (ppm)	1	97	75-122
tert-Butylbenzene	mg/kg (ppm)	1	96	73-130
1,2,4-Trimethylbenzene	mg/kg (ppm)	1	95	76-125
sec-Butylbenzene	mg/kg (ppm)	1	95	71-130
p-Isopropyltoluene	mg/kg (ppm)	1	94	70-132
1,3-Dichlorobenzene	mg/kg (ppm)	1	99	75-121
1,4-Dichlorobenzene	mg/kg (ppm)	1	100	74-117
1,2-Dichlorobenzene	mg/kg (ppm)	1	99	76-121
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1	84	58-138
1,2,4-Trichlorobenzene	mg/kg (ppm)	1	93	64-135
Hexachlorobutadiene	mg/kg (ppm)	1	92	50-153
Naphthalene	mg/kg (ppm)	1	93	63-140
1,2,3-Trichlorobenzene	mg/kg (ppm)	1	95	63-138

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 103585-12 1/0.5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	1.0	<0.05	24	14	10-47	53 vo
Chloromethane	mg/kg (ppm)	1.0	<0.05	48	38	10-88	23 vo
Vinyl chloride	mg/kg (ppm)	1.0	<0.005	58	46	10-79	23 vo
Bromomethane	mg/kg (ppm)	1.0	<0.5	78	71	10-85	9
Chloroethane	mg/kg (ppm)	1.0	<0.05	73	59	11-106	21 vo
Trichlorofluoromethane	mg/kg (ppm)	1.0	<0.05	67	51	10-85	27 vo
Acetone	mg/kg (ppm)	5.0	<5	65	59	10-224	10
1,1-Dichloroethene	mg/kg (ppm)	1.0	<0.005	82	68	11-105	19
Hexane	mg/kg (ppm)	1.0	<0.025	68	62	10-106	9
Methylene chloride	mg/kg (ppm)	1.0	<0.5	77	53	10-139	37 vo
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1.0	<0.005	86	72	18-131	18
trans-1,2-Dichloroethene	mg/kg (ppm)	1.0	<0.005	85	70	16-122	19
1,1-Dichloroethane	mg/kg (ppm)	1.0	<0.005	88	74	19-125	17
2,2-Dichloropropane	mg/kg (ppm)	1.0	<0.005	75	63	10-184	17
cis-1,2-Dichloroethene	mg/kg (ppm)	1.0	<0.005	87	71	18-129	20
Chloroform	mg/kg (ppm)	1.0	<0.01	85	71	18-126	18
2-Butanone (MEK)	mg/kg (ppm)	5.0	<0.5	70	60	10-190	15
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1.0	<0.005	90	74	19-138	20
1,1,1-Trichloroethane	mg/kg (ppm)	1.0	<0.005	84	71	16-126	17
1,1-Dichloropropene	mg/kg (ppm)	1.0	<0.005	85	70	19-129	19
Carbon tetrachloride	mg/kg (ppm)	1.0	<0.005	84	72	13-125	15
Benzene	mg/kg (ppm)	1.0	<0.005	85	71	15-129	18
Trichloroethene	mg/kg (ppm)	1.0	<0.005	87	73	14-127	17
1,2-Dichloropropane	mg/kg (ppm)	1.0	<0.005	89	75	17-137	17
Bromodichloromethane	mg/kg (ppm)	1.0	<0.025	90	74	24-130	20
Dibromomethane	mg/kg (ppm)	1.0	<0.025	81	66	20-138	20
4-Methyl-2-pentanone	mg/kg (ppm)	5.0	<0.5	85	74	21-139	14
cis-1,3-Dichloropropene	mg/kg (ppm)	1.0	<0.005	88	75	17-135	16
Toluene	mg/kg (ppm)	1.0	<0.005	84	77	15-129	9
trans-1,3-Dichloropropene	mg/kg (ppm)	1.0	<0.005	88	80	18-130	10
1,1,2-Trichloroethane	mg/kg (ppm)	1.0	<0.005	90	84	29-128	7
2-Hexanone	mg/kg (ppm)	5.0	<0.5	87	80	28-142	8
1,3-Dichloropropane	mg/kg (ppm)	1.0	<0.025	87	76	20-135	13
Tetrachloroethene	mg/kg (ppm)	1.0	<0.005	85	78	20-121	9
Dibromochloromethane	mg/kg (ppm)	1.0	<0.025	86	80	11-138	7
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1.0	<0.005	87	80	21-130	8
Chlorobenzene	mg/kg (ppm)	1.0	<0.005	88	80	19-129	10
Ethylbenzene	mg/kg (ppm)	1.0	<0.005	87	80	23-133	8
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1.0	<0.005	85	79	16-127	7
m,p-Xylene	mg/kg (ppm)	2.0	<0.01	86	79	19-134	8
o-Xylene	mg/kg (ppm)	1.0	<0.005	86	80	20-132	7
Styrene	mg/kg (ppm)	1.0	<0.005	85	79	23-127	7
Isopropylbenzene	mg/kg (ppm)	1.0	<0.005	86	81	21-134	6
Bromoform	mg/kg (ppm)	1.0	<0.005	83	77	10-142	7
n-Propylbenzene	mg/kg (ppm)	1.0	<0.005	87	80	10-141	8
Bromobenzene	mg/kg (ppm)	1.0	<0.005	81	78	10-135	4
1,3,5-Trimethylbenzene	mg/kg (ppm)	1.0	<0.005	84	80	20-136	5
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1.0	<0.025	85	77	10-234	10
1,2,3-Trichloropropane	mg/kg (ppm)	1.0	<0.025	88	81	10-144	8
2-Chlorotoluene	mg/kg (ppm)	1.0	<0.005	83	79	10-139	5
4-Chlorotoluene	mg/kg (ppm)	1.0	<0.005	87	80	10-139	8
tert-Butylbenzene	mg/kg (ppm)	1.0	<0.005	86	78	10-144	10
1,2,4-Trimethylbenzene	mg/kg (ppm)	1.0	<0.005	81	77	24-133	5
sec-Butylbenzene	mg/kg (ppm)	1.0	<0.005	88	82	23-134	7
p-Isopropyltoluene	mg/kg (ppm)	1.0	<0.005	86	80	25-131	7
1,3-Dichlorobenzene	mg/kg (ppm)	1.0	<0.005	83	78	10-143	6
1,4-Dichlorobenzene	mg/kg (ppm)	1.0	<0.005	86	79	10-146	8
1,2-Dichlorobenzene	mg/kg (ppm)	1.0	<0.005	85	78	10-144	9
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1.0	<0.5	85	80	10-163	6
1,2,4-Trichlorobenzene	mg/kg (ppm)	1.0	<0.025	87	84	10-147	4
Hexachlorobutadiene	mg/kg (ppm)	1.0	<0.025	81	75	10-162	8
Naphthalene	mg/kg (ppm)	1.0	<0.005	87	81	30-138	7
1,2,3-Trichlorobenzene	mg/kg (ppm)	1.0	<0.025	83	75	10-173	10

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	mg/kg (ppm)	1.0	57	10-93
Chloromethane	mg/kg (ppm)	1.0	78	34-101
Vinyl chloride	mg/kg (ppm)	1.0	97	47-106
Bromomethane	mg/kg (ppm)	1.0	89	38-123
Chloroethane	mg/kg (ppm)	1.0	100	44-123
Trichlorofluoromethane	mg/kg (ppm)	1.0	93	56-108
Acetone	mg/kg (ppm)	5.0	94	70-130
1,1-Dichloroethene	mg/kg (ppm)	1.0	116	61-118
Hexane	mg/kg (ppm)	1.0	125	54-142
Methylene chloride	mg/kg (ppm)	1.0	109	10-213
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1.0	112	70-130
trans-1,2-Dichloroethene	mg/kg (ppm)	1.0	113	70-130
1,1-Dichloroethane	mg/kg (ppm)	1.0	116	70-130
2,2-Dichloropropane	mg/kg (ppm)	1.0	123	70-130
cis-1,2-Dichloroethene	mg/kg (ppm)	1.0	112	70-130
Chloroform	mg/kg (ppm)	1.0	111	70-130
2-Butanone (MEK)	mg/kg (ppm)	5.0	103	70-130
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1.0	116	66-140
1,1,1-Trichloroethane	mg/kg (ppm)	1.0	113	70-130
1,1-Dichloropropene	mg/kg (ppm)	1.0	111	70-130
Carbon tetrachloride	mg/kg (ppm)	1.0	115	70-130
Benzene	mg/kg (ppm)	1.0	109	70-130
Trichloroethene	mg/kg (ppm)	1.0	110	53-133
1,2-Dichloropropane	mg/kg (ppm)	1.0	114	67-137
Bromodichloromethane	mg/kg (ppm)	1.0	118	70-130
Dibromomethane	mg/kg (ppm)	1.0	106	70-130
4-Methyl-2-pentanone	mg/kg (ppm)	5.0	111	70-130
cis-1,3-Dichloropropene	mg/kg (ppm)	1.0	118	70-130
Toluene	mg/kg (ppm)	1.0	107	63-127
trans-1,3-Dichloropropene	mg/kg (ppm)	1.0	117	70-130
1,1,2-Trichloroethane	mg/kg (ppm)	1.0	115	70-130
2-Hexanone	mg/kg (ppm)	5.0	112	65-148
1,3-Dichloropropane	mg/kg (ppm)	1.0	109	67-135
Tetrachloroethene	mg/kg (ppm)	1.0	108	66-124
Dibromochloromethane	mg/kg (ppm)	1.0	110	62-139
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1.0	110	70-130
Chlorobenzene	mg/kg (ppm)	1.0	111	70-130
Ethylbenzene	mg/kg (ppm)	1.0	112	70-130
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1.0	109	68-129
m,p-Xylene	mg/kg (ppm)	2.0	111	67-129
o-Xylene	mg/kg (ppm)	1.0	111	70-130
Styrene	mg/kg (ppm)	1.0	109	70-130
Isopropylbenzene	mg/kg (ppm)	1.0	113	70-130
Bromoform	mg/kg (ppm)	1.0	107	63-141
n-Propylbenzene	mg/kg (ppm)	1.0	108	68-125
Bromobenzene	mg/kg (ppm)	1.0	102	70-130
1,3,5-Trimethylbenzene	mg/kg (ppm)	1.0	108	66-128
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1.0	106	35-184
1,2,3-Trichloropropane	mg/kg (ppm)	1.0	104	70-130
2-Chlorotoluene	mg/kg (ppm)	1.0	105	70-130
4-Chlorotoluene	mg/kg (ppm)	1.0	108	70-130
tert-Butylbenzene	mg/kg (ppm)	1.0	107	70-130
1,2,4-Trimethylbenzene	mg/kg (ppm)	1.0	109	64-133
sec-Butylbenzene	mg/kg (ppm)	1.0	113	70-130
p-Isopropyltoluene	mg/kg (ppm)	1.0	113	70-130
1,3-Dichlorobenzene	mg/kg (ppm)	1.0	104	70-130
1,4-Dichlorobenzene	mg/kg (ppm)	1.0	105	70-130
1,2-Dichlorobenzene	mg/kg (ppm)	1.0	105	70-130
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1.0	112	70-130
1,2,4-Trichlorobenzene	mg/kg (ppm)	1.0	119	70-130
Hexachlorobutadiene	mg/kg (ppm)	1.0	106	67-140
Naphthalene	mg/kg (ppm)	1.0	116	67-143
1,2,3-Trichlorobenzene	mg/kg (ppm)	1.0	113	57-161

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 103575-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	10	<1	95	10-172
Chloromethane	ug/L (ppb)	10	<10	70	25-166
Vinyl chloride	ug/L (ppb)	10	<0.2	79	36-166
Bromomethane	ug/L (ppb)	10	<5	109	47-169
Chloroethane	ug/L (ppb)	10	<1	79	46-160
Trichlorofluoromethane	ug/L (ppb)	10	<1	86	44-165
Acetone	ug/L (ppb)	50	<50	85	10-182
1,1-Dichloroethene	ug/L (ppb)	10	<1	94	58-142
Hexane	ug/L (ppb)	10	<5	89	38-152
Methylene chloride	ug/L (ppb)	10	<5	105	50-145
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	<1	94	61-136
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	94	61-136
1,1-Dichloroethane	ug/L (ppb)	10	<1	89	63-135
2,2-Dichloropropane	ug/L (ppb)	10	<1	91	36-154
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	92	63-134
Chloroform	ug/L (ppb)	10	<1	93	61-135
2-Butanone (MEK)	ug/L (ppb)	50	<20	94	10-129
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	93	48-149
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	91	60-146
1,1-Dichloropropene	ug/L (ppb)	10	<1	93	69-133
Carbon tetrachloride	ug/L (ppb)	10	<1	95	56-152
Benzene	ug/L (ppb)	10	<0.35	92	57-135
Trichloroethene	ug/L (ppb)	10	<1	92	66-135
1,2-Dichloropropane	ug/L (ppb)	10	<1	90	59-136
Bromodichloromethane	ug/L (ppb)	10	<1	85	61-150
Dibromomethane	ug/L (ppb)	10	<1	96	66-141
4-Methyl-2-pentanone	ug/L (ppb)	50	<10	100	10-185
cis-1,3-Dichloropropene	ug/L (ppb)	10	<1	91	52-147
Toluene	ug/L (ppb)	10	<1	97	50-137
trans-1,3-Dichloropropene	ug/L (ppb)	10	<1	90	53-142
1,1,2-Trichloroethane	ug/L (ppb)	10	<1	97	68-131
2-Hexanone	ug/L (ppb)	50	<10	101	10-185
1,3-Dichloropropane	ug/L (ppb)	10	<1	98	60-135
Tetrachloroethene	ug/L (ppb)	10	<1	104	10-226
Dibromochloromethane	ug/L (ppb)	10	<1	89	52-145
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	<1	100	62-135
Chlorobenzene	ug/L (ppb)	10	<1	102	63-130
Ethylbenzene	ug/L (ppb)	10	<1	96	60-133
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	<1	95	56-143
m,p-Xylene	ug/L (ppb)	20	<2	99	69-135
o-Xylene	ug/L (ppb)	10	<1	100	60-140
Styrene	ug/L (ppb)	10	<1	97	60-133
Isopropylbenzene	ug/L (ppb)	10	<1	95	65-142
Bromoform	ug/L (ppb)	10	<5	84	54-148
n-Propylbenzene	ug/L (ppb)	10	<1	101	58-144
Bromobenzene	ug/L (ppb)	10	<1	107	61-130
1,3,5-Trimethylbenzene	ug/L (ppb)	10	<1	102	59-134
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	<1	102	51-154
1,2,3-Trichloropropane	ug/L (ppb)	10	<1	106	53-150
2-Chlorotoluene	ug/L (ppb)	10	<1	100	66-127
4-Chlorotoluene	ug/L (ppb)	10	<1	102	65-130
tert-Butylbenzene	ug/L (ppb)	10	<1	101	65-137
1,2,4-Trimethylbenzene	ug/L (ppb)	10	<1	98	59-146
sec-Butylbenzene	ug/L (ppb)	10	<1	101	64-140
p-Isopropyltoluene	ug/L (ppb)	10	<1	101	65-141
1,3-Dichlorobenzene	ug/L (ppb)	10	<1	104	60-131
1,4-Dichlorobenzene	ug/L (ppb)	10	<1	105	60-129
1,2-Dichlorobenzene	ug/L (ppb)	10	<1	105	60-130
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	<10	92	32-164
1,2,4-Trichlorobenzene	ug/L (ppb)	10	<1	101	52-138
Hexachlorobutadiene	ug/L (ppb)	10	<1	102	60-143
Naphthalene	ug/L (ppb)	10	<1	101	44-164
1,2,3-Trichlorobenzene	ug/L (ppb)	10	<1	104	69-148

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	10	81	85	25-158	5
Chloromethane	ug/L (ppb)	10	68	72	45-156	6
Vinyl chloride	ug/L (ppb)	10	74	77	50-154	4
Bromomethane	ug/L (ppb)	10	99	115	55-143	15
Chloroethane	ug/L (ppb)	10	74	80	58-146	8
Trichlorofluoromethane	ug/L (ppb)	10	78	86	50-150	10
Acetone	ug/L (ppb)	50	79	87	22-155	10
1,1-Dichloroethene	ug/L (ppb)	10	90	93	67-136	3
Hexane	ug/L (ppb)	10	78	80	57-137	3
Methylene chloride	ug/L (ppb)	10	85	91	19-178	7
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	88	93	64-147	6
trans-1,2-Dichloroethene	ug/L (ppb)	10	87	91	68-128	4
1,1-Dichloroethane	ug/L (ppb)	10	85	88	74-135	3
2,2-Dichloropropane	ug/L (ppb)	10	86	91	55-143	6
cis-1,2-Dichloroethene	ug/L (ppb)	10	87	91	74-136	4
Chloroform	ug/L (ppb)	10	88	92	74-134	4
2-Butanone (MEK)	ug/L (ppb)	50	94	97	37-150	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	90	93	66-129	3
1,1,1-Trichloroethane	ug/L (ppb)	10	87	90	74-142	3
1,1-Dichloropropene	ug/L (ppb)	10	87	91	77-129	4
Carbon tetrachloride	ug/L (ppb)	10	90	96	75-158	6
Benzene	ug/L (ppb)	10	89	92	69-134	3
Trichloroethene	ug/L (ppb)	10	88	92	67-133	4
1,2-Dichloropropane	ug/L (ppb)	10	87	91	71-134	4
Bromodichloromethane	ug/L (ppb)	10	82	85	66-126	4
Dibromomethane	ug/L (ppb)	10	92	94	68-132	2
4-Methyl-2-pentanone	ug/L (ppb)	50	98	99	65-138	1
cis-1,3-Dichloropropene	ug/L (ppb)	10	89	91	74-140	2
Toluene	ug/L (ppb)	10	93	95	72-122	2
trans-1,3-Dichloropropene	ug/L (ppb)	10	88	90	80-136	2
1,1,2-Trichloroethane	ug/L (ppb)	10	94	96	75-124	2
2-Hexanone	ug/L (ppb)	50	100	102	60-136	2
1,3-Dichloropropane	ug/L (ppb)	10	94	96	76-126	2
Tetrachloroethene	ug/L (ppb)	10	97	99	76-121	2
Dibromochloromethane	ug/L (ppb)	10	89	93	84-133	4
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	95	99	82-115	4
Chlorobenzene	ug/L (ppb)	10	96	98	83-114	2
Ethylbenzene	ug/L (ppb)	10	93	95	77-124	2
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	92	95	84-127	3
m,p-Xylene	ug/L (ppb)	20	95	97	81-112	2
o-Xylene	ug/L (ppb)	10	94	96	81-121	2
Styrene	ug/L (ppb)	10	92	94	84-119	2
Isopropylbenzene	ug/L (ppb)	10	91	93	80-117	2
Bromoform	ug/L (ppb)	10	89	90	69-121	1
n-Propylbenzene	ug/L (ppb)	10	93	96	74-126	3
Bromobenzene	ug/L (ppb)	10	100	102	80-121	2
1,3,5-Trimethylbenzene	ug/L (ppb)	10	94	97	78-123	3
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	95	99	66-126	4
1,2,3-Trichloropropane	ug/L (ppb)	10	99	102	67-124	3
2-Chlorotoluene	ug/L (ppb)	10	94	98	77-127	4
4-Chlorotoluene	ug/L (ppb)	10	94	97	78-128	3
tert-Butylbenzene	ug/L (ppb)	10	94	97	80-123	3
1,2,4-Trimethylbenzene	ug/L (ppb)	10	91	96	79-122	5
sec-Butylbenzene	ug/L (ppb)	10	93	96	80-116	3
p-Isopropyltoluene	ug/L (ppb)	10	92	96	81-123	4
1,3-Dichlorobenzene	ug/L (ppb)	10	98	101	83-113	3
1,4-Dichlorobenzene	ug/L (ppb)	10	99	100	81-112	1
1,2-Dichlorobenzene	ug/L (ppb)	10	97	99	84-112	2
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	92	94	57-141	2
1,2,4-Trichlorobenzene	ug/L (ppb)	10	90	94	72-130	4
Hexachlorobutadiene	ug/L (ppb)	10	88	92	53-141	4
Naphthalene	ug/L (ppb)	10	93	97	64-133	4
1,2,3-Trichlorobenzene	ug/L (ppb)	10	92	96	65-136	4

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 103484-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	108	104	29-125	4
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	332 ip	163 ip	25-137	68 b

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	104	55-137
Aroclor 1260	mg/kg (ppm)	0.25	115	51-150

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 103585-12 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	98	90	44-107	9
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	96	86	38-124	11

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	104	47-158
Aroclor 1260	mg/kg (ppm)	0.25	108	69-147

Date of Report: 04/09/21
Date Received: 03/31/21
Project: Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	0.25	52	50	25-111	4
Aroclor 1260	ug/L (ppb)	0.25	72	66	23-123	9

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

103585

SAMPLE CHAIN OF CUSTODY

HE 03-31-21

BI4/E03/VS2/VW5

Page # 1 of 4

Report To Jacob Letts
Company GEI
Address 2101 4th Ave Suite 950
City, State, ZIP Seattle, WA 98121
Phone ______ Email JLetts@geoengineers.com

SAMPLERS (signature)

PROJECT NAME
Snohomish County Airport C1 Hangar

PO #
5530-014-01

REMARKS
*If Gx detected, ask PM if he wants to quantify to mineral spirits.

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH______
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other______
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	(RCRA 8) Metals	(RCRA 8) Total metals	(RCRA 8) Dissolved metals		Notes
C-1 DP4-3.5	01A-F	3/30/21	1000	S	6	X	X			X		X	X				
C-1 DP4-5.0	02		1005	S	6	X	X			X		X	X				
C-1 DP4-7.0	03		1010	S	6	X	X			X		X	X				
C-1 DP3-4.0	04		1040	S	6	X	X			X		X	X				
C-1 DP3-7.0	05		1050	S	6	X	X			X		X	X				
C-1 DP3-033021w	06A-J		1140	gw	10	X	X			X		X		X	X		
C-1 DP5-3.0	07A-F		1150	S	6	X	X			X		X	X				
C-1 DP5-6.0	08		~~1340~~ 1200	S	6	X	X			X		X	X				
C-1 DP15-4.0	09		1340	S	6	X	X			X		X	X				
C-1 DP15-7.0	10		1350	S	6	X	X			X		X	X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	3/31/21	16:30
Received by:	Khoi Hoang	FBI	3/31/21	16:30
Relinquished by:				
Received by:				

Samples received at 4 °C

103585

Rep[redacted]

Company

Address

City, State, ZIP See pg 1

Phone Email

SAMPLE CHAIN OF CUSTODY ME 03-31-21 [redacted]

BI4/E03/VS2/VW5

Page # 2 of 4

SAMPLERS (signature)

PROJECT NAME

PO # S530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	metals	Total metals	Diss. metals		Notes
C-1 DP14-5.0	11A-F	3/30/21	1430	S	6	X	X			X		X	X				
C-1 DP14-10.0	12	↓	1440	S	6	X	X			X		X	X				4 extra VOA's 4/1
C-1 DP13-2.0	13		1500	S	6	X	X			X		X	X				labels C-1DP13-2.5
C-1 DP13-5.0	14 ↓	↓	1520	S	6	X	X			X		X	X				
C-1 DP13-033121w	15A-J	3/31/21	800	gw	10	X	X			X		X		X	X		time on bottle wrong
C-1DP14-033121w	16 ↓	↓	820	gw	10	X	X			X		X		X	X		
C-1DP8-4.5	17A-F		900	S	6	X	X			X		X	X				
C-1DP8-9.0	18		910	S	6	X	X			X		X	X				
C-1DP9-3.0	19		920	S	6	X	X			X		X	X				
C-1DP9-7.5	20 ↓	↓	930	S	6	X	X			X		X	X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Ataktuk	GEI	3/31/21	16:30
Received by:	Khoi Hoang	FBI	3/31/21	16:30
Relinquished by:				
Received by:		Samples received at 4 °C		

103585

SAMPLE CHAIN OF CUSTODY

03-31-21 [redacted] BE4/E03/VS2/VWS

Page # 3 of 4

Report To
Company
Address See pg 1
City, State, ZIP
Phone
Email

SAMPLERS (*signature*) ME

PROJECT NAME

PO # 5530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	RCRA8 metals	Total metals	Diss. metals	Hex Chrome	Notes
C-1 DP10-4.0	21A-F	3/31/21	1000	S	6	X	X			X		X	X				● -per JL
C-1 DP11-4.0	22		1030	S	6	X	X			X		X	X				4/27/21 ME
C-1 DP2-5.0	23		1100	S	6	X	X			X		X	X				
C-1 DP2-11.0	24		1120	S	6	X	X			X		X	X				
C-1 DP1-3.5	25		1200	S	6	X	X			X		X	X				
C-1 DP1-11.0	26		1220	S	6	X	X			X		X	X			●	
C-1 DP2-033121w	27A-J		1300	gw	10	X	X			X		X		X	X		
C-1 DP7-4.0	28A-F		1300	S	6	X	X			X		X	X				
C-1 DP7-9.0	29		1320	S	6	X	X			X		X	X				
C-1 DP12-3.0	30		1340	S	6	X	X			X		X	X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	3/31/21	16:30
Received by:	Khoi Hoang	FBE	3/31/21	16:30
Relinquished by:				
Received by:		Samples received at 4 °C		

103585

SAMPLE CHAIN OF CUSTODY ME 03-31-21 BI4/E03/VS2/VWS

Page # 4 of 4

Report To

Company

Address Seepy

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME 1

PO # 05530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

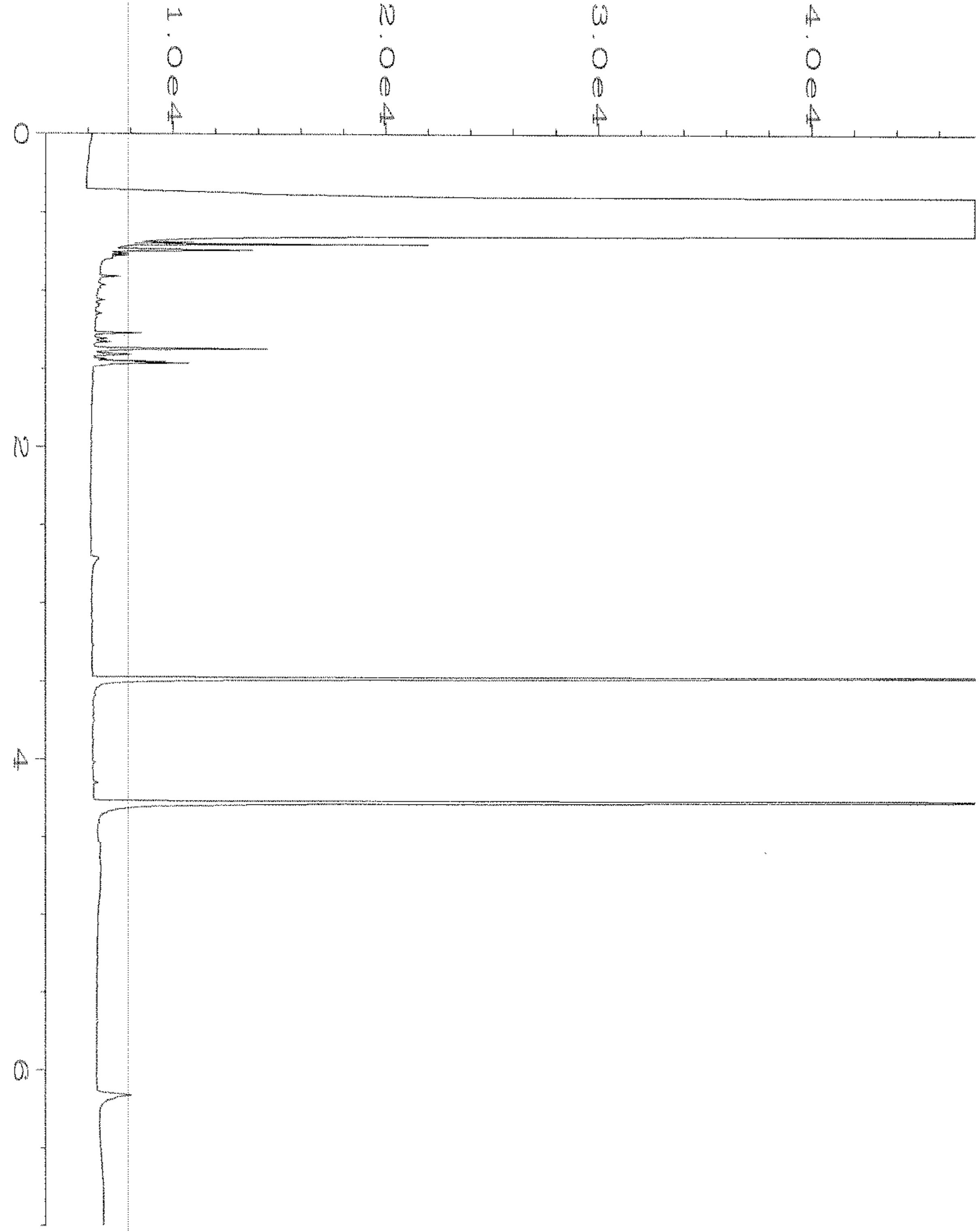
TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	metals (RCRA 8)				Notes ⊗ per KA
C-1 DP12-8.0	31A-F	3/31/21	1400	S	6	X	X			X		X	X				4/1/21 ME
C-1 DPG-3.0	32A-F	03/30/21	1220	soil	5	⊗	⊗			⊗		⊗	⊗				
C-1 DPG-4.0	33	03/30/21	1230	soil	5	⊗	⊗			⊗		⊗	⊗				FB 4/1
Trip Blank 1	34 A-B			water	2					⊗							
Trip Blank 2	35																
Trip Blank 3	36																
Trip Blank 4	37																
Trip Blank 5	38																

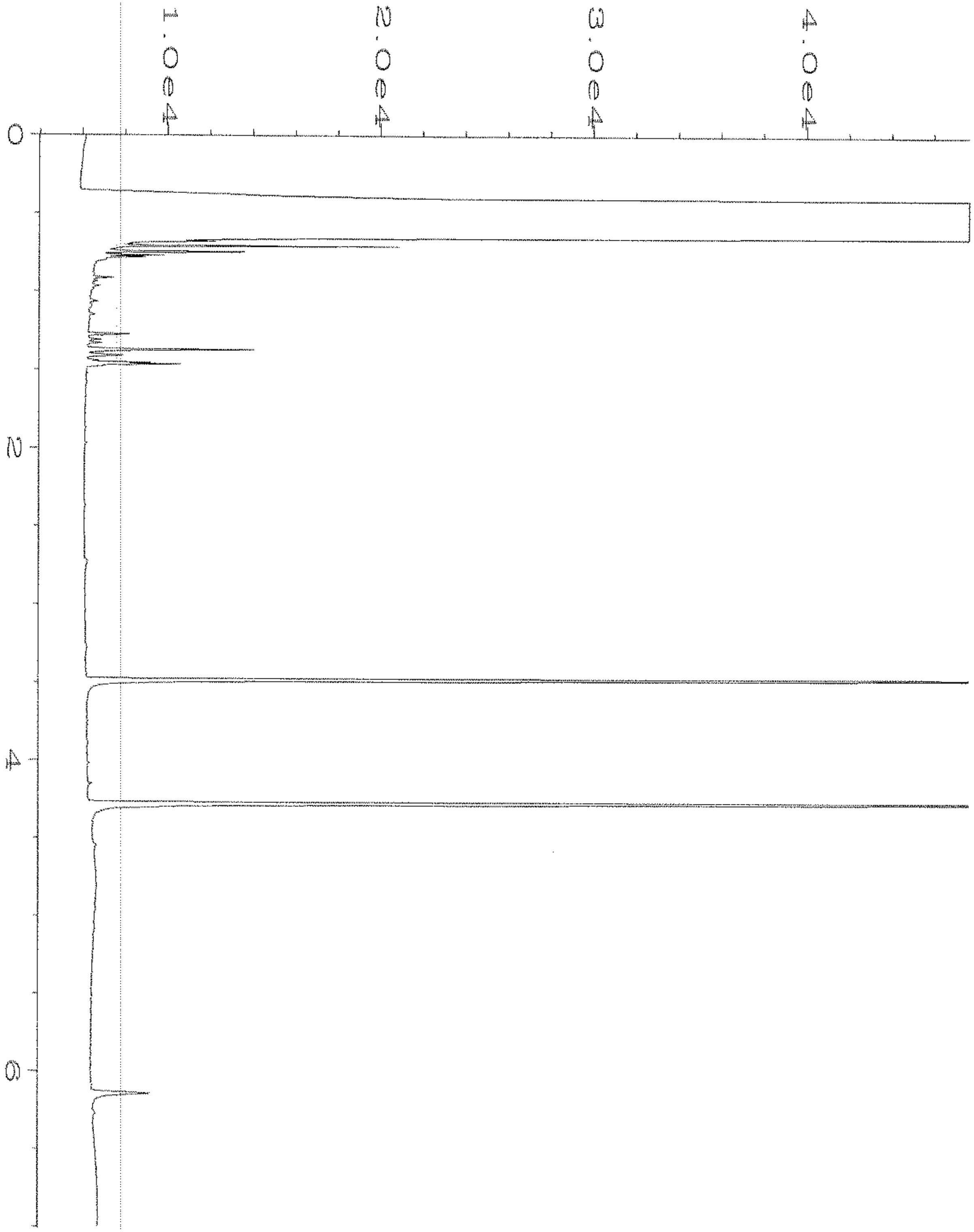
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	3/31/21	1630
Received by:	Khoi Hoang	FBI	3/31/21	16:30
Relinquished by:				
Received by:		Samples received at 4 °C		



Data File Name : C:\HPCHEM\6\DATA\04-01-21\022F0601.D

Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 22
Sample Name	: 103585-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 6
Acquired on	: 01 Apr 21 03:10 PM	Instrument Method:	DX.MTH
Report Created on:	02 Apr 21 07:45 AM	Analysis Method	: DEFAULT.MTH



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Operator          : TL                              Page Number      : 1
Instrument        : GC6                             Vial Number      : 23
Sample Name       : 103585-02                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line    : 6
Acquired on       : 01 Apr 21   03:21 PM            Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:46 AM             Analysis Method  : DEFAULT.MTH
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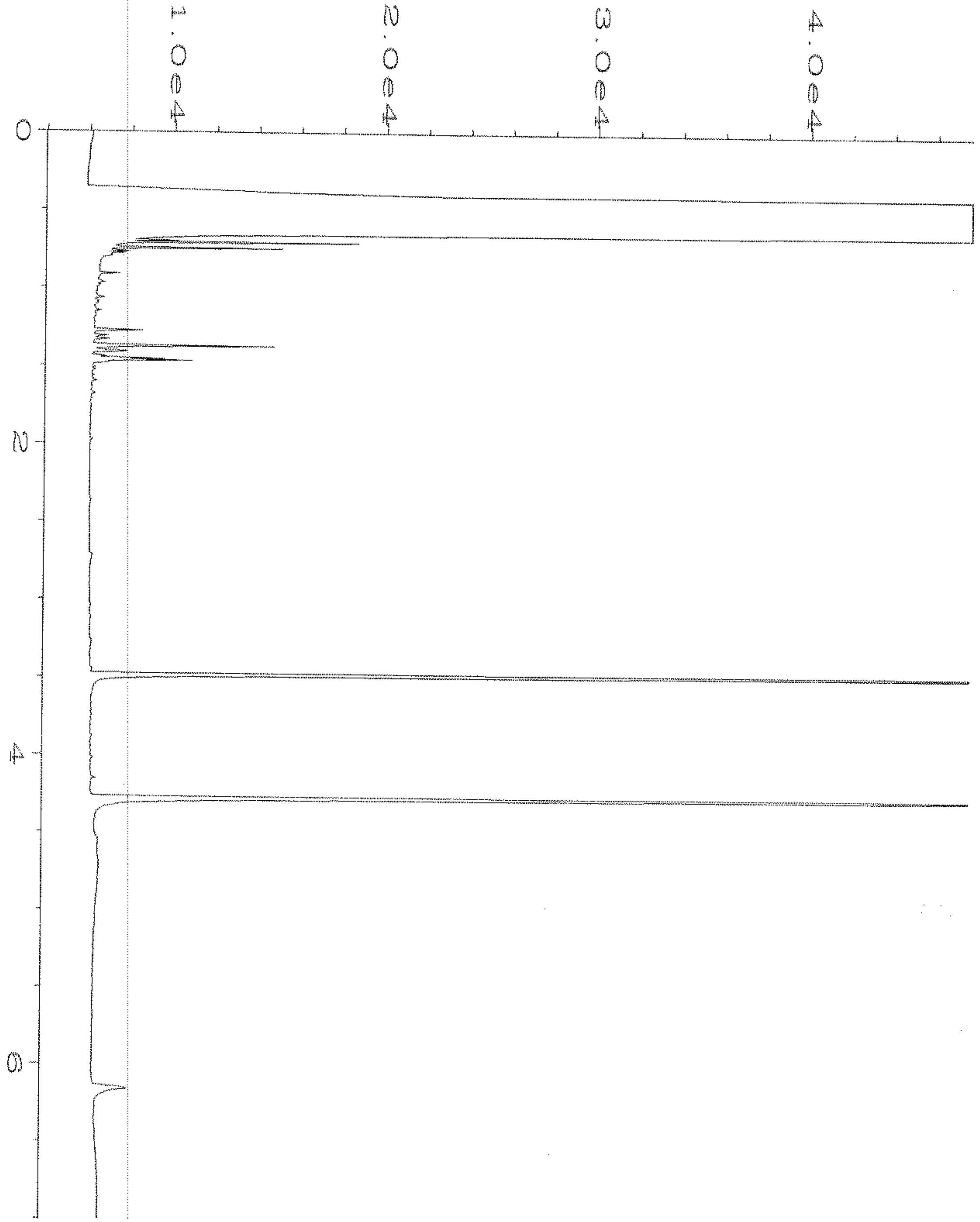
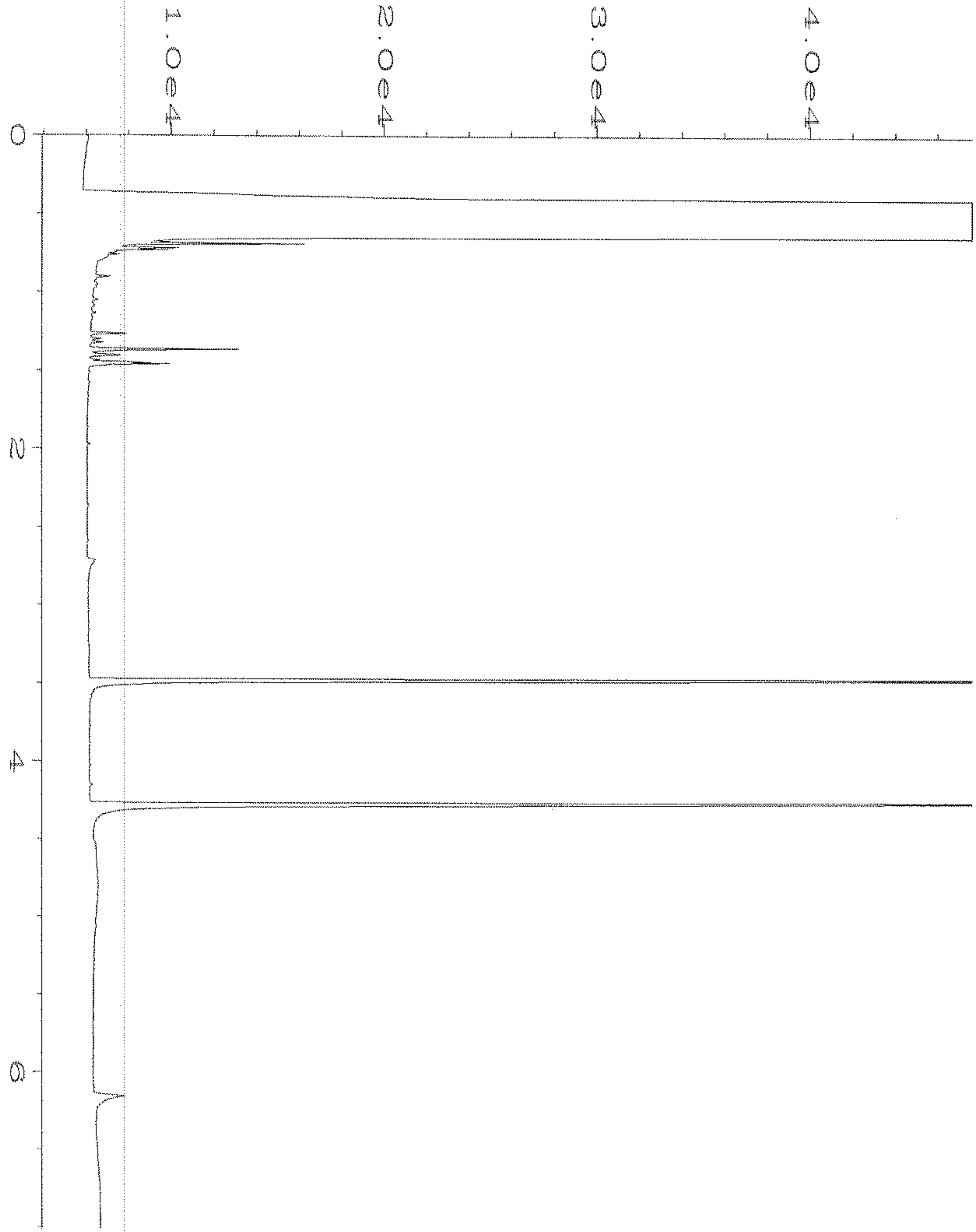


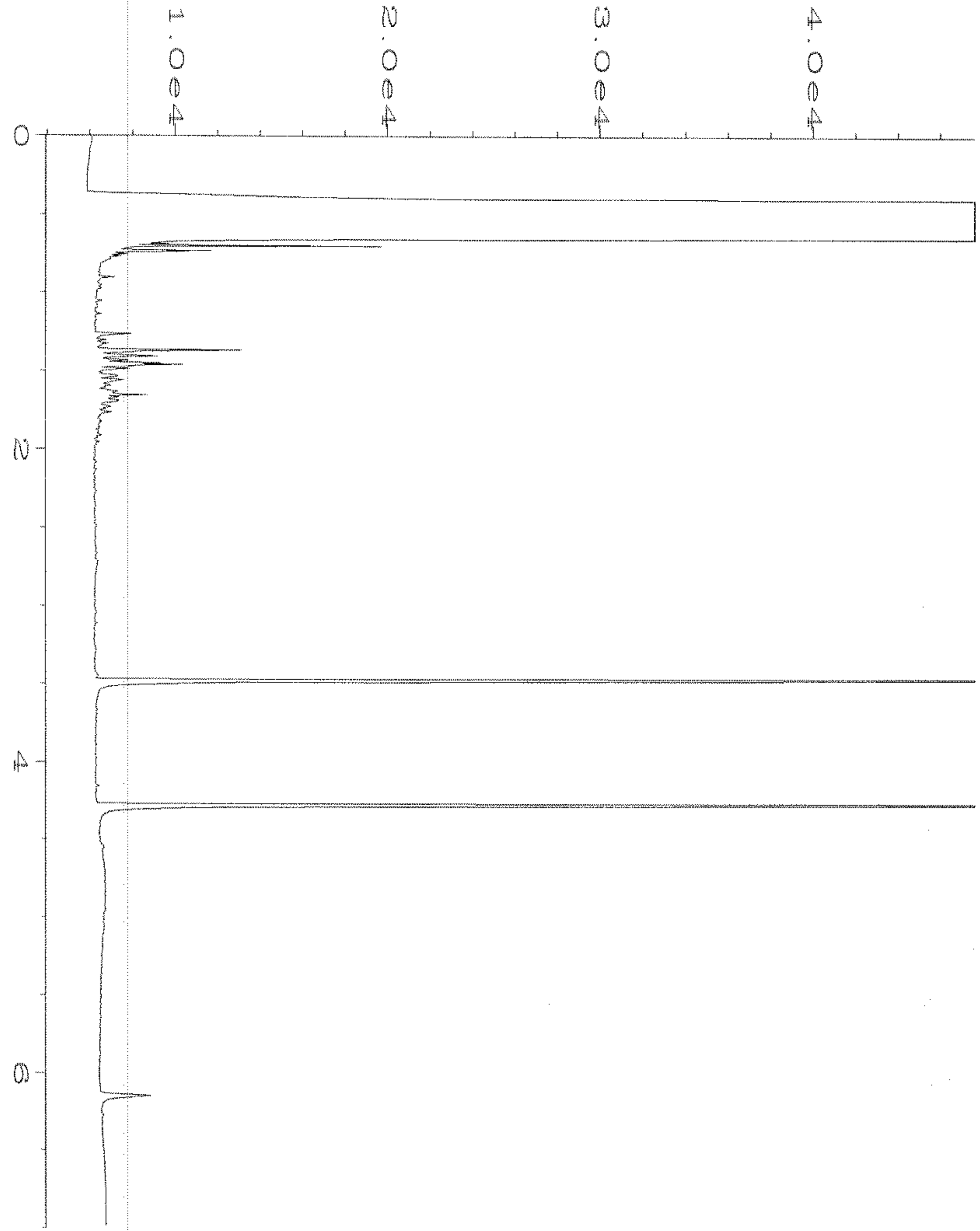
Data File Name   : C:\HPCHEM\6\DATA\04-01-21\024F0601.D
Operator   : TL
Instrument   : GC6
Sample Name   : 103585-03
Run Time Bar Code:
Acquired on   : 01 Apr 21   03:32 PM
Report Created on: 02 Apr 21   07:46 AM

Page Number   : 1
Vial Number   : 24
Injection Number : 1
Sequence Line   : 6
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\04-01-21\025F0601.D
Operator : TL
Instrument : GC6
Sample Name : 103585-04
Run Time Bar Code:
Acquired on : 01 Apr 21 03:43 PM
Report Created on: 02 Apr 21 07:46 AM

Page Number : 1
Vial Number : 25
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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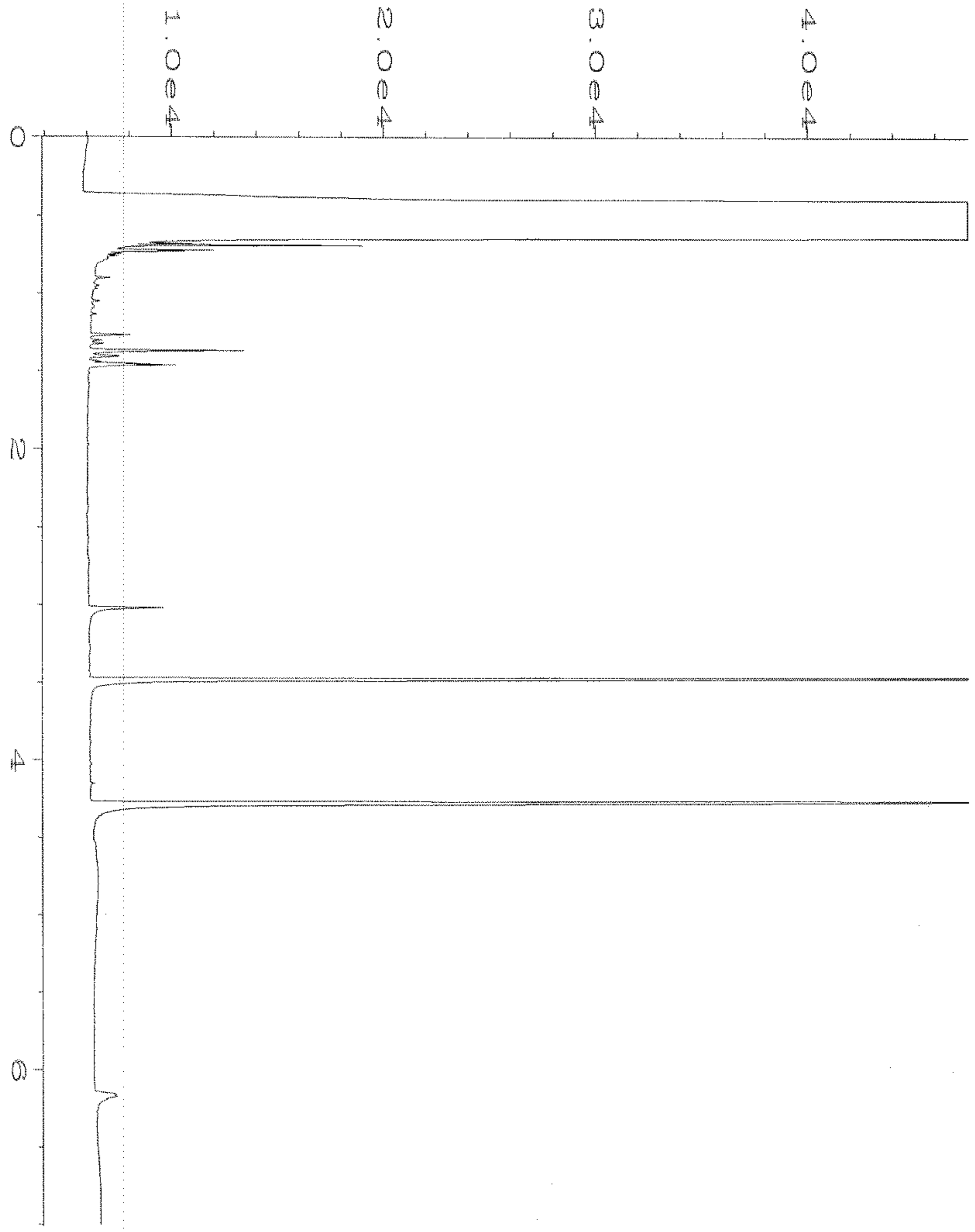
Data File Name    : C:\HPCHEM\6\DATA\04-01-21\026F0601.D
Operator          : TL                            Page Number      : 1
Instrument        : GC6                           Vial Number      : 26
Sample Name       : 103585-05                     Injection Number : 1
Run Time Bar Code:                                Sequence Line    : 6
Acquired on       : 01 Apr 21  03:54 PM           Instrument Method: DX.MTH
Report Created on: 02 Apr 21  07:46 AM            Analysis Method  : DEFAULT.MTH
```



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\027F0601.D
Operator          : TL                               Page Number       : 1
Instrument        : GC6                              Vial Number       : 27
Sample Name       : 103585-07                        Injection Number : 1
Run Time Bar Code:                                   Sequence Line     : 6
Acquired on       : 01 Apr 21   04:04 PM             Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:46 AM              Analysis Method   : DEFAULT.MTH
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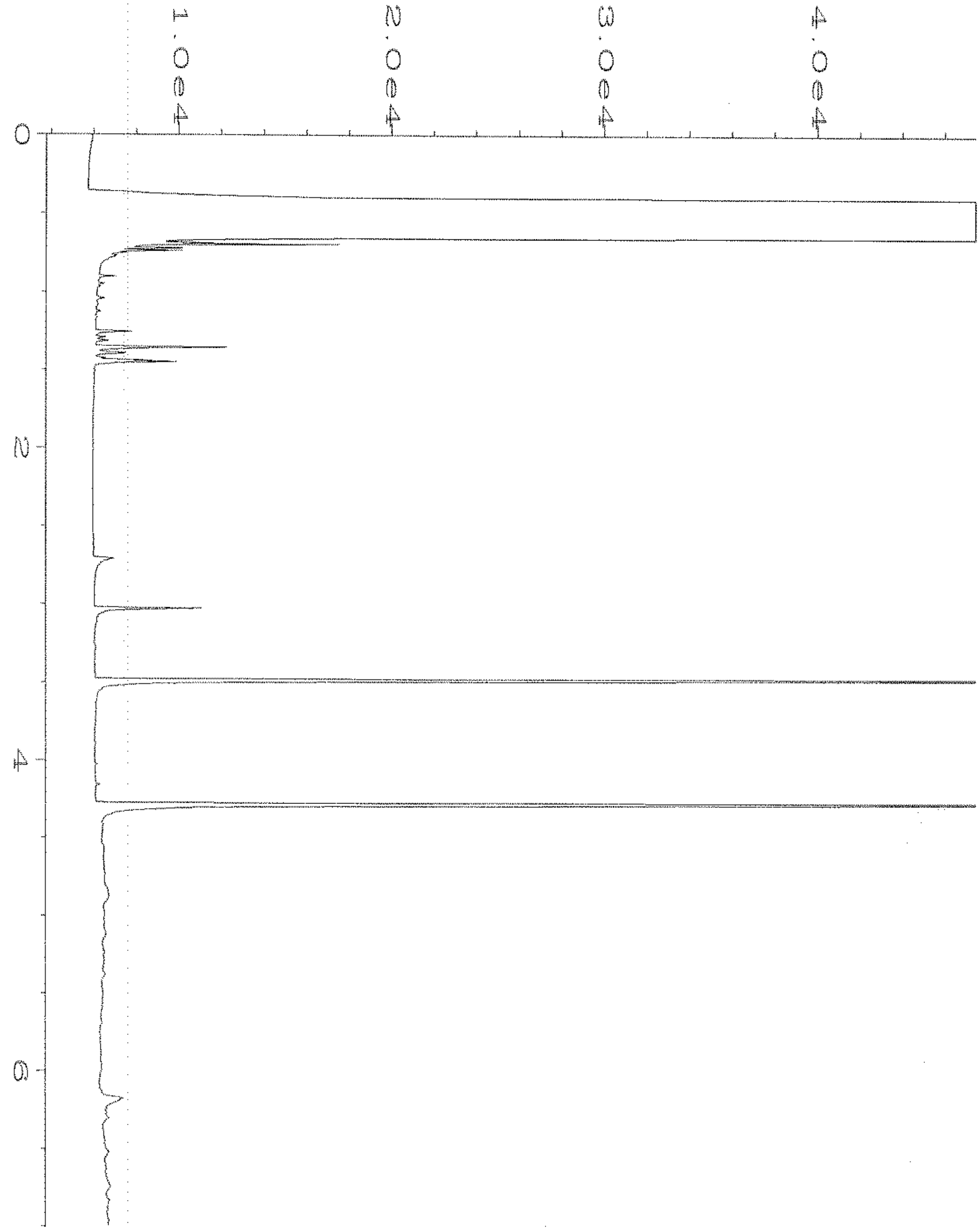
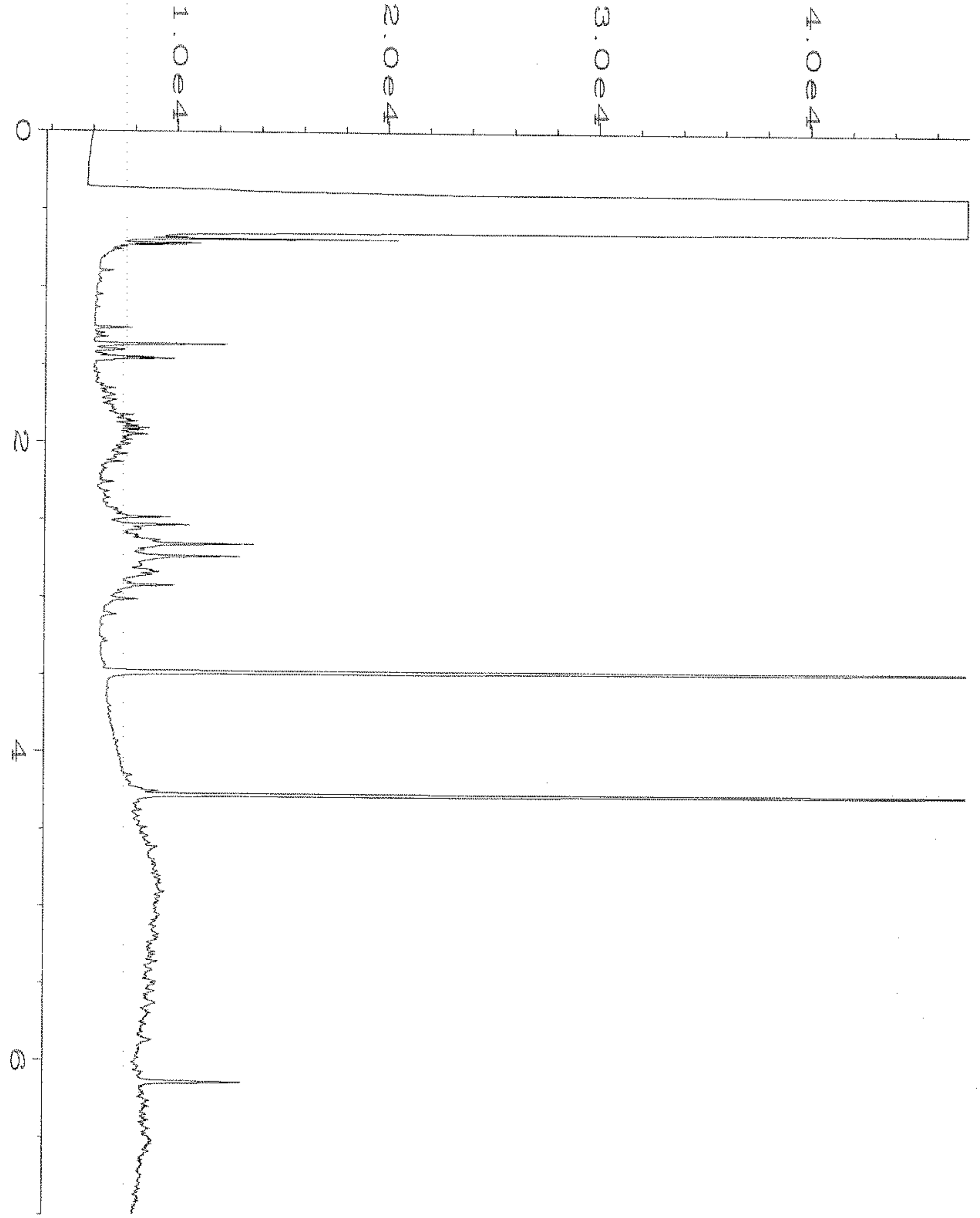


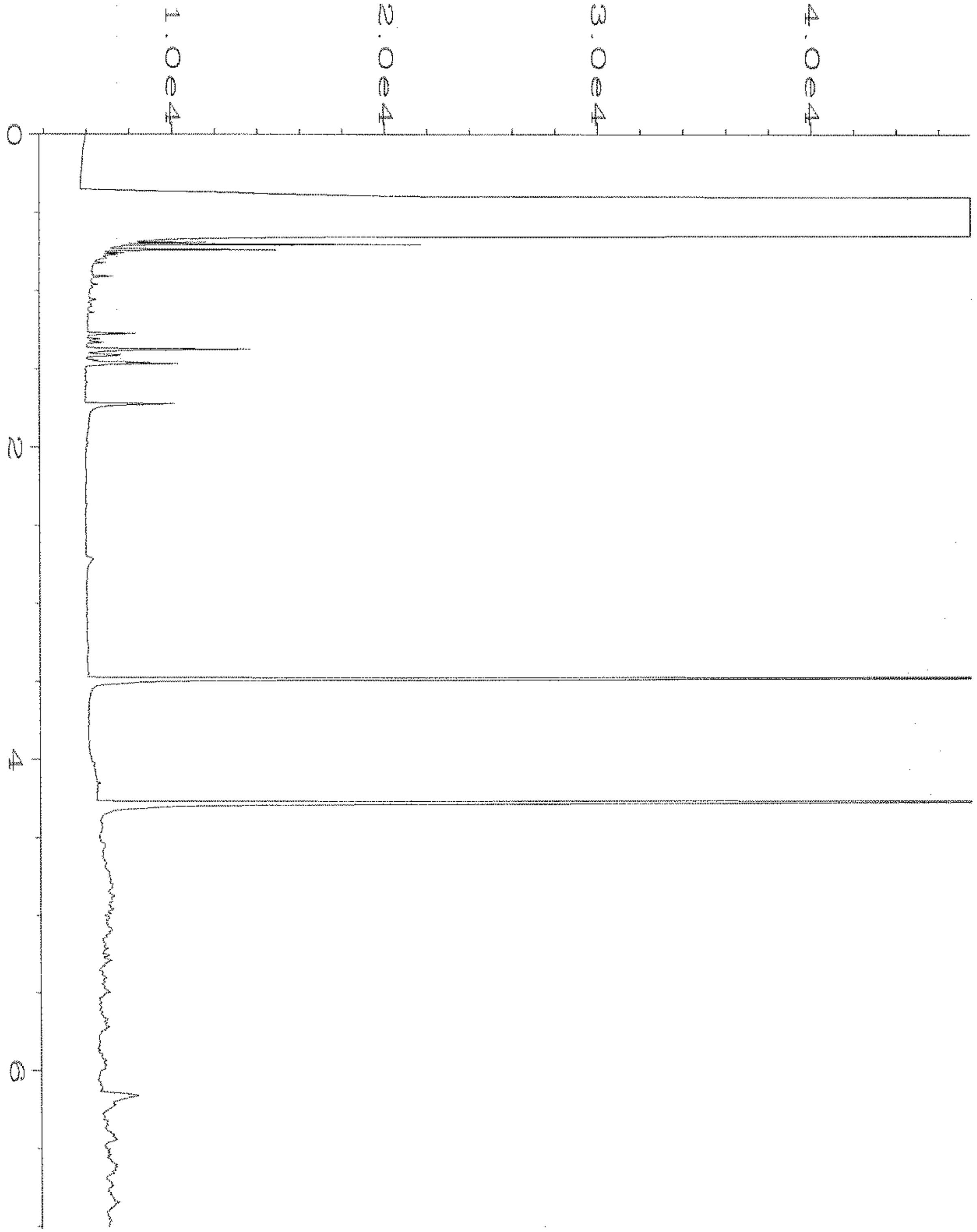
Data File Name : C:\HPCHEM\6\DATA\04-01-21\028F0801.D
Operator : TL
Instrument : GC6
Sample Name : 103585-08
Run Time Bar Code:
Acquired on : 01 Apr 21 04:45 PM
Report Created on: 02 Apr 21 07:46 AM

Page Number : 1
Vial Number : 28
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\04-01-21\029F0801.D
Operator : TL
Instrument : GC6
Sample Name : 103585-09
Run Time Bar Code:
Acquired on : 01 Apr 21 04:53 PM
Report Created on: 02 Apr 21 07:46 AM

Page Number : 1
Vial Number : 29
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\030F0801.D
Operator          : TL                                      Page Number      : 1
Instrument        : GC6                                     Vial Number      : 30
Sample Name       : 103585-10                               Injection Number : 1
Run Time Bar Code:                                          Sequence Line    : 8
Acquired on       : 01 Apr 21   05:04 PM                    Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:47 AM                     Analysis Method  : DEFAULT.MTH
```
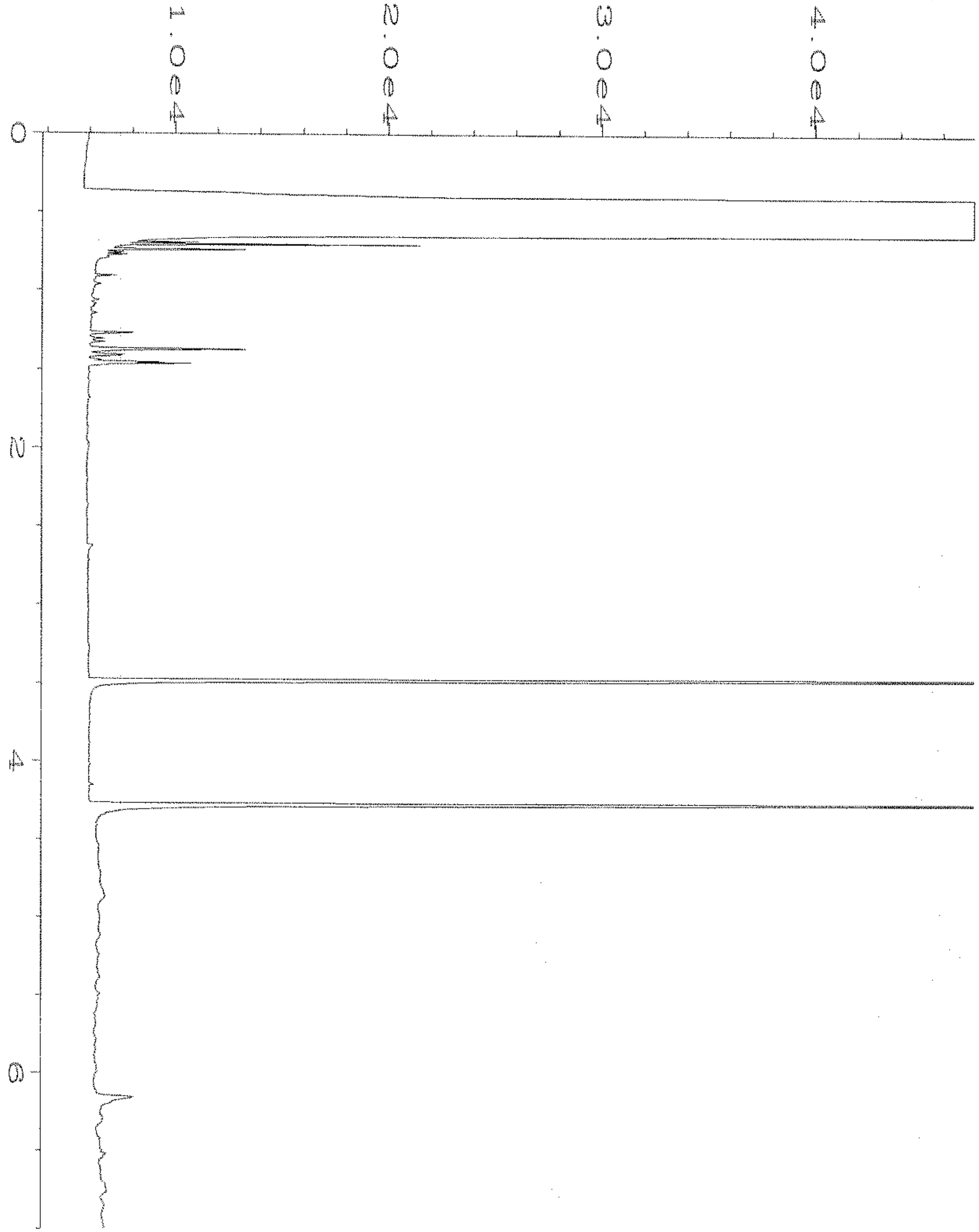
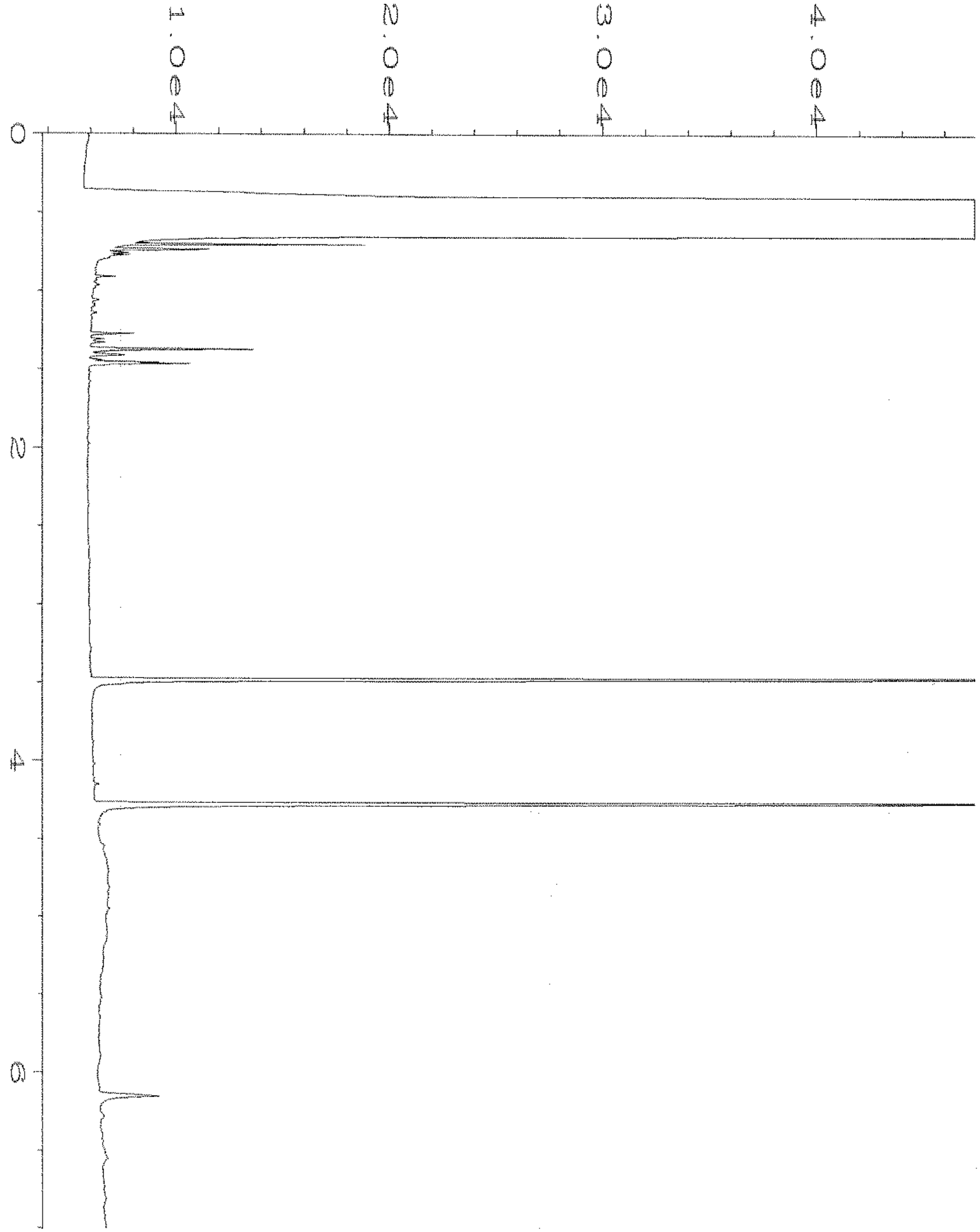



Data File Name : C:\HPCHEM\6\DATA\04-01-21\031F0801.D

Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 31
Sample Name	: 103585-11	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 01 Apr 21 05:15 PM	Instrument Method:	DX.MTH
Report Created on:	02 Apr 21 07:47 AM	Analysis Method	: DEFAULT.MTH



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\032F0801.D
Operator          : TL                               Page Number       : 1
Instrument        : GC6                              Vial Number       : 32
Sample Name       : 103585-12                        Injection Number  : 1
Run Time Bar Code:                                   Sequence Line     : 8
Acquired on       : 01 Apr 21   05:26 PM             Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:49 AM              Analysis Method   : DEFAULT.MTH
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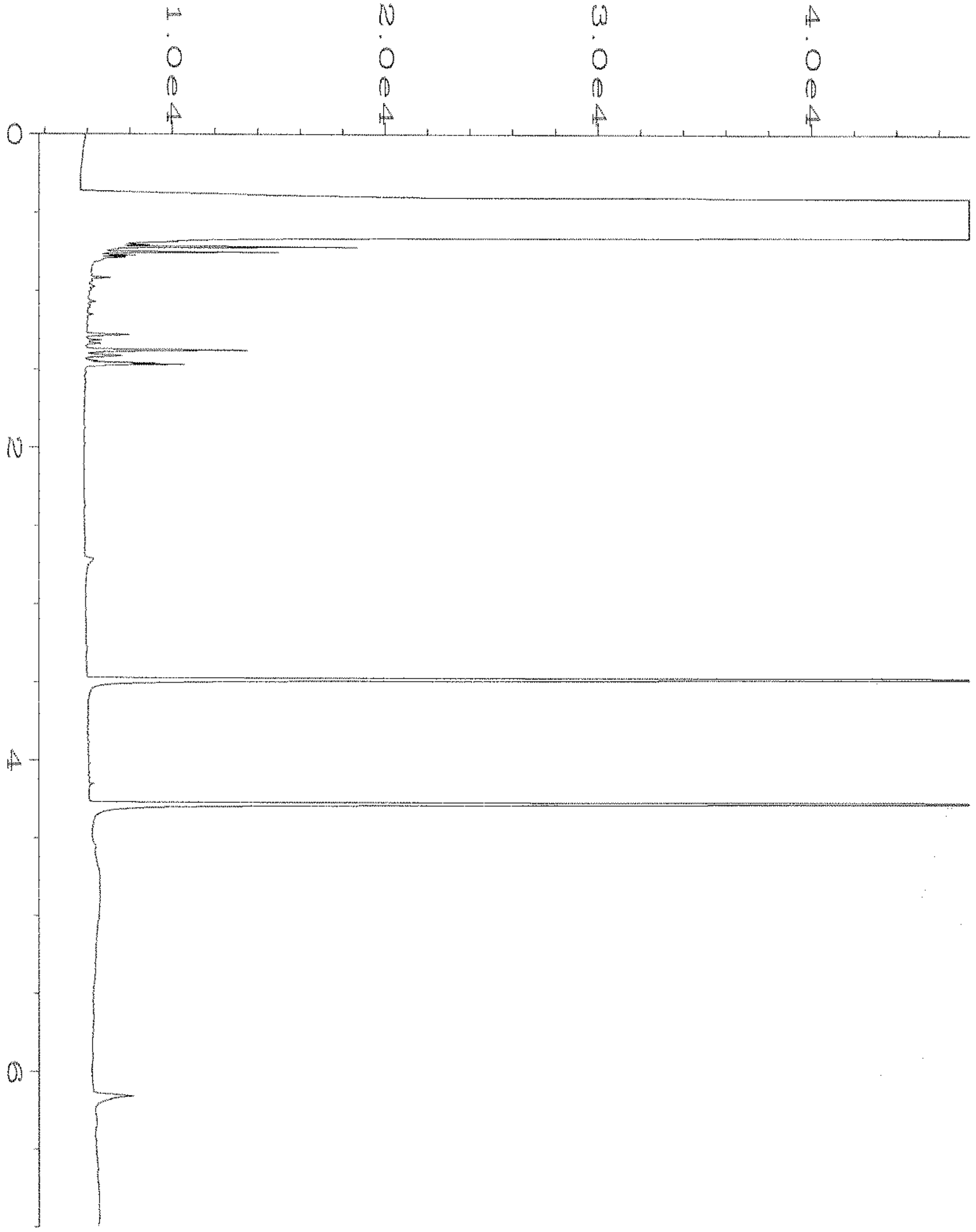

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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\033F0801.D
Operator          : TL                              Page Number      : 1
Instrument        : GC6                             Vial Number      : 33
Sample Name       : 103585-13                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line    : 8
Acquired on       : 01 Apr 21   05:37 PM            Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:49 AM             Analysis Method  : DEFAULT.MTH
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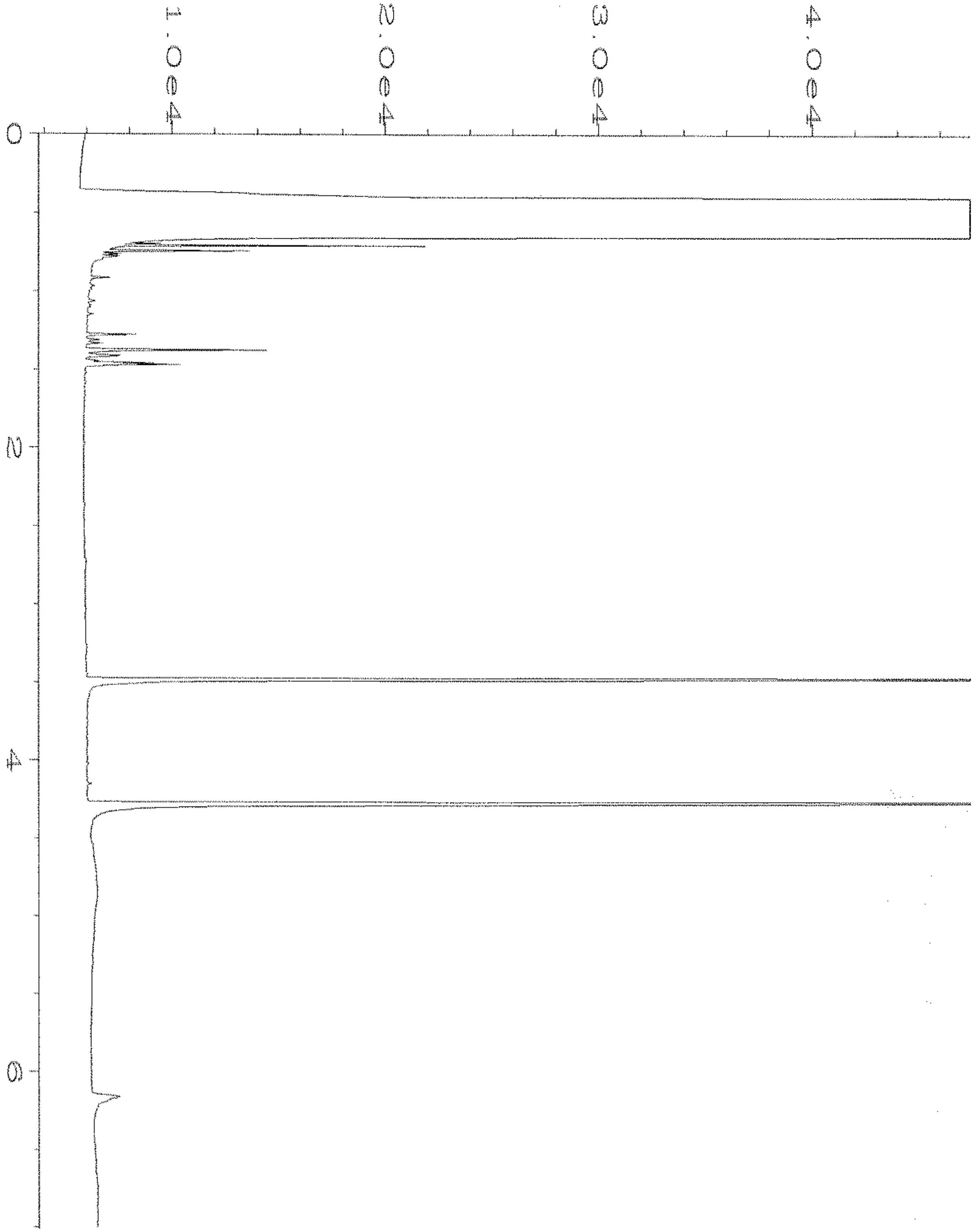

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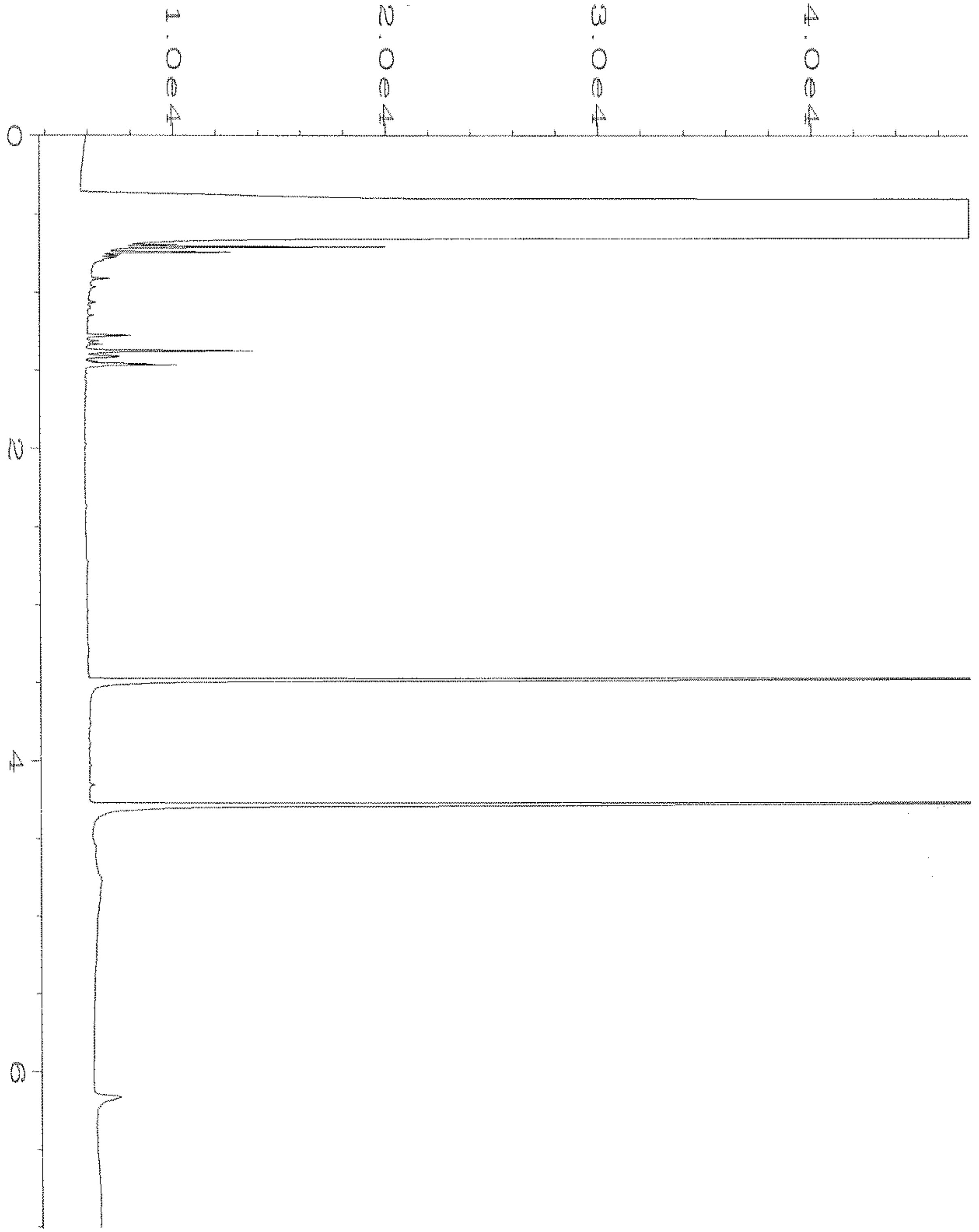
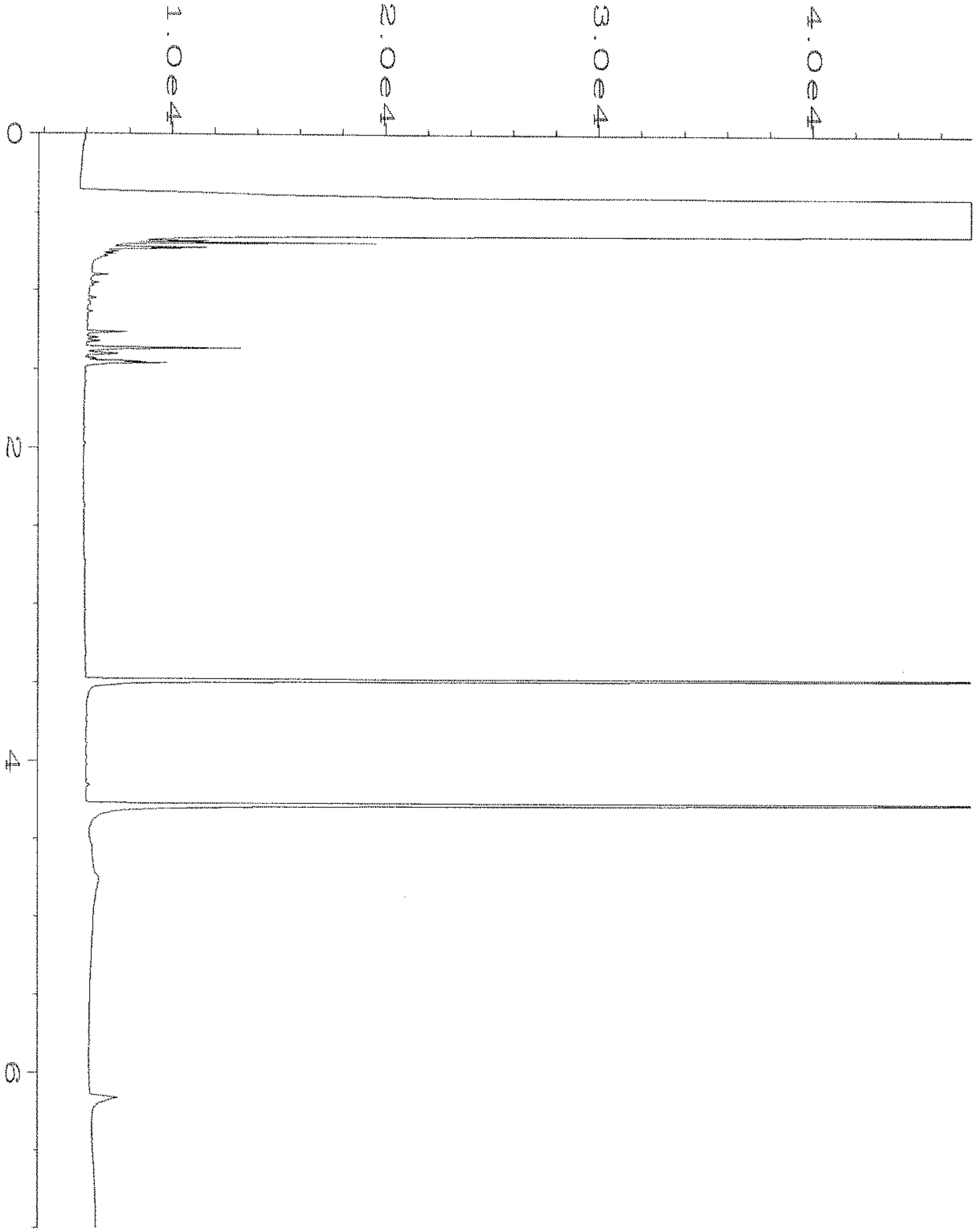
Data File Name    : C:\HPCHEM\6\DATA\04-01-21\034F0801.D
Operator          : TL                              Page Number       : 1
Instrument        : GC6                             Vial Number       : 34
Sample Name       : 103585-14                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line     : 8
Acquired on       : 01 Apr 21   05:48 PM            Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:49 AM             Analysis Method   : DEFAULT.MTH
```



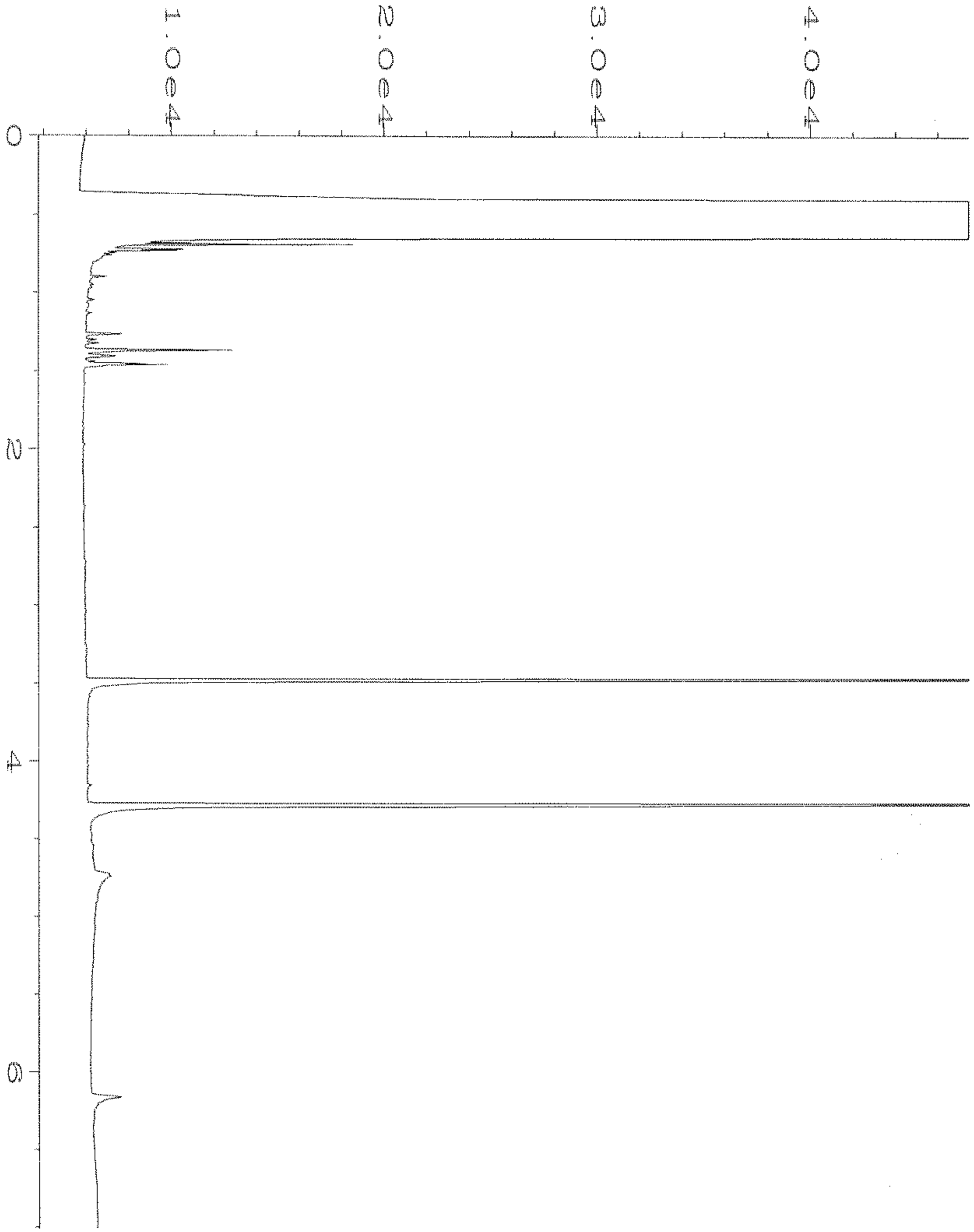
Data File Name : C:\HPCHEM\6\DATA\04-01-21\035F0801.D
Operator : TL
Instrument : GC6
Sample Name : 103585-17
Run Time Bar Code:
Acquired on : 01 Apr 21 05:59 PM
Report Created on: 02 Apr 21 07:49 AM

Page Number : 1
Vial Number : 35
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name   : C:\HPCHEM\6\DATA\04-01-21\036F0801.D
Operator   : TL
Instrument   : GC6
Sample Name   : 103585-18
Run Time Bar Code:
Acquired on   : 01 Apr 21   06:10 PM
Report Created on: 02 Apr 21   07:49 AM

Page Number   : 1
Vial Number   : 36
Injection Number : 1
Sequence Line   : 8
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\037F0801.D
Operator          : TL                              Page Number      : 1
Instrument        : GC6                             Vial Number      : 37
Sample Name       : 103585-19                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line    : 8
Acquired on       : 01 Apr 21   06:21 PM            Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:49 AM            Analysis Method  : DEFAULT.MTH
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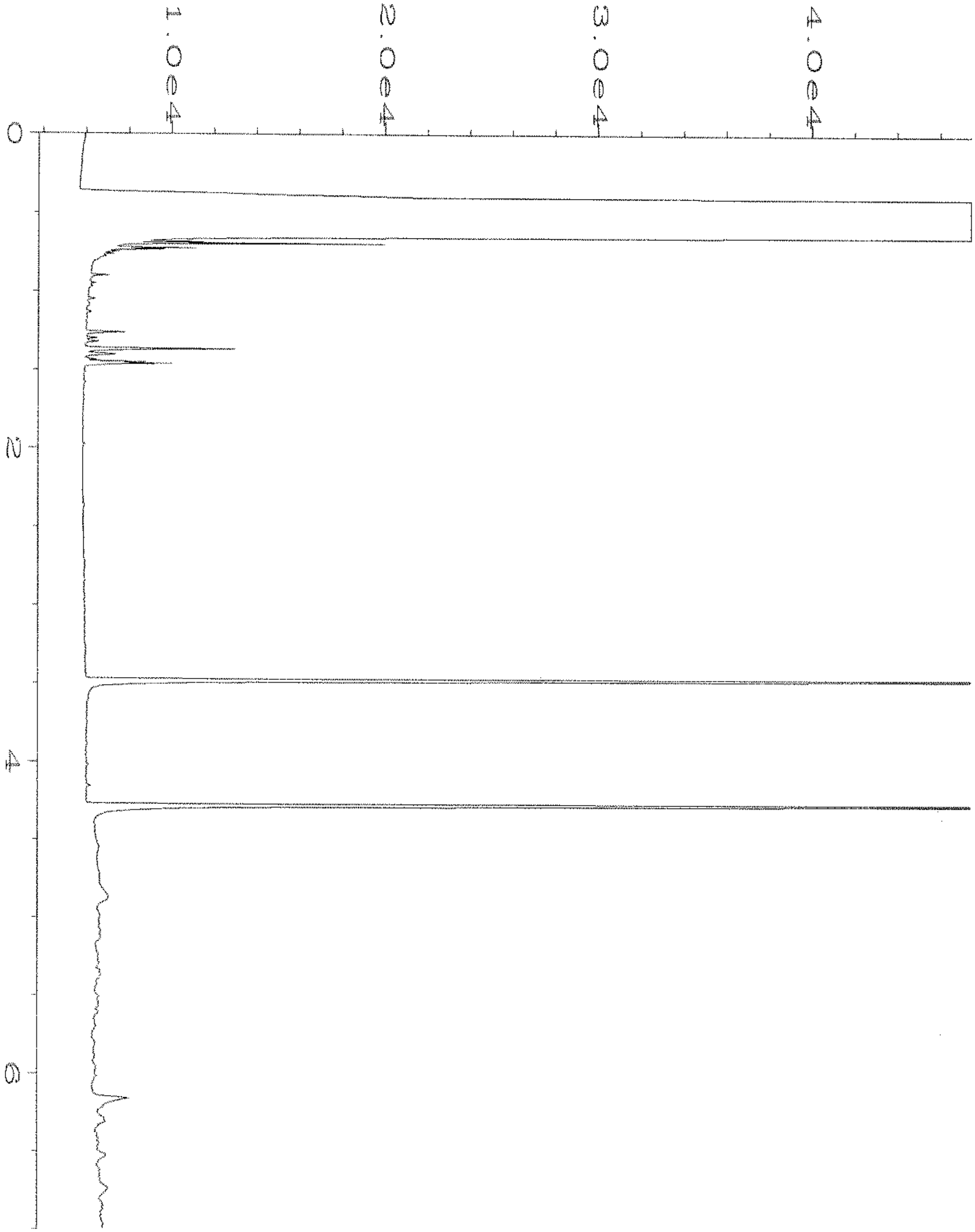

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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\038F1001.D
Operator          : TL                                  Page Number      : 1
Instrument        : GC6                                 Vial Number      : 38
Sample Name       : 103585-20                           Injection Number : 1
Run Time Bar Code:                                      Sequence Line    : 10
Acquired on       : 01 Apr 21   06:54 PM                Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:49 AM                 Analysis Method  : DEFAULT.MTH
```

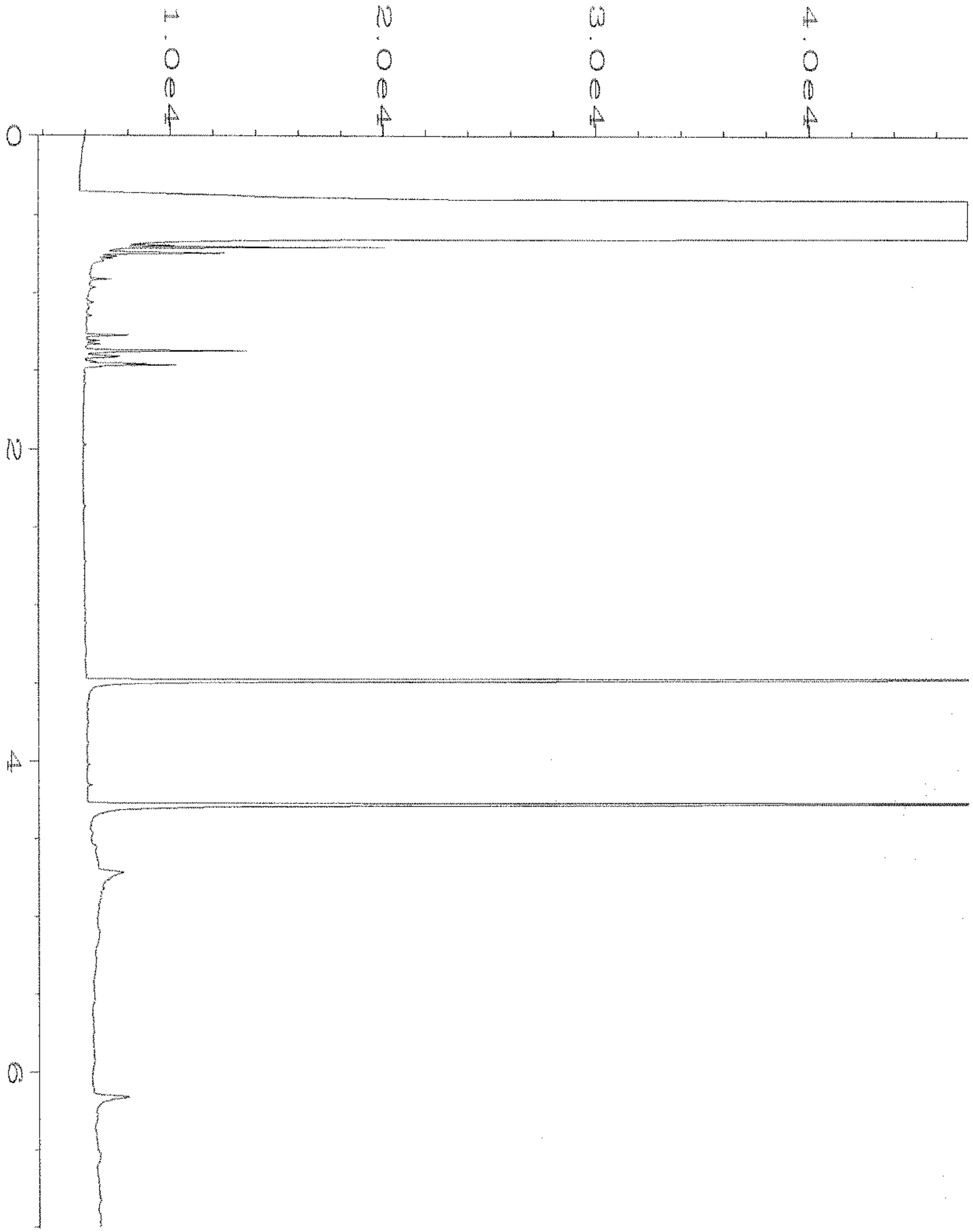

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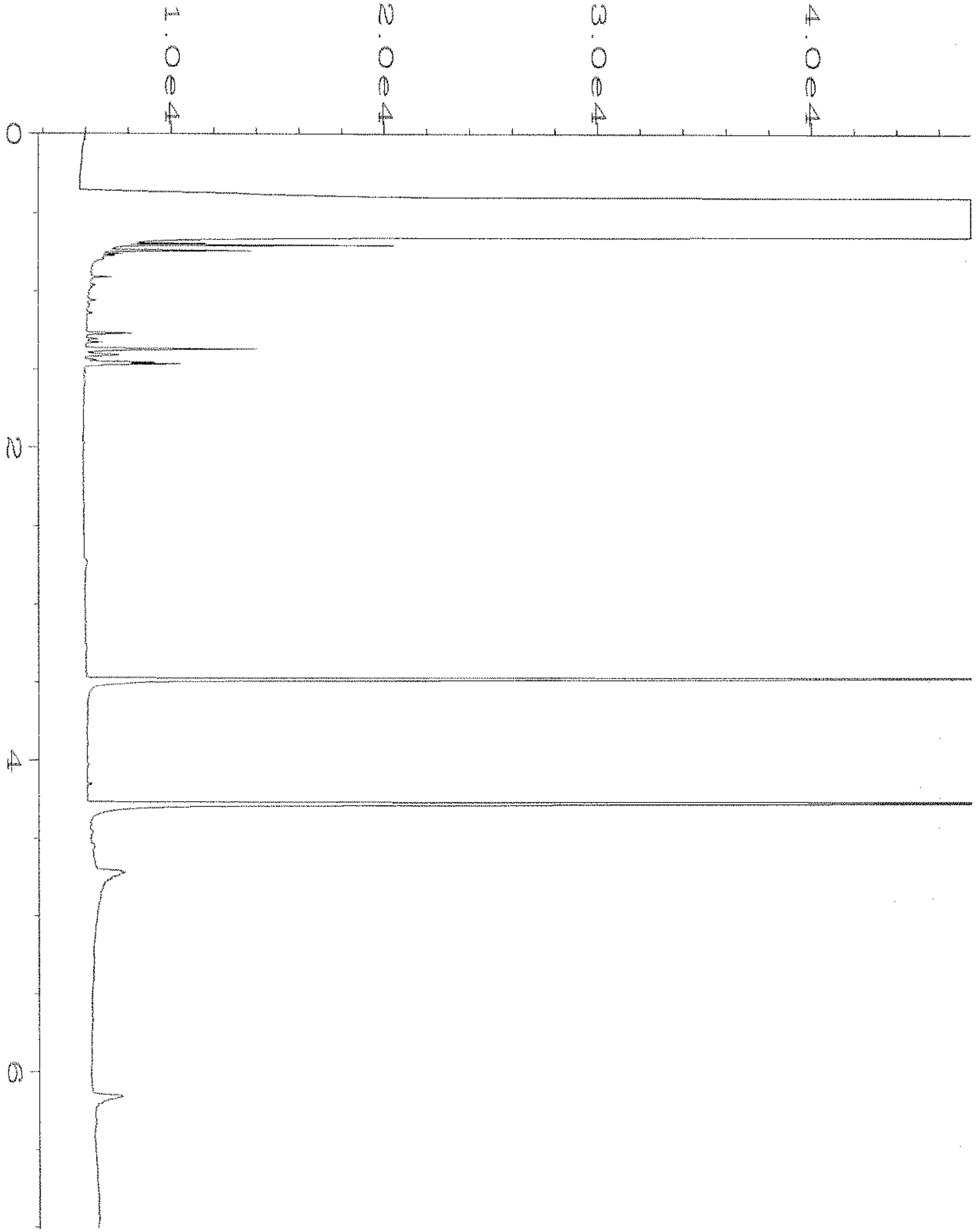
Data File Name   : C:\HPCHEM\6\DATA\04-01-21\039F1001.D
Operator         : TL                               Page Number       : 1
Instrument       : GC6                              Vial Number       : 39
Sample Name      : 103585-21                        Injection Number : 1
Run Time Bar Code:                                  Sequence Line     : 10
Acquired on      : 01 Apr 21   07:05 PM             Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:49 AM             Analysis Method  : DEFAULT.MTH
```



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\040F1001.D
Operator          : TL                                     Page Number      : 1
Instrument        : GC6                                    Vial Number      : 40
Sample Name       : 103585-22                              Injection Number : 1
Run Time Bar Code:                                         Sequence Line    : 10
Acquired on       : 01 Apr 21   07:16 PM                   Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:50 AM                    Analysis Method  : DEFAULT.MTH
```

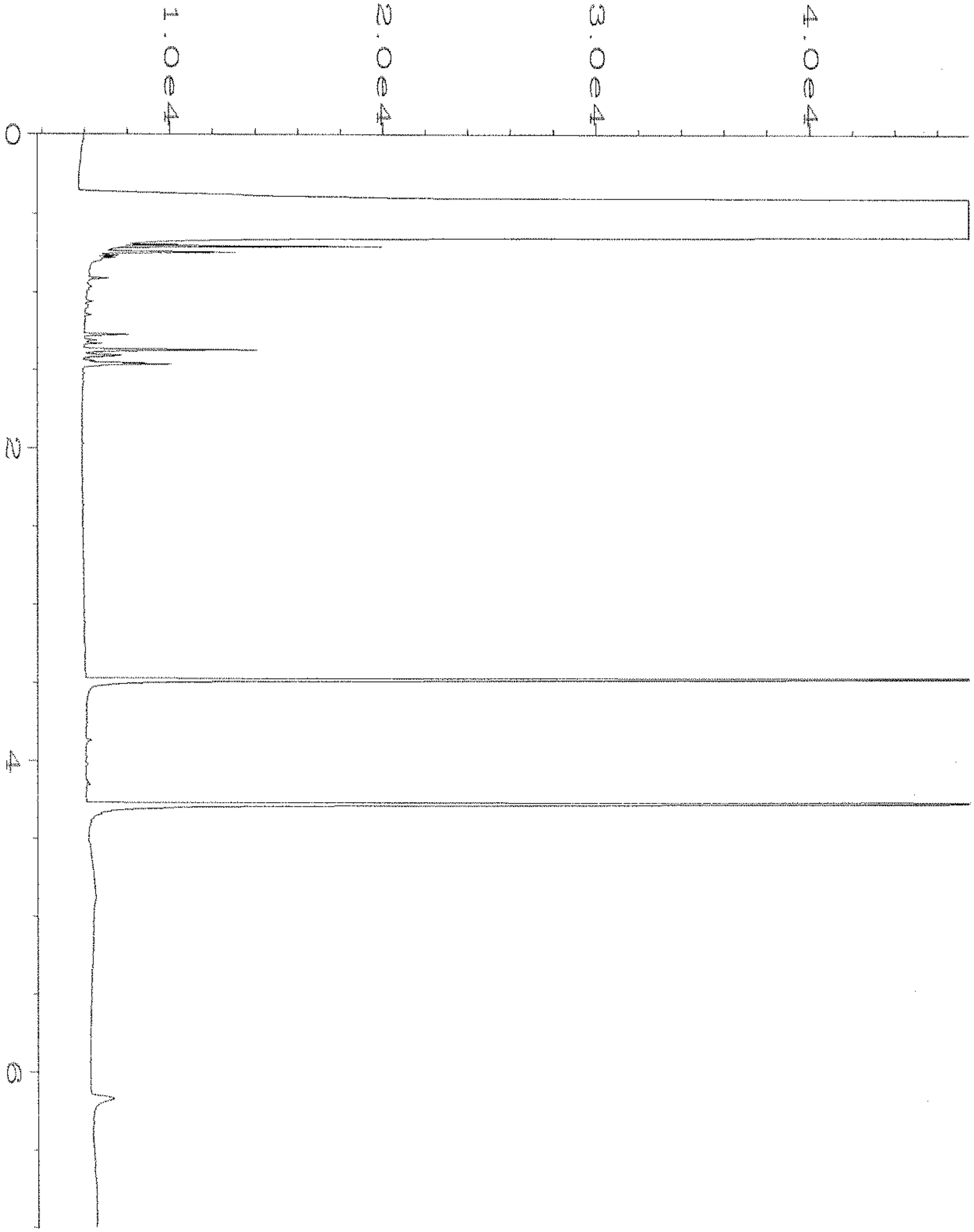

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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\041F1001.D
Operator          : TL                               Page Number      : 1
Instrument        : GC6                              Vial Number      : 41
Sample Name       : 103585-23                        Injection Number : 1
Run Time Bar Code:                                   Sequence Line    : 10
Acquired on       : 01 Apr 21   07:27 PM             Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:50 AM              Analysis Method  : DEFAULT.MTH
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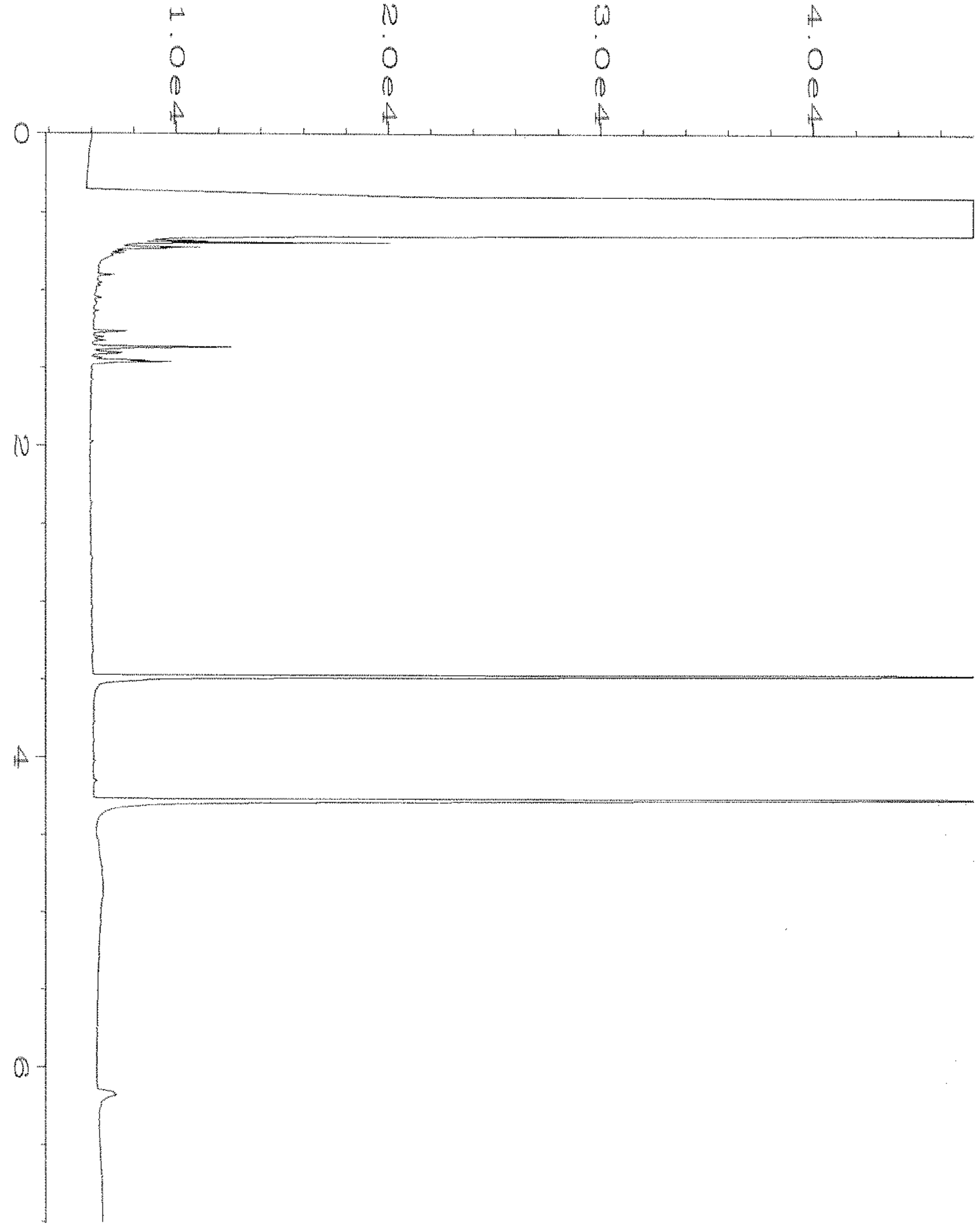
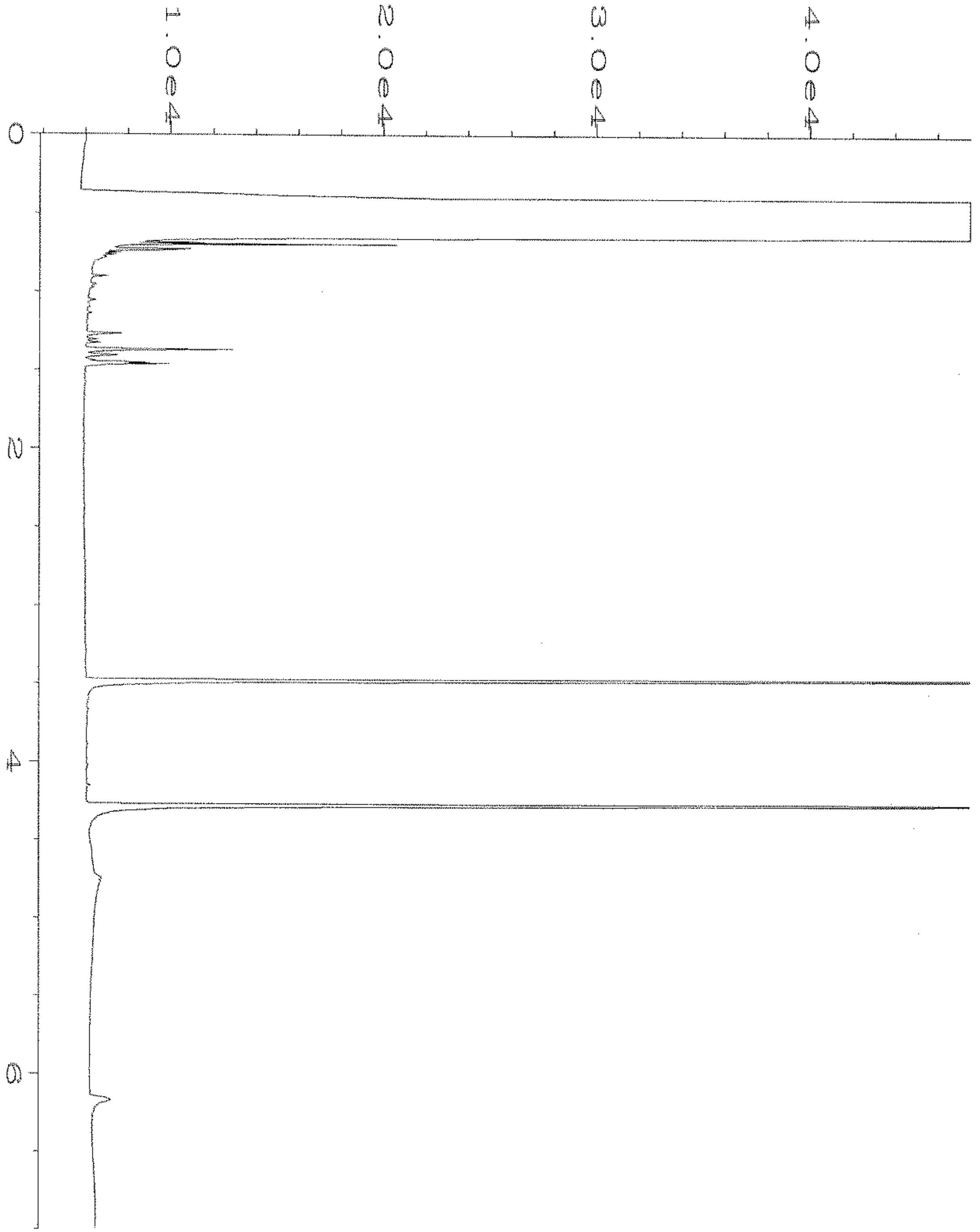


Data File Name : C:\HPCHEM\6\DATA\04-01-21\046F1001.D
Operator : TL
Instrument : GC6
Sample Name : 103585-24
Run Time Bar Code:
Acquired on : 01 Apr 21 08:22 PM
Report Created on: 02 Apr 21 07:50 AM

Page Number : 1
Vial Number : 46
Injection Number : 1
Sequence Line : 10
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\047F1001.D
Operator          : TL                              Page Number       : 1
Instrument        : GC6                             Vial Number       : 47
Sample Name       : 103585-25                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line     : 10
Acquired on       : 01 Apr 21   08:33 PM            Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:50 AM             Analysis Method   : DEFAULT.MTH
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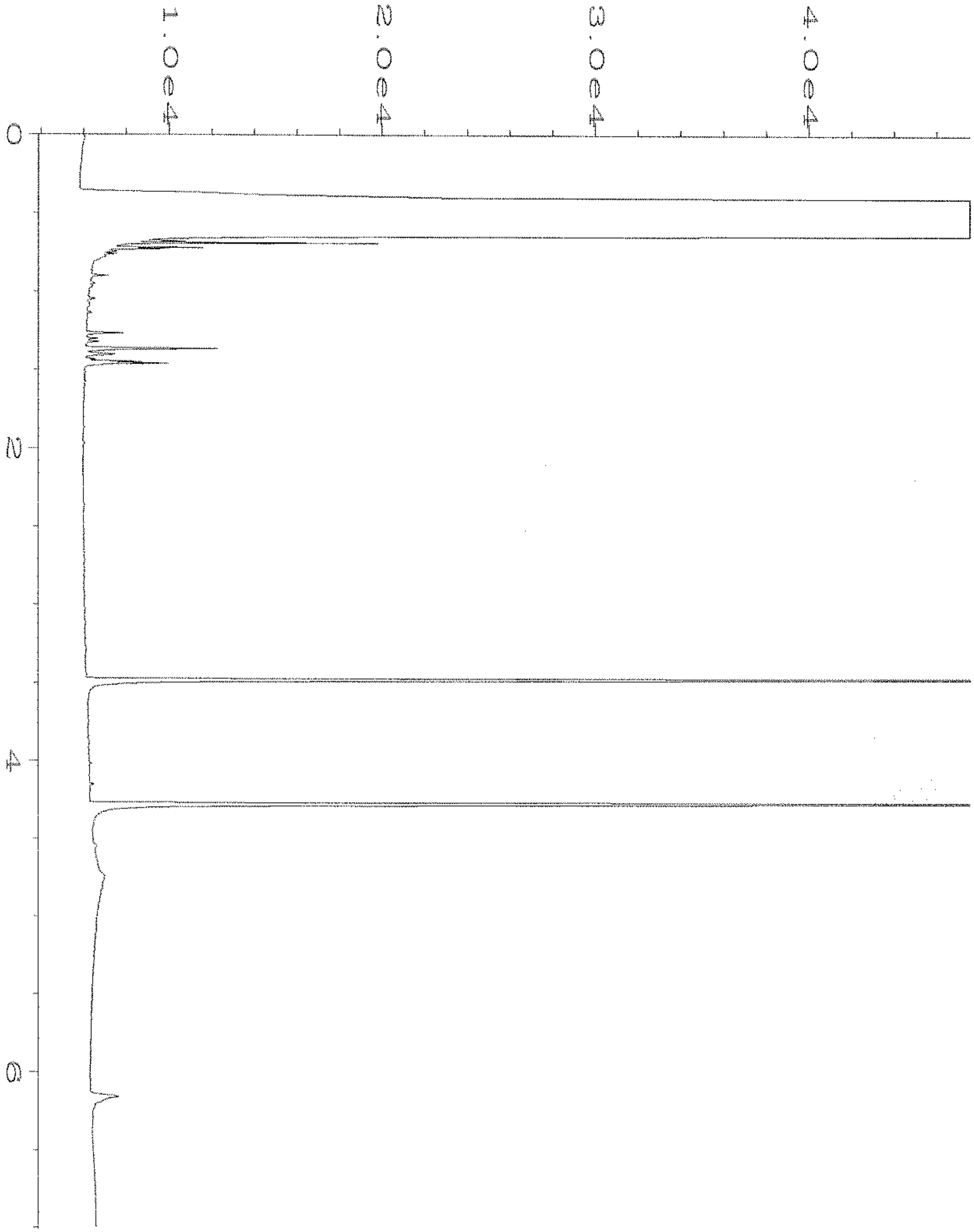

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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\048F1001.D
Operator          : TL                                  Page Number      : 1
Instrument        : GC6                                 Vial Number      : 48
Sample Name       : 103585-26                           Injection Number : 1
Run Time Bar Code:                                      Sequence Line    : 10
Acquired on       : 01 Apr 21   08:44 PM                Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:51 AM                Analysis Method  : DEFAULT.MTH
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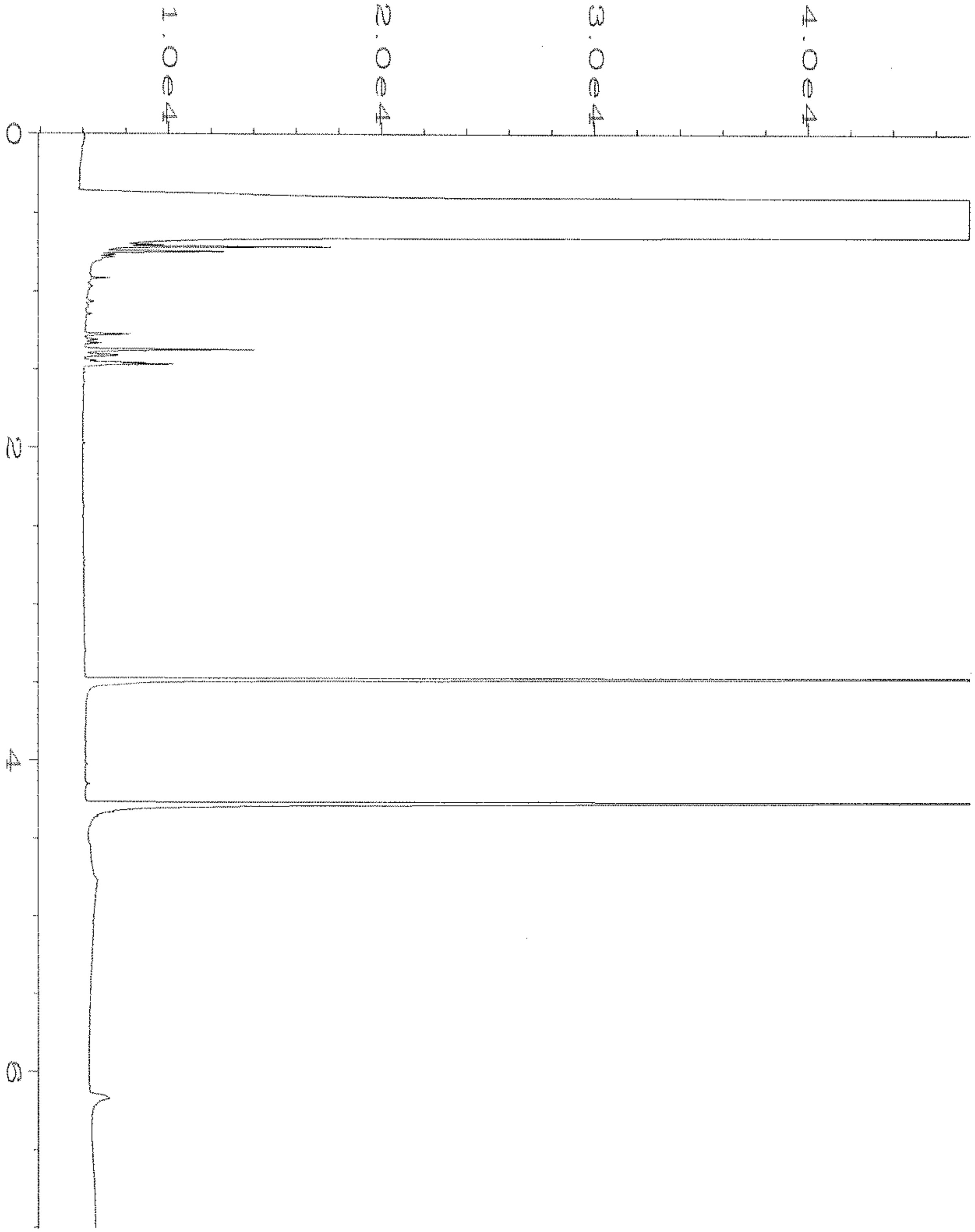

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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\049F1001.D
Operator          : TL                            Page Number      : 1
Instrument        : GC6                           Vial Number      : 49
Sample Name       : 103585-28                     Injection Number : 1
Run Time Bar Code:                                Sequence Line    : 10
Acquired on       : 01 Apr 21   08:55 PM          Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:51 AM           Analysis Method  : DEFAULT.MTH
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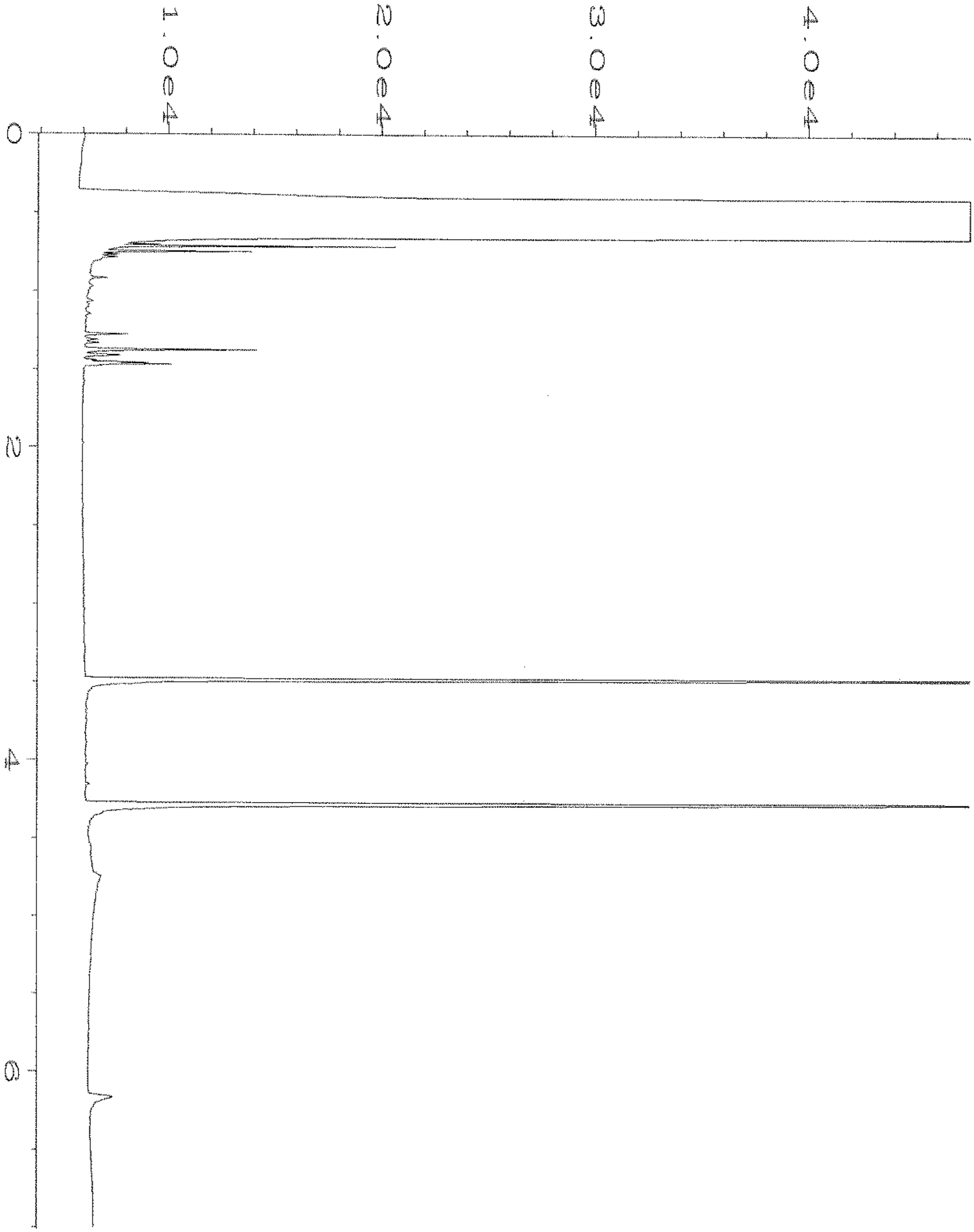
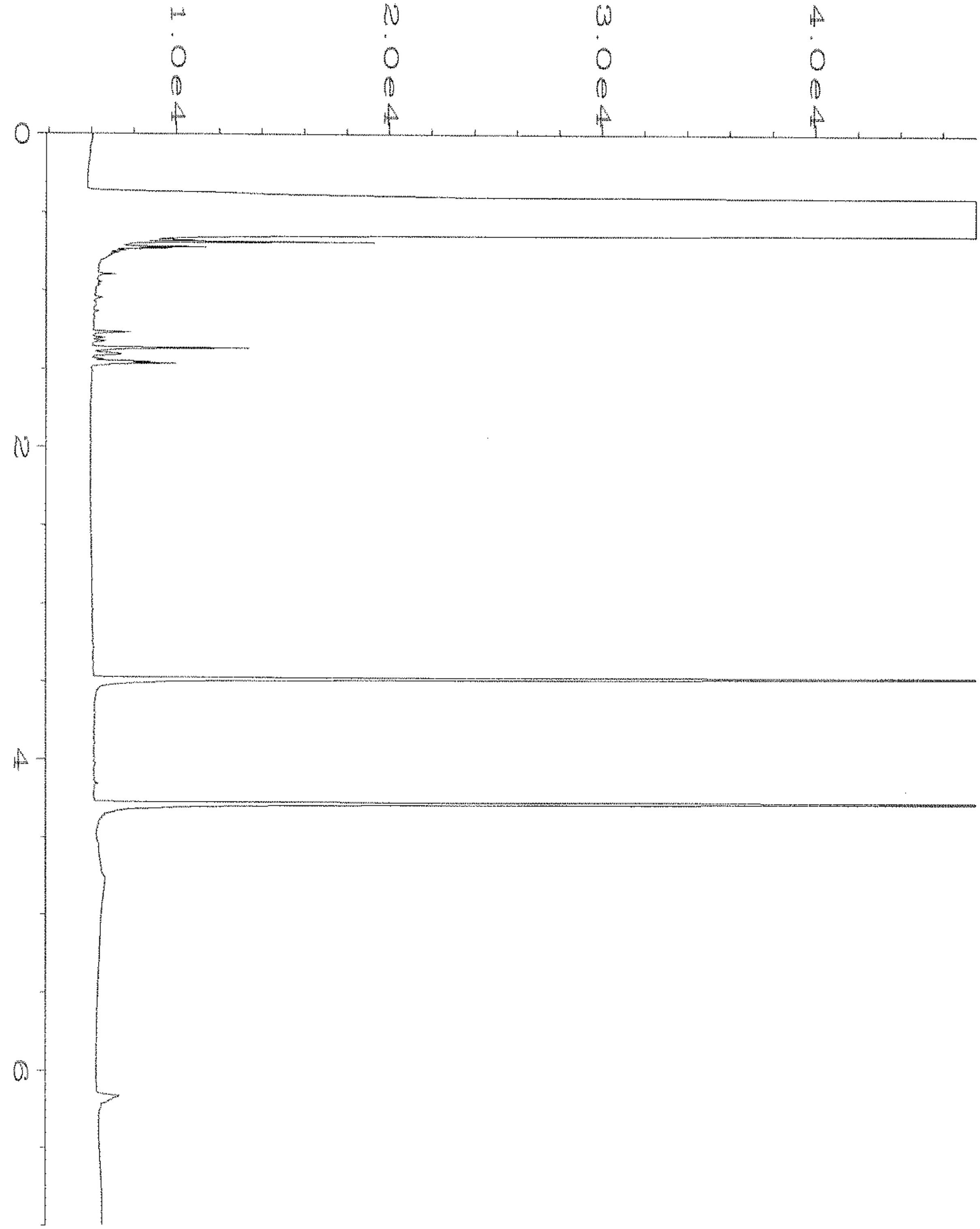


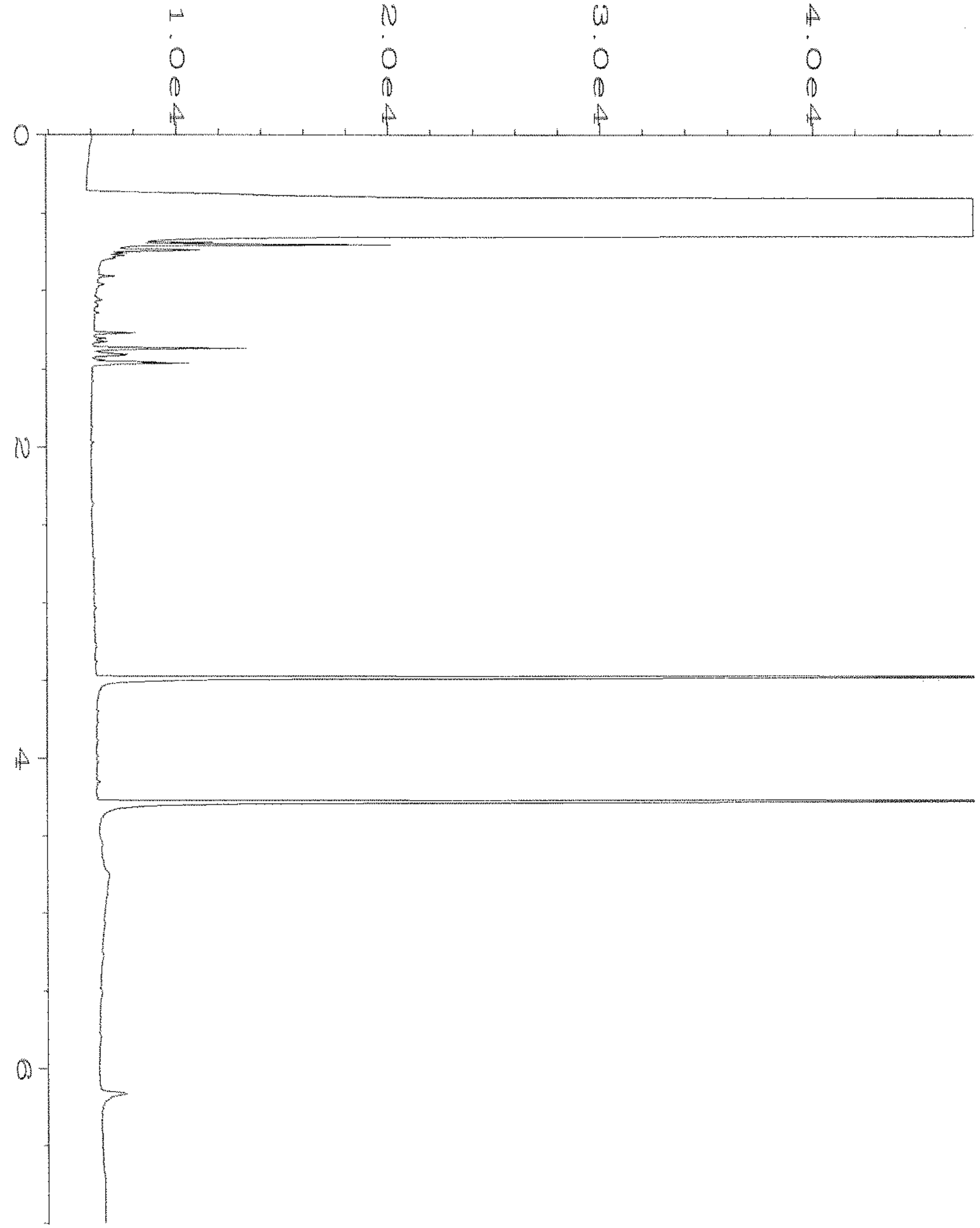
Data File Name : C:\HPCHEM\6\DATA\04-01-21\050F1001.D
Operator : TL
Instrument : GC6
Sample Name : 103585-29
Run Time Bar Code:
Acquired on : 01 Apr 21 09:06 PM
Report Created on: 02 Apr 21 07:51 AM

Page Number : 1
Vial Number : 50
Injection Number : 1
Sequence Line : 10
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



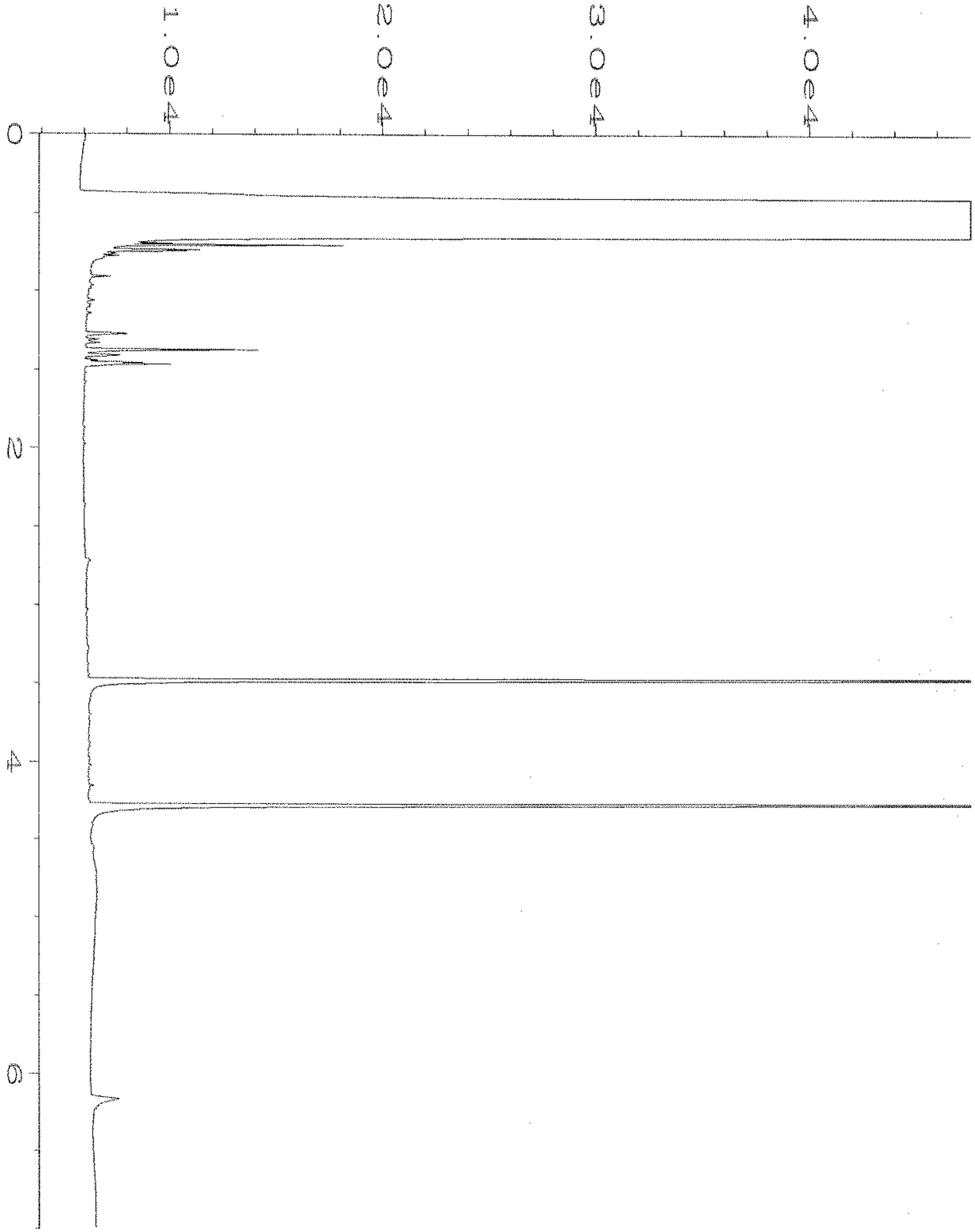
Data File Name : C:\HPCHEM\6\DATA\04-01-21\051F1001.D
Operator : TL
Instrument : GC6
Sample Name : 103585-30
Run Time Bar Code:
Acquired on : 01 Apr 21 09:17 PM
Report Created on: 02 Apr 21 07:51 AM

Page Number : 1
Vial Number : 51
Injection Number : 1
Sequence Line : 10
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\04-01-21\052F1001.D
Operator : TL
Instrument : GC6
Sample Name : 103585-31
Run Time Bar Code:
Acquired on : 01 Apr 21 09:28 PM
Report Created on: 02 Apr 21 07:51 AM

Page Number : 1
Vial Number : 52
Injection Number : 1
Sequence Line : 10
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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Data File Name    : C:\HPCHEM\6\DATA\04-01-21\053F1001.D
Operator          : TL                               Page Number       : 1
Instrument        : GC6                              Vial Number       : 53
Sample Name       : 103585-32                        Injection Number : 1
Run Time Bar Code:                                   Sequence Line     : 10
Acquired on       : 01 Apr 21   09:38 PM             Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:51 AM              Analysis Method   : DEFAULT.MTH
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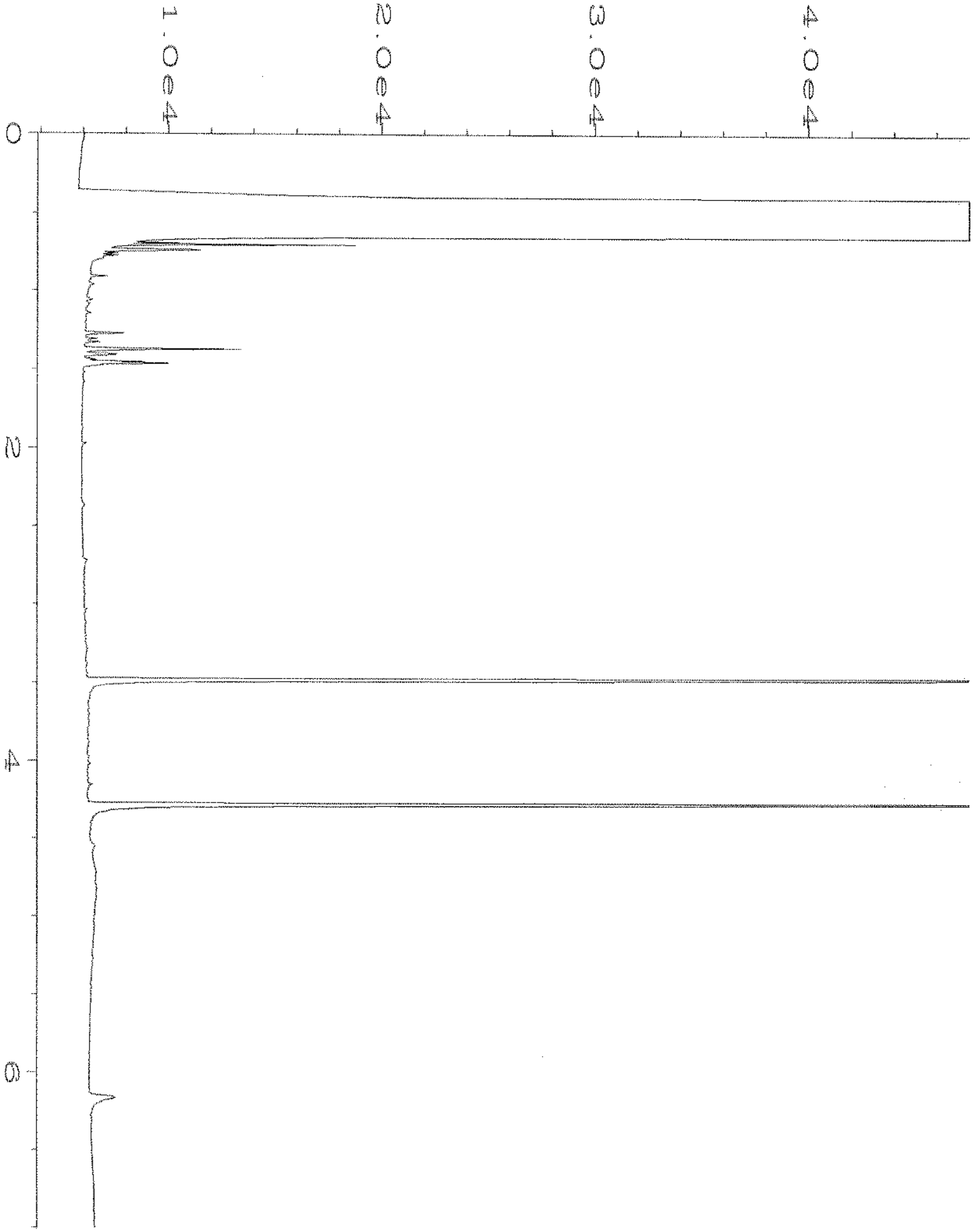
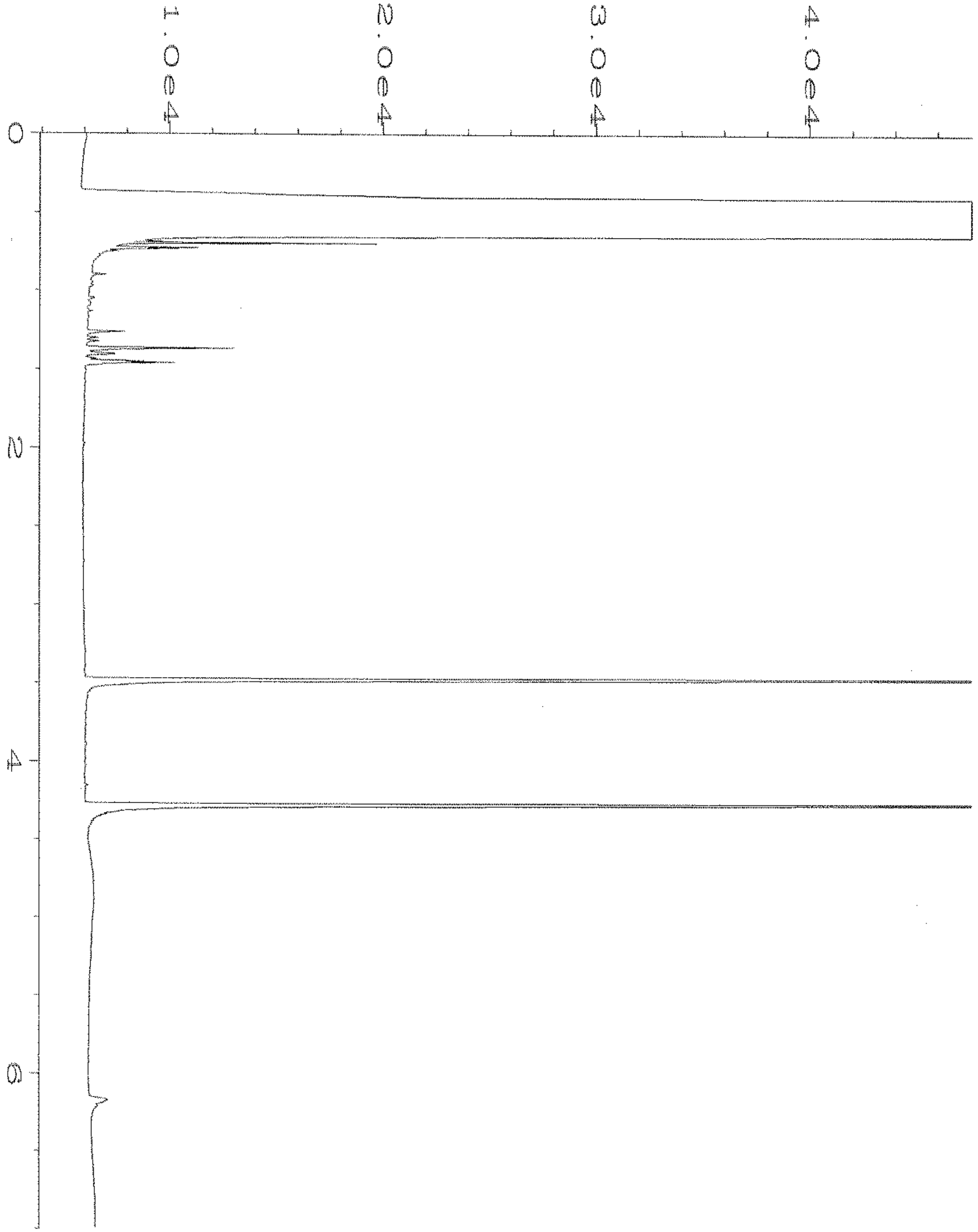


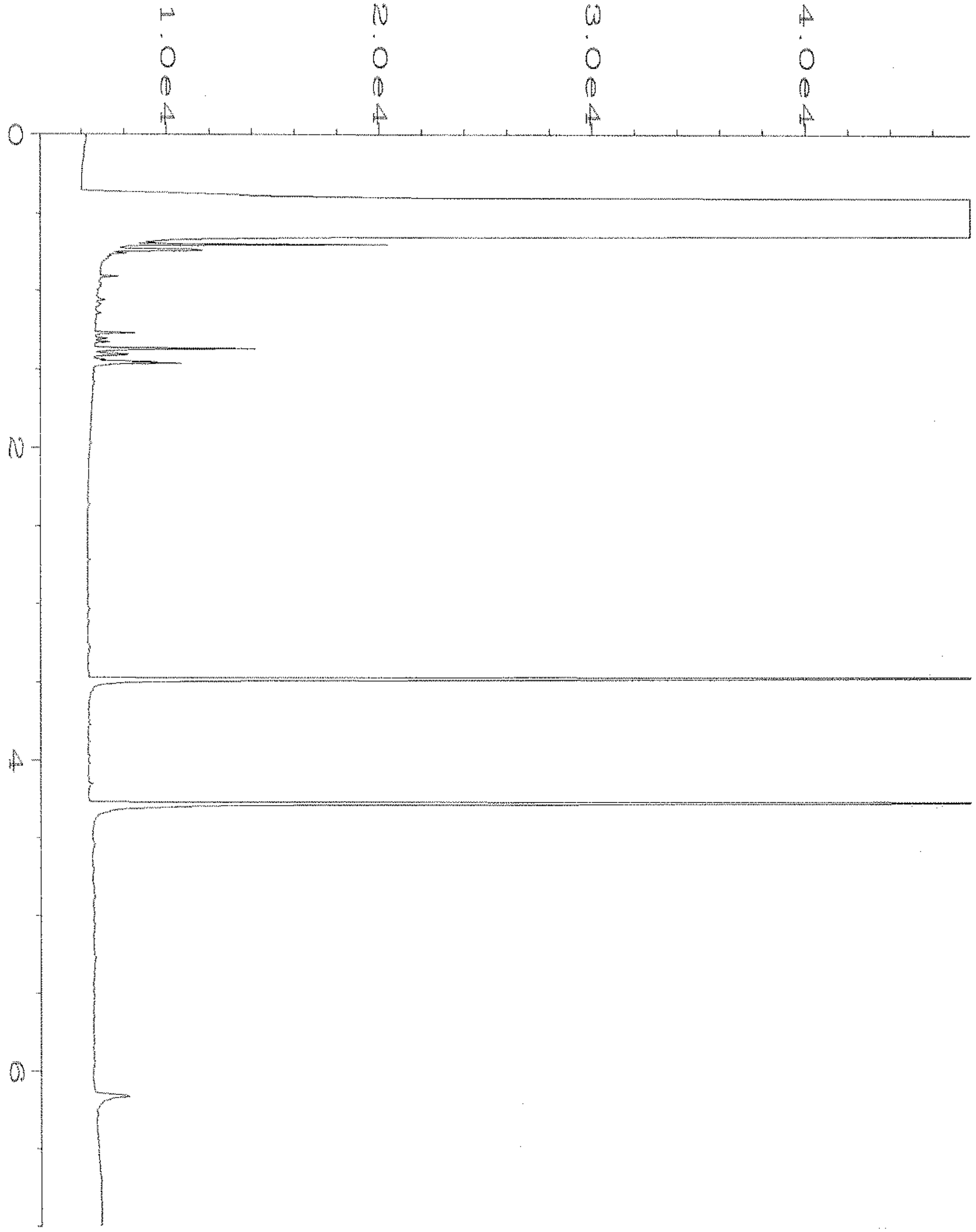
Data File Name : C:\HPCHEM\6\DATA\04-01-21\054F1001.D
Operator : TL
Instrument : GC6
Sample Name : 103585-33
Run Time Bar Code:
Acquired on : 01 Apr 21 09:49 PM
Report Created on: 02 Apr 21 07:51 AM

Page Number : 1
Vial Number : 54
Injection Number : 1
Sequence Line : 10
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\04-01-21\042F1001.D

Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 42
Sample Name	: 01-774 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 10
Acquired on	: 01 Apr 21 07:38 PM	Instrument Method:	DX.MTH
Report Created on:	02 Apr 21 07:50 AM	Analysis Method	: DEFAULT.MTH



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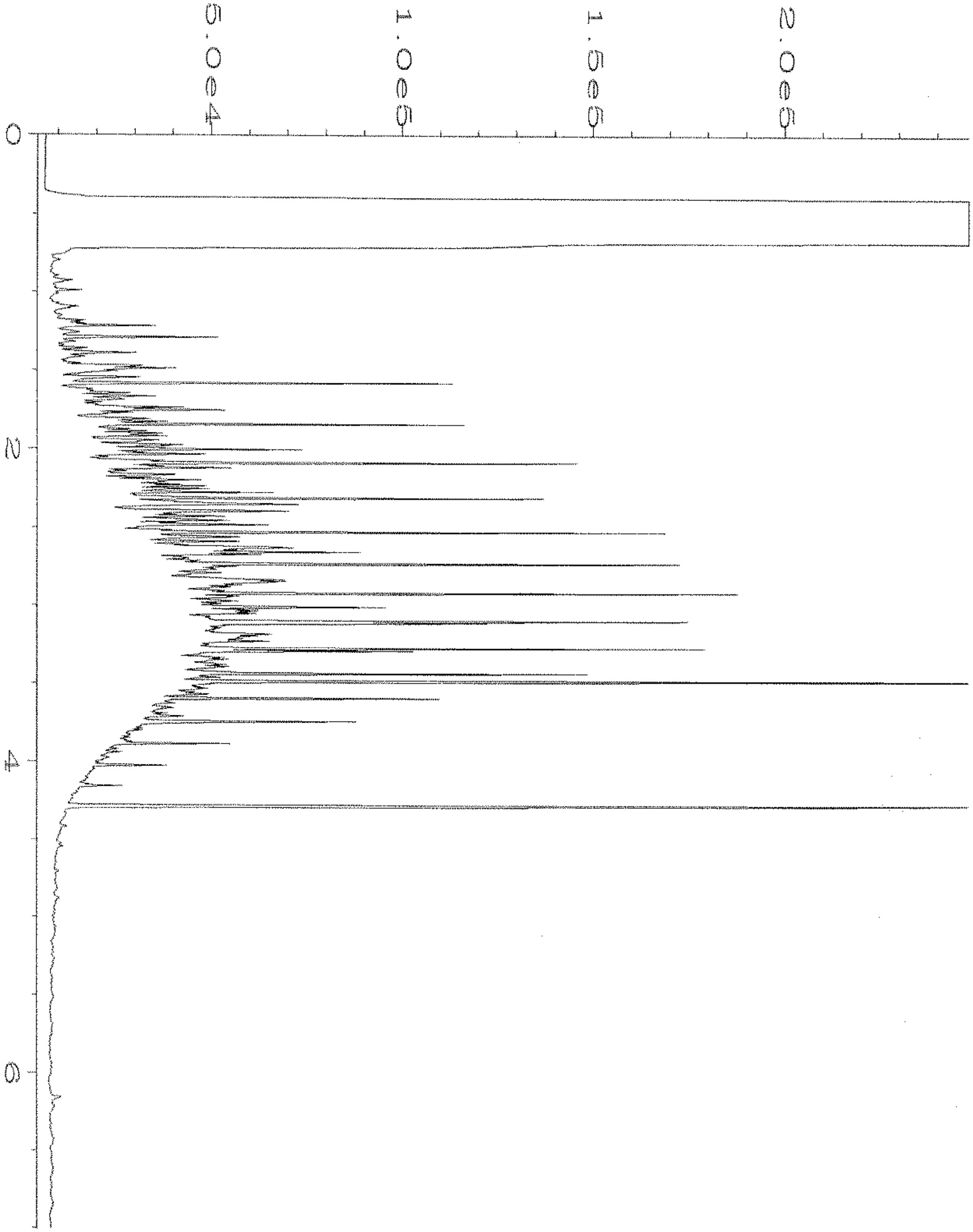
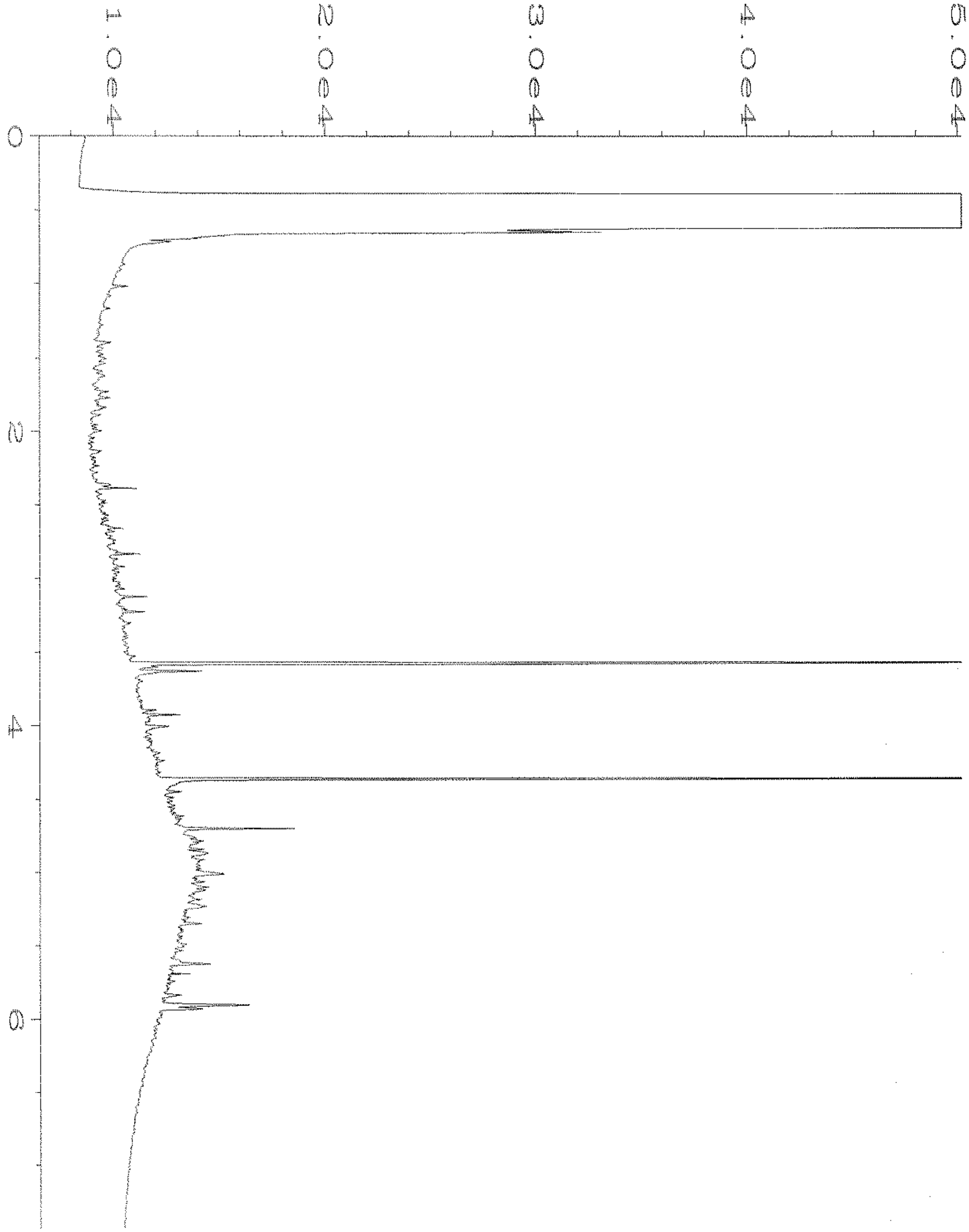
Data File Name    : C:\HPCHEM\6\DATA\04-01-21\018F0601.D
Operator          : TL                              Page Number      : 1
Instrument        : GC6                             Vial Number      : 18
Sample Name       : 01-772 mb                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line    : 6
Acquired on       : 01 Apr 21   02:27 PM            Instrument Method: DX.MTH
Report Created on: 02 Apr 21   07:52 AM            Analysis Method  : DEFAULT.MTH
```



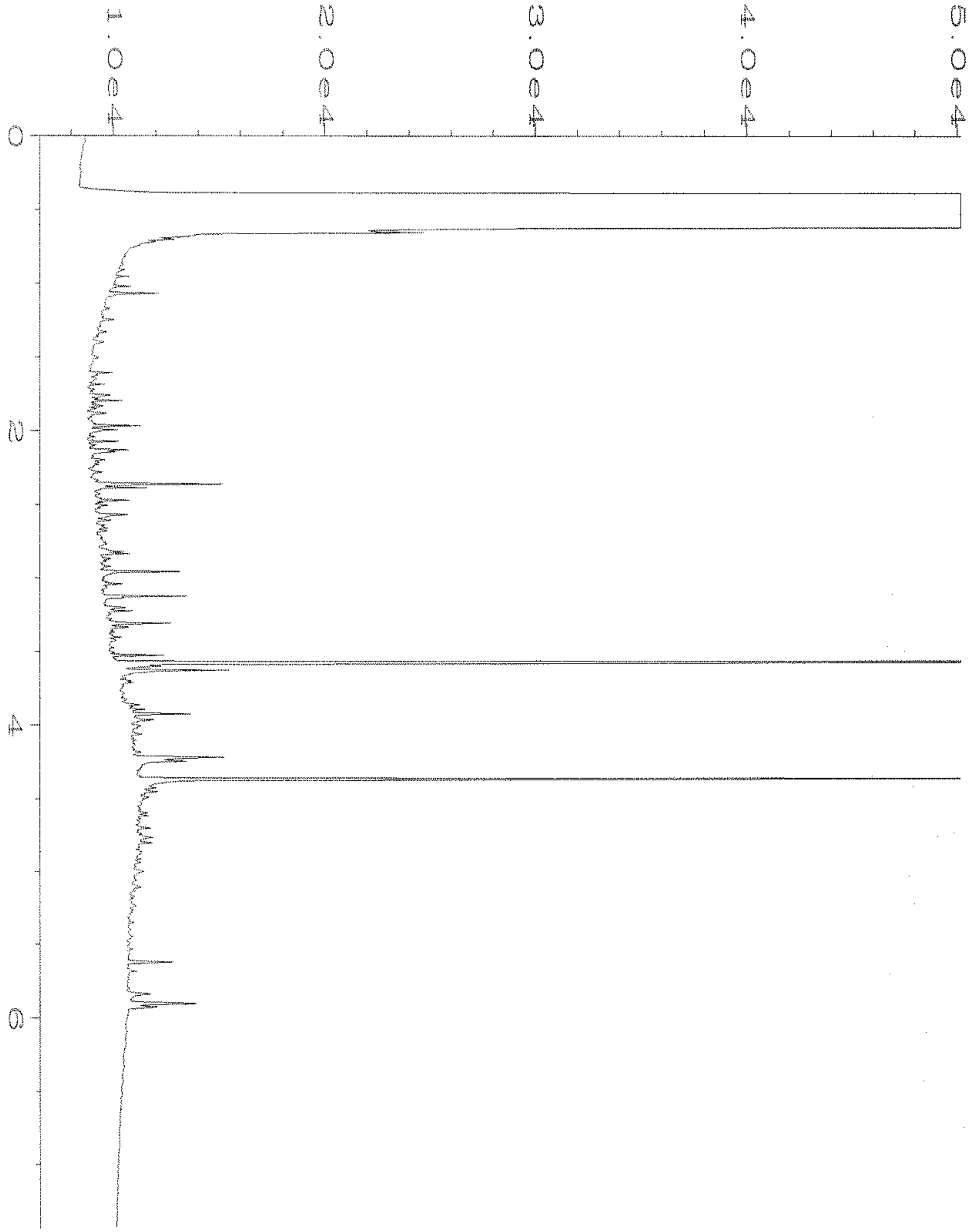
Data File Name : C:\HPCHEM\6\DATA\04-01-21\003F0201.D

Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 3
Sample Name	: 500 Dx 62-142D	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 01 Apr 21 08:40 AM	Instrument Method:	DX.MTH
Report Created on:	02 Apr 21 07:52 AM	Analysis Method	: DEFAULT.MTH



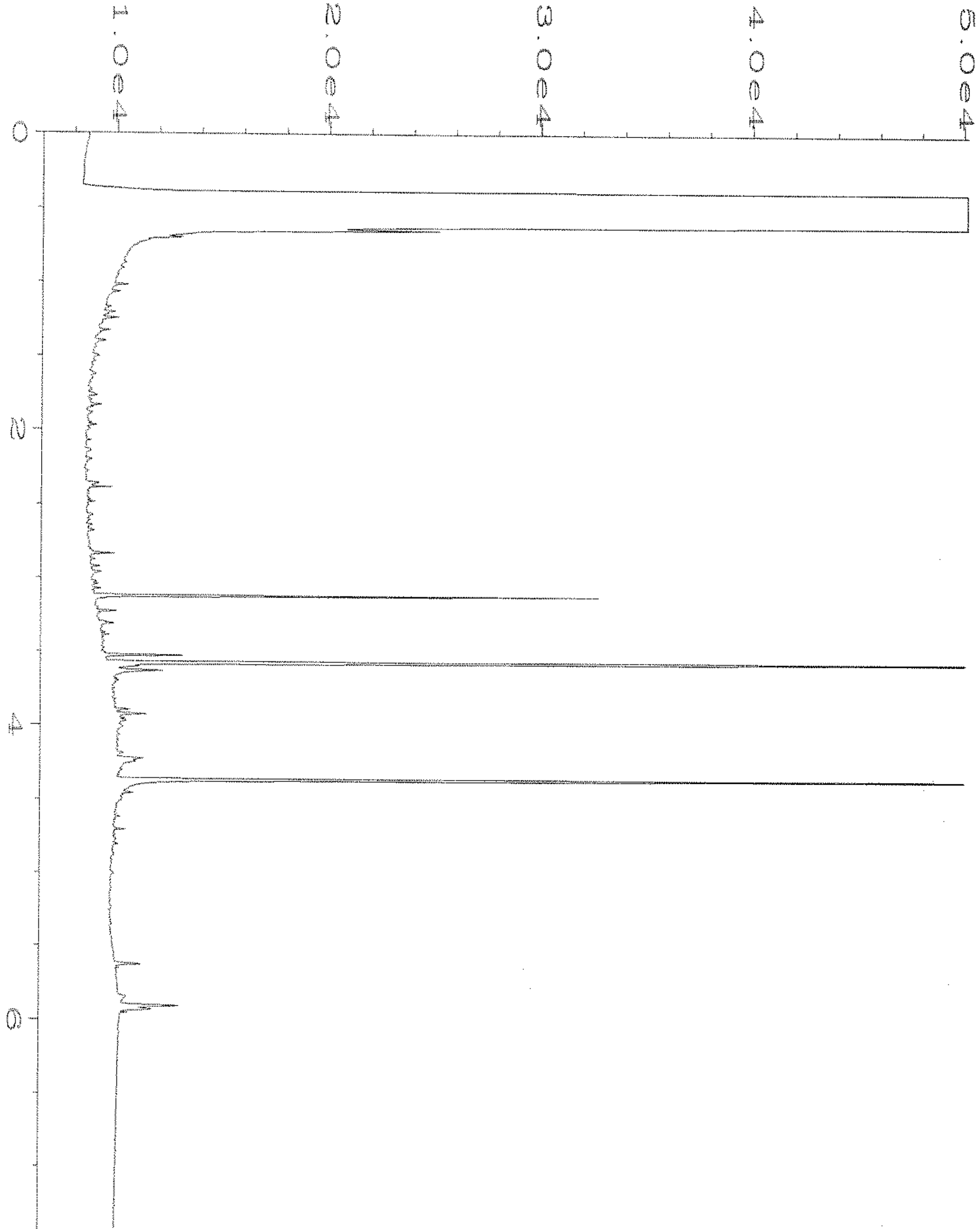
Data File Name : C:\HPCHEM\1\DATA\04-02-21\025F0901.D
Operator : TL
Instrument : GC1
Sample Name : 103585-06
Run Time Bar Code:
Acquired on : 02 Apr 21 02:26 PM
Report Created on: 05 Apr 21 09:11 AM

Page Number : 1
Vial Number : 25
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

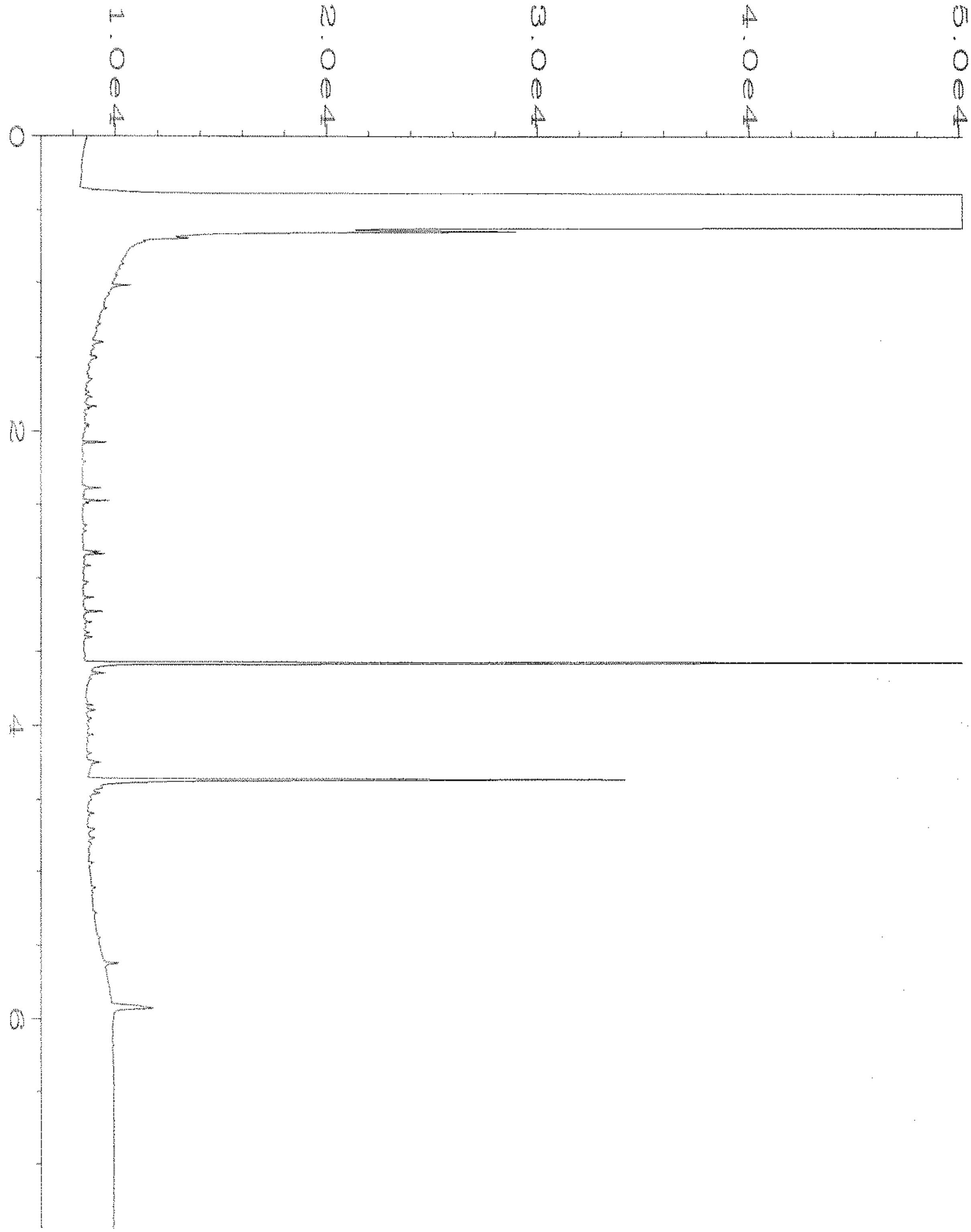


Data File Name : C:\HPCHEM\1\DATA\04-02-21\026F0901.D
Operator : TL
Instrument : GC1
Sample Name : 103585-15
Run Time Bar Code:
Acquired on : 02 Apr 21 02:38 PM
Report Created on: 05 Apr 21 09:11 AM

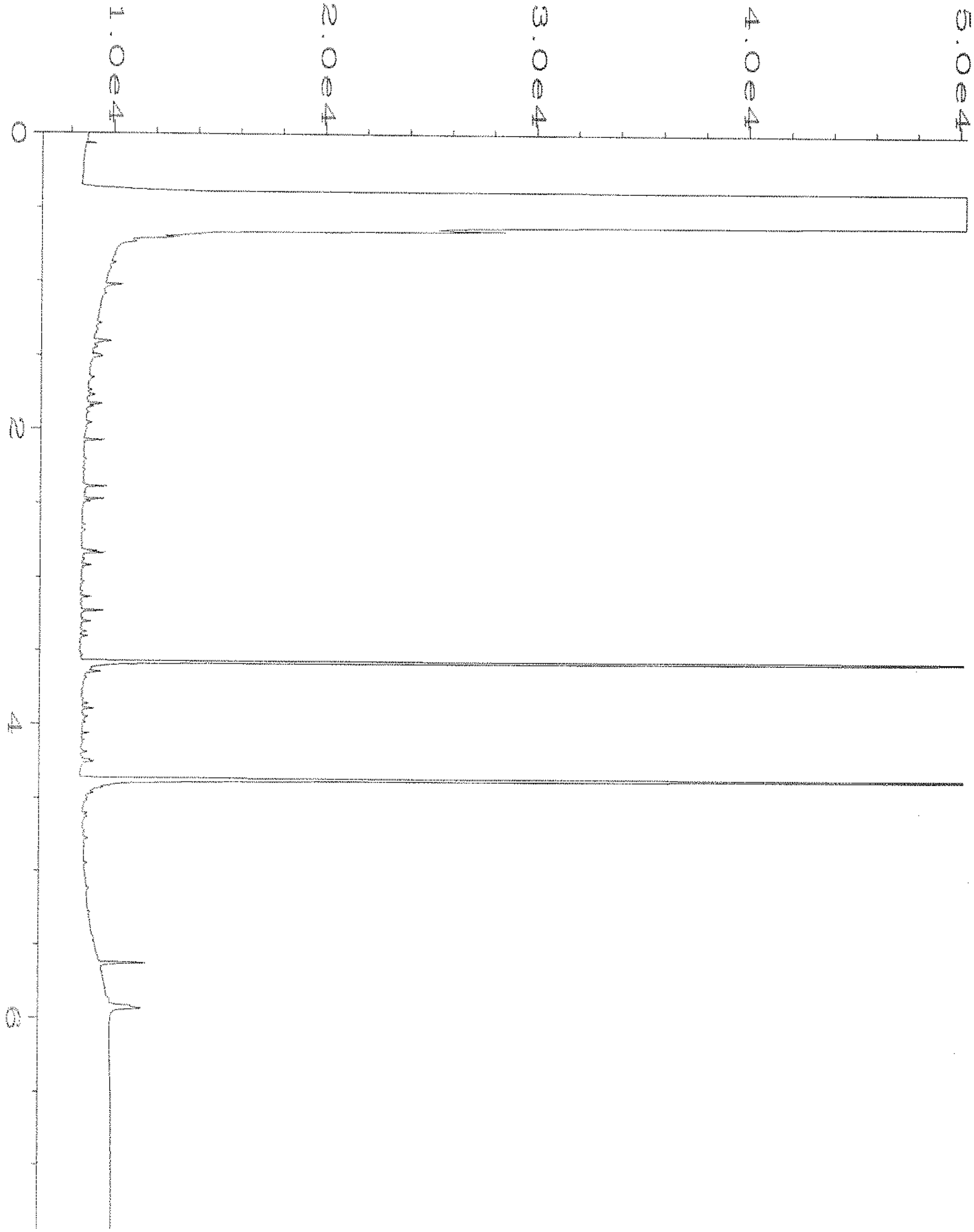
Page Number : 1
Vial Number : 26
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



```
Data File Name    : C:\HPCHEM\1\DATA\04-02-21\027F0901.D
Operator          : TL                          Page Number       : 1
Instrument        : GC1                         Vial Number       : 27
Sample Name       : 103585-16                   Injection Number : 1
Run Time Bar Code:                              Sequence Line     : 9
Acquired on       : 02 Apr 21   02:49 PM        Instrument Method: DX.MTH
Report Created on: 05 Apr 21   09:11 AM        Analysis Method   : DEFAULT.MTH
```

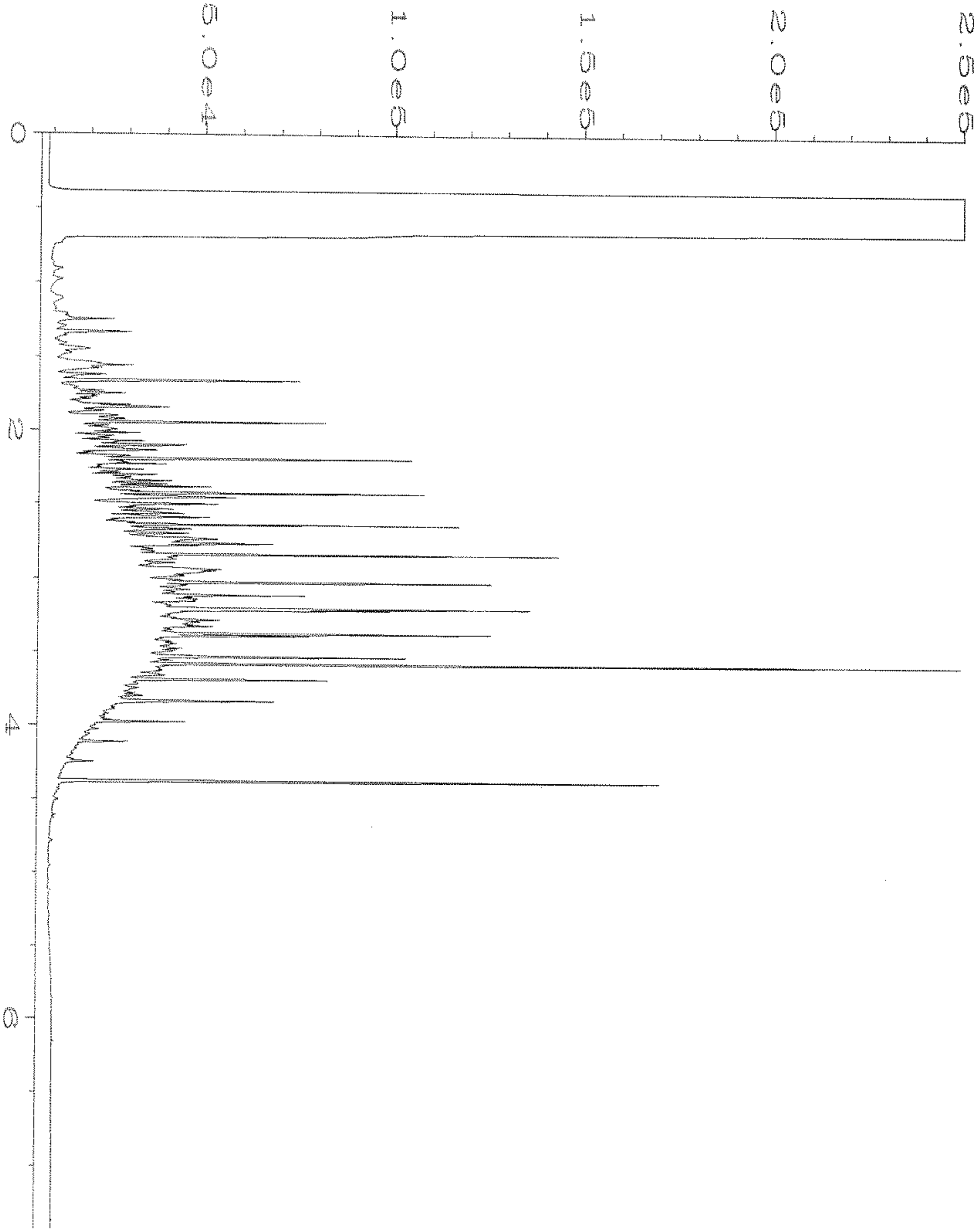


```
Data File Name    : C:\HPCHEM\1\DATA\04-02-21\028F0901.D
Operator          : TL                            Page Number       : 1
Instrument        : GC1                           Vial Number       : 28
Sample Name       : 103585-27                     Injection Number  : 1
Run Time Bar Code:                                Sequence Line     : 9
Acquired on       : 02 Apr 21  03:01 PM           Instrument Method: DX.MTH
Report Created on: 05 Apr 21  09:12 AM            Analysis Method   : DEFAULT.MTH
```



Data File Name   : C:\HPCHEM\1\DATA\04-02-21\018F0701.D
Operator   : TL
Instrument   : GC1
Sample Name   : 01-778 mb
Run Time Bar Code:
Acquired on   : 02 Apr 21   12:38 PM
Report Created on: 05 Apr 21   09:10 AM

Page Number   : 1
Vial Number   : 18
Injection Number : 1
Sequence Line   : 7
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\04-02-21\003F0201.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 62-142D
Run Time Bar Code:
Acquired on : 02 Apr 21 05:43 AM
Report Created on: 05 Apr 21 09:16 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 103585
Work Order Number: 2104392

May 05, 2021

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 4/28/2021 for the analyses presented in the following report.

Hexavalent Chromium by EPA Method 7196
Sample Moisture (Percent Moisture)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

CLIENT: Friedman & Bruya
Project: 103585
Work Order: 2104392

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2104392-001	C-1 DP1-11.0	03/31/2021 12:20 PM	04/28/2021 1:28 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2104392**

Date: **5/5/2021**

CLIENT: Friedman & Bruya

Project: 103585

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: Friedman & Bruya
Collection Date: 3/31/2021 12:20:00 PM
Project: 103585
Lab ID: 2104392-001
Matrix: Soil
Client Sample ID: C-1 DP1-11.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R66978		Analyst: CJ
Percent Moisture	10.0	0.500		wt%	1	5/4/2021 9:17:29 AM
Hexavalent Chromium by EPA Method 7196				Batch ID: 32196		Analyst: LB
Chromium, Hexavalent	ND	0.555	H	mg/Kg-dry	1	5/5/2021 12:53:00 PM

Date: *5/5/2021*

Work Order: 2104392
CLIENT: Friedman & Bruya
Project: 103585

QC SUMMARY REPORT

Hexavalent Chromium by EPA Method 7196

Sample ID: **MB-32196** SampType: **MBLK** Units: **mg/Kg** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **MBLKS** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350324**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.500									

Sample ID: **LCS-32196** SampType: **LCS** Units: **mg/Kg** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **LCSS** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350325**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.19	0.500	2.500	0	87.6	86.5	114				

Sample ID: **2104305-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **BATCH** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350327**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.532						0		30	

Sample ID: **2104305-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **BATCH** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350328**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.53	0.522	2.611	0	96.9	6.79	138				

Sample ID: **2104305-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **BATCH** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350329**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.57	0.536	2.679	0	95.9	6.79	138	2.531	1.52	30	

Sample Log-In Check List

Client Name: **FB**

Work Order Number: **2104392**

Logged by: **Carissa True**

Date Received: **4/28/2021 1:28:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? FedEx

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☑
6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☑ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☐ No ☑

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date:

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	3.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2104392

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO. 103585

PO # B-238

REMARKS

Please Email Results EQUIS EDD

TURNAROUND TIME
☒ Standard TAT
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Hex Chrome							Notes
C-1 DP1-11.0		3/31/21	1220	Soil	1				X							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Michael Erdahl	Friedman & Bruya	4/28/21	0800 AM
Received by: Claire Anderson	Claire Anderson	FAT	4/29/21	1328
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 6, 2021

Jacob Letts, Project Manager
GeoEngineers
2101 4th Avenue, Suite 150
Seattle, WA 98121

Dear Mr Letts:

Included are the additional results from the testing of material submitted on March 31, 2021 from the Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585 project. There are 2 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
GNR0506R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 31, 2021 by Friedman & Bruya, Inc. from the GeoEngineers Snohomish County Airport C-1 Hangar 5530-014-01, F&BI 103585 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	GeoEngineers
103585 -01	C-1 DP4-3.5
103585 -02	C-1 DP4-5.0
103585 -03	C-1 DP4-7.0
103585 -04	C-1 DP3-4.0
103585 -05	C-1 DP3-7.0
103585 -06	C-1 DP3-033021w
103585 -07	C-1 DP5-3.0
103585 -08	C-1 DP5-6.0
103585 -09	C-1 DP15-4.0
103585 -10	C-1 DP15-7.0
103585 -11	C-1 DP14-5.0
103585 -12	C-1 DP14-10.0
103585 -13	C-1 DP13-2.0
103585 -14	C-1 DP13-5.0
103585 -15	C-1 DP13-033121w
103585 -16	C-1 DP14-033121w
103585 -17	C-1 DP8-4.5
103585 -18	C-1 DP8-9.0
103585 -19	C-1 DP9-3.0
103585 -20	C-1 DP9-7.5
103585 -21	C-1 DP10-4.0
103585 -22	C-1 DP11-4.0
103585 -23	C-1 DP2-5.0
103585 -24	C-1 DP2-11.0
103585 -25	C-1 DP1-3.5
103585 -26	C-1 DP1-11.0
103585 -27	C-1 DP2-033121w
103585 -28	C-1 DP7-4.0
103585 -29	C-1 DP7-9.0
103585 -30	C-1 DP12-3.0
103585 -31	C-1 DP12-8.0
103585 -32	C-1 DP6-3.0
103585 -33	C-1 DP6-6.0
103585 -34	Trip Blank 1
103585 -35	Trip Blank 2

CASE NARRATIVE (continued)

Laboratory ID	GeoEngineers
103585 -36	Trip Blank 3
103585 -37	Trip Blank 4
103585 -38	Trip Blank 5

Sample C-1 DP1-11.0 was sent to Fremont Analytical for hexavalent chromium analysis. The report is enclosed.

103585

SAMPLE CHAIN OF CUSTODY

ME 03-31-21

BI4/E03/VS2/VW5

Page # 1 of 4

Report To Jacob Letts

Company GEI

Address 2101 4th Ave Suite 950

City, State, ZIP Seattle, WA 98121

Phone ______ Email Jletts@geoengineers.com

SAMPLERS (signature)

PROJECT NAME
Snohomish County Airport C1 Hangar

PO #
5530-014-01

REMARKS
*If Gx detected, ask PM if he wants to quantify to mineral spirits.

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH______
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other______
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	(RCRA 8) Metals	(RCRA8) Total metals	(RCRA8) Dissolved metals		Notes
C-1 DP4-3.5	01A-F	3/30/21	1000	S	6	X	X			X		X	X				
C-1 DP4-5.0	02		1005	S	6	X	X			X		X	X				
C-1 DP4-7.0	03		1010	S	6	X	X			X		X	X				
C-1 DP3-4.0	04		1040	S	6	X	X			X		X	X				
C-1 DP3-7.0	05		1050	S	6	X	X			X		X	X				
C-1 DP3-033021w	06A-J		1140	gw	10	X	X			X		X		X	X		
C-1 DP5-3.0	07A-F		1150	S	6	X	X			X		X	X				
C-1 DP5-6.0	08		~~1340~~ 1200	S	6	X	X			X		X	X				
C-1 DP15-4.0	09		1340	S	6	X	X			X		X	X				
C-1 DP15-7.0	10		1350	S	6	X	X			X		X	X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	3/31/21	16:30
Received by: ME	Khoi Hoang	FBI	3/31/21	16:30
Relinquished by:				
Received by:				

Samples received at 4 °C

103585 [redacted]

SAMPLE CHAIN OF CUSTODY

ME 03-31-21 [redacted] BI4/E03/VS2/VW5

Page # 21 of 4

Report To

Company

Address

City, State, ZIP

Phone Email

See pg 1

SAMPLERS (*signature*)

PROJECT NAME

PO # S530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	metals	Total metals	Diss. metals		Notes
C-1 DP14-5.0	11 A-F	3/30/21	1430	S	6	X	X			X		X	X				
C-1 DP14-10.0	12		1440	S	6	X	X			X		X	X				4 extra VOA's 4/1
C-1 DP13-2.0	13		1500	S	6	X	X			X		X	X				labels C-1 DP13-2.5
C-1 DP13-5.0	14		1520	S	6	X	X			X		X	X				
C-1 DP13-033121w	15 A-J	3/31/21	800	gw	10	X	X			X		X		X	X		time on bottle wrong
C-1 DP14-033121w	16		820	gw	10	X	X			X		X		X	X		
C-1 DP8-4.5	17 A-F		900	S	6	X	X			X		X	X				
C-1 DP8-9.0	18		910	S	6	X	X			X		X	X				
C-1 DP9-3.0	19		920	S	6	X	X			X		X	X				
C-1 DP9-7.5	20		930	S	6	X	X			X		X	X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Ataktuk	GEI	3/31/21	16:30
Received by:	Khoi Hoang	FBI	3/31/21	16:30
Relinquished by:				
Received by:		Samples received at 4 °C		

103585

SAMPLE CHAIN OF CUSTODY

03-31-21 BE4/E03/VS2/VWS

ME

Page # 3 of 4

Report To

Company See pg 1

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME

PO # 5530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	RCRA8 metals	Total metals	Diss. metals	Hex Chrome	Notes
C-1 DP10-4.0	21A-F	3/31/21	1000	S	6	X	X			X		X	X				● -per JL 4/27/21 ME
C-1 DP11-4.0	22		1030	S	6	X	X			X		X	X				
C-1 DP2-5.0	23		1100	S	6	X	X			X		X	X				
C-1 DP2-11.0	24		1126	S	6	X	X			X		X	X				
C-1 DP1-3.5	25		1200	S	6	X	X			X		X	X				
C-1 DP1-11.0	26		1220	S	6	X	X			X		X	X			●	
C-1 DP2-033121w	27A-J		1300	gw	10	X	X			X		X		X	X		
C-1 DP7-4.0	28A-F		1300	S	6	X	X			X		X	X				
C-1 DP7-9.0	29		1320	S	6	X	X			X		X	X				
C-1 DP12-3.0	30		1340	S	6	X	X			X		X	X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	3/31/21	16:30
Received by:	Khoi Hoang	FBE	3/31/21	16:30
Relinquished by:				
Received by:		Samples received at 4 °C		

103585

SAMPLE CHAIN OF CUSTODY ME 03-31-21 BI4/E03/VS2/ VWS

Page # 4 of 4

Report To
Company
Address Seep
City, State, ZIP
Phone Email

SAMPLERS (*signature*)

PROJECT NAME 1

PO # 05530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	metals (RCRA 8)				Notes
C1 DP12-8.0	31A-F	3/31/21	1400	S	6	X	X			X		X	X				⊗ per KA 4/1/21 ME
C-1 DPG-3.0	32A-F	03/30/21	1220	soil	5	⊗	⊗			⊗		⊗	⊗				
C-1 DPG-4.0	33	03/30/21	1230	soil	5	⊗	⊗			⊗		⊗	⊗				FB 4/1
Trip Blank 1	34 A-B			water	2					⊗							
Trip Blank 2	35																
Trip Blank 3	36																
Trip Blank 4	37																
Trip Blank 5	38																

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Ataktuk	GEI	3/31/21	1630
Received by:	Khoi Hoang	FBI	3/31/21	16:30
Relinquished by:				
Received by:		Samples received at 4 °C		

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 103585
Work Order Number: 2104392

May 05, 2021

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 4/28/2021 for the analyses presented in the following report.

Hexavalent Chromium by EPA Method 7196
Sample Moisture (Percent Moisture)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original

CLIENT: Friedman & Bruya
Project: 103585
Work Order: 2104392

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2104392-001	C-1 DP1-11.0	03/31/2021 12:20 PM	04/28/2021 1:28 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2104392**
Date: **5/5/2021**

CLIENT: Friedman & Bruya
Project: 103585

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2104392**
Date Reported: **5/5/2021**

Client: Friedman & Bruya
Collection Date: 3/31/2021 12:20:00 PM
Project: 103585
Lab ID: 2104392-001
Matrix: Soil
Client Sample ID: C-1 DP1-11.0

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Sample Moisture (Percent Moisture)				Batch ID: R66978		Analyst: CJ
Percent Moisture	10.0	0.500		wt%	1	5/4/2021 9:17:29 AM
Hexavalent Chromium by EPA Method 7196				Batch ID: 32196		Analyst: LB
Chromium, Hexavalent	ND	0.555	H	mg/Kg-dry	1	5/5/2021 12:53:00 PM

Work Order: 2104392
CLIENT: Friedman & Bruya
Project: 103585

QC SUMMARY REPORT

Hexavalent Chromium by EPA Method 7196

Sample ID: **MB-32196** SampType: **MBLK** Units: **mg/Kg** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **MBLKS** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350324**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.500									

Sample ID: **LCS-32196** SampType: **LCS** Units: **mg/Kg** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **LCSS** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350325**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.19	0.500	2.500	0	87.6	86.5	114				

Sample ID: **2104305-001ADUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **BATCH** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350327**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	ND	0.532						0		30	

Sample ID: **2104305-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **BATCH** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350328**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.53	0.522	2.611	0	96.9	6.79	138				

Sample ID: **2104305-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **5/5/2021** RunNo: **67034**
Client ID: **BATCH** Batch ID: **32196** Analysis Date: **5/5/2021** SeqNo: **1350329**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium, Hexavalent	2.57	0.536	2.679	0	95.9	6.79	138	2.531	1.52	30	

Fremont Analytical

Sample Log-In Check List

Client Name: **FB**
Work Order Number: **2104392**
Logged by: **Carissa True**
Date Received: **4/28/2021 1:28:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? FedEx

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☑
6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☑ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☐ No ☑

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:
Date:
By Whom:
Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	3.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2104392

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO. 103585

PO # B-238

REMARKS

Please Email Results EQUIS EDD

TURNAROUND TIME

☒ Standard TAT
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	Dioxins/Furans	EPH	VPH	Hex Chrome							Notes
C-1 DP1-11.0		3/31/21	1220	Soil	1				X							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Michael Erdahl	Friedman & Bruya	4/28/21	0800 AM
Received by: Clair Anderson	Claire Anderson	FAI	4/29/21	1328
Relinquished by:				
Received by:				

APPENDIX C

Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geosciences practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of Snohomish County Airport, their authorized agents and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except the Snohomish County Airport should rely on this report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report Is Based on a Unique Set of Project-Specific Factors

This report applies to the C-1 Hangar and C-1 Building located at 3220 100th Street SW in Everett, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

---

[1] Developed based on material provided by ASFE, The GeoProfessional Association; www.asfe.org.

Reliance Conditions for Third Parties

No third party may rely on the product of our services unless GeoEngineers agrees in advance, and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Environmental Regulations Are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Subsurface Conditions Can Change

This report is based on conditions that existed at the time our site studies were performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes and slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

Do Not Redraw the Exploration Logs

Environmental scientists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in an environmental report should never be redrawn for inclusion in other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Geotechnical, Geologic and Environmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on Site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject Site to another location or its reuse on site in instances that we were not aware of or could not control.

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GeoEngineers

APPENDIX B

2021 Phase II ESA and 2022 Supplemental Investigation Boring Logs

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	○	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
			○	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
			▨	GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	░	SW	WELL-GRADED SANDS, GRAVELLY SANDS
			░	SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	▥	SM	SILTY SANDS, SAND - SILT MIXTURES
			▨	SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	◫	ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
			▨	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			▥	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	▮	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
			▩	CH	INORGANIC CLAYS OF HIGH PLASTICITY
			▨	OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			〰	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
■	AC	Asphalt Concrete
▨	CC	Cement Concrete
▩	CR	Crushed Rock/ Quarry Spalls
⁂	SOD	Sod/Forest Duff
░	TS	Topsoil

Groundwater Contact

▼	**Measured groundwater level in exploration, well, or piezometer**
▼	**Measured free product in well or piezometer**

Graphic Log Contact

—	**Distinct contact between soil strata**
/	**Approximate contact between soil strata**

Material Description Contact

—	**Contact between geologic units**
– – – –	**Contact between soil of the same geologic unit**

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point lead test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

Sampler Symbol Descriptions

◫	**2.4-inch I.D. split barrel / Dames & Moore (D&M)**
☒	**Standard Penetration Test (SPT)**
■	**Shelby tube**
☰	**Piston**
◧	**Direct-Push**
◫	**Bulk or grab**
▥	**Continuous Coring**

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

GEOENGINEERS

Figure A-1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 15	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
Drilling Method	Direct-Push				
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	
Notes:					

		FIELD DATA									
Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36				CC	Approximately 8 inches of portland concrete cement			
							SP-SM	Brown fine to coarse sand with silt and occasional gravel (loose, moist) (fill)			
						C-1 DP1-3.5			SS	3.1	
	5		60								
							SM	Dark gray silty sand with occasional gravel (medium dense, moist) (native)			
									SS	3.5	
	10		60								
						C-1 DP1-11			MS	8.9	
								Becomes dry			
									NS	<1	
	15										

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-1

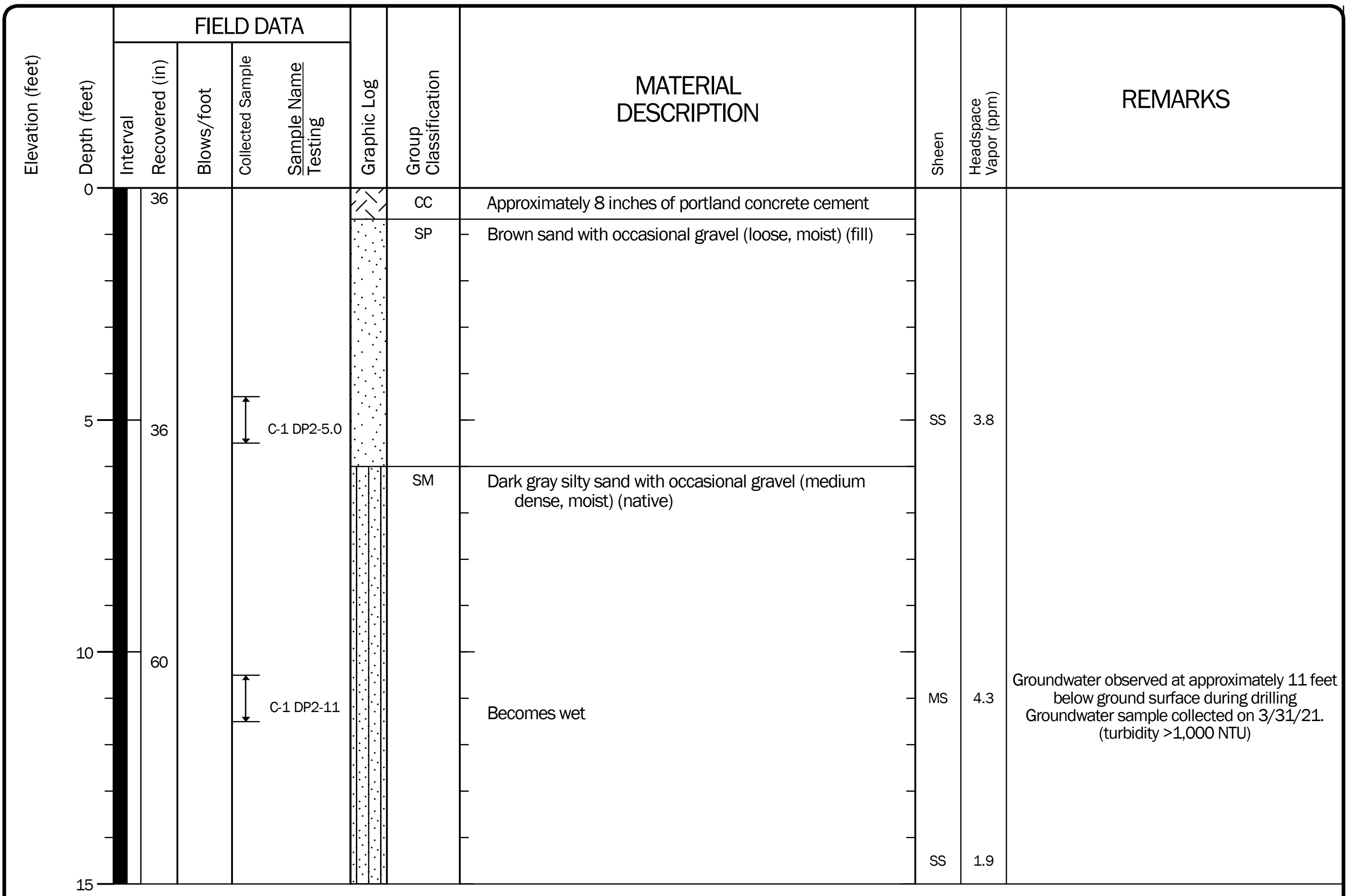
GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-2
Sheet 1 of 1

Date:6/22/22 Path:P:\5\5530014\GINT\553001401.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 3/31/2021 End 3/31/2021
Total Depth (ft) 15
Logged By KRA
Checked By
Driller Holocene Drilling, Inc.
Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum Undetermined
Hammer Data N/A
Drilling Equipment Geoprobe (7822DT)
Easting (X)
Northing (Y)
System Datum
See "Remarks" section for groundwater observed
Notes:



Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36					CC	Approximately 8 inches of portland concrete cement			
								SP	Brown sand with occasional gravel (loose, moist) (fill)			
	5		36			C-1 DP2-5.0				SS	3.8	
								SM	Dark gray silty sand with occasional gravel (medium dense, moist) (native)			
	10		60									
						C-1 DP2-11			Becomes wet	MS	4.3	Groundwater observed at approximately 11 feet below ground surface during drilling Groundwater sample collected on 3/31/21. (turbidity >1,000 NTU)
										SS	1.9	
	15											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-2

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-3
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 10	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		See "Remarks" section for groundwater observed	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36					AC	Approximately 3 inches of asphalt concrete pavement			
								SP-SM	Dark brown sand with silt (loose, dry) (fill)			
								SP	Light brown sand with gravel (loose, wet) (fill)			Groundwater observed at approximately 4 feet below ground surface during drilling Groundwater sample collected on 3/30/21. (turbidity >100 NTU)
			60			C-1 DP3-4.0				MS	<1	
	5											
									Becomes medium dense			
						C-1 DP3-7.0		SM	Gray silty sand with occasional gravel (dense, moist) (native)	MS	1084	
										NS	<1	
	10											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-3

GeoEngineers

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-4
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft)	7	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							AC	Approximately 4 inches of asphalt concrete pavement			
								SP-SM	Gray sand with silt and gravel (loose, dry) (fill?)			
						C-1 DP4-3.5				SS	<1	
								SP-SM	Brown sand with silt and gravel (loose, dry) (fill?)			
	5					C-1 DP4-5.0		SP	Gray-brown sand with silt (medium dense, moist) (fill?)	MS	3.7	
						C-1 DP4-7.0		SM	Dark gray silty sand with gravel (dense, moist) (native)	NS	<1	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-4

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-5
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 8	Logged By KRA Checked By	Driller Holocene Drilling, Inc.
Drilling Method	Direct-Push				

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: N/A	Drilling Equipment: Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					SP	Light brown fine to coarse sand (loose, dry) (fill)	NS	<1	
						C-1 DP5-3.0		SP-SM	Gray sand with silt (medium dense, moist) (native?)	NS	<1	
	5		36									
						C-1 DP5-6.0				NS	<1	
								SM	Gray silty sand with occasional gravel (dense, moist) (native)	NS	<1	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-5

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-6
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 9	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined		Hammer Data N/A		Drilling Equipment Geoprobe (7822DT)
Easting (X) Northing (Y)			System Datum		Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 12 inches of portland concrete cement			
								SP-SM	Brown sand with silt and occasional subrounded gravel (loose, dry) (fill)			
						C-1 DP6-3.0				NS	<1	
										NS	<1	
	5		48					SP-SM	Gray sand with silt and occasional angular gravel (medium dense, dry) (native)			
						C-1 DP6-6.0				NS	<1	
										NS	<1	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-6

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-7
Sheet 1 of 1

Date:6/22/22 Path:P:\5\5530014\GINT\553001401.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled — Start: 3/31/2021 — End: 3/31/2021	Total Depth (ft): 9	Logged By: KRA Checked By	Driller: Holocene Drilling, Inc.	Drilling Method: Direct-Push
Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: N/A		Drilling Equipment: Geoprobe (7822DT)	
Easting (X) Northing (Y)	System Datum		Groundwater not observed at time of exploration	
Notes:				

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 8 inches of portland concrete cement			
								SP	Brown fine to coarse sand with mottled red stain with occasional gravel (loose, moist) (fill)			
						C-1 DP7-4.0		SP-SM	Dark gray-brown sand with silt and occasional gravel (loose to medium dense, moist) (native?)	SS	3.0	
	5		48									
						C-1 DP7-9.0			Becomes medium dense	SS	4.6	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-7

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-8
Sheet 1 of 1

Drilled Start 3/31/2021 End 3/31/2021	Total Depth (ft) 9	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum: Undetermined		Hammer Data: N/A		Drilling Equipment: Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration
Notes:				

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 8 inches of portland concrete cement			
								SP	Brown fine to coarse sand with occasional rounded gravel (loose, dry) (fill)	NS	1.0	
								SP-SM	Brown fine to coarse sand with silt and occasional gravel (loose, dry) (fill?)			
						C-1 DP8-4.5				NS	1.9	
	5		48									
								SP-SM	Dark brown fine to coarse sand with silt and occasional gravel (medium dense, moist) (fill?)	SS	4.9	
						C-1 DP8-9.0						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-8

GeoEngineers

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-9
Sheet 1 of 1

Drilled Start 3/31/2021 End 3/31/2021	Total Depth (ft) 10	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A		Drilling Equipment Geoprobe (7822DT)	
Easting (X) Northing (Y)	System Datum		Groundwater not observed at time of exploration	
Notes:				

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 8 inches of portland concrete cement			
								SP	Light brown sand with occasional gravel (loose, dry) (fill)			
						C-1 DP9-3.0				NS	3.4	
	5		60					SP-SM	Brown fine to coarse sand with silt and occasional gravel (loose, moist) (fill?)			
						C-1 DP9-7.5				SS	4.8	
								SM	Dark gray silty fine to coarse sand with occasional gravel (medium dense, moist) (native)			
										SS	<1	
	10											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-9

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-10
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 4	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A	Drilling Equipment Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		48					CC	Approximately 6 inches of portland concrete cement			
								SP-SM	Brown fine to coarse sand with silt and occasional gravel (medium dense, dry) (fill)	SS	4.0	
						C-1 DP10-4.0		SM	Dark gray silty fine to coarse sand with occasional gravel (medium dense, dry) (native)	SS	3.7	

Boring terminated at approximately 4 feet below ground surface due to refusal on hard ground

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-10

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-11
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 4	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A	Drilling Equipment Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration
Notes:		

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							CC	Portland concrete cement			
								SP-SM	Brown sand with silt (loose, dry) (fill)	NS	1.3	
								SP-SM	Brown sand with silt and occasional gravel (medium dense, moist) (fill)			
						C-1 DP11-4.0				SS	2.6	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-11

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-12
Sheet 1 of 1

Drilled	Start 3/31/2021	End 3/31/2021	Total Depth (ft) 9.5	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					AC	Approximately 8 inches of asphalt concrete pavement			
								SP	Brown sand with occasional gravel (loose, dry) (fill)	NS	1.7	
								SP-SM	Brown with mottled red coloring fine to coarse sand with silt and occasional gravel (medium dense, moist) (fill)			
						C-1 DP12-3.0				SS	2.2	
	5		54									
						C-1 DP12-8.0				SS	1.1	
								SM	Dark gray silty sand with occasional gravel (medium dense, moist) (native)	NS	1.0	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-12

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-13
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 10	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push

Surface Elevation (ft) Vertical Datum Undetermined	Hammer Data N/A	Drilling Equipment Geoprobe (7822DT)
Easting (X) Northing (Y)	System Datum	See "Remarks" section for groundwater observed

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		42					AC	Approximately 6 inches of asphalt concrete pavement			
								SP	Brown sand with occasional gravel (loose, dry) (fill)			
						C-1 DP13-2.0				SS	2.5	
	5		60			C-1 DP13-5.0			Becomes wet	SS	2.3	Groundwater observed at approximately 4 feet below ground surface during drilling Groundwater sample collected on 3/31/21. (turbidity >1,000 NTU)
									Becomes medium dense	NS	<1	
									Gray silty sand (dense, moist) (native)	NS	<1	
	10											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-13

GEOENGINEERS

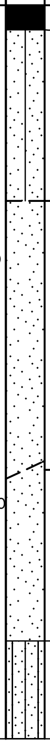
Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-14
Sheet 1 of 1

Date:6/22/22 Path:P:\5\5530014\GINT\553001401.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 3/30/2021 End 3/30/2021	Total Depth (ft) 15	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: N/A		Drilling Equipment: Geoprobe (7822DT)	
Easting (X) Northing (Y)	System Datum		See "Remarks" section for groundwater observed	
Notes:				

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36					AC	Approximately 6 inches of asphalt concrete pavement			
								SP-SM	Dark brown fine to coarse sand with silt (loose, moist) (fill)			
								SP	Gray sand with occasional gravel (loose, moist) (fill?)			
	5		60			C-1 DP14-5.0				SS	<1	
								SP	Brown sand with gravel (loose, wet) (fill?)			
	10		60			C-1 DP14-10.0				MS	2.3	Groundwater observed at approximately 10 feet below ground surface during drilling Groundwater sample collected on 3/31/21. (turbidity >1,000 NTU)
								SM	Dark gray silt with sand (dense, moist) (native)			
										NS	<1	
	15											



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-14

GeoEngineers

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-15
Sheet 1 of 1

Drilled	Start 3/30/2021	End 3/30/2021	Total Depth (ft) 7	Logged By KRA Checked By	Driller Holocene Drilling, Inc.	Drilling Method Direct-Push
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	N/A	Drilling Equipment	Geoprobe (7822DT)
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA Interval	FIELD DATA Recovered (in)	FIELD DATA Blows/foot	FIELD DATA Collected Sample	FIELD DATA Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		60					CC	Approximately 6 inches of portland concrete cement			
								SP-SM	Brown silt with fine to coarse sand and occasional gravel (medium dense, moist) (fill)			
						C-1 DP15-4.0				MS	218	
	5		24									
						C-1 DP15-7.0				SS	1.9	

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 DP-15

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-16
Sheet 1 of 1

Drilled	Start 4/4/2022	End 4/4/2022	Total Depth (ft) 24	Logged By KRA Checked By	Driller Holt Drilling	Drilling Method Hollow-stem Auger
Surface Elevation (ft) Vertical Datum	Undetermined	Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Truck-mounted
Easting (X) Northing (Y)		System Datum		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	 Recovered (in)	 Blows/foot	 Collected Sample	 Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							AC	Asphalt concrete pavement			
								GP	Gravel			
								SP-SM	Dark brown sand with silt (loose, dry) (fill)			
		☒	6	50/6"						SS	<1	
								SP	Brown sand with occasional gravel (loose, dry) (native)			
	5					C-1 HSA1-5						
								SM	Gray silty sand with occasional gravel (medium dense, dry)			
		☒	6	50/6"						NS	<1	
	10					C-1 HSA1-10						
		☒	12	50/3"					Becomes loose, moist	NS	<1	
	15					C-1 HSA1-15						
		☒	6	50/6"						NS	<1	
	20					C-1 HSA1-20						
		☒	6	50/6"					Becomes medium dense	NS	<1	
						C-1 HSA1-25						

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 HSA-1

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-17
Sheet 1 of 1

Drilled	Start 4/4/2022	End 4/4/2022	Total Depth (ft) 25	Logged By KRA Checked By	Driller Holt Drilling	Drilling Method Hollow-stem Auger

Surface Elevation (ft) Vertical Datum: Undetermined	Hammer Data: Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment: Truck-mounted
Easting (X) Northing (Y)	System Datum	Groundwater not observed at time of exploration

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							AC	Asphalt concrete pavement			
								SP-SM	Light brown sand with silt (medium dense, moist) (fill)			
		☒	18	62		C-1 HSA2-4				NS	<1	
								SP-SM	Brown sand with silt and gravel (loose, moist) (native)			
	5											
		☒	12	74		C-1 HSA2-10			Becomes dry	SS	<1	
	10											
								SM	Gray silty sand with occasional gravel (medium dense, moist)			
		☒	6	55		C-1 HSA2-15				NS	<1	
	15											
		☒	6	53		C-1 HSA2-20				NS	<1	
	20											
		☒	6	53		C-1 HSA2-25				NS	<1	
	25											

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring C-1 HSA-2

GeoEngineers

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-18
Sheet 1 of 1

Drilled	Start 4/4/2022	End 4/4/2022	Total Depth (ft) 16.5	Logged By KRA Checked By	Driller Holt Drilling	Drilling Method Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Truck-mounted
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)	
Easting (X) Northing (Y)		Horizontal Datum	

A 2-in well was installed on 4/5/2022 to a depth of 15 ft and designated C-1-MW1.

Groundwater

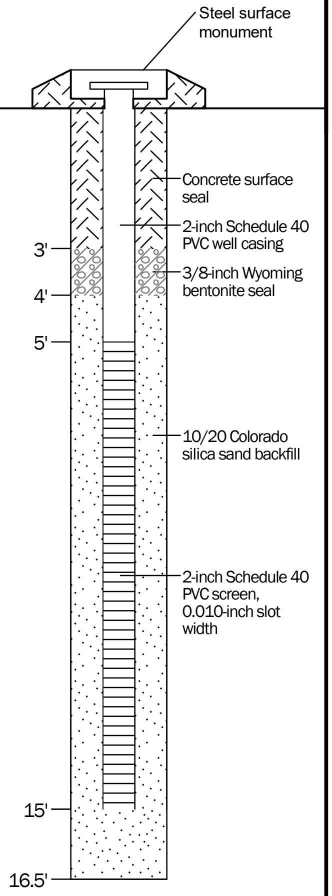
Date Measured	Depth to Water (ft)	Elevation (ft)
4/21/2022	12.04	

Notes:

FIELD DATA

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								AC	Asphalt concrete pavement		
									SP	Brown sand with occasional gravel (loose, moist) (fill)		
		☒	6	50/6"							NS	<1
	5					C-1 HSA3-5						
									SM	Gray silty sand with gravel (medium dense, moist) (native)		
		☒	18	54							NS	<1
	10					C-1 HSA3-10						
							▼					
		☒	12	52							NS	<1
	15					C-1 HSA3-15						
									RX	Refusal due to rock		

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well C-1 HSA-3

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-19
Sheet 1 of 1

Drilled	Start 4/4/2022	End 4/4/2022	Total Depth (ft) 20	Logged By KRA Checked By	Driller Holt Drilling	Drilling Method Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Truck-mounted	A 2-in well was installed on 4/5/2022 to a depth of 15 ft and designated C-1-MW2.
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)		
Easting (X) Northing (Y)		Horizontal Datum		

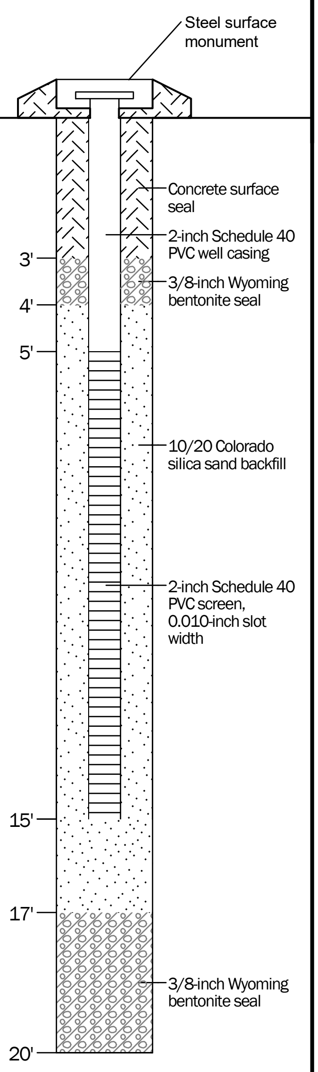
Groundwater

Date Measured	Depth to Water (ft)	Elevation (ft)
4/21/2022	4.32	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								AC	Asphalt concrete pavement		
									SP	Brown sand with gravel (loose, moist) (fill)		
		☒	12	3							SS	<1
							▼		SM	Gray-blue silty sand (loose, wet) (native)		
	5					C-1 HSA4-5						
									SP-SM	Gray-blue sand with silt (loose, wet)		
		☒	12	5							MS	<1
	10					C-1 HSA4-10						
		☒	9							Becomes brown, medium dense, moist to wet	MS	1.5
	15					C-1 HSA4-15						
									SM	Gray silty sand (medium dense, moist)		
		☒	6								SS	<1
	20					C-1 HSA4-20						

WELL LOG



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well C-1 HSA-4

GEOENGINEERS

Project: Snohomish County - C-1 Building and Hangar Phase II ESA
Project Location: Snohomish County, Washington
Project Number: 5530-014-01

Figure A-20
Sheet 1 of 1

APPENDIX C

2022 Supplemental Investigation Chemical Analytical Reports

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
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April 14, 2022

Jacob Letts, Project Manager
GeoEngineers
2101 4th Avenue, Suite 150
Seattle, WA 98121

Dear Mr Letts:

Included are the results from the testing of material submitted on April 5, 2022 from the C-1 Hangar Property 5530-014-01, F&BI 204056 project. There are 30 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Katy Atakturk
GNR0414R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 5, 2022 by Friedman & Bruya, Inc. from the GeoEngineers C-1 Hangar Property 5530-014-01, F&BI 204056 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	GeoEngineers
204056 -01	C-1 HSA1-5
204056 -02	C-1 HSA1-10
204056 -03	C-1 HSA1-15
204056 -04	C-1 HSA1-20
204056 -05	C-1 HSA1-25
204056 -06	C-1 HSA2-4
204056 -07	C-1 HSA2-10
204056 -08	C-1 HSA2-15
204056 -09	C-1 HSA2-20
204056 -10	C-1 HSA2-25
204056 -11	C-1 HSA3-5
204056 -12	C-1 HSA3-10
204056 -13	C-1 HSA3-15
204056 -14	C-1 HSA4-5
204056 -15	C-1 HSA4-10
204056 -16	C-1 HSA4-15
204056 -17	C-1 HSA4-20
204056 -18	TB-040522

Stoddard Solvent by NWTPH-Gx (soil)

All quality control requirements were acceptable.

Diesel and Motor Oil by NWTPH-Dx (soil)

All quality control requirements were acceptable.

VOCs by 8260D (soil)

Several 8260D compounds exceeded the acceptance criteria in the matrix spike sample. The compounds were not detected, therefore the data were acceptable. All other quality control requirements were acceptable.

VOCs by 8260D (water)

The 8260D calibration standard failed the acceptance criteria for bromomethane and chloroethane. The data were flagged accordingly. All other quality control requirements were acceptable.

Total Metals by 6020B (soil)

Selenium in the 6020B matrix spike and matrix spike duplicate failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect. All other quality control requirements were acceptable.

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056
Date Extracted: 04/06/22
Date Analyzed: 04/06/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
C-1 HSA1-5 204056-01	<50	<250	94
C-1 HSA1-15 204056-03	<50	<250	95
C-1 HSA2-4 204056-06	<50	<250	95
C-1 HSA2-10 204056-07	<50	<250	95
C-1 HSA3-5 204056-11	<50	<250	95
C-1 HSA3-10 204056-12	<50	<250	94
C-1 HSA4-5 204056-14	<50	<250	107
C-1 HSA4-10 204056-15	<50	<250	94
C-1 HSA4-15 204056-16	<50	<250	95
C-1 HSA4-20 204056-17	<50	<250	94
Method Blank 02-849 MB	<50	<250	105

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056
Date Extracted: 04/07/22
Date Analyzed: 04/07/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS STODDARD SOLVENT USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Stoddard Solvent Range (C_8-C_{11})	Surrogate (% Recovery) (Limit 50-150)
C-1 HSA1-5 204056-01	<5	86
C-1 HSA1-15 204056-03	<5	74
C-1 HSA2-4 204056-06	<5	88
C-1 HSA2-10 204056-07	<5	82
C-1 HSA3-5 204056-11	<5	80
C-1 HSA3-10 204056-12	<5	57
C-1 HSA4-5 204056-14	<5	85
C-1 HSA4-10 204056-15	<5	81
C-1 HSA4-15 204056-16	<5	77
C-1 HSA4-20 204056-17	<5	82
Method Blank 02-816 MB	<5	84

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 HSA1-5	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/06/22	Lab ID:	204056-01
Date Analyzed:	04/06/22	Data File:	204056-01.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.70
Barium	46.2
Cadmium	<1
Chromium	15.9
Lead	1.59
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 HSA1-15	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/06/22	Lab ID:	204056-03
Date Analyzed:	04/06/22	Data File:	204056-03.112
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.14
Barium	48.5
Cadmium	<1
Chromium	22.3
Lead	2.26
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 HSA2-4	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/06/22	Lab ID:	204056-06
Date Analyzed:	04/06/22	Data File:	204056-06.113
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.36
Barium	43.5
Cadmium	<1
Chromium	19.4
Lead	2.03
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 HSA4-5	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/06/22	Lab ID:	204056-14
Date Analyzed:	04/06/22	Data File:	204056-14.114
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.13
Barium	52.3
Cadmium	<1
Chromium	18.2
Lead	1.90
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/06/22	Lab ID:	I2-266 mb2
Date Analyzed:	04/06/22	Data File:	I2-266 mb2.107
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA1-5	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-01 1/0.25
Date Analyzed:	04/12/22	Data File:	041229.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	84	118
Toluene-d8	102	86	117
4-Bromofluorobenzene	95	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA1-15	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-03 1/0.25
Date Analyzed:	04/12/22	Data File:	041230.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	84	118
Toluene-d8	89	86	117
4-Bromofluorobenzene	101	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA2-4	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-06 1/0.25
Date Analyzed:	04/12/22	Data File:	041231.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	88	84	118
Toluene-d8	88	86	117
4-Bromofluorobenzene	102	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA2-10	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-07 1/0.25
Date Analyzed:	04/12/22	Data File:	041232.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	84	118
Toluene-d8	94	86	117
4-Bromofluorobenzene	101	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	0.0026	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA2-15	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-08 1/0.25
Date Analyzed:	04/12/22	Data File:	041233.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	84	118
Toluene-d8	90	86	117
4-Bromofluorobenzene	98	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	0.029	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA3-5	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-11 1/0.25
Date Analyzed:	04/12/22	Data File:	041234.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	84	118
Toluene-d8	99	86	117
4-Bromofluorobenzene	98	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA3-10	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-12 1/0.25
Date Analyzed:	04/12/22	Data File:	041235.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	84	118
Toluene-d8	98	86	117
4-Bromofluorobenzene	96	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA4-5	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-14 1/0.25
Date Analyzed:	04/12/22	Data File:	041236.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	84	118
Toluene-d8	102	86	117
4-Bromofluorobenzene	99	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA4-10	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-15 1/0.25
Date Analyzed:	04/12/22	Data File:	041237.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	89	84	118
Toluene-d8	94	86	117
4-Bromofluorobenzene	99	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA4-15	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-16 1/0.25
Date Analyzed:	04/12/22	Data File:	041238.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	84	118
Toluene-d8	103	86	117
4-Bromofluorobenzene	102	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	0.0014	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	0.0022	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	C-1 HSA4-20	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	204056-17 1/0.25
Date Analyzed:	04/12/22	Data File:	041239.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	84	118
Toluene-d8	103	86	117
4-Bromofluorobenzene	95	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	0.0053
Hexane	<0.25	o-Xylene	0.0011
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	0.0029	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	0.018	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	0.067	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	0.0032	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition LL

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/12/22	Lab ID:	02-802 mb 1/0.25
Date Analyzed:	04/12/22	Data File:	041218.D
Matrix:	Soil	Instrument:	GCMS13
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	84	118
Toluene-d8	96	86	117
4-Bromofluorobenzene	101	90	112

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.001
Vinyl chloride	<0.001	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.005
Chloroethane	<0.1	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.001
Acetone	<5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.001	m,p-Xylene	<0.002
Hexane	<0.25	o-Xylene	<0.001
Methylene chloride	<0.2	Styrene	<0.05
Methyl t-butyl ether (MTBE)	<0.001	Isopropylbenzene	<0.05
trans-1,2-Dichloroethene	<0.002	Bromoform	<0.05
1,1-Dichloroethane	<0.002	n-Propylbenzene	<0.05
2,2-Dichloropropane	<0.05	Bromobenzene	<0.05
cis-1,2-Dichloroethene	<0.001	1,3,5-Trimethylbenzene	<0.05
Chloroform	<0.05	1,1,2,2-Tetrachloroethane	<0.05
2-Butanone (MEK)	<1	1,2,3-Trichloropropane	<0.05
1,2-Dichloroethane (EDC)	<0.002	2-Chlorotoluene	<0.05
1,1,1-Trichloroethane	<0.002	4-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	tert-Butylbenzene	<0.05
Carbon tetrachloride	<0.05	1,2,4-Trimethylbenzene	<0.05
Benzene	<0.001	sec-Butylbenzene	<0.05
Trichloroethene	<0.001	p-Isopropyltoluene	<0.05
1,2-Dichloropropane	<0.05	1,3-Dichlorobenzene	<0.05
Bromodichloromethane	<0.05	1,4-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,2-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<1	1,2-Dibromo-3-chloropropane	<0.5
cis-1,3-Dichloropropene	<0.05	1,2,4-Trichlorobenzene	<0.25
Toluene	<0.001	Hexachlorobutadiene	<0.25
trans-1,3-Dichloropropene	<0.05	Naphthalene	<0.005
1,1,2-Trichloroethane	<0.05	1,2,3-Trichlorobenzene	<0.25
2-Hexanone	<0.5		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	TB-040522	Client:	GeoEngineers
Date Received:	04/05/22	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/07/22	Lab ID:	204056-18
Date Analyzed:	04/13/22	Data File:	041315.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	85	117
Toluene-d8	98	88	112
4-Bromofluorobenzene	100	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5 ca	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1 ca	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	5530-014-01, F&BI 204056
Date Extracted:	04/13/22	Lab ID:	02-807 mb
Date Analyzed:	04/13/22	Data File:	041307.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	85	117
Toluene-d8	97	88	112
4-Bromofluorobenzene	103	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5 ca	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1 ca	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 204063-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	98	98	73-135	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	98	74-139

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR STODDARD SOLVENT USING METHOD NWTPH-Gx

Laboratory Code: 204056-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Stoddard Solvent	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Stoddard Solvent	mg/kg (ppm)	10	90	70-130

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 204011-05 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	82	73 vo	75-125	12
Barium	mg/kg (ppm)	50	155	168 b	116	75-125	37 b
Cadmium	mg/kg (ppm)	10	<5	101	93	75-125	8
Chromium	mg/kg (ppm)	50	7.26	88	81	75-125	8
Lead	mg/kg (ppm)	50	19.9	97	81	75-125	18
Mercury	mg/kg (ppm	5	<5	98	93	75-125	5
Selenium	mg/kg (ppm)	5	<5	74 vo	67 vo	75-125	10
Silver	mg/kg (ppm)	10	<5	101	94	75-125	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	88	80-120
Barium	mg/kg (ppm)	50	100	80-120
Cadmium	mg/kg (ppm)	10	100	80-120
Chromium	mg/kg (ppm)	50	98	80-120
Lead	mg/kg (ppm)	50	99	80-120
Mercury	mg/kg (ppm)	10	93	80-120
Selenium	mg/kg (ppm)	5	89	80-120
Silver	mg/kg (ppm)	10	97	80-120

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 204171-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	1	<0.5	19	19	10-142	0
Chloromethane	mg/kg (ppm)	1	<0.5	60	55	10-126	9
Vinyl chloride	mg/kg (ppm)	1	<0.05	71	66	10-138	7
Bromomethane	mg/kg (ppm)	1	<0.5	74	62	10-163	18
Chloroethane	mg/kg (ppm)	1	<0.5	82	77	10-176	6
Trichlorofluoromethane	mg/kg (ppm)	1	<0.5	71	66	10-176	7
Acetone	mg/kg (ppm)	5	<5	141	118	10-163	18
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	81	75	10-160	8
Hexane	mg/kg (ppm)	1	<0.25	76	69	10-137	10
Methylene chloride	mg/kg (ppm)	1	<0.5	107	95	10-156	12
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1	<0.05	122	108	21-145	12
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	101	91	14-137	10
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	109	97	19-140	12
2,2-Dichloropropane	mg/kg (ppm)	1	<0.05	124	113	10-158	9
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	110	98	25-135	12
Chloroform	mg/kg (ppm)	1	<0.05	106	95	21-145	11
2-Butanone (MEK)	mg/kg (ppm)	5	<1	128	112	19-147	13
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	112	99	12-160	12
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	104	98	10-156	6
1,1-Dichloropropene	mg/kg (ppm)	1	<0.05	109	99	17-140	10
Carbon tetrachloride	mg/kg (ppm)	1	<0.05	100	91	9-164	9
Benzene	mg/kg (ppm)	1	<0.03	109	96	29-129	13
Trichloroethene	mg/kg (ppm)	1	<0.02	110	98	21-139	12
1,2-Dichloropropane	mg/kg (ppm)	1	<0.05	119	104	30-135	13
Bromodichloromethane	mg/kg (ppm)	1	<0.05	110	97	23-155	13
Dibromomethane	mg/kg (ppm)	1	<0.05	113	101	23-145	11
4-Methyl-2-pentanone	mg/kg (ppm)	5	<1	127	111	24-155	13
cis-1,3-Dichloropropene	mg/kg (ppm)	1	<0.05	117	101	28-144	15
Toluene	mg/kg (ppm)	1	<0.05	130	112	35-130	15
trans-1,3-Dichloropropene	mg/kg (ppm)	1	<0.05	136	118	26-149	14
1,1,2-Trichloroethane	mg/kg (ppm)	1	<0.05	136	116	10-205	16
2-Hexanone	mg/kg (ppm)	5	<0.5	155	131	15-166	17
1,3-Dichloropropane	mg/kg (ppm)	1	<0.05	136	118	31-137	14
Tetrachloroethene	mg/kg (ppm)	1	<0.025	129	112	20-133	14
Dibromochloromethane	mg/kg (ppm)	1	<0.05	115	105	28-150	9
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1	<0.05	136	117	28-142	15
Chlorobenzene	mg/kg (ppm)	1	<0.05	131 vo	114	32-129	14
Ethylbenzene	mg/kg (ppm)	1	<0.05	135	116	32-137	15
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1	<0.05	119	105	31-143	12
m,p-Xylene	mg/kg (ppm)	2	<0.1	134	117	34-136	14
o-Xylene	mg/kg (ppm)	1	<0.05	130	114	33-134	13
Styrene	mg/kg (ppm)	1	<0.05	133	115	35-137	15
Isopropylbenzene	mg/kg (ppm)	1	<0.05	135	118	31-142	13
Bromoform	mg/kg (ppm)	1	<0.05	110	96	21-156	14
n-Propylbenzene	mg/kg (ppm)	1	<0.05	145	127	23-146	13
Bromobenzene	mg/kg (ppm)	1	<0.05	139 vo	120	34-130	15
1,3,5-Trimethylbenzene	mg/kg (ppm)	1	<0.05	145	125	18-149	15
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1	<0.05	144 vo	123	28-140	16
1,2,3-Trichloropropane	mg/kg (ppm)	1	<0.05	138	121	25-144	13
2-Chlorotoluene	mg/kg (ppm)	1	<0.05	142 vo	124	31-134	14
4-Chlorotoluene	mg/kg (ppm)	1	<0.05	142 vo	123	31-136	14
tert-Butylbenzene	mg/kg (ppm)	1	<0.05	145 vo	125	30-137	15
1,2,4-Trimethylbenzene	mg/kg (ppm)	1	<0.05	143	124	10-182	14
sec-Butylbenzene	mg/kg (ppm)	1	<0.05	146 vo	126	23-145	15
p-Isopropyltoluene	mg/kg (ppm)	1	<0.05	144	125	21-149	14
1,3-Dichlorobenzene	mg/kg (ppm)	1	<0.05	136 vo	122	30-131	11
1,4-Dichlorobenzene	mg/kg (ppm)	1	<0.05	135 vo	119	29-129	13
1,2-Dichlorobenzene	mg/kg (ppm)	1	<0.05	140 vo	121	31-132	15
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1	<0.5	128	113	11-161	12
1,2,4-Trichlorobenzene	mg/kg (ppm)	1	<0.25	136	120	22-142	12
Hexachlorobutadiene	mg/kg (ppm)	1	<0.25	137	120	10-142	13
Naphthalene	mg/kg (ppm)	1	<0.05	141	122	14-157	14
1,2,3-Trichlorobenzene	mg/kg (ppm)	1	<0.25	139	118	20-144	16

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	mg/kg (ppm)	1	47	10-146
Chloromethane	mg/kg (ppm)	1	67	27-133
Vinyl chloride	mg/kg (ppm)	1	86	22-139
Bromomethane	mg/kg (ppm)	1	73	38-114
Chloroethane	mg/kg (ppm)	1	78	9-163
Trichlorofluoromethane	mg/kg (ppm)	1	78	10-196
Acetone	mg/kg (ppm)	5	107	52-141
1,1-Dichloroethene	mg/kg (ppm)	1	76	47-128
Hexane	mg/kg (ppm)	1	107	43-142
Methylene chloride	mg/kg (ppm)	1	84	10-184
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	1	98	60-123
trans-1,2-Dichloroethene	mg/kg (ppm)	1	89	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	91	68-115
2,2-Dichloropropane	mg/kg (ppm)	1	105	52-170
cis-1,2-Dichloroethene	mg/kg (ppm)	1	83	72-127
Chloroform	mg/kg (ppm)	1	78	66-120
2-Butanone (MEK)	mg/kg (ppm)	5	97	30-197
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	83	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	86	62-131
1,1-Dichloropropene	mg/kg (ppm)	1	86	69-128
Carbon tetrachloride	mg/kg (ppm)	1	85	60-139
Benzene	mg/kg (ppm)	1	82	71-118
Trichloroethene	mg/kg (ppm)	1	85	63-121
1,2-Dichloropropane	mg/kg (ppm)	1	90	72-127
Bromodichloromethane	mg/kg (ppm)	1	85	57-126
Dibromomethane	mg/kg (ppm)	1	86	62-123
4-Methyl-2-pentanone	mg/kg (ppm)	5	99	45-145
cis-1,3-Dichloropropene	mg/kg (ppm)	1	90	67-122
Toluene	mg/kg (ppm)	1	96	66-126
trans-1,3-Dichloropropene	mg/kg (ppm)	1	105	72-132
1,1,2-Trichloroethane	mg/kg (ppm)	1	99	64-115
2-Hexanone	mg/kg (ppm)	5	115	33-152
1,3-Dichloropropane	mg/kg (ppm)	1	102	72-130
Tetrachloroethene	mg/kg (ppm)	1	94	72-114
Dibromochloromethane	mg/kg (ppm)	1	92	55-121
1,2-Dibromoethane (EDB)	mg/kg (ppm)	1	104	74-132
Chlorobenzene	mg/kg (ppm)	1	95	76-111
Ethylbenzene	mg/kg (ppm)	1	97	64-123
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	1	92	64-121
m,p-Xylene	mg/kg (ppm)	2	97	78-122
o-Xylene	mg/kg (ppm)	1	96	77-124
Styrene	mg/kg (ppm)	1	96	74-126
Isopropylbenzene	mg/kg (ppm)	1	97	76-127
Bromoform	mg/kg (ppm)	1	88	56-132
n-Propylbenzene	mg/kg (ppm)	1	106	74-124
Bromobenzene	mg/kg (ppm)	1	104	72-122
1,3,5-Trimethylbenzene	mg/kg (ppm)	1	105	76-126
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	1	107	56-143
1,2,3-Trichloropropane	mg/kg (ppm)	1	106	61-137
2-Chlorotoluene	mg/kg (ppm)	1	103	74-121
4-Chlorotoluene	mg/kg (ppm)	1	104	75-122
tert-Butylbenzene	mg/kg (ppm)	1	105	73-130
1,2,4-Trimethylbenzene	mg/kg (ppm)	1	104	76-125
sec-Butylbenzene	mg/kg (ppm)	1	105	71-130
p-Isopropyltoluene	mg/kg (ppm)	1	104	70-132
1,3-Dichlorobenzene	mg/kg (ppm)	1	99	75-121
1,4-Dichlorobenzene	mg/kg (ppm)	1	99	74-117
1,2-Dichlorobenzene	mg/kg (ppm)	1	102	76-121
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	1	100	58-138
1,2,4-Trichlorobenzene	mg/kg (ppm)	1	97	64-135
Hexachlorobutadiene	mg/kg (ppm)	1	101	50-153
Naphthalene	mg/kg (ppm)	1	100	63-140
1,2,3-Trichlorobenzene	mg/kg (ppm)	1	97	63-138

Date of Report: 04/14/22
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Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 204055-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	10	<1	120	50-150
Chloromethane	ug/L (ppb)	10	<10	97	50-150
Vinyl chloride	ug/L (ppb)	10	<0.02	100	16-176
Bromomethane	ug/L (ppb)	10	<5	112	10-193
Chloroethane	ug/L (ppb)	10	<1	103	50-150
Trichlorofluoromethane	ug/L (ppb)	10	<1	98	50-150
Acetone	ug/L (ppb)	50	<50	89	15-179
1,1-Dichloroethene	ug/L (ppb)	10	<1	100	50-150
Hexane	ug/L (ppb)	10	<5	99	49-161
Methylene chloride	ug/L (ppb)	10	<5	114	40-143
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	<1	99	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	98	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	96	50-150
2,2-Dichloropropane	ug/L (ppb)	10	<1	95	10-335
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
Chloroform	ug/L (ppb)	10	<1	99	50-150
2-Butanone (MEK)	ug/L (ppb)	50	<20	98	34-168
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	94	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	98	50-150
1,1-Dichloropropene	ug/L (ppb)	10	<1	100	50-150
Carbon tetrachloride	ug/L (ppb)	10	<0.5	97	50-150
Benzene	ug/L (ppb)	10	<0.35	98	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	98	43-133
1,2-Dichloropropane	ug/L (ppb)	10	<1	93	50-150
Bromodichloromethane	ug/L (ppb)	10	<0.5	95	50-150
Dibromomethane	ug/L (ppb)	10	<1	94	50-150
4-Methyl-2-pentanone	ug/L (ppb)	50	<10	99	50-150
cis-1,3-Dichloropropene	ug/L (ppb)	10	<0.4	95	48-145
Toluene	ug/L (ppb)	10	<1	96	50-150
trans-1,3-Dichloropropene	ug/L (ppb)	10	<0.4	93	37-152
1,1,2-Trichloroethane	ug/L (ppb)	10	<0.5	99	50-150
2-Hexanone	ug/L (ppb)	50	<10	102	50-150
1,3-Dichloropropane	ug/L (ppb)	10	<1	94	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	98	50-150
Dibromochloromethane	ug/L (ppb)	10	<0.5	95	33-164
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	<1	98	50-150
Chlorobenzene	ug/L (ppb)	10	<1	102	50-150
Ethylbenzene	ug/L (ppb)	10	<1	101	50-150
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	<1	103	50-150
m,p-Xylene	ug/L (ppb)	20	<2	101	50-150
o-Xylene	ug/L (ppb)	10	<1	100	50-150
Styrene	ug/L (ppb)	10	<1	103	50-150
Isopropylbenzene	ug/L (ppb)	10	<1	103	50-150
Bromoform	ug/L (ppb)	10	<5	94	23-161
n-Propylbenzene	ug/L (ppb)	10	<1	99	50-150
Bromobenzene	ug/L (ppb)	10	<1	97	50-150
1,3,5-Trimethylbenzene	ug/L (ppb)	10	<1	100	50-150
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	<0.2	93	10-235
1,2,3-Trichloropropane	ug/L (ppb)	10	<1	96	33-151
2-Chlorotoluene	ug/L (ppb)	10	<1	99	50-150
4-Chlorotoluene	ug/L (ppb)	10	<1	99	50-150
tert-Butylbenzene	ug/L (ppb)	10	<1	97	50-150
1,2,4-Trimethylbenzene	ug/L (ppb)	10	<1	101	50-150
sec-Butylbenzene	ug/L (ppb)	10	<1	99	46-139
p-Isopropyltoluene	ug/L (ppb)	10	<1	102	46-140
1,3-Dichlorobenzene	ug/L (ppb)	10	<1	97	50-150
1,4-Dichlorobenzene	ug/L (ppb)	10	<1	99	50-150
1,2-Dichlorobenzene	ug/L (ppb)	10	<1	98	50-150
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	<10	89	50-150
1,2,4-Trichlorobenzene	ug/L (ppb)	10	<1	98	50-150
Hexachlorobutadiene	ug/L (ppb)	10	<0.5	96	42-150
Naphthalene	ug/L (ppb)	10	<1	100	50-150
1,2,3-Trichlorobenzene	ug/L (ppb)	10	<1	98	44-155

Date of Report: 04/14/22
Date Received: 04/05/22
Project: C-1 Hangar Property 5530-014-01, F&BI 204056

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	10	102	107	70-130	5
Chloromethane	ug/L (ppb)	10	92	98	70-130	6
Vinyl chloride	ug/L (ppb)	10	99	103	70-130	4
Bromomethane	ug/L (ppb)	10	105	107	28-182	2
Chloroethane	ug/L (ppb)	10	95	107	70-130	12
Trichlorofluoromethane	ug/L (ppb)	10	87	97	70-130	11
Acetone	ug/L (ppb)	50	84	96	42-155	13
1,1-Dichloroethene	ug/L (ppb)	10	91	100	70-130	9
Hexane	ug/L (ppb)	10	87	94	50-161	8
Methylene chloride	ug/L (ppb)	10	82	89	29-192	8
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	86	94	70-130	9
trans-1,2-Dichloroethene	ug/L (ppb)	10	87	94	70-130	8
1,1-Dichloroethane	ug/L (ppb)	10	86	93	70-130	8
2,2-Dichloropropane	ug/L (ppb)	10	85	88	70-130	3
cis-1,2-Dichloroethene	ug/L (ppb)	10	86	92	70-130	7
Chloroform	ug/L (ppb)	10	87	96	70-130	10
2-Butanone (MEK)	ug/L (ppb)	50	90	100	50-157	11
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	86	94	70-130	9
1,1,1-Trichloroethane	ug/L (ppb)	10	87	95	70-130	9
1,1-Dichloropropene	ug/L (ppb)	10	90	98	70-130	9
Carbon tetrachloride	ug/L (ppb)	10	84	94	70-130	11
Benzene	ug/L (ppb)	10	89	95	70-130	7
Trichloroethene	ug/L (ppb)	10	88	91	70-130	3
1,2-Dichloropropane	ug/L (ppb)	10	85	91	70-130	7
Bromodichloromethane	ug/L (ppb)	10	86	90	70-130	5
Dibromomethane	ug/L (ppb)	10	87	92	70-130	6
4-Methyl-2-pentanone	ug/L (ppb)	50	86	91	70-130	6
cis-1,3-Dichloropropene	ug/L (ppb)	10	84	86	70-130	2
Toluene	ug/L (ppb)	10	86	94	70-130	9
trans-1,3-Dichloropropene	ug/L (ppb)	10	86	92	70-130	7
1,1,2-Trichloroethane	ug/L (ppb)	10	87	96	70-130	10
2-Hexanone	ug/L (ppb)	50	95	105	69-130	10
1,3-Dichloropropane	ug/L (ppb)	10	88	96	70-130	9
Tetrachloroethene	ug/L (ppb)	10	86	95	70-130	10
Dibromochloromethane	ug/L (ppb)	10	85	90	63-142	6
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	85	95	70-130	11
Chlorobenzene	ug/L (ppb)	10	87	98	70-130	12
Ethylbenzene	ug/L (ppb)	10	88	98	70-130	11
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	85	96	70-130	12
m,p-Xylene	ug/L (ppb)	20	88	98	70-130	11
o-Xylene	ug/L (ppb)	10	87	96	70-130	10
Styrene	ug/L (ppb)	10	88	98	70-130	11
Isopropylbenzene	ug/L (ppb)	10	89	98	70-130	10
Bromoform	ug/L (ppb)	10	80	90	50-157	12
n-Propylbenzene	ug/L (ppb)	10	85	97	70-130	13
Bromobenzene	ug/L (ppb)	10	84	95	70-130	12
1,3,5-Trimethylbenzene	ug/L (ppb)	10	86	96	52-150	11
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	83	94	70-130	12
1,2,3-Trichloropropane	ug/L (ppb)	10	84	96	70-130	13
2-Chlorotoluene	ug/L (ppb)	10	85	98	70-130	14
4-Chlorotoluene	ug/L (ppb)	10	86	95	70-130	10
tert-Butylbenzene	ug/L (ppb)	10	84	95	70-130	12
1,2,4-Trimethylbenzene	ug/L (ppb)	10	87	98	70-130	12
sec-Butylbenzene	ug/L (ppb)	10	85	96	70-130	12
p-Isopropyltoluene	ug/L (ppb)	10	86	98	70-130	13
1,3-Dichlorobenzene	ug/L (ppb)	10	85	96	70-130	12
1,4-Dichlorobenzene	ug/L (ppb)	10	84	94	70-130	11
1,2-Dichlorobenzene	ug/L (ppb)	10	84	96	70-130	13
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	87	95	70-130	9
1,2,4-Trichlorobenzene	ug/L (ppb)	10	82	92	70-130	11
Hexachlorobutadiene	ug/L (ppb)	10	80	91	70-130	13
Naphthalene	ug/L (ppb)	10	85	95	70-130	11
1,2,3-Trichlorobenzene	ug/L (ppb)	10	81	92	69-143	13

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

204056

SAMPLE CHAIN OF CUSTODY

04-05-22

BI3/VSB3/VM

Page # 1 of 2

Report To Jacob Letts
Company GeoEngineers
Address 2101 4th Ave Suite 950
City, State, ZIP Seattle, WA 98121
Phone ______ Email JLetts@geoengineers.com

SAMPLERS (signature)

PROJECT NAME	PO #
C-1 Hangar Property	5530-014-01
REMARKS Project specific RLs? - Yes / No	INVOICE TO

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx *Q. as Mineral spirit	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals				Notes
C-1 HSA1-5	01A-E	4.4.22		S	5	X	X			X			X				
C-1 HSA1-10	02																
C-1 HSA1-15	03					X	X			X			X				
C-1 HSA1-20	04																
C-1 HSA1-25	05																
C-1 HSA2-4	06					X	X			X			X				
C-1 HSA2-10	07					X	X			X							
C-1 HSA2-15	08									X							
C-1 HSA2-20	09																
C-1 HSA2-25	10																

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	4/5/22	17:45
Received by:	Wesley Eaud	FBI	04/05/22	17:45
Relinquished by:				
Received by:		Samples received at 3 °C		

VM

204056

SAMPLE CHAIN OF CUSTODY

04-05-22

Page # 2 of 2 BI3/VSB3/VW

Report To Jacob Letts
Company
Address See pg 1
City, State, ZIP
Phone Email

SAMPLERS (*signature*)

PROJECT NAME

PO # 5530-014-01

REMARKS

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	RQ. as Mineral Spirits NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals				Notes
C-1 HSA3-5	11 A-E	4.5.22	900	S	5	X	X			X							
C-1 HSA3-10	12		910			X	X			X							
C-1 HSA3-15	13		920														
C-1 HSA4-5	14		1200			X	X			X			X				
C-1 HSA4-10	15		1210			X	X			X							
C-1 HSA4-15	16		1220			X	X			X							
C-1 HSA4-20	17		1230		↓	X	X			X							
TB-040522	18 A-B	↓	—	↓	2					X							

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Katy Atakturk	GEI	4.5.22	1745
Received by: Wesley	Wesley Eand	FBI	04-5-22	17:45
Relinquished by:				
Received by:				

Samples received at 3 °C

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 304056 CLIENT GeoEngineers INITIALS/ DATE: WE 04/05/23

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 3 °C

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☑ Over the Counter
☐ Picked up by F&BI
☐ FedEx/UPS/GSO

Number of days samples have been sitting prior to receipt at laboratory 0-1 days

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO
*or other representative documents, letters, and/or shipping memos

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Is the following information provided on the COC* ? (explain "no" answer below)

Sample ID's	☑ Yes	☐ No	# of Containers	☑ Yes	☐ No
Date Sampled	☑ Yes	☐ No	Relinquished	☑ Yes	☐ No
Time Sampled	☐ Yes	☑ No	Requested analysis	☑ Yes	☐ No

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

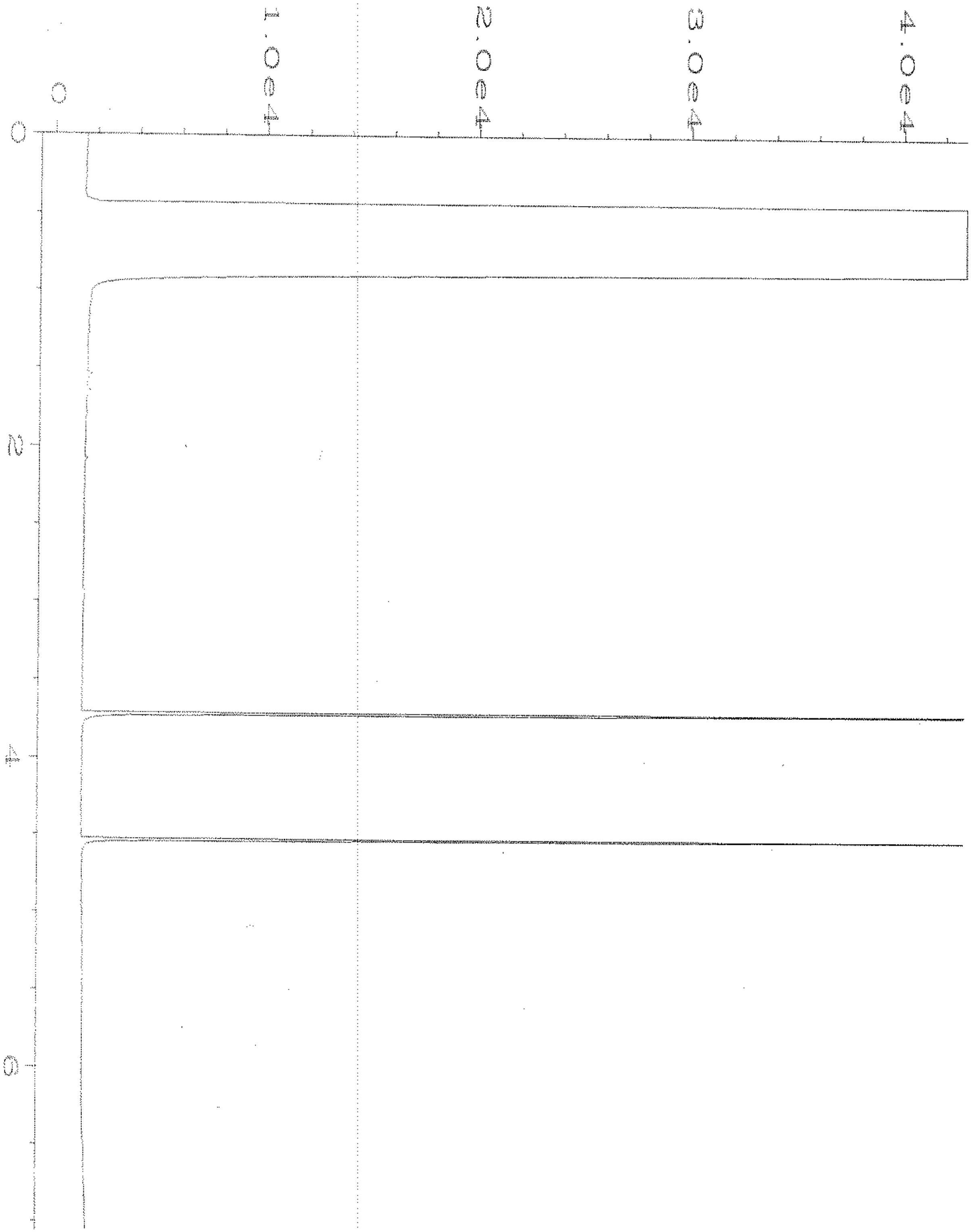
Air Samples: Were any additional canisters received? ☑ NA ☐ YES ☐ NO

If Yes, number of unused 1L canisters ______

number of unused 6L canisters ______

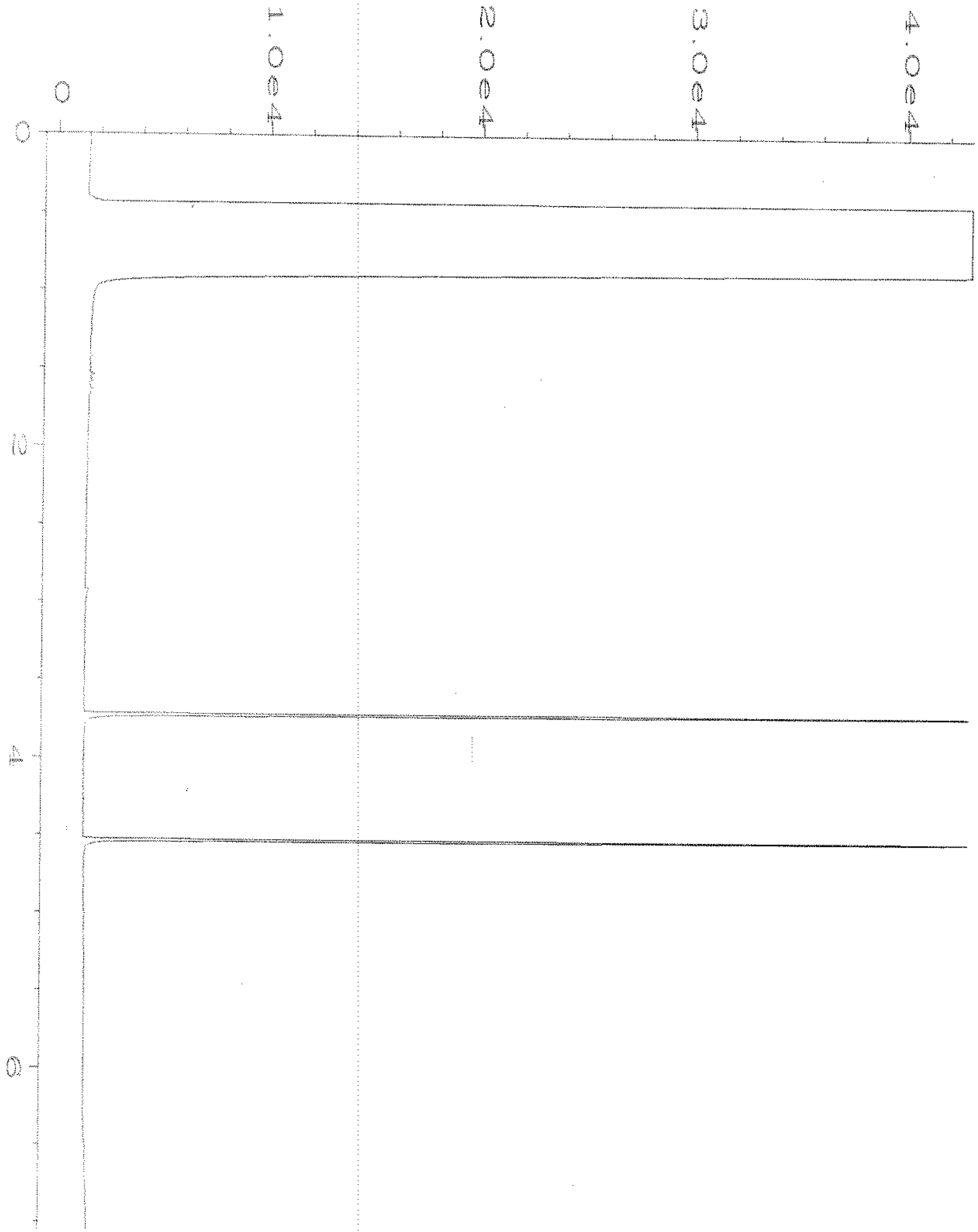
Explain "no" items from above (use the back if needed)

no time on pg1 of COC



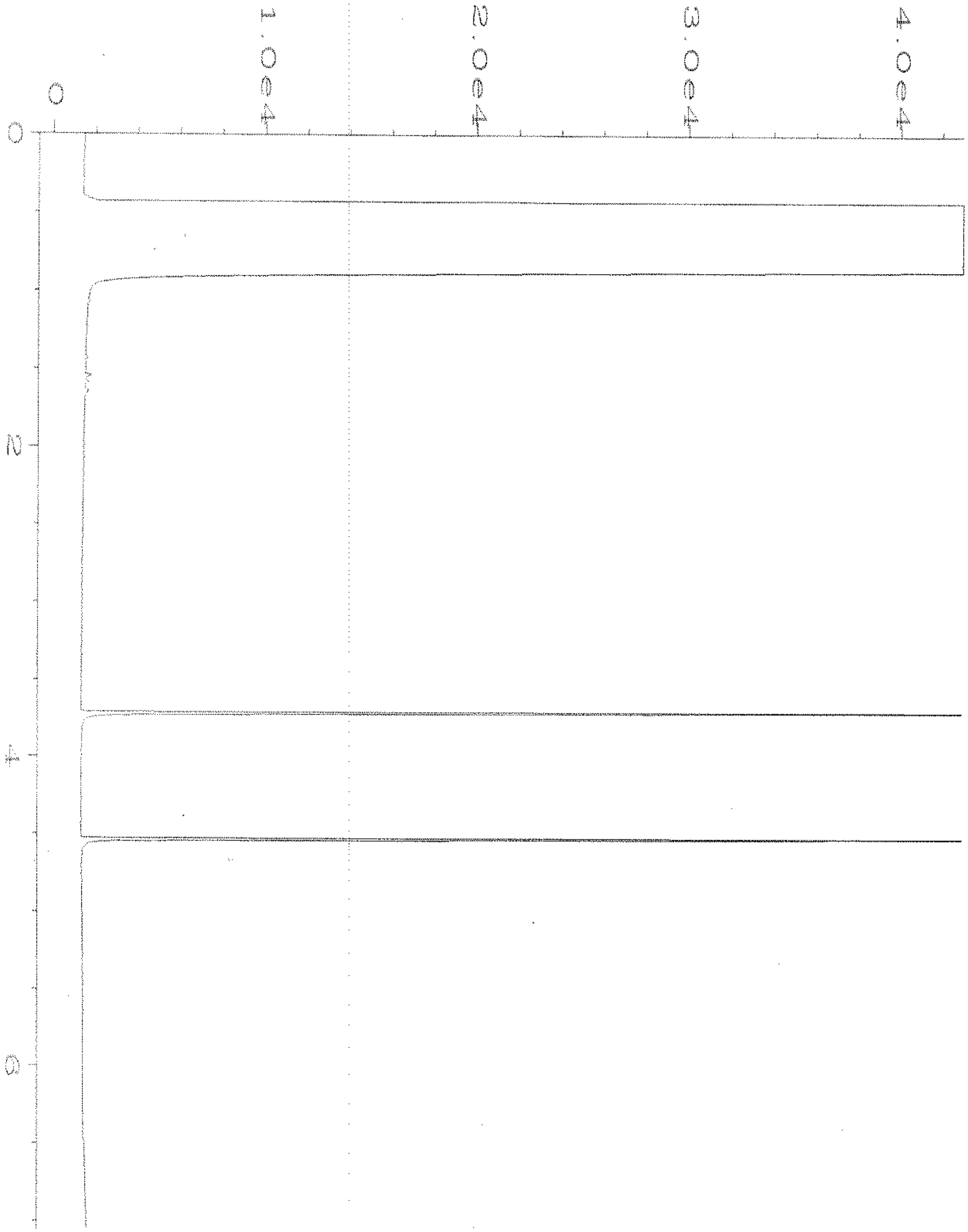
Data File Name   : C:\HPCHEM\4\DATA\04-06-22\029F0701.D
Operator   : TL
Instrument   : GC#4
Sample Name   : 204056-01
Run Time Bar Code:
Acquired on   : 06 Apr 22   04:17 PM
Report Created on: 07 Apr 22   07:41 AM

Page Number   : 1
Vial Number   : 29
Injection Number : 1
Sequence Line   : 7
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH

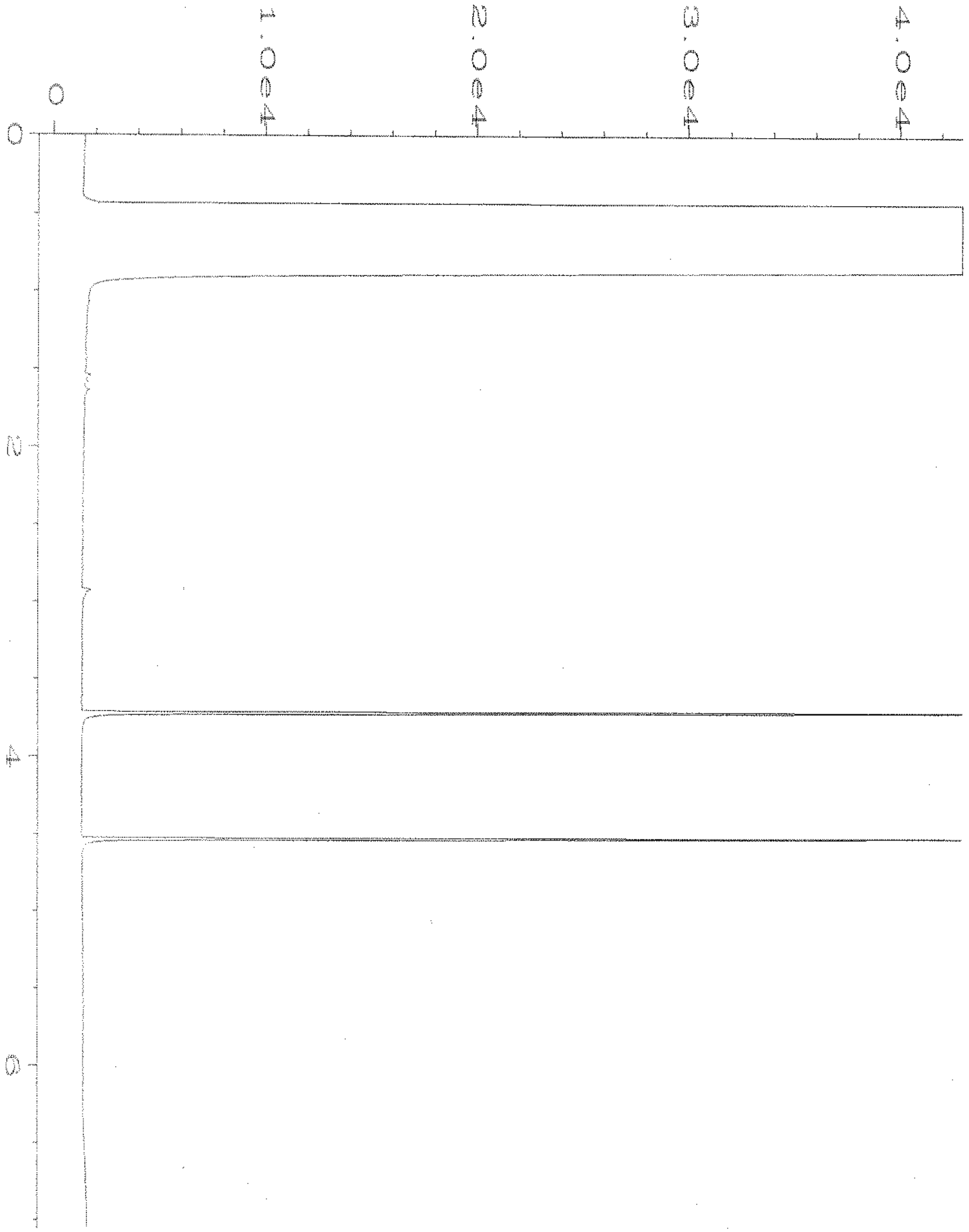


Data File Name : C:\HPCHEM\4\DATA\04-06-22\030F0701.D
Operator : TL
Instrument : GC#4
Sample Name : 204056-03
Run Time Bar Code:
Acquired on : 06 Apr 22 04:28 PM
Report Created on: 07 Apr 22 07:41 AM

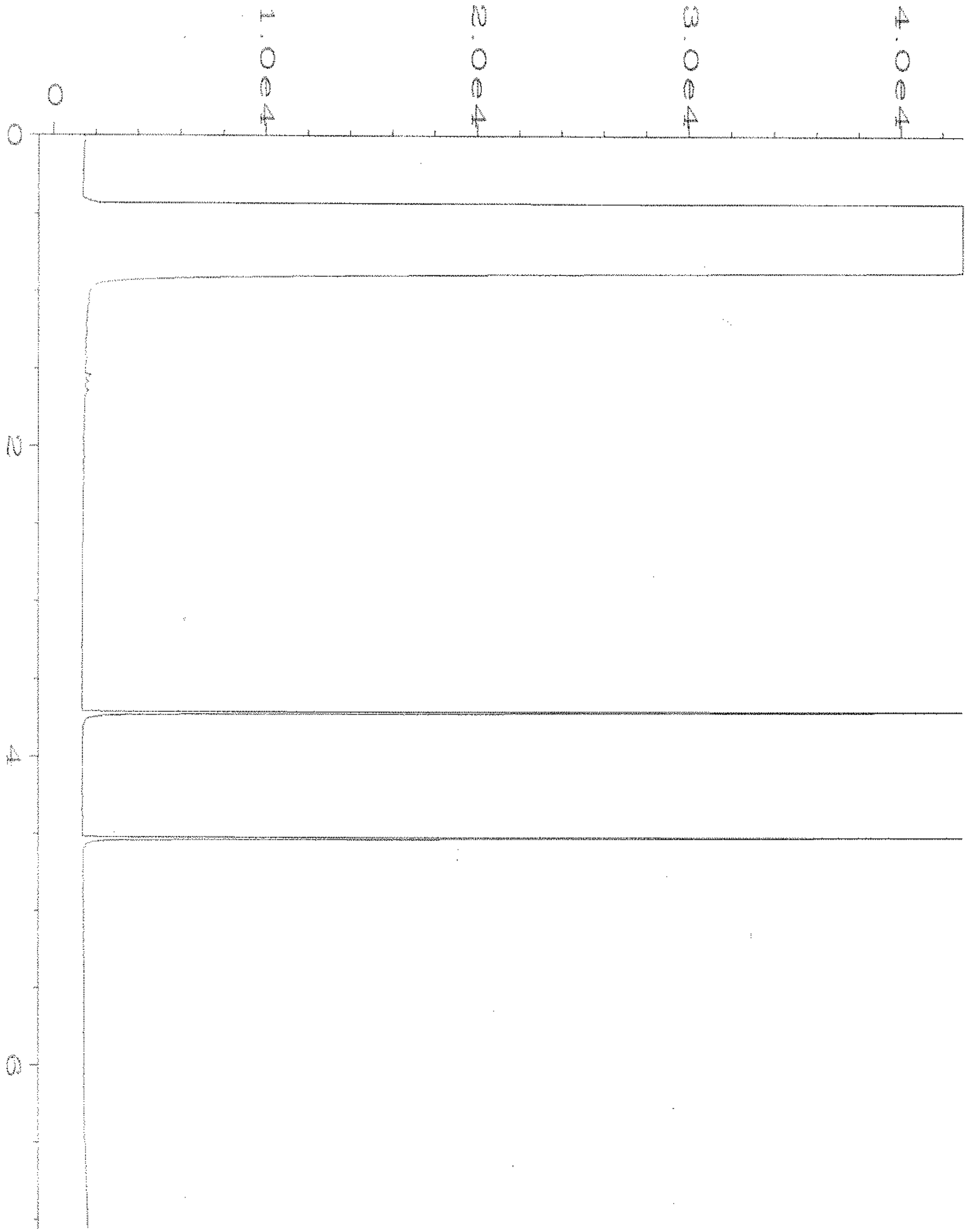
Page Number : 1
Vial Number : 30
Injection Number : 1
Sequence Line : 7
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



```
Data File Name    : C:\HPCHEM\4\DATA\04-06-22\031F0701.D
Operator          : TL                              Page Number      : 1
Instrument        : GC#4                            Vial Number      : 31
Sample Name       : 204056-06                       Injection Number : 1
Run Time Bar Code:                                  Sequence Line    : 7
Acquired on       : 06 Apr 22  04:39 PM             Instrument Method: DX.MTH
Report Created on: 07 Apr 22  07:41 AM              Analysis Method  : DEFAULT.MTH
```



```
Data File Name    : C:\HPCHEM\4\DATA\04-06-22\032F0701.D
Operator          : TL                             Page Number      : 1
Instrument        : GC#4                           Vial Number      : 32
Sample Name       : 204056-07                      Injection Number : 1
Run Time Bar Code:                                 Sequence Line    : 7
Acquired on       : 06 Apr 22  04:51 PM            Instrument Method: DX.MTH
Report Created on: 07 Apr 22  07:41 AM             Analysis Method  : DEFAULT.MTH
```



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Data File Name    : C:\HPCHEM\4\DATA\04-06-22\033F0701.D
Operator          : TL                                Page Number      : 1
Instrument        : GC#4                              Vial Number      : 33
Sample Name       : 204056-11                         Injection Number : 1
Run Time Bar Code:                                    Sequence Line    : 7
Acquired on       : 06 Apr 22   05:02 PM              Instrument Method: DX.MTH
Report Created on: 07 Apr 22   07:41 AM               Analysis Method  : DEFAULT.MTH
```
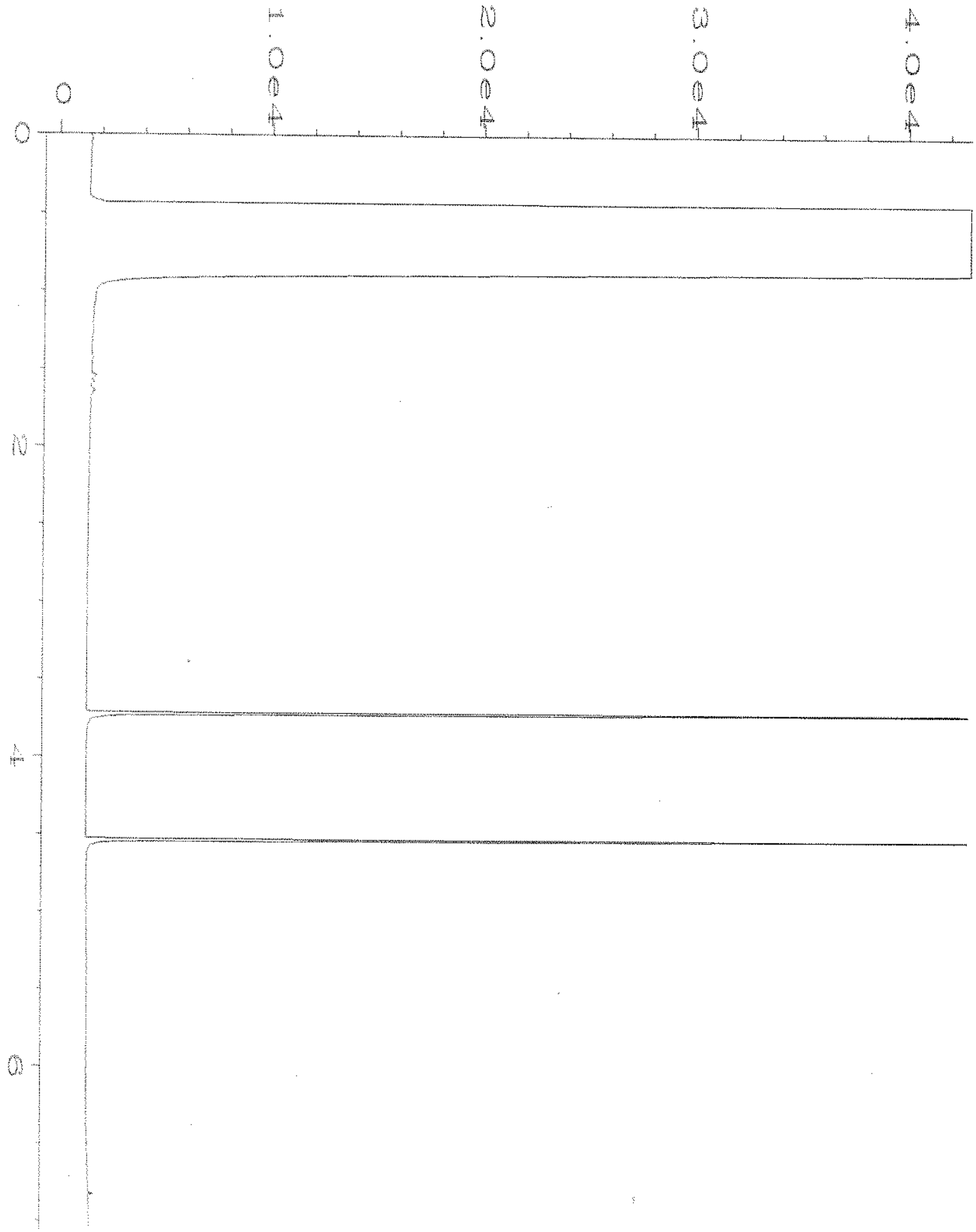
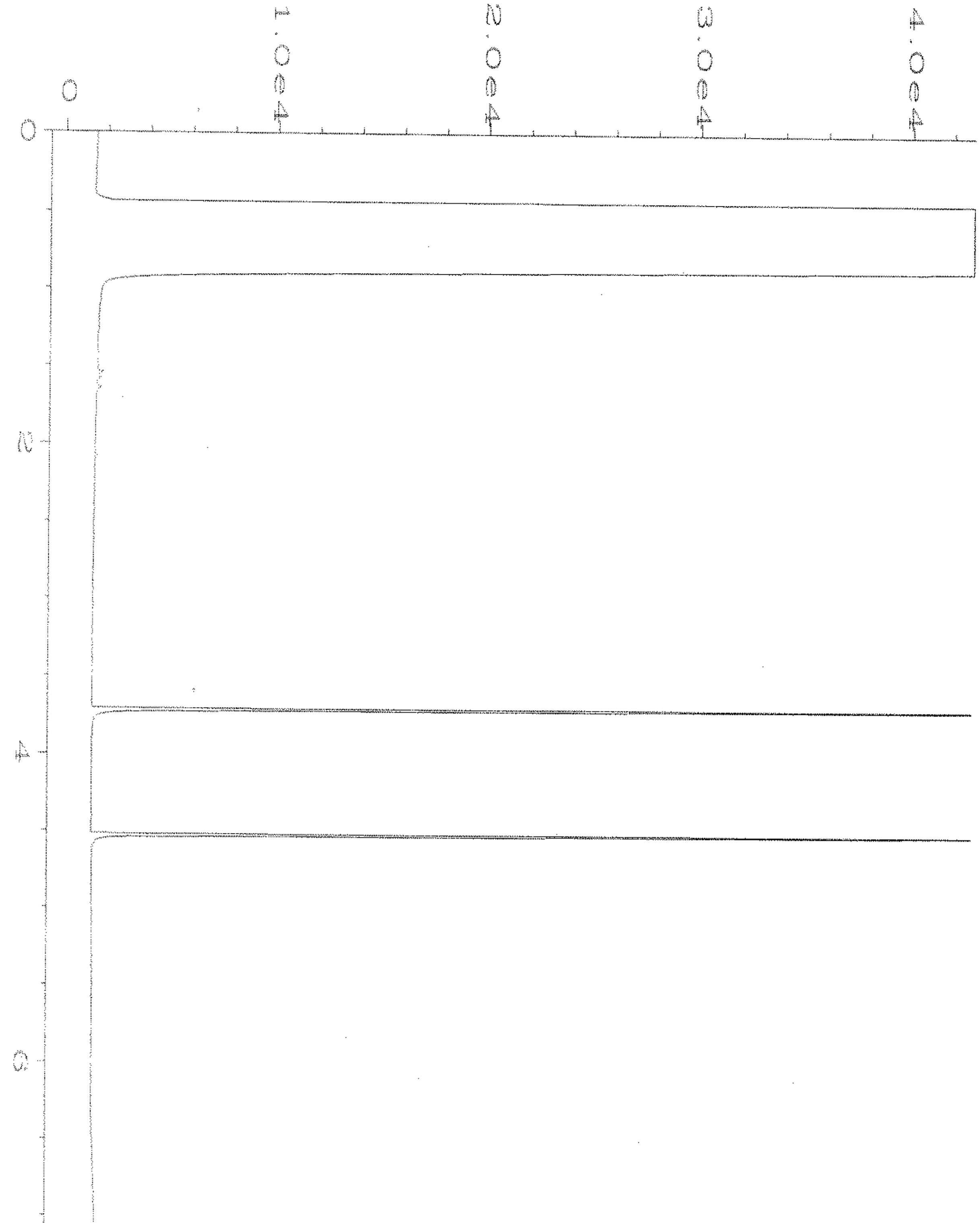



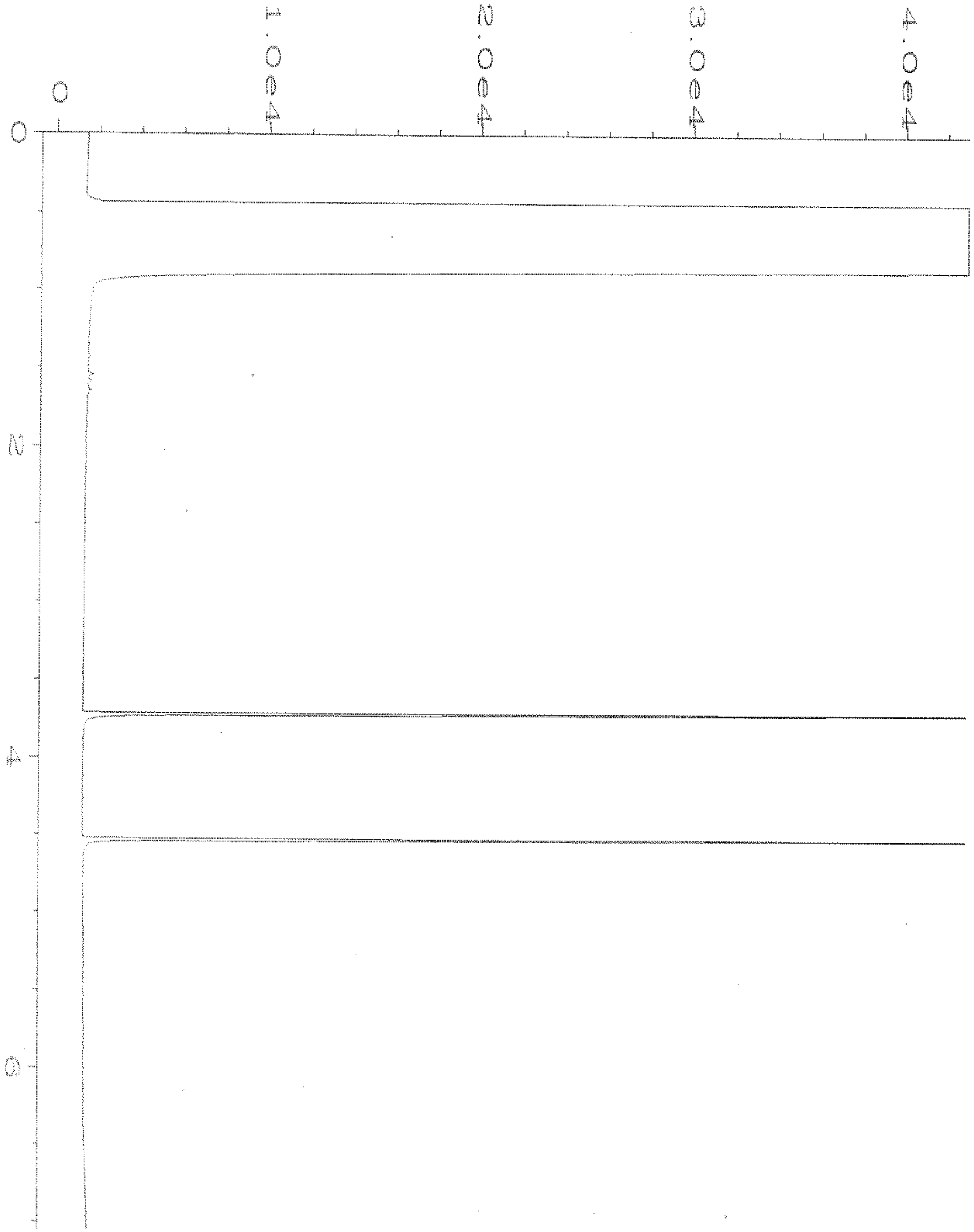
Data File Name : C:\HPCHEM\4\DATA\04-06-22\034F0701.D
Operator : TL
Instrument : GC#4
Sample Name : 204056-12
Run Time Bar Code:
Acquired on : 06 Apr 22 05:13 PM
Report Created on: 07 Apr 22 07:42 AM

Page Number : 1
Vial Number : 34
Injection Number : 1
Sequence Line : 7
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



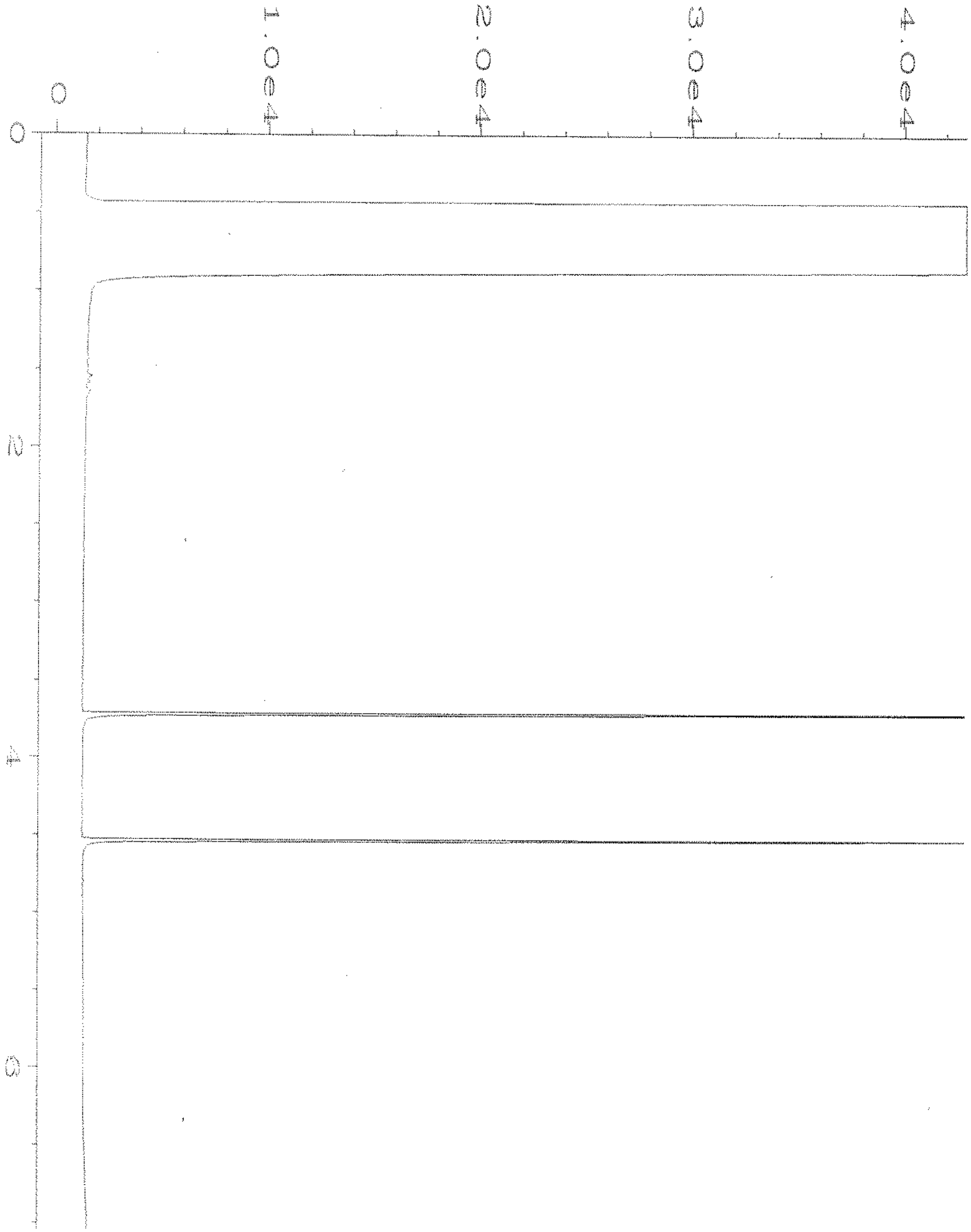
Data File Name   : C:\HPCHEM\4\DATA\04-06-22\035F0701.D
Operator   : TL
Instrument   : GC#4
Sample Name   : 204056-14
Run Time Bar Code:
Acquired on   : 06 Apr 22   05:24 PM
Report Created on: 07 Apr 22   07:42 AM

Page Number   : 1
Vial Number   : 35
Injection Number : 1
Sequence Line   : 7
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



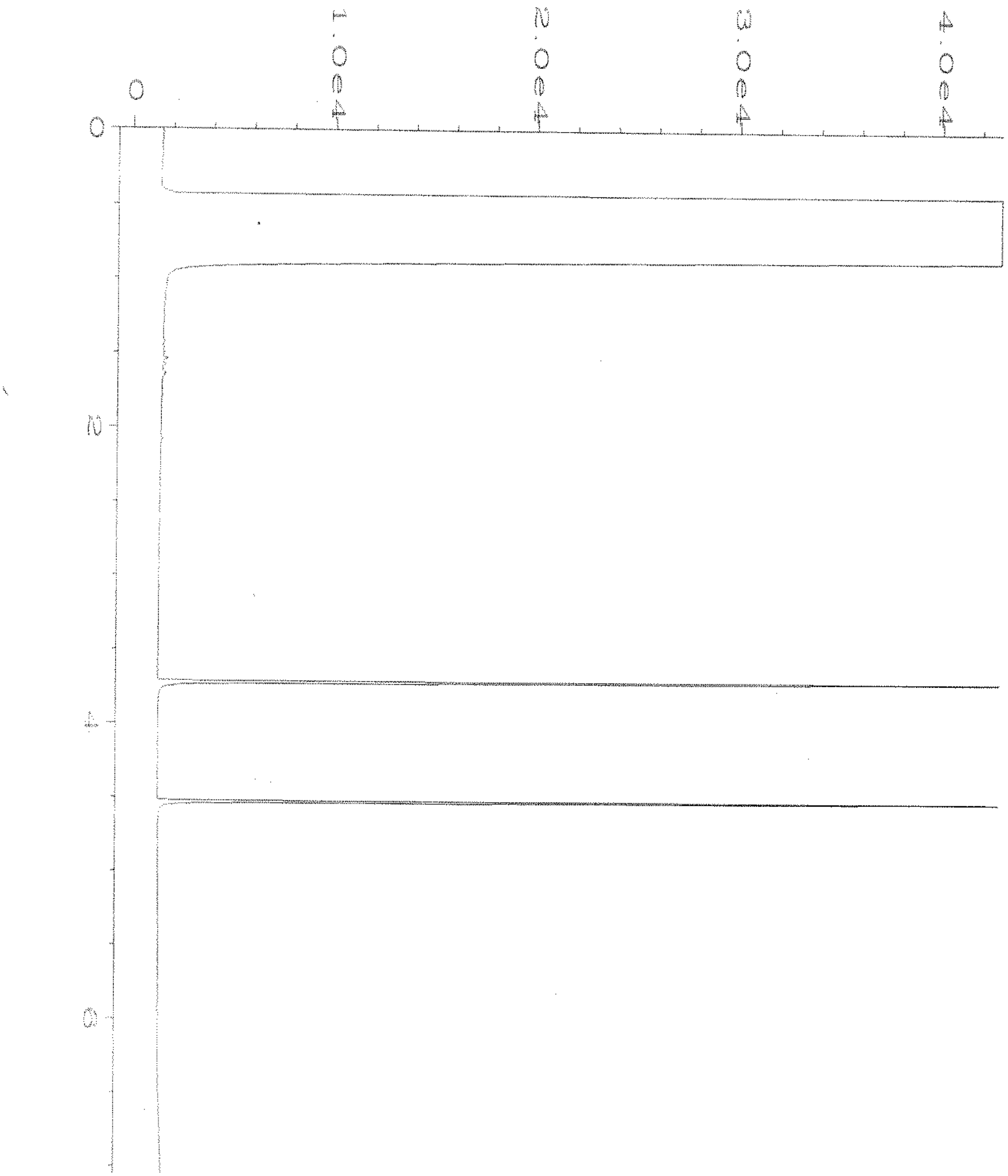
Data File Name : C:\HPCHEM\4\DATA\04-06-22\036F0701.D
Operator : TL
Instrument : GC#4
Sample Name : 204056-15
Run Time Bar Code:
Acquired on : 06 Apr 22 05:35 PM
Report Created on: 07 Apr 22 07:42 AM

Page Number : 1
Vial Number : 36
Injection Number : 1
Sequence Line : 7
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

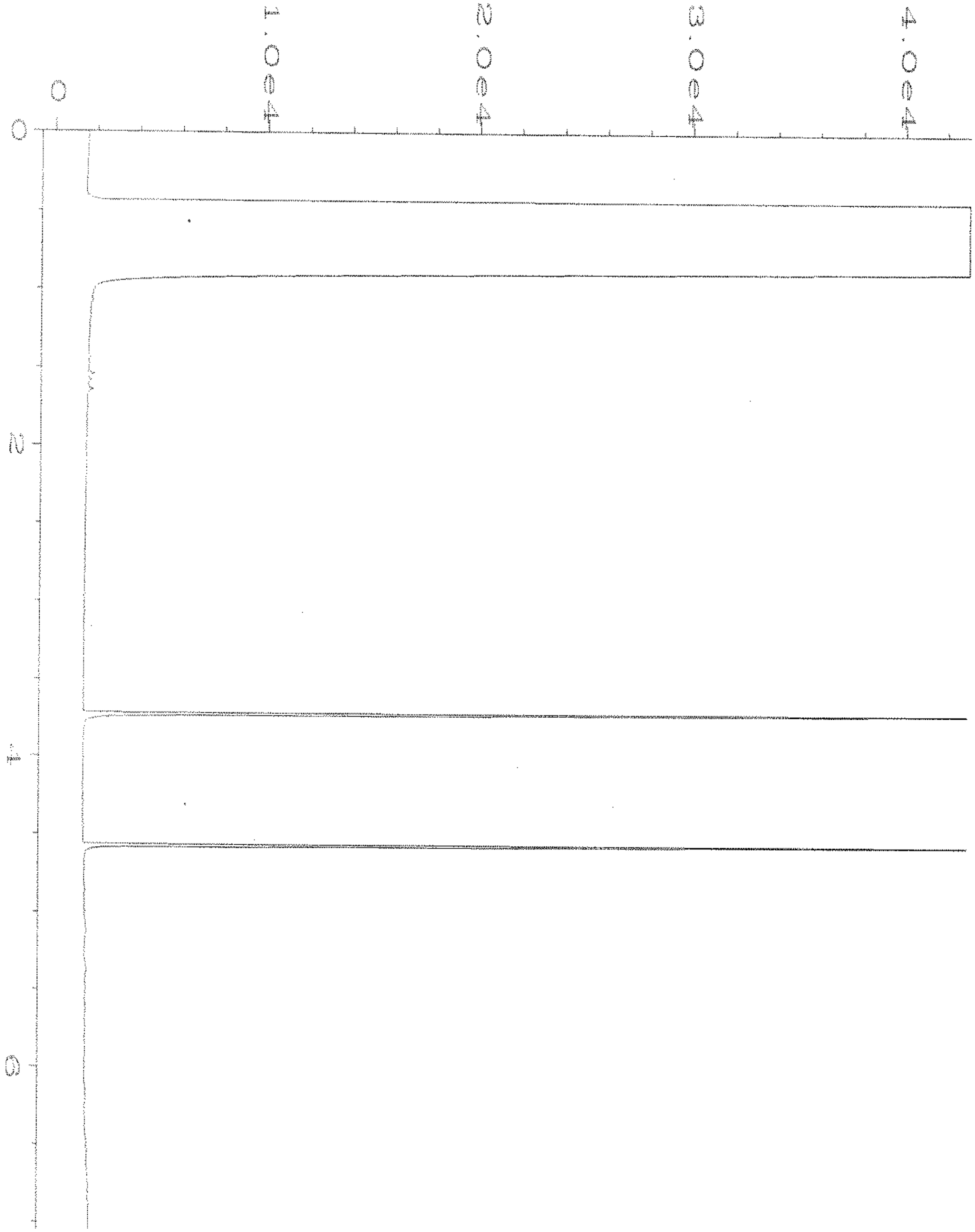


Data File Name   : C:\HPCHEM\4\DATA\04-06-22\037F0701.D
Operator   : TL
Instrument   : GC#4
Sample Name   : 204056-16
Run Time Bar Code:
Acquired on   : 06 Apr 22   05:47 PM
Report Created on: 07 Apr 22   07:42 AM

Page Number   : 1
Vial Number   : 37
Injection Number : 1
Sequence Line   : 7
Instrument Method: DX.MTH
Analysis Method   : DEFAULT.MTH



```
Data File Name    : C:\HPCHEM\4\DATA\04-06-22\038F0701.D
Operator          : TL                                 Page Number       : 1
Instrument        : GC#4                               Vial Number       : 38
Sample Name       : 204056-17                          Injection Number : 1
Run Time Bar Code:                                     Sequence Line     : 7
Acquired on       : 06 Apr 22   05:58 PM               Instrument Method: DX.MTH
Report Created on: 07 Apr 22   07:42 AM                Analysis Method   : DEFAULT.MTH
```



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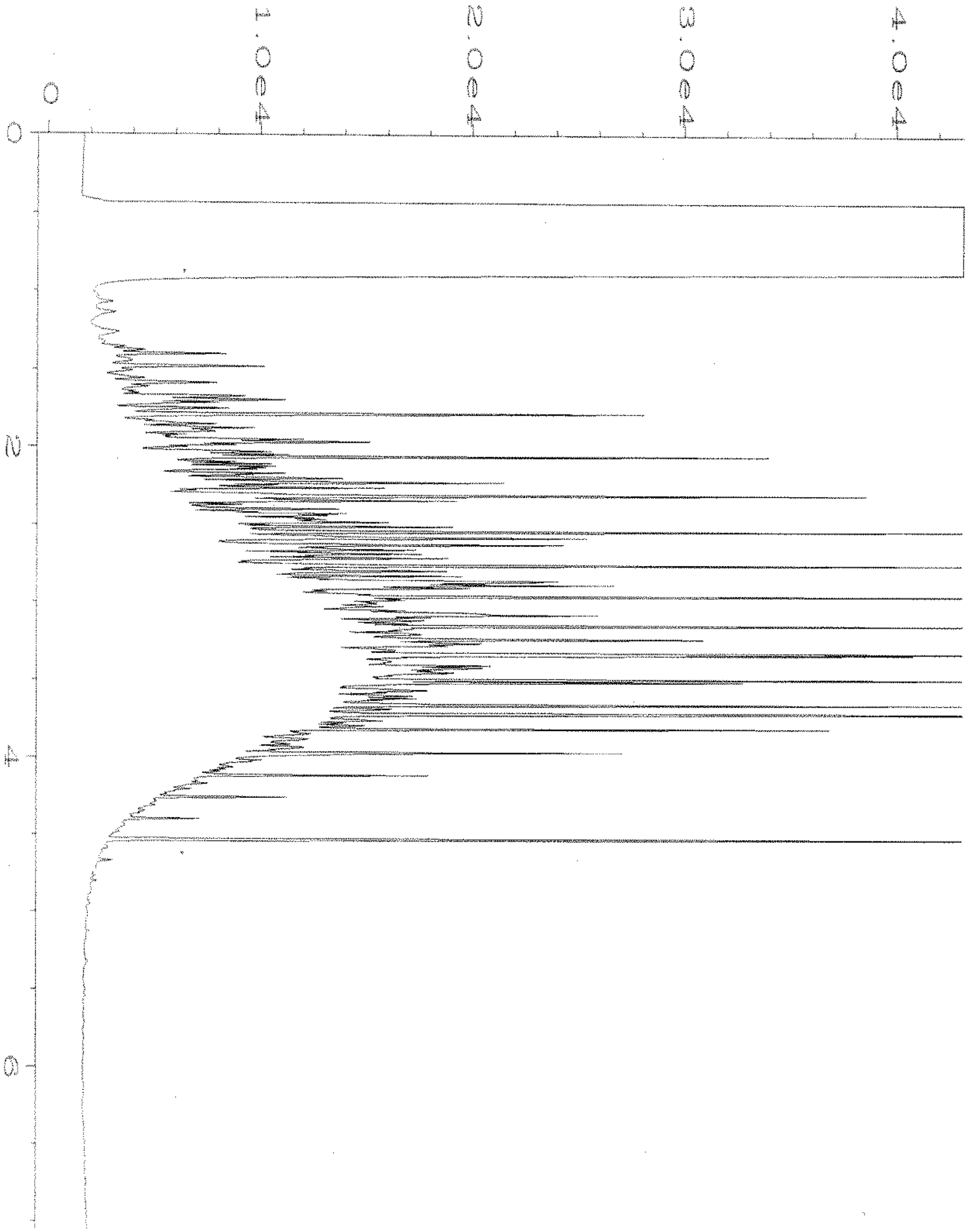
Data File Name    : C:\HPCHEM\4\DATA\04-06-22\020F0501.D
Operator          : TL                                    Page Number       : 1
Instrument        : GC#4                                  Vial Number       : 20
Sample Name       : 02-849 mb                             Injection Number : 1
Run Time Bar Code:                                        Sequence Line     : 5
Acquired on       : 06 Apr 22  01:40 PM                   Instrument Method: DX.MTH
Report Created on: 07 Apr 22  07:42 AM                    Analysis Method   : DEFAULT.MTH
```



Data File Name : C:\HPCHEM\4\DATA\04-06-22\003F0201.D
Operator : TL
Instrument : GC#4
Sample Name : 500 Dx 65-27F
Run Time Bar Code:
Acquired on : 06 Apr 22 05:53 AM
Report Created on: 07 Apr 22 07:43 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 20, 2022

Jacob Letts, Project Manager
GeoEngineers
2101 4th Avenue, Suite 150
Seattle, WA 98121

Dear Mr Letts:

Included are the results from the testing of material submitted on April 21, 2022 from the PAE C-1 Hangar 5530-014-01, F&BI 204363 project. The sample IDs have been amended per your request.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Katy Ataturk
GNR0503R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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May 3, 2022

Jacob Letts, Project Manager
GeoEngineers
2101 4th Avenue, Suite 150
Seattle, WA 98121

Dear Mr Letts:

Included are the results from the testing of material submitted on April 21, 2022 from the PAE C-1 Hangar 5530-014-01, F&BI 204363 project. There are 22 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Katy Ataturk
GNR0503R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 21, 2022 by Friedman & Bruya, Inc. from the GeoEngineers PAE C-1 Hangar 5530-014-01, F&BI 204363 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	GeoEngineers
204363 -01	C-1 HSA3
204363 -02	C-1 HSA4
204363 -03	TB-04212022

Gasoline by NWTPH-Gx

All quality control requirements were acceptable.

Diesel and Motor Oil by NWTPH-Dx

All quality control requirements were acceptable.

VOCs by 8260D

The 8260D calibration standard failed the acceptance criteria for several analytes. The data were flagged accordingly. All other quality control requirements were acceptable.

Metals by 6020B

Silver in the 6020B matrix spike and the selenium matrix spike and matrix spike duplicate relative percent difference did not meet the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect. All other quality control requirements were acceptable.

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363
Date Extracted: 04/26/22
Date Analyzed: 04/27/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
C-1 HSA3 204363-01	<100	89
C-1 HSA4 204363-02	<100	87
Method Blank 02-890 MB	<100	81

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363
Date Extracted: 04/22/22
Date Analyzed: 04/22/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
C-1 HSA3 204363-01	<50	<250	132
C-1 HSA4 204363-02	230 x	<250	128
Method Blank 02-980 MB	<50	<250	126

Analysis For Total Metals By EPA Method 6020B

Client ID: C-1 HSA3
Date Received: 04/21/22
Date Extracted: 04/26/22
Date Analyzed: 04/26/22
Matrix: Water
Units: ug/L (ppb)

Client: GeoEngineers
Project: 5530-014-01, F&BI 204363
Lab ID: 204363-01
Data File: 204363-01.044
Instrument: ICPMS2
Operator: SP

Analyte:	Concentration ug/L (ppb)
Arsenic	9.99
Barium	71.8
Cadmium	<1
Chromium	2.23
Lead	<1
Mercury	<1
Selenium	3.26
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 HSA4	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/26/22	Lab ID:	204363-02
Date Analyzed:	04/26/22	Data File:	204363-02.045
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	10.2
Barium	55.9
Cadmium	<1
Lead	<1
Mercury	<1
Selenium	1.50
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	C-1 HSA4	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/26/22	Lab ID:	204363-02 x5
Date Analyzed:	04/26/22	Data File:	204363-02 x5.060
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/26/22	Lab ID:	I2-308 mb2
Date Analyzed:	04/26/22	Data File:	I2-308 mb2.043
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 HSA3	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/25/22	Lab ID:	204363-01
Date Analyzed:	04/25/22	Data File:	204363-01.077
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	7.41
Barium	65.4
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	3.03
Silver	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 HSA4	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/25/22	Lab ID:	204363-02
Date Analyzed:	04/25/22	Data File:	204363-02.078
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	7.62
Barium	52.7
Cadmium	<1
Lead	<1
Mercury	<1
Selenium	1.37
Silver	<1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	C-1 HSA4	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/25/22	Lab ID:	204363-02 x5
Date Analyzed:	04/25/22	Data File:	204363-02 x5.106
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Chromium	<5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	GeoEngineers
Date Received:	NA	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/25/22	Lab ID:	I2-308 mb
Date Analyzed:	04/25/22	Data File:	I2-308 mb.064
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Barium	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	C-1 HSA3	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/29/22	Lab ID:	204363-01
Date Analyzed:	04/29/22	Data File:	042926.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	85	117
Toluene-d8	99	88	112
4-Bromofluorobenzene	102	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10 ca	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5 ca	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	C-1 HSA4	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/29/22	Lab ID:	204363-02
Date Analyzed:	04/29/22	Data File:	042927.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	92	85	117
Toluene-d8	101	88	112
4-Bromofluorobenzene	101	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10 ca	Tetrachloroethene	<1
Vinyl chloride	0.36	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	3.0
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5 ca	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	1.4
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	TB-04212022	Client:	GeoEngineers
Date Received:	04/21/22	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/29/22	Lab ID:	204363-03
Date Analyzed:	04/29/22	Data File:	042925.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	85	117
Toluene-d8	98	88	112
4-Bromofluorobenzene	104	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10 ca	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5 ca	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	GeoEngineers
Date Received:	Not Applicable	Project:	5530-014-01, F&BI 204363
Date Extracted:	04/29/22	Lab ID:	02-1000 MB
Date Analyzed:	04/29/22	Data File:	042907.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	105	88	112
4-Bromofluorobenzene	94	90	111

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10 ca	Tetrachloroethene	<1
Vinyl chloride	<0.02	Dibromochloromethane	<0.5
Bromomethane	<5	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<5	o-Xylene	<1
Methylene chloride	<5 ca	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<5
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<0.2
2-Butanone (MEK)	<20	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<0.2	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<0.5	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<0.5	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<0.5	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<0.4	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<0.5
trans-1,3-Dichloropropene	<0.4	Naphthalene	<1
1,1,2-Trichloroethane	<0.5	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 204351-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	81	69-134

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	104	108	63-142	4

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 204333-02 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<10	81	92	75-125	13
Barium	ug/L (ppb)	50	172	87	104	75-125	18
Cadmium	ug/L (ppb)	5	<10	83	96	75-125	15
Chromium	ug/L (ppb)	20	<10	82	88	75-125	7
Lead	ug/L (ppb)	10	<10	78	87	75-125	11
Mercury	ug/L (ppb)	5	<10	79	85	75-125	7
Selenium	ug/L (ppb)	5	<10	80	103	75-125	25 vo
Silver	ug/L (ppb)	5	<10	74 vo	83	75-125	11

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	85	80-120
Barium	ug/L (ppb)	50	98	80-120
Cadmium	ug/L (ppb)	5	96	80-120
Chromium	ug/L (ppb)	20	97	80-120
Lead	ug/L (ppb)	10	93	80-120
Mercury	ug/L (ppb)	5	97	80-120
Selenium	ug/L (ppb)	5	88	80-120
Silver	ug/L (ppb)	5	87	80-120

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 204333-02 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<10	81	92	75-125	13
Barium	ug/L (ppb)	50	172	87	104	75-125	18
Cadmium	ug/L (ppb)	5	<10	83	96	75-125	15
Chromium	ug/L (ppb)	20	<10	82	88	75-125	7
Lead	ug/L (ppb)	10	<10	78	87	75-125	11
Mercury	ug/L (ppb)	5	<10	79	85	75-125	7
Selenium	ug/L (ppb)	5	<10	80	103	75-125	25 vo
Silver	ug/L (ppb)	5	<10	74 vo	83	75-125	11

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	85	80-120
Barium	ug/L (ppb)	50	98	80-120
Cadmium	ug/L (ppb)	5	96	80-120
Chromium	ug/L (ppb)	20	97	80-120
Lead	ug/L (ppb)	10	93	80-120
Mercury	ug/L (ppb)	5	97	80-120
Selenium	ug/L (ppb)	5	88	80-120
Silver	ug/L (ppb)	5	87	80-120

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 204474-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	10	<1	110	50-150
Chloromethane	ug/L (ppb)	10	<10	87	50-150
Vinyl chloride	ug/L (ppb)	10	<0.02	89	16-176
Bromomethane	ug/L (ppb)	10	<5	106	10-193
Chloroethane	ug/L (ppb)	10	<1	101	50-150
Trichlorofluoromethane	ug/L (ppb)	10	<1	104	50-150
Acetone	ug/L (ppb)	50	<50	84	15-179
1,1-Dichloroethene	ug/L (ppb)	10	<1	112	50-150
Hexane	ug/L (ppb)	10	<5	71	49-161
Methylene chloride	ug/L (ppb)	10	<5	106	40-143
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	<1	108	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	97	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	99	50-150
2,2-Dichloropropane	ug/L (ppb)	10	<1	80	10-335
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	98	50-150
Chloroform	ug/L (ppb)	10	<1	104	50-150
2-Butanone (MEK)	ug/L (ppb)	50	<20	81	34-168
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	119	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	112	50-150
1,1-Dichloropropene	ug/L (ppb)	10	<1	95	50-150
Carbon tetrachloride	ug/L (ppb)	10	<0.5	109	50-150
Benzene	ug/L (ppb)	10	<0.35	96	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	97	43-133
1,2-Dichloropropane	ug/L (ppb)	10	<1	87	50-150
Bromodichloromethane	ug/L (ppb)	10	<0.5	101	50-150
Dibromomethane	ug/L (ppb)	10	<1	101	50-150
4-Methyl-2-pentanone	ug/L (ppb)	50	<10	99	50-150
cis-1,3-Dichloropropene	ug/L (ppb)	10	<0.4	85	48-145
Toluene	ug/L (ppb)	10	<1	90	50-150
trans-1,3-Dichloropropene	ug/L (ppb)	10	<0.4	83	37-152
1,1,2-Trichloroethane	ug/L (ppb)	10	<0.5	89	50-150
2-Hexanone	ug/L (ppb)	50	<10	83	50-150
1,3-Dichloropropane	ug/L (ppb)	10	<1	90	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	98	50-150
Dibromochloromethane	ug/L (ppb)	10	<0.5	96	33-164
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	<1	96	50-150
Chlorobenzene	ug/L (ppb)	10	<1	96	50-150
Ethylbenzene	ug/L (ppb)	10	<1	104	50-150
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	<1	107	50-150
m,p-Xylene	ug/L (ppb)	20	<2	102	50-150
o-Xylene	ug/L (ppb)	10	<1	96	50-150
Styrene	ug/L (ppb)	10	<1	98	50-150
Isopropylbenzene	ug/L (ppb)	10	<1	102	50-150
Bromoform	ug/L (ppb)	10	<5	92	23-161
n-Propylbenzene	ug/L (ppb)	10	<1	88	50-150
Bromobenzene	ug/L (ppb)	10	<1	93	50-150
1,3,5-Trimethylbenzene	ug/L (ppb)	10	<1	92	50-150
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	<0.2	87	10-235
1,2,3-Trichloropropane	ug/L (ppb)	10	<1	84	33-151
2-Chlorotoluene	ug/L (ppb)	10	<1	90	50-150
4-Chlorotoluene	ug/L (ppb)	10	<1	90	50-150
tert-Butylbenzene	ug/L (ppb)	10	<1	93	50-150
1,2,4-Trimethylbenzene	ug/L (ppb)	10	<1	92	50-150
sec-Butylbenzene	ug/L (ppb)	10	<1	90	46-139
p-Isopropyltoluene	ug/L (ppb)	10	<1	94	46-140
1,3-Dichlorobenzene	ug/L (ppb)	10	<1	93	50-150
1,4-Dichlorobenzene	ug/L (ppb)	10	<1	92	50-150
1,2-Dichlorobenzene	ug/L (ppb)	10	<1	95	50-150
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	<10	84	50-150
1,2,4-Trichlorobenzene	ug/L (ppb)	10	<1	90	50-150
Hexachlorobutadiene	ug/L (ppb)	10	<0.5	86	42-150
Naphthalene	ug/L (ppb)	10	<1	89	50-150
1,2,3-Trichlorobenzene	ug/L (ppb)	10	<1	90	44-155

Date of Report: 05/03/22
Date Received: 04/21/22
Project: PAE C-1 Hangar 5530-014-01, F&BI 204363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	10	90	84	70-130	7
Chloromethane	ug/L (ppb)	10	102	104	70-130	2
Vinyl chloride	ug/L (ppb)	10	110	109	70-130	1
Bromomethane	ug/L (ppb)	10	126	112	28-182	12
Chloroethane	ug/L (ppb)	10	119	117	70-130	2
Trichlorofluoromethane	ug/L (ppb)	10	97	88	70-130	10
Acetone	ug/L (ppb)	50	86	89	42-155	3
1,1-Dichloroethene	ug/L (ppb)	10	94	89	70-130	5
Hexane	ug/L (ppb)	10	82	81	50-161	1
Methylene chloride	ug/L (ppb)	10	97	88	29-192	10
Methyl t-butyl ether (MTBE)	ug/L (ppb)	10	98	94	70-130	4
trans-1,2-Dichloroethene	ug/L (ppb)	10	94	88	70-130	7
1,1-Dichloroethane	ug/L (ppb)	10	97	92	70-130	5
2,2-Dichloropropane	ug/L (ppb)	10	94	88	70-130	7
cis-1,2-Dichloroethene	ug/L (ppb)	10	96	90	70-130	6
Chloroform	ug/L (ppb)	10	98	90	70-130	9
2-Butanone (MEK)	ug/L (ppb)	50	94	87	50-157	8
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	95	89	70-130	7
1,1,1-Trichloroethane	ug/L (ppb)	10	97	92	70-130	5
1,1-Dichloropropene	ug/L (ppb)	10	96	88	70-130	9
Carbon tetrachloride	ug/L (ppb)	10	96	88	70-130	9
Benzene	ug/L (ppb)	10	96	93	70-130	3
Trichloroethene	ug/L (ppb)	10	93	87	70-130	7
1,2-Dichloropropane	ug/L (ppb)	10	93	91	70-130	2
Bromodichloromethane	ug/L (ppb)	10	94	85	70-130	10
Dibromomethane	ug/L (ppb)	10	95	89	70-130	7
4-Methyl-2-pentanone	ug/L (ppb)	50	92	93	70-130	1
cis-1,3-Dichloropropene	ug/L (ppb)	10	90	89	70-130	1
Toluene	ug/L (ppb)	10	94	95	70-130	1
trans-1,3-Dichloropropene	ug/L (ppb)	10	96	98	70-130	2
1,1,2-Trichloroethane	ug/L (ppb)	10	95	98	70-130	3
2-Hexanone	ug/L (ppb)	50	95	103	69-130	8
1,3-Dichloropropane	ug/L (ppb)	10	95	100	70-130	5
Tetrachloroethene	ug/L (ppb)	10	94	93	70-130	1
Dibromochloromethane	ug/L (ppb)	10	94	97	63-142	3
1,2-Dibromoethane (EDB)	ug/L (ppb)	10	98	97	70-130	1
Chlorobenzene	ug/L (ppb)	10	97	96	70-130	1
Ethylbenzene	ug/L (ppb)	10	100	99	70-130	1
1,1,1,2-Tetrachloroethane	ug/L (ppb)	10	102	99	70-130	3
m,p-Xylene	ug/L (ppb)	20	100	99	70-130	1
o-Xylene	ug/L (ppb)	10	100	98	70-130	2
Styrene	ug/L (ppb)	10	102	100	70-130	2
Isopropylbenzene	ug/L (ppb)	10	105	101	70-130	4
Bromoform	ug/L (ppb)	10	97	95	50-157	2
n-Propylbenzene	ug/L (ppb)	10	101	99	70-130	2
Bromobenzene	ug/L (ppb)	10	95	94	70-130	1
1,3,5-Trimethylbenzene	ug/L (ppb)	10	102	97	52-150	5
1,1,2,2-Tetrachloroethane	ug/L (ppb)	10	104	99	70-130	5
1,2,3-Trichloropropane	ug/L (ppb)	10	96	96	70-130	0
2-Chlorotoluene	ug/L (ppb)	10	100	97	70-130	3
4-Chlorotoluene	ug/L (ppb)	10	100	97	70-130	3
tert-Butylbenzene	ug/L (ppb)	10	101	96	70-130	5
1,2,4-Trimethylbenzene	ug/L (ppb)	10	103	98	70-130	5
sec-Butylbenzene	ug/L (ppb)	10	102	98	70-130	4
p-Isopropyltoluene	ug/L (ppb)	10	102	97	70-130	5
1,3-Dichlorobenzene	ug/L (ppb)	10	100	96	70-130	4
1,4-Dichlorobenzene	ug/L (ppb)	10	97	94	70-130	3
1,2-Dichlorobenzene	ug/L (ppb)	10	100	96	70-130	4
1,2-Dibromo-3-chloropropane	ug/L (ppb)	10	99	96	70-130	3
1,2,4-Trichlorobenzene	ug/L (ppb)	10	96	87	70-130	10
Hexachlorobutadiene	ug/L (ppb)	10	93	86	70-130	8
Naphthalene	ug/L (ppb)	10	103	95	70-130	8
1,2,3-Trichlorobenzene	ug/L (ppb)	10	101	91	69-143	10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

04-21-22

204363 [redacted]

Report To Jacob Letts

Company GeoEngineers

Address 2101 4th Ave Suite 950

City, State, ZIP Seattle, WA 98121

Phone______ Email JLetts@geoengineers.com

SAMPLERS (*signature*) [redacted]

PROJECT NAME	PO #
PAE C-1 Hangar	5530-014-01

REMARKS
* Special pricing

Project specific RLs? - Yes / No

INVOICE TO

Page # 1 of E03/AJ3/VW3

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH______
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other______
Default: Dispose after 30 days

						ANALYSES REQUESTED											
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Total & Diss. RCRA Metals				Notes
C-1 ~~MW-1w~~ HSA3	01 A-J	4/21/22	1200	W	10	X	X			X			X				
C-1 ~~MW-2w~~ HSA4	02 ↓	↓	1400	W	10	X	X			X			X				
TB-04212022	03 A-B	↓	—	W	2					X							
IDs updated per JL																	
7/19/22 ME																	

Friedman & Bruya, Inc.
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Katy Ataktirk	GEI	4/21/22	16:05
Received by:	VH	Khoi Hoang	FBI	4/21/22	16:05
Relinquished by:					
Received by:			Samples received at 4 °C		

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 204363 CLIENT Geo Engineers INITIALS/ DATE: KH 4/21/22

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 4 °C

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☑ Over the Counter
☐ Picked up by F&BI
☐ FedEx/UPS/GSO

Number of days samples have been sitting prior to receipt at laboratory 0 days

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO
*or other representative documents, letters, and/or shipping memos

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Is the following information provided on the COC* ? (explain "no" answer below)

Sample ID's	☑ Yes	☐ No	# of Containers	☑ Yes	☐ No
Date Sampled	☑ Yes	☐ No	Relinquished	☑ Yes	☐ No
Time Sampled	☑ Yes	☐ No	Requested analysis	☑ Yes	☐ No

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

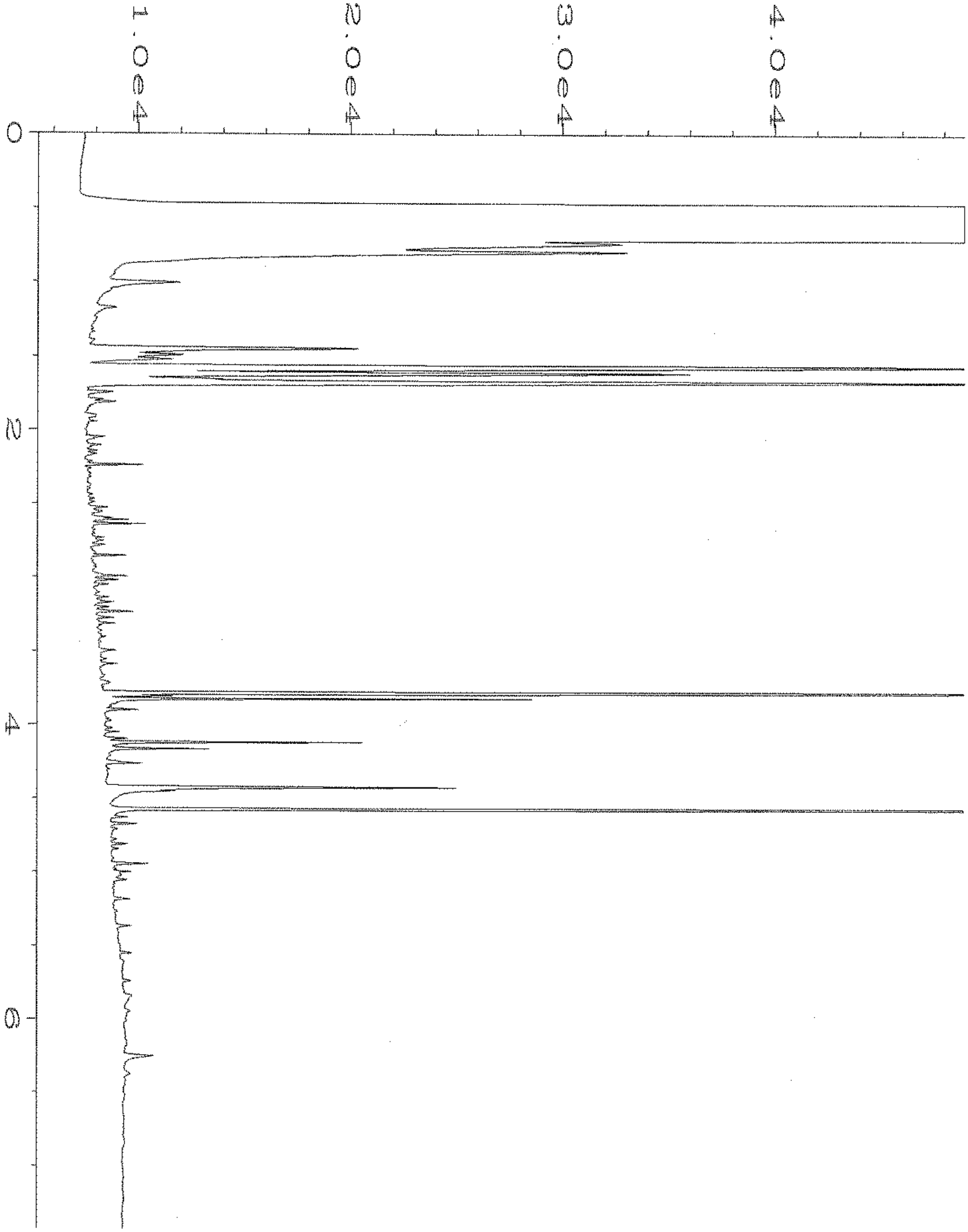
Are samples requiring no headspace, headspace free? ☐ NA ☑ YES ☐ NO

Air Samples: Were any additional canisters received? ☑ NA ☐ YES ☐ NO

If Yes, number of unused 1L canisters ______

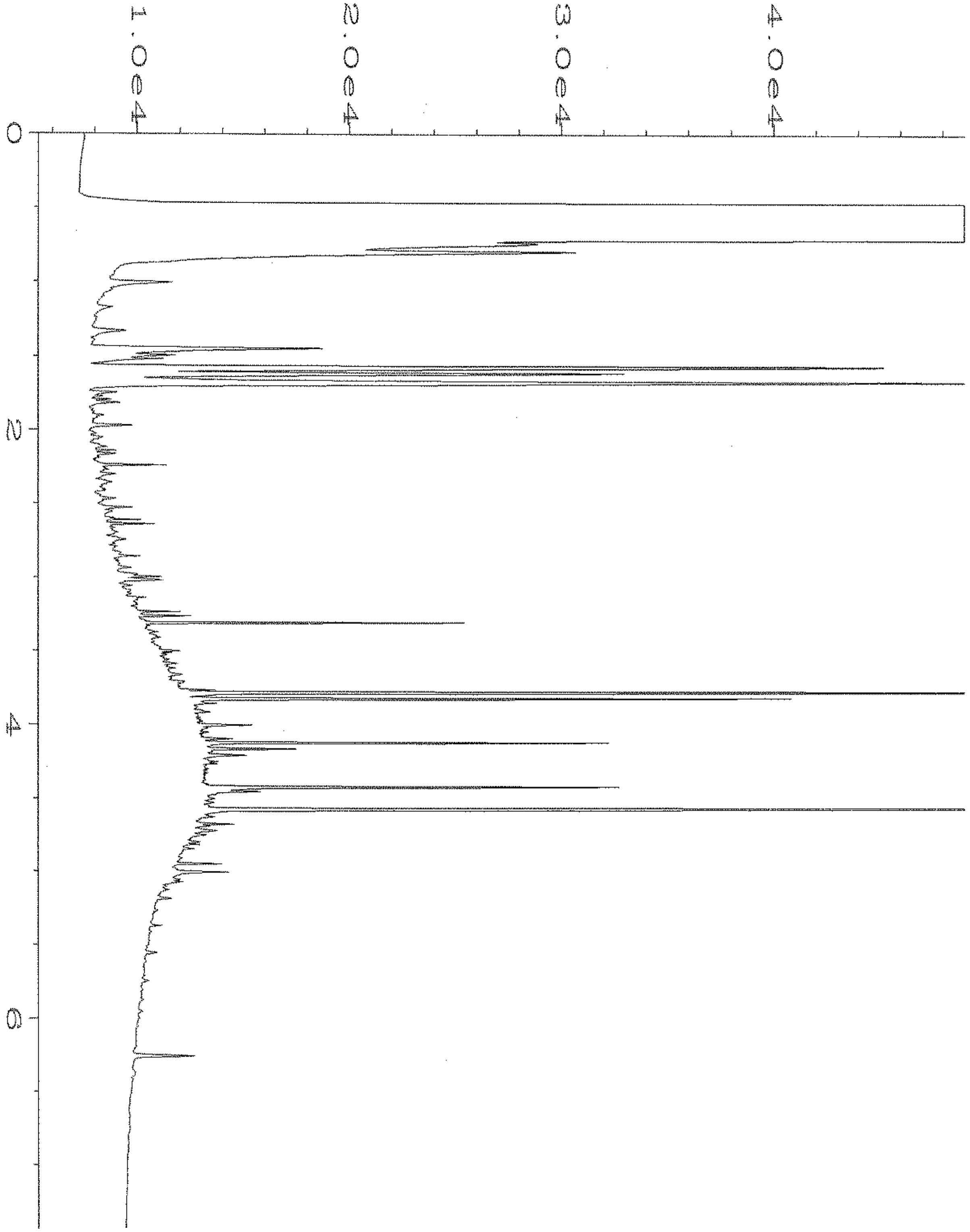
number of unused 6L canisters ______

Explain "no" items from above (use the back if needed)



Data File Name : C:\HPCHEM\1\DATA\04-22-22\058F1601.D
Operator : TL
Instrument : GC1
Sample Name : 204363-01
Run Time Bar Code:
Acquired on : 22 Apr 22 11:53 PM
Report Created on: 25 Apr 22 02:09 PM

Page Number : 1
Vial Number : 58
Injection Number : 1
Sequence Line : 16
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Data File Name    : C:\HPCHEM\1\DATA\04-22-22\059F1601.D
Operator          : TL                                  Page Number      : 1
Instrument        : GC1                                 Vial Number      : 59
Sample Name       : 204363-02                           Injection Number : 1
Run Time Bar Code:                                      Sequence Line    : 16
Acquired on       : 23 Apr 22   00:08 AM                Instrument Method: DX.MTH
Report Created on: 25 Apr 22   10:22 AM                 Analysis Method  : DX.MTH
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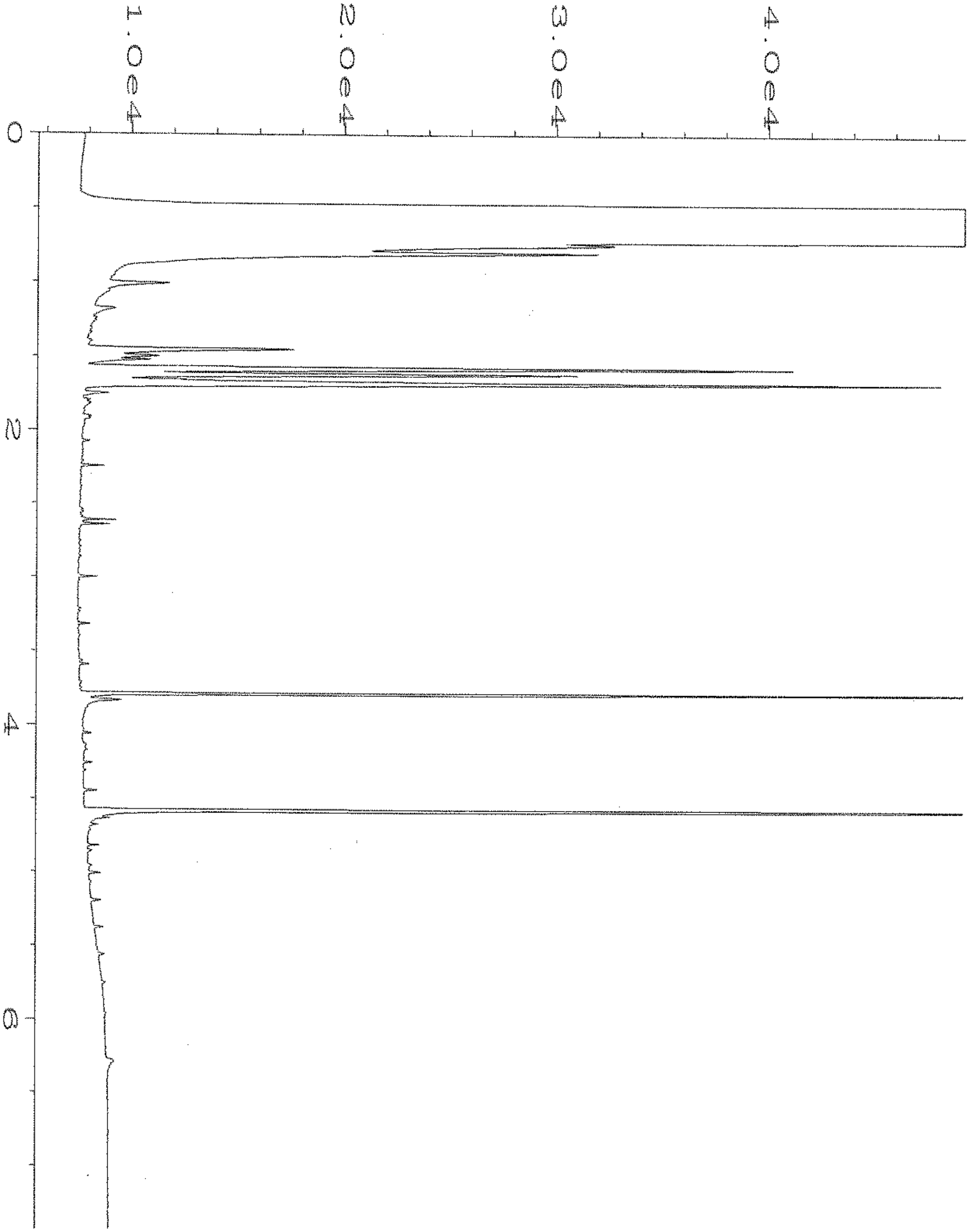
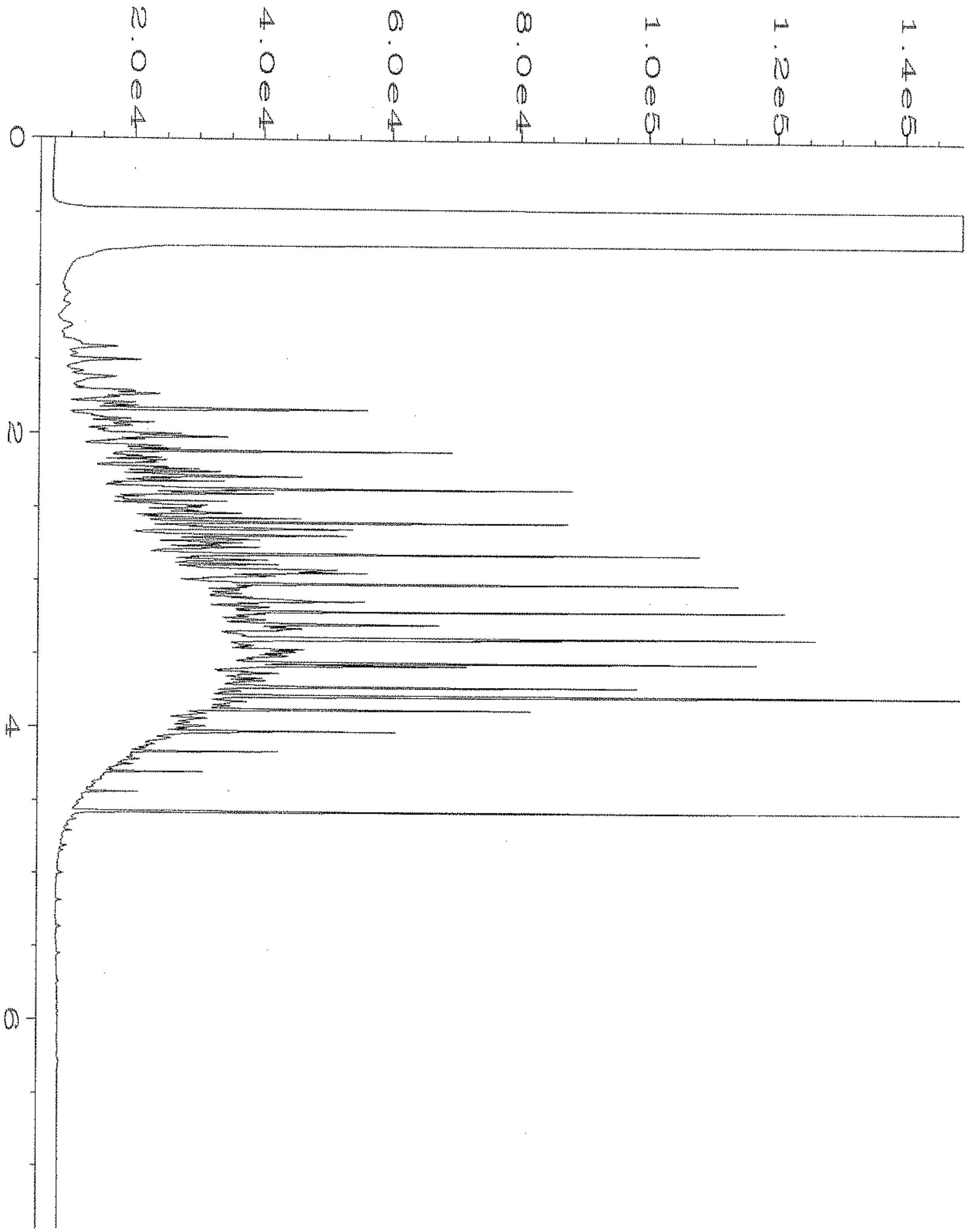


Data File Name : C:\HPCHEM\1\DATA\04-22-22\020F0801.D
Operator : TL
Instrument : GC1
Sample Name : 02-980 mb
Run Time Bar Code:
Acquired on : 22 Apr 22 12:46 PM
Report Created on: 25 Apr 22 02:09 PM

Page Number : 1
Vial Number : 20
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Data File Name    : C:\HPCHEM\1\DATA\04-22-22\003F1301.D
Operator          : TL                                  Page Number      : 1
Instrument        : GC1                                 Vial Number      : 3
Sample Name       : 500 Dx 65-122D                      Injection Number : 1
Run Time Bar Code:                                      Sequence Line    : 13
Acquired on       : 22 Apr 22   05:15 PM                Instrument Method: DX.MTH
Report Created on: 25 Apr 22   02:09 PM                 Analysis Method  : DX.MTH
```

APPENDIX D
RI Field Procedures

APPENDIX D
RI FIELD PROCEDURES

Underground Utility Locate

Prior to drilling activities, an underground utility locate will be conducted in the area of the proposed boring locations to identify subsurface utilities and/or potential underground physical hazards. The underground utility check will consist of contacting a local utility alert service (One call) and hiring a private utility locating service to locate utilities by conductible and ground penetrating radar (GPR) technologies.

Soil Sampling

The remedial investigation (RI) will be completed using continuous-flight, hollow-stem auger (HSA) equipment and direct-push drilling equipment. Discrete soil samples from selected depths will be collected during hollow-stem auger drilling using a 2-inch diameter, 18-inch long stainless-steel split spoon sampler driven with a 300-pound auto hammer dropped from a distance of 30-inches.

A representative from GeoEngineers will observe and classify the soil encountered in general accordance with ASTM D 2488-94 and maintain a detailed log of each exploration.

The sampling equipment will be decontaminated before each sampling attempt with a Liqui-Nox® solution wash and a distilled water rinse. Soil samples will be obtained from the split spoon sampler for field screening and possible chemical analysis. Undisturbed portions of selected samples will be placed in laboratory-prepared vials/jars for chemical analytical testing at an Ecology-approved laboratory. The soil samples will be placed in a cooler with ice for transport to the laboratory within proper hold-times under standard chain-of-custody procedures.

Drill cuttings and decontamination/purge water generated during RI drilling activities will be tested for characterization purposes and removed from the Site by a licensed waste removal company for off-site disposal. Borings will be backfilled with bentonite and the surface restored to match the surrounding area. Borings completed inside the C-1 Building will have the surface restored with concrete.

Sample Identification Scheme

Each environmental sample obtained during the investigation will be identified by a unique sample designation. The sample designation will be documented in the field report, on the boring log, included on the sample container label and on the laboratory chain-of-custody. The soil sample designation scheme is as follows:

- Soil samples from borings: Boring number C-1 RI1 etc., followed by the depth from which the soil sample was collected, to the nearest 0.5 foot. For example, C-1 RI1-10.0 is from boring number C-1 RI1,,and sampled at a depth of 10 feet bgs.
- Groundwater samples from monitoring wells: Boring number C-1 RI1 etc., followed by “GW” and the date. For example, C-1 RI2-GW-091222 is the groundwater sample collected from boring/monitoring well C-1 RI2, and sampled on September 12, 2022.
- IDW characterization samples: Sample IDs for IDW characterization samples will be designated as follows: IDW-Soil-1 for the first IDW soil sample, and IDW-Water-1 for the first IDW water sample.

Field Screening of Soil Samples

Soil samples obtained from the borings will be screened in the field for evidence of contamination using: (1) visual examination; (2) sheen screening and (3) vapor headspace screening with a photo-ionization detector (PID). The results of headspace and sheen screening will be included in the RI tables and on the boring logs.

Visual screening will consist of inspecting the soil for stains indicative of petroleum-related contamination. Visual screening is generally more effective when contamination is related to heavy petroleum hydrocarbons, such as motor oil or hydraulic oil, or when hydrocarbon concentrations are high. Sheen screening and headspace vapor screening are more sensitive methods that have been effective in detecting contamination at concentrations less than regulatory cleanup guidelines. Sheen screening involves placing soil in a pan of water and observing the water surface for signs of sheen. Sheen classifications are as follows:

- No Sheen (NS): No visible sheen on water surface.
- Slight Sheen (SS): Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly.
- Moderate Sheen (MS): Light to heavy sheen, may have some color/iridescence; spread is irregular to flowing; few remaining areas of no sheen on water surface.
- Heavy Sheen (HS): Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a PID is inserted in the bag and the instrument measures the concentration of combustible vapor in the air removed from the sample headspace. The PID measures concentrations in ppm (parts per million) and is calibrated to isobutylene. The PID is designed to quantify combustible gas and organic vapor concentrations up to 5,000 ppm. A lower threshold of significance of 1 ppm was used in this application. Field screening results are site-specific and vary with soil type, soil moisture content, temperature, and type of contaminant.

Groundwater Monitoring Well Development and Sampling

Following construction of the RI monitoring wells, the wells will be developed using surge and purge development methods until the groundwater is relatively clear of suspended solids. Monitoring wells will be left to sit undisturbed for at least 24 hours following development prior to groundwater sampling. Groundwater samples will be obtained from monitoring wells C-1 RI2, C-1 RI5, C-1 RI12 and C-1 RI13 if sufficient groundwater is encountered during drilling and these borings are completed as monitoring wells. Groundwater samples will be collected by low-flow methods using dedicated disposable tubing and a peristaltic pump. Groundwater samples will be placed in laboratory-prepared vials/jars for chemical analytical testing at an Ecology-approved laboratory. The samples will be placed in a cooler with ice for transport to the laboratory within proper hold-times under standard chain-of-custody procedures. Purge water from groundwater sampling will be placed into drums and left on site pending receipt of analytical data for characterization and disposal at a permitted offsite facility.

Investigation-Derived Waste Management

Investigation-derived waste (IDW) will include drill cuttings, well development water, sampling equipment decontamination water, pre-sampling purge water from monitoring wells, and incidental waste.

Drill cuttings, well development water, decontamination water, and pre-sampling purge water will be stored in sealed drums. The drums will be temporarily stored on the Site pending waste designation and off-site disposal. The drums will be labeled with the following information:

- Material contained in the drum (e.g., drill cuttings, decontamination water, etc.).
- Source of the material (e.g., investigation locations and depths where applicable).
- Date material was generated.
- Name and telephone number of the appropriate contact person.

Incidental waste to be generated during sampling activities includes items such as disposable gloves, plastic sheeting, sample bags, paper towels, and similar expended and discarded field supplies. These materials are considered *de minimis* and will be disposed of in a trash receptacle or county disposal facility.

Additional details regarding IDW management are provided in the RI Work Plan.

APPENDIX E

Quality Assurance Project Plan

APPENDIX E
QUALITY ASSURANCE PROJECT PLAN (QAPP)

This QAPP was developed for subsurface investigation activities at Paine Field/Snohomish County Airport in connection with Remedial Investigation (RI) activities at the C-1 Hangar and C-1 Building to conform with Washington State Department of Ecology (Ecology) soil and groundwater sampling guidelines. The QAPP covers Quality Assurance/Quality Control (QA/QC) procedures for site investigations.

The QAPP serves as the primary guide for the integration of QA and QC functions for the soil and groundwater sample collection activities outlined in the RI Work Plan. The QAPP presents the objectives, procedures, organization, functional activities and specific QA and QC activities designed to achieve data quality goals established for the project. This QAPP is based on guidelines specified in the US Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans (EPA 2002).

Throughout the project, environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality, and meet established objectives. QA/QC procedures will be implemented so that precision, accuracy, representativeness, completeness, and comparability of data generated meet the specified data quality objectives. Data collected by the methods outlined in this document are used to assess site conditions. The data might also be used to evaluate risk to environmental receptors via identified routes of exposure for complete pathways, address the need for remediation workplan development, evaluate remediation effectiveness and/or provide regulatory closure criteria.

Project Objective

This QAPP establishes qualitative and quantitative measures so that data of acceptable quality is collected, and to ascertain that project-specific data quality objectives (DQOs) are met. DQOs include:

- Generating data able to withstand scientific scrutiny and is suitable for its intended use;
- Generating data using controlled, approved field sampling procedures, chain of custody (COC) record keeping and laboratory analysis; and
- Using collection and analytical methods to produce data of known precision and accuracy.

Data quality will be evaluated by how well the final data meet the established objectives. Specific QA elements have been established from "*Guidance on Systematic Planning Using the Data Quality Objectives Process*" (EPA 2006) to verify that data quality objectives are met, and field and analytical procedure elements are outlined in the following sections. This information has been compiled based on the anticipated work to be performed under the contract. Changes to procedures or unexpected difficulties in the field may require amendment of this QAPP. Changes in the QAPP will be brought to the attention of Ecology for review and approval.

Supporting Documentation

This QAPP provides supporting information in the form of tables, figures, and attachments that detail analytical data and technical procedures needed for successful completion of field and laboratory actions. Attached Table E-1, Test Methods, Sample Containers, Preservation and Holding Time, provides a summary of analytical methods with soil and groundwater sample collection requirements. Attached Table E-2, Measurement Quality Objectives, lists measurement quality objectives. Table E-3, Quality Control Sample Type and Frequency, lists quality control sample type and frequency. Control limits related to analytes listed in the tables are associated with data validation requirements as stated in the National Functional Guideline documents (EPA 2020a, 2020b).

DISTRIBUTION LIST

Key Project personnel and their responsibilities are defined in Table A-I. The final approved QAPP will be distributed to the following personnel and analytical laboratory contacts.

TABLE A-I. PROJECT DISTRIBUTION LIST

Name	Project Affiliation	Organization and Location	Contact Number
Andrew Rardin	Airport Environmental and Wildlife Manager	Paine Field/Snohomish County Airport	425.388.5115
Jacob Letts	Project Manager/Field Coordinator	GeoEngineers, Tacoma	253.722.2419
Tim Syverson	Senior Reviewer	GeoEngineers, Seattle	206.605.9236
Denell Warren	QA Leader	GeoEngineers, Tacoma	253.722.2792
Michael Erdahl	Laboratory Project Manager	Friedman and Bruya, Seattle	206.285.8282
Katy Atakturk	Project Geologist/Field Investigation Lead	GeoEngineers, Seattle	425.861.6045

PROJECT ORGANIZATION AND RESPONSIBILITY

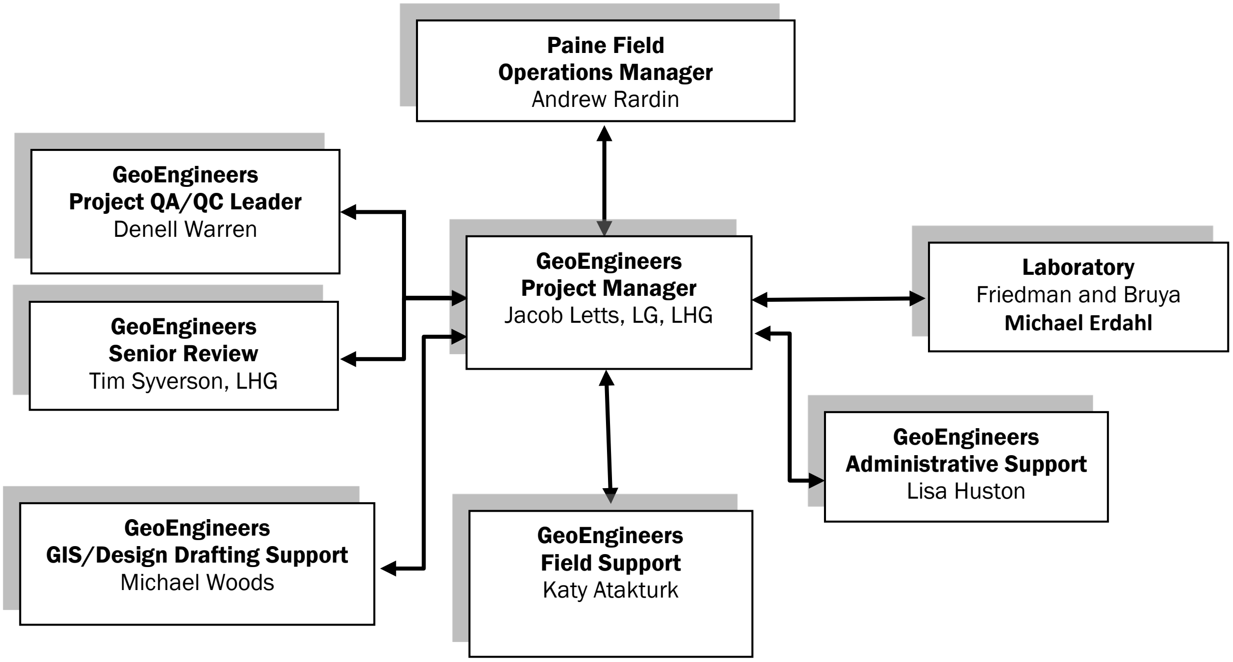
Descriptions of the responsibilities, lines of authority and communication for the key positions in the QA/QC are provided in Table A-II below. This organization facilitates the efficient production of project work, allows for an independent quality review, and permits resolution of QA issues before report submittal. Key positions are discussed below, and project organization is provided in Chart E-1, Project Organization.

TABLE E-II. KEY PERSONNEL AND ASSOCIATED RESPONSIBILITIES

Name	Project Title/Responsibility
Jacob Letts, LG, LHG	**GeoEngineers Project Manager/Field Coordinator** ▪ Performs overall project planning, document development and approval, sample planning and coordination, laboratory coordination, reporting functions, project report/summary development and project documentation. ▪ Verifies project work is conducted in accordance with the approved QAPP, and applicable project operating procedures. ▪ Confirms that personnel assigned to the project are appropriately trained and qualified. ▪ Communicates key elements of on-site safety to field personnel, including personal protective measures and equipment, emergency preparedness and incident protocol. ▪ Performs data review and verification per the project QAPP, using the appropriate checklist located in this Appendix A. ▪ Reviews the project QAPP and standard operating procedures to determine if revision is necessary. If document revision is required, the GeoEngineers Quality Assurance Officer (QAO) initiates such action. All such documents will be revised, reviewed, and approved prior to implementing modifications. ▪ Confirms that appropriate sampling, testing, and measurement procedures are followed. ▪ Documents audit and data review/verification activities. ▪ Performs all other duties and responsibilities as assigned in the project QAPP. ▪ Coordinates the transfer of field data, sample tracking forms, and logbooks to the Project Manager (PM) for data reduction and validation. ▪ Coordinate work with on-site subcontractors.
Denell Warren	**GeoEngineers QA/QC Leader** ▪ Serves as the official contact for laboratory data QA concerns. ▪ Responds to laboratory data and QA needs, resolve issues, and answer requests for guidance and assistance if needed. ▪ Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective. ▪ Maintains the authority to implement corrective actions as necessary. ▪ Evaluates the laboratory's final QA report for any condition that adversely impacts data generation if data qualifiers are reported.
Michael Erdahl	**Friedman and Bruya Laboratory Contact/Manager** ▪ Implements the laboratory QA plan. ▪ Serves as the primary point of contact for the laboratory. ▪ Activates corrective action for out-of-control events. ▪ Issues the final QA/QC report. ▪ Administers QA sample analysis. ▪ Complies with the specifications established in the project plans as related to laboratory services. ▪ Participates in QA audits and compliance inspections. ▪ Issues sample receipts, verifies analysis, and confirms the laboratory data review.

Chart E-1 below shows Paine Field/Snohomish County Airport and GeoEngineers project organization.

CHART E-1. PROJECT ORGANIZATION



Health and Safety

A site-specific Health and Safety Plan (HASP) is included in Appendix F. Job Hazard Analysis (JHA) forms will be completed for each of the various investigation and sampling activities. The Field Coordinator will be responsible for implementing the HASP during sampling activities. The PM will discuss health and safety issues with the Field Coordinator on a routine basis during the completion of field activities.

A daily tailgate safety meeting will be conducted before beginning field activities. Field staff will consult with the selected contractor when conditions that do not comply with the HASP are observed; activities that do not comply with the HASP will be terminated. Retained subcontractors will be responsible to prepare and implement their own HASP.

Intended Data Use

Data collected for this project will be used to assess and quantify the presence of chemicals of concern (CoCs) with respect to Model Toxics Cleanup Act (MTCA) Method A cleanup levels.

Data collected during field sampling will be used to evaluate if a CoC release has occurred. Subsurface investigation activities will be presented in a single report; and will include data interpretation.

Project Timetable

Investigation activities are expected to take several days to complete; groundwater sampling is expected to take one day to complete following a 48-hour equilibration period of the newly installed wells. The report is projected to be completed within 6 weeks after receipt of the final laboratory report.

DATA QUALITY OBJECTIVES

The QA objective for technical data is to collect environmental monitoring data of known, acceptable, and documentable quality for which to make environmental decisions. The QA objectives established for the project are:

1. Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
2. Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness, and comparability, and by evaluating data against these criteria.

The sampling design, field procedures, laboratory procedures, and QC procedures are set up to provide high-quality and defensible data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (precision, bias, accuracy, completeness, and reporting limits) and qualitative factors (representativeness and comparability). The measurement quality objectives associated with these data quality factors are summarized in Table E-2, Measurement Quality Objectives, and are discussed below.

Analytes and Matrices of Concern

Soil and groundwater samples will be collected during the assessment. The chemical analyses will be performed by Friedman and Bruya Laboratory. Laboratory quality control and analytical methods are referenced from the Friedman and Bruya Quality Assurance Manual (QAM) dated June 12, 2021. An "uncontrolled" copy of the QAM is retained by Geoengineers in the project file.

Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Individual instruments often can detect but not accurately quantify compounds at concentrations lower than the MDL, referred to as the instrument detection limit (IDL). Although results reported near the MDL or IDL provide insight to site conditions, QA dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL) or method reporting limit (MRL). The PQL/MRL is the lowest standard on the calibration curve and the lowest level that can be reliably achieved within established precision and accuracy limits. The MDL is the minimum chemical concentration that can be analyzed with 99 percent confidence that the analyte concentration is greater than zero. It is requested the laboratory report detected compounds below the PQL/MRL.

Comparison of laboratory analytical PQLs and MDLs with regulatory levels indicates the PQL/MDLs are below the required standards for the CoC.

Achieving a stated detection limit for a given analyte is helpful in providing statistically useful data. Intended data uses, such as comparison to numerical criteria or risk assessments, typically dictate specific project target reporting limits necessary to fulfill stated objectives. The MDLs and PQLs for site media CoCs are referenced in the specific analytical method. Laboratory analytical results reported between the MDL and PQL are identified by the laboratory with a 'J' qualifier.

The analytical methods and processes selected will provide PQLs less than the target reporting limits (TRLs) under ideal conditions. However, the reporting limits are considered targets because several factors may influence final detection limits including:

- Moisture and other physical soil conditions affect detection limits.
- Analytical procedures might require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as non-detected, but at a value much higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize site conditions.

Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for collected samples. This value is calculated by:

$$RPD\,(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2}\ X\ 100,$$

Where

D_1 = Concentration of analyte in sample

D_2 = Concentration of analyte in duplicate sample

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates) and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Persons performing the evaluation must review one or more pertinent documents (EPA 20120a, 2020b) that address criteria exceedances and courses of action. Relative percent difference goals for this effort are 50 percent in soil and 20 percent in water for all analyses, unless either the sample or duplicate values are within 5 times the reporting limit. In this case, the absolute difference is used instead of the RPD. The absolute difference control limit for soil is two times and for water is equal to the lowest reporting limit of the two samples.

Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported value versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest.

Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

Accuracy will be expressed as the percent recovery of a surrogate compound (also known as "system monitoring compound"), a matrix spike (MS) result, or from a standard reference material where:

$$Recovery\,(\%) = \frac{Sample\ Result}{Spike\ Amount}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (EPA 2020a, EPA 2020b) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, MS, and laboratory control samples (LCS) are found in Table E-2.

Representativeness, Completeness and Comparability

Representativeness expresses the degree to which data accurately and precisely represent the actual site conditions. The determination of the representativeness of the data will be performed by completing the following:

1. Comparing actual sampling procedures to those delineated within this QAPP;
2. Comparing analytical results of laboratory duplicates to determine the variations in the analytical results; and
3. Invalidating non-representative data or identifying data to be classified as questionable or qualitative. Only representative data will be used in subsequent data reduction, validation and reporting activities.

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved, an evaluation will be made to determine if the data are adequate to meet study objectives.

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

SAMPLE COLLECTION, HANDLING AND CUSTODY

Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling and documentation. Soil and groundwater samples obtained during this study will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Table E-1.

- Sample containers will be labeled with the following information at the time of collection:
- Project name and number;
- Sample name, which will include a reference to depth if appropriate;
- Analysis to be performed; and
- Date and time of collection.

Sample collection activities will be noted in the field log books. The Field Coordinator will monitor consistency between the Work Plan, sample containers/labels, field logbooks and the COC.

Sample Storage

Samples will be placed in a cooler with double-bagged "wet ice" immediately after they are collected; the objective being to attain a sample temperature of 4 ± 2 degrees Celsius. Holding times will be observed during sample storage. Holding times for the project analyses are summarized in Table E-1.

Sample Shipment

The samples will be delivered to the analytical laboratory in the coolers as soon as practical. Field personnel will ship samples submitted to Friedman and Bruya for analysis.

Measures will be implemented to minimize the potential for sample breakage, which includes packaging materials and placing sample bottles in the cooler in a manner intended to minimize damage. Sample bottles will be appropriately wrapped with bubble wrap or other protective material before being placed in coolers.

Chain of Custody Records

Field personnel are responsible for the security of samples from the time the samples are taken until the samples have been received by the laboratory. A COC form will be completed at the end of each field day for samples being delivered to the laboratory. Information to be included on the COC form includes:

- Project name and number
- Sample identification number
- Date and time of sampling
- Sample matrix and number of containers from each sampling point, including preservatives used (if applicable)
- Depth of subsurface soil sample
- Analyses to be performed
- Names of sampling personnel and transfer of custody acknowledgment spaces
- Shipping information including shipping container number

The original COC record will be signed by a member of the field team and bear a unique tracking number. Field personnel shall retain carbon copies and place the original and remaining copies in a plastic bag, placed within the cooler or taped to the inside lid of the cooler before sealing the container for delivery. This record will accompany the samples during transit to the laboratory.

Laboratory Custody Procedures

The laboratory will follow their standard operating procedures to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include at a minimum, the analysts name or initial, time and date.

Field Documentation

Field documentation provides important information about potential problems or special circumstances surrounding sample collection. Field personnel will maintain daily field logs while on-site. The field logs will be prepared on field report forms or in a bound logbook. Entries in the field logs and associated sample documentation forms will be made in waterproof ink, and corrections will consist of line-out deletions that are initialed and dated. Individual logbooks will become part of the project files after the site characterization field explorations. Drilling and sampling activities also will be photo-documented at the site.

At a minimum, the following information will be recorded during the collection of each sample:

- Sample location and description
- Site or sampling area sketch showing sample location and measured distances. Sample locations might be logged with a global positioning system (GPS) capable device instead of measured and sketched by hand
- Sampler’s name(s)
- Date and time of sample collection
- Designation of sample as composite or discrete
- Type of sample matrix
- Type of sampling equipment used
- Field instrument readings
- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.)
- Preliminary sample descriptions (e.g., lithologies, noticeable odors, colors, field-screening results)
- Sample preservation
- Shipping arrangements (overnight air bill number)
- Name of recipient laboratory
- In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling:
- Team members and their responsibilities
- Time of arrival/entry on site and time of site departure

- Weather conditions
- Other personnel present at the site
- Summary of pertinent meetings or discussions with regulatory agency or contractor personnel
- Deviations from sampling plans, site safety plans and QAPP procedures
- Changes in personnel and responsibilities with reasons for the changes
- Levels of safety protection
- Calibration readings for any equipment used and equipment model and serial number

The handling, use, and maintenance of field log books are the field coordinator’s responsibilities.

Sampling Equipment

Disposable sampling equipment will be used whenever possible. Disposable sampling equipment shall not require decontamination prior to sampling; however, field personnel will carefully inspect equipment and maintain cleanliness prior to use. Decontamination procedures are further discussed in the Sampling and Analysis Plan (SAP), Section 4.5.

Laboratory instrument/equipment testing, inspection, and maintenance will be performed and documented by the laboratory. Procedures and schedules for sampling equipment preventive maintenance are the laboratory’s responsibility. Each instrument or item of laboratory equipment will be maintained periodically to ensure accuracy. These procedures and performance frequency are designated in the individual instrument manuals. A copy of the laboratory Quality Assurance Manual was received by GeoEngineers and has been placed in the project file for reference.

Contaminated Soil

Petroleum contaminated soil may be generated as cuttings. Contaminated soil will be identified through field screening and placed in a 55-gallon drum prior to waste profiling for disposal. Purge water may be generated during groundwater sampling. Purge water will be placed in a separate 55-gallon drum for disposal. Environmental samples generated for laboratory testing purposes become the responsibility of the laboratory. As such, disposal responsibilities will remain with the laboratory at the conclusion of testing activities for spent samples.

Contaminated soil will be disposed in accordance with applicable state and federal regulations.

CALIBRATION PROCEDURES

Equipment and instrumentation calibration facilitates accurate and reliable measurements.

Field Instrumentation

Equipment and instrumentation calibration facilitates accurate and reliable field measurements. Field and laboratory equipment used on the project will be calibrated and adjusted in general accordance with the manufacturer’s recommendations. Methods and intervals of calibration and maintenance will be based on the type of equipment, stability characteristics, required accuracy, intended use, and environmental conditions. The basic calibration frequencies are described below.

The photoionization detector (PID) used for total hydrocarbon screening will be calibrated prior to initial use, at least once per day, or after the unit has been turned off. Calibration results/checks will be recorded in the field logbook.

Laboratory Instrumentation

For analytical chemistry, calibration procedures will be performed in general accordance with the methods cited and laboratory standard operating procedures. Calibration documentation will be retained at the laboratory and readily available for a period of 6 months.

DATA REPORTING AND LABORATORY DELIVERABLES

The laboratory will report data in digital form. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates and detection limits (MDL and PQL/MRL). Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverables (EDD) will be established by GeoEngineers, Inc., with the contract laboratory. Final results will be sent to the GeoEngineers Project Manager.

INTERNAL QC

Table E-3 summarizes the types and frequency of QC samples to be collected during the site characterization, including both field QC and laboratory QC samples.

Field QC

Field QC samples serve as a control and check mechanism to monitor the consistency of sampling methods and the influence of off-site factors on environmental samples.

Field Duplicates

In addition to replicate analyses performed in the laboratory, field duplicates also serve as measures for precision. Under ideal field conditions, field duplicates are created when a volume of the sample matrix is thoroughly mixed, placed in separate containers, and identified as different samples. This tests both the precision and consistency of laboratory analytical procedures and methods, and the consistency of the sampling techniques used by field personnel.

One soil and one groundwater duplicate sample will be obtained during this project for laboratory analysis.

Field Blanks

According to the *"National Functional Guidelines for Organic Superfund Methods Data Review"* (EPA 2020b), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks and equipment blanks)." Trip blanks (typically for volatile analysis) are placed with samples during shipment and travel with samples from the laboratory to the field and back to the laboratory; method blanks are created during sample preparation and follow samples throughout the analysis process; and equipment blanks are generated in the field to provide QA/QC for decontamination procedures. Trip blanks will be analyzed for this project.

Analytical results for blanks will be interpreted in general accordance with *National Functional Guidelines for Organic Superfund Methods Data Review* (EPA 2020b) and professional judgment.

Laboratory QC

Laboratory QC procedures will be evaluated through a formal data validation process. The analytical laboratory will follow standard method procedures that include specified QC monitoring requirements. These requirements will vary by method, but generally include:

- Method blanks
- Internal standards
- Calibrations
- MS/matrix spike duplicates (MSD)
- LCS/laboratory control spike duplicates (LCSD)
- Laboratory replicates or duplicates
- Surrogate spikes

Laboratory Blanks

Laboratory method blanks are the most commonly used blank for QA/QC assessments. Method blanks are laboratory QC samples consisting of either a soil-like material having undergone a contaminant destruction process, or high-performance liquid chromatography (HPLC) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. Method blanks are particularly useful during volatiles analysis since volatile organic compounds (VOCs) can be transported in the laboratory through the vapor phase. If a substance is found in the method blank, then one (or more) of the following likely occurred:

1. Measurement apparatus or containers were not properly cleaned and contained contaminants.
2. Reagents used in the process were contaminated with a substance(s) of interest.
3. Contaminated analytical equipment was not properly cleaned.
4. Volatile substances in the air with high solubility or affinities toward the sample matrix contaminated the samples during preparation or analysis.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that conditions affecting the blanks also affected the project samples. Given method blank results, validation rules assist in determining which substances in samples are considered "real," and which ones are attributable to the analytical process. Furthermore, the EPA (2002a) guidelines state, "there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example."

Calibrations

Several types of calibrations are used, depending on the method, to determine whether the methodology is 'in control' by verifying the linearity of the calibration curve and so that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations and continuing calibration verifications.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH affects the results of semi-volatile organic compounds (SVOCs); or the presence of a particular compound may interfere with accurate quantitation of another compound. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix effects cannot be determined due to dilution and/or high levels of related substances in the sample. A MS is evaluated by spiking a known amount of one or more of the target analytes ideally at a concentration of 5 to 10 times higher than the sample result. A percent recovery is calculated by subtracting the sample result from the spike result, dividing by the spiked amount, and multiplying by 100.

The samples for the MS and MSD analyses will be collected from a sampling location that is believed to exhibit low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for these analyses.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

Also known as blanks spikes, LCSs are similar to matrix spikes in that a known amount of one or more of the target analytes are spiked into a prepared media and a percent recovery of the spiked substances are calculated. The primary difference between a MS and LCS is that the LCS media is considered "clean" or contaminant free; therefore, eliminating the possibility of matrix interference. For example, HPLC water is typically used for LCS water analyses. The purpose of an LCS and LCSD is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance. LCS data must be reviewed in context with other controls to determine if out-of-control events occur.

Laboratory Replicates/Duplicates

Laboratories often utilize MS/MSDs, LCS/LCSDs, and/or replicates to assess precision. Replicates are a second analysis of a field collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process, but most commonly occur as a second analysis on the extracted media.

Surrogate Spikes

The purposes of using a surrogate are to verify the accuracy of the instrument being used and extraction procedures. Surrogates are substances similar, but not one of, the target analytes. A known concentration of surrogate is added to the sample and passed through the instrument, noting the surrogate recovery.

Each surrogate used has an acceptable range of percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified range of acceptance a possibility of false positives exist, although non-detected results are considered accurate.

Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of a soil sample is exceeded, then the possibility exists that some of the organic constituents have volatilized from the sample or degraded. Results for that analysis will be qualified as estimated to indicate that the reported results may be lower than actual site conditions. Holding times are presented in Table E-1.

ANALYTICAL PROCEDURES

Analytical procedures are specified in Section 4.0 of the RI Work Plan. Friedman and Bruya is responsible for implementing the selected analytical methods, documenting modifications (if any) to the methods, and providing these documents for review upon request.

Sample collection or analytical changes as detailed in the RI Work Plan may require QC program modification. If field samples require changes in testing methodology or modification of MDLs, the rationale will be identified in the RI Work Plan, and subsequently updated in this QAPP.

DATA REDUCTION AND ASSESSMENT PROCEDURES

Data Reduction

Data reduction involves the conversion or transcription of field and analytical data to a useable format. The laboratory personnel will reduce the analytical data for review by the GeoEngineers PM and QA Leader (if needed).

Field Measurement Evaluation

Field data will be reviewed at the end of the field program by following the QC checks outlined below, procedures in the Work Plan, and commensurate with the Stage 2A Data Verification and Data Validation Process (EPA 2009). Field data documentation will be checked against the applicable criteria as follows:

- Sample collection information
- Field instrumentation and calibration
- Sample collection protocol
- Sample containers, preservation, and volume
- Field QC samples collected at the frequency specified

- Sample documentation and COC protocols
- Sample shipment

Cooler receipt forms and sample condition forms provided by the laboratory will be reviewed for out-of-control incidents. The final report will contain what effects, if any, an incident has on data quality. Sample collection information will be reviewed for correctness before inclusion in a final report.

Field QC Evaluation

A field QC evaluation will be conducted by reviewing field log books and daily reports, discussing field activities with staff, and reviewing field QC samples (trip blanks and field duplicates).

A duplicate soil sample will be collected even though a well-mixed sample is not entirely homogenous due to sampling procedures, soil conditions and contaminant transport mechanisms.

Laboratory Data QC Evaluation

The laboratory data assessment will consist of a formal review of the following QC parameters:

- Holding times
- Method blanks
- MS/MSD
- LCS/LCSD
- Surrogate spikes
- Replicates

In addition to these QC mechanisms, other documentation such as cooler receipt forms and case narratives will be reviewed to fully evaluate laboratory QA/QC.

DATA QUALITY REVIEW AND VALIDATION PROCEDURES

Analytical data shall first be compiled by the analytical laboratory and reduced to include the specified deliverable elements. Friedman and Bruya will conduct an internal review of analytical data prior to data report submission to GeoEngineers. Data reports must be signed by laboratory personnel responsible for production and analytical data review. Once received, the data will be validated by GeoEngineers QA/QC Leader in compliance with existing validation guidelines prior to submitting to the Project Manager for data assessment.

ASSESSMENT AND RESPONSE ACTIONS

Project QAPP assessment will be performed by reviewing field notes, laboratory reports, and by conducting field and laboratory audits where possible and as resources allow. This assessment will be completed or directed by the GeoEngineers PM. Errors or inconsistencies identified in the field notes will be investigated and corrected to ensure data integrity, and conformance to the QAPP and associated field sampling procedures. Laboratory internal QA reviews, audits, surveillances, or other types of assessment will also be reviewed. If unexpected analytical results are reported, the GeoEngineers PM will contact the laboratory to perform a review of the questionable data. A note to the file regarding follow-up QA activities will be included with the field notes and laboratory reports, if warranted.

The GeoEngineers PM will review the QAPP to ascertain if the document continues to meet the data user(s) needs. If the QAPP or RI Work Plan requires revision as a result of the audit or review, the corrections will be made, and the revised QAPP submitted to the original signatories for preapproval prior to implementation.

DATA MANAGEMENT

Data management consists of routing and storing incoming data and project correspondence to facilitate security, access and compliance with project goals.

Analytical Data Management

Friedman and Bruya will provide data to GeoEngineers in an electronic format. Electronic data will be sent to GeoEngineers QA/QC Leader for validation. The electronic data will be processed into an analytical database and/or Microsoft Excel spreadsheet for reporting.

Data Review, Verification and Validation

Data Review

Data review is performed by the GeoEngineers Project Manager to verify that project data has been recorded, transmitted, and processed correctly.

Data Verification

Data verification follows data review and is performed to evaluate data completeness, correctness, conformance, and compliance against QAPP-specified method, procedural or contractual requirements. Data verification evaluates actual project performance against QAPP established requirements.

Data Validation

Data Validation is conducted by the GeoEngineers QA/QC Leader, or qualified expert not otherwise assigned to the project or data generating activities. Validation follows the data review and verification process and is an analyte- and sample-specific process that determines specific data quality with respect to project objectives. Data validation efforts shall include reviewing a minimum of 90 percent of all project data.

Project data validation must be equivalent, or at a minimum to EPA Stage 1 and Stage 2A verification and validation checks as outlined in the guidance (EPA 2009). These checks include verifying the following:

- Documentation identifying sample-receiving analytical laboratory for samples submitted for analyses
- Requested analytical methods performed and analysis dates
- Requested target analyte results reported with original laboratory data qualifiers, and data qualifier definitions
- Requested target analyte units are reported

- Requested reporting limits for samples are present and results at or below the reporting limits are identified
- Documentation of sample collection dates and times; date and time of laboratory sample receipt; and sample conditions upon receipt by laboratory
- Sample results are evaluated by comparing sample conditions upon receipt by the laboratory and sample characteristics to the requirements and guidelines present in national or regional data validation documents or analytical method(s)
- Required handling, preparation, cleanup, and analytical methods are performed
- Method dates for handling preparation, cleanup and analysis are present, as appropriate
- Sample-related QC data and QC acceptance criteria (e.g., method blanks, surrogate recoveries, laboratory control sample recoveries, duplicate analyses, matrix spike, and matrix spike duplicate recoveries, serial dilutions, post-digestion spikes, standard reference materials) are provided and linked to the reported field samples
- Requested spike analytes or compounds are added, as appropriate
- Sample holding times are evaluated
- Frequency of laboratory QC samples is checked for appropriateness
- Sample results are evaluated by comparing holding times and sample-related QC data to the requirements and guidelines present in national or regional validation documents or analytical method(s)

Potential unacceptable departures from the project QAPP requirements will be noted during the data validation process. If the GeoEngineers QA/QC Manager determine the data do not meet the project needs, or the QAPP DQOs and/or conclusions drawn from the data do not appear reasonable, they shall immediately report such findings to the GeoEngineers Project Manager to address necessary corrective actions. Such findings and activities shall be documented and maintained in the project files.

Non-direct Measurements and Data

Non-direct measurements and data acquisition refer to data obtained for project use from existing data sources, obtained or produced by others, and not directly measured or generated in this project scope. Once existing data has been received, reviewed, and validated referencing EPA QA/G-8 (EPA 2002b) it may be incorporated into a final report.

REPORTS TO CLIENT

Reports will be submitted to Paine Field/Snohomish County Airports in a format specified in the RI Work Plan. The timing of deliverables provided to Paine Field/Snohomish County Airports will be established in the RI Work Plan.

RECONCILIATION WITH USER REQUIREMENTS

The data will be reviewed by GeoEngineers QA/QC Manager to determine whether the data are adequate to meet the project objectives. Deviations from the DQOs or the QAPP will be reported to the GeoEngineers Project Manager to determine and document corrective actions, if necessary. Required revisions will be addressed in a revised QAPP or Work Plan and will be detailed in the decommissioning report.

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Environmental Protection Agency. 2016. Regional Screening Level (RSL) Summary Table (TR=1E, HQ=1) June 2017 from EPA Risk Assessment website https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.

Environmental Protection Agency. 20120a. Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA-542-R-20-006. November 2020.

Environmental Protection Agency. 2020b. Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review, EPA-540-R-20-005. November 2020.

Table E-1

Test Methods, Sample Containers, Preservation and Holding Time[1]

C-1 Hangar and C-1 Building

Paine Field/Snohomish County Airports

Analysis	Matrix	Method	Minimum Sample	Sample Containers	Sample Preservation	Holding Times
Gasoline Range Total Petroleum Hydrocarbons (TPH-GRO)	Soil	NWTPH-Gx	10 mL	40 ml VOA Vial	10 ml MeOH, Cool to 4±2°C	14 Days
	Groundwater	NWTPH-Gx	120 ml	40 ml VOA Vial	HCl, Cool to 4±2°C	14 Days
Diesel and Heavy Oil Range TPH (TPH-DRO & ORO)	Soil	NWTPH-Dx	10 g	Clear 4 oz glass wide-mouth jar with Teflon-lined lid	none, Cool to 4±2°C	14 Days
	Groundwater	NWTPH-Dx	500 ml	250 ml amber glass bottle	HCl, Cool to 4±2°C	14 Days
Volatile Organic Compounds (VOCs)	Soil	5035A/8260D	80 ml	40 mL amber VOA, tared with stir bar	None, Cool to 4±2°C	48 hours
	Groundwater	8260D	120 mL	40 ml amber VOA vial, PFTE septa cap, no headspace	pH<2 with HCl or 4 mg NH_4Cl, Cool to 4±2°C	14 days
RCRA 8 Metals	Soil	6010D	20 g	Clear 4 oz glass wide-mouth jar with Teflon-lined lid	None	180 days
	Soil	7471A	20 g	Clear 4 oz glass wide-mouth jar with Teflon-lined lid	None	28 days
	Groundwater	6010D	100 ml	Plastic 250 ml bottle	Nitric Acid	180 days
	Groundwater	7471A	100 ml	Plastic 250 ml bottle	Nitric Acid	28 Days

Notes:

[1] Holding times are based on elapsed time from date of collection.

VOA = volatile organic analysis; HDPE = High Density Polyethylene; HCl - Hydrochloric acid;

g = gram; mL = milliliter; C = Celsius

Table E-2

Measurement Quality Objectives

C-1 Hangar and C-1 Building

Paine Field/Snohomish County Airports

Laboratory Analysis	Reference Method	Surrogate Standards (SS) %R Limits[1,2,3]	Check Standard (LCS) %R Limits[2,3]	Matrix Spike %R Limits[3]	MSD Samples or Lab Duplicate RPD Limits[4]	Field Duplicate Samples RPD Limits[4]
		Soil/GW	Soil/GW	Soil/GW	Soil/GW	Soil/GW
Gasoline Range Total Petroleum Hydrocarbons	NWTPH-Gx	50%-150%	50%-150%	30%-140%	≤35%	≤50%/≤20%
Diesel and Heavy Oil Total Petroleum Hydrocarbons	NWTPH-Dx	50%-150%	50%-150%	30%-140%	≤35%	≤50%/≤20%
Volatile Organic Compounds	8260D	50%-150%	50%-150%	30%-140%	≤35%	≤50%/≤20%
Polyaromatic Hydrocarbons (PAHs)	8270E-SIM	50%-150%	50%-150%	30%-140%	≤35%	≤50%/≤20%
Per- and Polyfluoroalkyl Substances	QSM B15	50%-150%	50%-150%	30%-140%	≤35%	≤50%/≤20%
RCRA 8 Metals (Totals)	6010D/7471A	NA	80%-120%	75%-125%	≤35%	≤50%/≤20%

Notes:

[1] Individual surrogate recoveries are compound specific.

[2] Recovery Ranges are estimates. Actual ranges will be provided by the laboratory when contracted.

[3] Percent Recovery Limits are expressed as ranges based on laboratory control limits. Limits will vary for individual analytes.

[4] RPD control limits are only applicable if the concentration is greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the difference between the sample and duplicate must be less than 2X the MRL for soils.

Method numbers refer to EPA SW-846 Analytical Methods recommended analytical methods.

%R = percent recovery; LCS = Laboratory Control Sample; MS/MSD = Matrix Spike/Matrix Spike Duplicate; RPD = Relative Percent Difference

Table E-3

Quality Control Sample Type and Frequency

C-1 Hangar and C-1 Building

Paine Field/Snohomish County Airports

Parameter	Field QC		Laboratory QC			
	Field Duplicates	**Trip Blanks**	**Method Blanks**	**LCS**	**MS / MSD**	**Lab Duplicates**
TPH-GRO, DRO/ORO	NA	NA	NA	NA	NA	NA
VOCs	1/batch	1/batch	1/batch	1/batch	1/batch	1/batch
PAHs	1/batch	NA	1/batch	1/batch	1/batch	1/batch
PFAS	1/batch	1/batch	1/batch	1/batch	1/batch	1/batch
RCRA 8 Total Metals	NA	NA	NA	NA	NA	NA

Notes:

No more than 20 field samples can be contained in one batch.

LCS = Laboratory control sample; MS = Matrix spike sample; MSD = Matrix spike duplicate sample

NA = Not applicable

PAHs = Polycyclic Aromatic Hydrocarbons

PFAS = Per- and Polyfluoroalkyl Substances

RCRA - Resource Conservation and Recovery Act

TPH-GRO, DRO, ORO = Total Petroleum Hydrocarbons - Gasoline Range, Diesel Range and Heavy Oil Range

VOCs = volatile organic compounds

APPENDIX F

Health and Safety Plan

Site Health & Safety Plan

Remedial Investigation

C-1 Hangar and C-1 Building
Paine Field, Snohomish County, Washington

for
Paine Field/Snohomish County Airport

September 2, 2022

GEOENGINEERS

2101 4th Avenue, Suite 950
Seattle, Washington 98121
206.728.2674

Table of Contents

GEOENGINEERS, INC.
SITE HEALTH AND SAFETY PLAN
REMEDIAL INVESTIGATION PLANNING AND IMPLEMENTATION
C-1 HANGAR AND C-1 BUILDING
FILE NO. 05530-014-02

This Health and Safety Plan (HASP) is to be used in conjunction with the GeoEngineers, Inc. (GeoEngineers) Safety Programs. Together, the written safety programs and this HASP constitute the site safety plan for this site. This plan is to be used by GeoEngineers personnel on this site and must be available on site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included, and the plan will need to be approved by the GeoEngineers Health and Safety Program Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Programs.

Liability Clause: If requested by subcontractors, this site HASP may be provided for informational purposes only. In this case, Form 1 shall be signed by the subcontractor. Please be advised that this site-specific HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

GENERAL PROJECT INFORMATION

Project Name:	Remedial Investigation Paine Field/Snohomish County Airport – C-1 Hangar and C-1 Building
Project Number:	05530-014-02
Type of Project:	Remedial Investigation
Start/Completion:	July 2022/July 2023
Subcontractors:	To be determined

Chain of Command	Title	Name	Telephone Numbers
1	**Project Manager**	Jacob Letts	206.228.4375
2	**Site Safety Officer (SSO)**	Katy Ataktürk	206.419.4290
3	**Health and Safety Program Manager**	Lucas Miller	509.209.2830
4	**Field Personnel**	Katy Ataktürk	206.419.4290
5	**Client Assigned Site Supervisor**	Paul Robinette	253.278.0273
6	**Subcontractor(s)**	To be determined	
7	**Current Owner**	Snohomish County Paine Field – Andrew Rardin Owner contact	425.388.5115

Functional Responsibility

Health and Safety Program Manager (HSM), Lucas Miller

GeoEngineers' Health and Safety Program Manager (HSM) is responsible for implementing and promoting employee participation in the program. The HSM issues directives, advisories and information regarding health and safety to the technical staff. Additionally, the HSM has the authority to audit on-site compliance with HASPs, suspend work or modify work practices for safety reasons, and dismiss from the site any GeoEngineers or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others.

Project Manager (PM)

A PM is assigned to manage the activities of various projects and is responsible to the principal-in-charge of the project. The PM is responsible for assessing the hazards present at a job site and incorporating the appropriate safety measures for field staff protection into the field briefing and/or Site Safety Plan. He or she is also responsible for assuring that appropriate HASPs complying with this manual are developed. The PM will provide a summary of chemical analysis to personnel completing the HASP. PMs shall also see that their project budgets consider health and safety costs. The PM shall keep the HSM informed of the project's health- and safety-related matters as necessary. The PM shall designate the project Site Safety Officer (SSO) and help the SSO implement the specifications of the HASP. The PM is responsible for communicating information in site safety plans and checklists to appropriate field personnel. Additionally, the PM and SSO shall hold a site safety briefing before any field activities begin. The PM is responsible for transmitting health and safety information to the Site Safety Officer (SSO) when appropriate.

Site Safety Officer/HAZWOPER (SSO)

The SSO will have the on-site responsibility and authority to modify and stop work, or remove personnel from the site if working conditions change that may affect on-site and off-site health and safety. The SSO will be the main contact for any on-site emergency situation. The SSO is First Aid and CPR qualified and has current Hazardous Waste Operations and Emergency Response (HAZWOPER) training. The SSO is responsible for implementing and enforcing the project safety program and safe work practices during site activities. The SSO shall conduct daily safety meetings, perform air monitoring as required, conduct site safety inspections as required, coordinate emergency medical care, and ensure personnel are wearing the appropriate personal protective equipment (PPE). The SSO shall have advanced fieldwork experience and shall be familiar with health and safety requirements specific to the project. The SSO has the authority to suspend site activities if unsafe conditions are reported or observed.

Duties of the SSO include the following:

- Implementing the HASP in the field and monitoring compliance with its guidelines by staff.
- Being sure that all GeoEngineers field personnel have met the training and medical examination requirements. Advising other contractor employees of these requirements.
- Maintaining adequate and functioning safety supplies and equipment at the site.
- Setting up work zones, markers, signs and security systems, if necessary.
- Performing or supervising air quality measurements. Communicating information on these measurements to GeoEngineers field staff and subcontractor personnel.

- Communicating health and safety requirements and site hazards to field personnel, subcontractors and contractor employees, and site visitors.
- Directing personnel to wear PPE and guiding compliance with all health and safety practices in the field.
- Consulting with the PM regarding new or unanticipated site conditions, including emergency response activities. If monitoring detects concentrations of potentially hazardous substances at or above the established exposure limits, notify/consult with the PM. Consult with the PM and the HSM regarding new or unanticipated site conditions, including emergency response activities. If field monitoring indicates concentrations of potentially hazardous substances at or above the established exposure limits, the HSM must be notified and corrective action taken.
- Documenting all site accidents, illnesses and unsafe activities or conditions, and reporting them to the PM and the HSM.
- Directing decontamination operations of equipment and personnel.

Field Employees

All employees working on site that have the potential of coming in contact with hazardous substances or physical hazards are responsible for participating in the health and safety program and complying with the site-specific health and safety plans. These employees are required to:

- Participate and be familiar with the health and safety program as described in this manual.
- Notify the SSO that when there is need to stop work to address an unsafe situation.
- Comply with the HASP and acknowledge understanding of the plan.
- Report to the SSO, PM or HSM any unsafe conditions and all facts pertaining to incidents or accidents that could result in physical injury or exposure to hazardous materials.
- Participate in health and safety training, including initial 40-hour Occupational Safety and Health Administration (OSHA) course, annual 8-hour HAZWOPER refresher, and First Aid/cardiopulmonary resuscitation (CPR) training.
- Participate in the medical surveillance program if applicable.
- Schedule and take a respirator fit test annually.
- Any field employee working on site may stop work if the employee believes the work is unsafe.

Contractors Under GeoEngineers Supervision

Contractors working on the site under GeoEngineers supervision or direct control that have the potential of coming in contact with hazardous substances or physical hazards shall have their own health and safety program that is in line with the site-specific health and safety plan.

List of Field Personnel and Training

Name of Employee on Site	Level of HAZWOPER Training (24-/40-hr)	Date of 8-Hr Refresher Training	First Aid/ CPR	Date of Respirator Fit Test
Jacob Letts	40-hr	10/30/21	2/19/21	1/20/19
Katy Atakturk	40-hr	4/22/22	4/20/22	9/21/22

Site Description

The C-1 Hangar and C-1 Building (Site) are located at Paine Field/Snohomish County Airport (Paine Field) in Everett, Washington. The Site is approximately 1.5-acres and developed with an approximately 53,000 square-foot aircraft hangar building and adjacent covered outdoor space. The C-1 Precision Property is located adjacent to the Hangar Property and is approximately 0.85-acres and consists of one approximately 25,000 square-foot building and an adjacent 12,000 square-foot exterior storage yard.

Site Map (Attached)

The Site location and the location of the two properties is shown in the attached map.

Site History

The C-1 Building Property has been used for overhaul of aircraft radial engines and manufacture of fuel injection systems since about 1956. The Property is listed by Ecology as the Precision Engines LLC site with status listed as "cleanup started" and has been the subject of investigations and focused remedial actions since at least 1998. The results of the investigations conducted to date have identified the presence of petroleum hydrocarbons, mineral spirits, chlorinated solvents and arsenic in soil and groundwater at concentrations greater than the applicable MTCA cleanup levels. Online searches of Ecology's database did not return any information for the C-1 Hangar Property; a records request has been submitted to Ecology and that request is pending.

WORK PLAN

The RI sampling and analytical plan is as follows:

- Thirteen soil borings, including four of the borings to completed as permanent monitoring wells, are planned to further evaluate and document the contaminated soil and groundwater identified during prior investigations at the Site.
- Submit the soil and groundwater samples to an Ecology-accredited laboratory for chemical analysis of the following on standard turnaround time: petroleum hydrocarbons by NWTPH-Gx and NWTPH-Dx; volatile organic compounds (VOCs) including chlorinated solvents by United States Environmental Protection Agency (EPA) Method 8260; RCRA 8 metals by EPA 6000/7000 series.

The sampling and analytical plan for RI soil and groundwater sampling is included in the RI Work Plan.

List of Field Activities

Check the activities to be completed during the project:

☐ Job Hazard analyses (JHA) Form 3
☐ Site Reconnaissance
☐ Exploratory Borings
☐ Construction Monitoring
☐ Surveying
☐ Test Pit Exploration
☐ Soil Sample Collection
☐ Groundwater Sampling
☐ Groundwater Depth and Free Product Measurement
☐ Vapor Measurements
☐ Product Sample collection
☐ Soil Stockpile Testing
☐ Remedial Excavation
☐ Recovery of Free Product
☐ Monitoring Well Installation
☐ Monitoring Well Development
☐ Underground Storage Tank (UST) Removal Monitoring
☐ Other: Click here to enter text.

EMERGENCY INFORMATION

A map and directions to the nearest hospital are provided in Attachment 3 on Page 32.

Ambulance:	9-1-1
Poison Control:	Seattle (206) 253-2121; Other (800) 732-6985
Police:	9-1-1
Fire:	9-1-1
Location of Nearest Telephone:	Cell phones are carried by field personnel.
Nearest Fire Extinguisher:	Located in the GeoEngineers vehicle on site.
Nearest First-Aid Kit:	Located in the GeoEngineers vehicle on site.

Standard Emergency Procedures

Get help

- Send another worker to phone 9-1-1 (if necessary)
- As soon as feasible, notify GeoEngineers' Project Manager

Reduce risk to injured person

- Turn off equipment
- Move person from injury location (if in life-threatening situation only)
- Keep person warm
- Perform CPR (if necessary)

Transport injured person to medical treatment facility (if necessary)

- By ambulance (if necessary) or GeoEngineers vehicle
- Stay with person at medical facility
- Keep GeoEngineers Project Manager apprised of situation and notify Human Resources Manager of situation

HAZARD ANALYSIS

A hazard analysis has been completed as part of preparation of this HASP. The hazard analysis was performed taking into account the known and potential hazards at the site and surrounding areas, as wells as the planned work activities. The results of the hazard analysis are presented in this section. The hazard assessment will be evaluated each day before beginning work. Updates will be made as necessary and documented in the Job Hazard Analyses (JHA) Form 3 or daily field log.

The following are known applicable hazards.

Physical Hazards

☐ Drill rigs and Concrete Coring, including working inside a warehouse
☐ Backhoe
☐ Trackhoe
☐ Crane
☐ Front End Loader
☐ Excavations/trenching (1:1 slopes for Type B soil)
☐ Shored/braced excavation if greater than 4 feet of depth
☐ Overhead hazards/power lines
☐ Tripping/puncture hazards (debris on site, steep slopes or pits)
☐ Unusual traffic hazard – Street traffic
☐ Heat/Cold, Humidity
☐ Utilities/ utility locate
☐ Noise
☐ Other: Click here to enter text.

- Utility checklist will be completed as required for the location to prevent drilling or digging into utilities. Note: These procedures should be added to the standard GeoEngineers utility checklist identifying subcontractors that will complete the utility locate.
- Work areas will be marked with reflective cones, barricades and/or caution tape. High-visibility vests will be worn by on-site personnel to ensure they can be seen by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus.

Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.

- Heavy equipment and/or vehicles used on this site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet, depending on the client and the use of a safety watch. Note: If it is later determined that overhead lines are a hazard on this job site, a copy the overhead lines safety section from the HASP Supplemental document shall be attached.
- Personnel entry into unshored or unsloped excavations deeper than 4 feet is not allowed. Any trenching and shoring requirements will follow guidelines established in Washington Administrative Code (WAC) 296-155, the Washington State Construction Standards or OSHA 1926.651 Excavation Requirements. In the event that a worker is required to enter an excavation deeper than 4 feet, a trench box or other acceptable shoring will be employed or the side walls of the excavation will be sloped according to the soil type and guidelines as outlined in Department of Occupational Safety and Health (DOSH) and OSHA regulations. If the shoring/sloping deviates from that outlined in the WAC, it will be designed and stamped by a Professional Engineer (PE). Prior to entry, personnel will conduct air monitoring as described later in this plan. All hazardous encumbrances and excavated material will be stockpiled at least 2 feet from the edge of a trench or open pit. If concentrations of volatile gases accumulate within an open trench or excavation, the means of entering shall adhere to confined space entry and air monitoring procedures outlined under the air monitoring recommendations in this Plan and/or the GeoEngineers Health and Safety Programs.
- Personnel will avoid tripping hazards, steep slopes, pits and other hazardous encumbrances. If it becomes necessary to work within 6 feet of the edge of a pit, slope or other potentially hazardous area, appropriate fall protection measures will be implemented by the Site Safety Officer in accordance with OSHA/DOSH regulations and the GeoEngineers Health and Safety Program.
- Cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature). Heated break areas and warm beverages shall be available during periods of cold weather.
- Heat stress control measures required for this site will be implemented according to GeoEngineers Health and Safety Program with water provided on site.

Biological Hazards and Procedures

☐ Poison Ivy or other vegetation	Click here to enter text.
☐ Insects or snakes	Click here to enter text.
☐ Hypodermic needles or other infectious hazards	Click here to enter text.
☐ Wildlife	Click here to enter text.
☐ Other: Click here to enter text.	Click here to enter text.

Ergonomic Hazard Mitigation Measures and Procedures

Avoiding Lifting Injuries

Back injuries often result from lifting objects that are too heavy or from using the wrong lifting technique. Keep your back healthy and pain-free by following common sense safety precautions.

- Minimize reaching by keeping frequently used items within arm's reach, moving your whole body as close as possible to the object.
- Avoid overextending by standing up when retrieving objects on shelves.
- Keep your back in shape with regular stretching exercises.
- Get help from a coworker or use a hand truck if the load is too heavy or bulky to lift alone.

Proper Lifting Techniques

- Face the load; don't twist your body. Stand in a wide stance with your feet close to the object.
- Bend at the knees, keeping your back straight. Wrap your arms around the object.
- Let your legs do the lifting.
- Hold the object close to your body as you stand up straight. To set the load down, bend at the knees, not from the waist.

Engineering Controls

☐ Trench shoring (1:1 slope for Type B Soils)

☐ Location work spaces upwind/wind direction monitoring

☐ Other soil covers (as needed)

☐ Other (specify): Click here to enter text.

Chemical Hazards

CHEMICAL HAZARDS (POTENTIALLY PRESENT AT SITE)

Compound/ Description	OSHA PEL Exposure Limit (TWA)	NIOSH PEL Exposure Limit	ACGIH TLV Exposure Limits	Exposure Routes	Toxic Characteristics
Vinyl Chloride colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations	1 ppm	NA	1 ppm	Inhalation, skin, and/or eye contact (liquid)	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; (potential occupational carcinogen)

Compound/ Description	OSHA PEL Exposure Limit (TWA)	NIOSH PEL Exposure Limit	ACGIH TLV Exposure Limits	Exposure Routes	Toxic Characteristics
Benzene	1 ppm	0.1 ppm	0.5 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]
Diesel Fuel—liquid with a characteristic odor	NA	NA	100 mg/m3 (as total hydrocarbons)	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis
Gasoline—clear liquid with a characteristic odor. Motor fuel, motor spirits, natural gasoline. A complex mixture of volatile, hydrocarbons (paraffins, cycloparaffins & aromatics)	NA	NA	300 ppm	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, nose, respiratory system; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; gastrointestinal disturbances and diarrhea. convulsions, loss of consciousness, coma, precancerous skin
Tetrachloroethene (PCE) colorless liquid with a mild, chloroform-like odor	100 ppm	100 ppm	25 ppm	Ingestion, inhalation, skin absorption, skin and eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; (potential occupational carcinogen)

Compound/ Description	OSHA PEL Exposure Limit (TWA)	NIOSH PEL Exposure Limit	ACGIH TLV Exposure Limits	Exposure Routes	Toxic Characteristics
Cis-1,2-Dichloroethene (vinylidene chloride) colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor	NA	NA	NA	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; (potential occupational carcinogen)

Notes:

If a State has established a PEL more restrictive than the OSHA limits, then the applicable State limit becomes the legal limit.
IDLH = immediately dangerous to life or health
OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists
mg/m3 = milligrams per cubic meter
TWA = time-weighted average (Over 8 hrs.)
PEL = permissible exposure limit
TLV = threshold limit value (over 10 hrs)
STEL = short-term exposure limit (15 min)
ppm = parts per million

Summary of Selected Chemical Hazards

Vinyl Chloride

Vinyl chloride is a colorless gas. It burns easily and it is not stable at high temperatures. It has a mild, sweet odor. It is a manufactured substance that does not occur naturally. It can be formed when trichloroethane, trichloroethylene, and tetrachloroethylene or other substances break down to form vinyl chloride. Most of the vinyl chloride produced in the United States is used to make polyvinyl chloride (PVC), a material used to manufacture a variety of plastic and vinyl products including pipes, wire and cable coatings, and packaging materials. Smaller amounts of vinyl chloride are used in furniture and automobile upholstery, wall coverings, housewares, and automotive parts. Vinyl chloride has been used in the past as a refrigerant.

The Washington State PEL- (TWA) is 1 ppm over an 8-hour period. The STEL is 5 ppm. The odor threshold for vinyl chloride is 3,000 ppm. In the United States, most vinyl chloride is used to make polyvinyl chloride (PVC). Exposure to this compound can cause effects on the central nervous system and liver. EPA has classified vinyl chloride as a Group A, human carcinogen.

Benzene

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities. Benzene is classified as a hydrocarbon (contain hydrogen and carbon atoms), Volatile organic compounds. It is a known human carcinogen Affected organ systems: hematological (blood forming), immunological (immune system), neurological (nervous system). Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke. The EPA has set the maximum permissible level of benzene in drinking water at 5 parts benzene per billion parts of water (5 ppb). The Occupational Safety and Health Administration (OSHA) has set limits of 1 part benzene per million parts of workplace air (1 ppm) for 8 hour shifts and 40 hour work weeks.

Chlorobenzene

Chlorobenzene is used primarily as a solvent, a degreasing agent, and a chemical intermediate. Limited information is available on the acute (short-term) effects of chlorobenzene. Acute inhalation exposure of animals to chlorobenzene produced narcosis, restlessness, tremors, and muscle spasms. Chronic (long-term) exposure of humans to chlorobenzene affects the central nervous system (CNS). Signs of neurotoxicity in humans include numbness, cyanosis, hyperesthesia (increased sensation), and muscle spasms. No information is available on the carcinogenic effects of chlorobenzene in humans. EPA has classified chlorobenzene as a Group D, not classifiable as to human carcinogenicity.

Diesel Fuels

Diesel fuels are similar to fuel oils used for heating (fuel oils no. 1, no. 2 and no. 4). All fuel oils consist of complex mixtures of aliphatic and aromatic hydrocarbons. Diesel fuels predominantly contain a mixture of C10 through C19 hydrocarbons, which include approximately 64 percent aliphatic hydrocarbons, 1 to 2 percent olefinic hydrocarbons, and 35 percent aromatic hydrocarbons. Workers may be exposed to fuel oils through their skin without adequate protection, such as gloves, boots, coveralls, or other protective clothing. Breathing diesel fuel vapors for a long time may damage your kidneys, increase your blood pressure, or lower your blood's ability to clot. Constant skin contact (for example, washing) with diesel fuel may also damage your kidneys. The International Agency for Research on Cancer (IARC) has determined that residual (heavy) fuel oils and marine diesel fuel are possibly carcinogenic to humans (Group 2B classification).

Gasoline Range Hydrocarbons

Gasoline is a complex manufactured mixture that does not exist naturally in the environment. It is a colorless, pale brown, or pink volatile liquid and is very flammable. The odor threshold of gasoline is approximately 0.25 parts per million (ppm) in the air. Gasoline may be present in the air, groundwater, and soil. Gasoline is also a skin irritant. Breathing in high levels of gasoline for short periods of time or swallowing large amounts of gasoline may also cause harmful effects on the nervous system. Less serious nervous system effects include dizziness and headaches, while more serious effects include coma and the inability to breathe. Effects on the nervous system have also occurred in people exposed to gasoline vapors for long periods of time in their jobs. OSHA has set a legal limit of 300 ppm for workroom air during an 8-hour workday of a 40-hour workweek.

Heavy Oil

Heavy crude oil or extra heavy crude oil is any type of crude oil which does not flow easily. It is referred to as “heavy” because its density or specific gravity is higher than that of light crude oil. Heavy crude oil has been defined as any liquid petroleum with an API gravity less than 20°. Physical properties that differ between heavy crude oils and lighter grades include higher viscosity and specific gravity, as well as heavier molecular composition. Contact with eyes may cause mild to severe irritation including stinging, watering, redness, and swelling. Mild skin irritation including redness and a burning sensation may follow acute contact. Prolonged contact may cause dermatitis, folliculitis, or oil acne. Liquid may be absorbed through the skin in toxic amounts if large amounts of skin are exposed repeatedly. There have been rare occurrences of precancerous warts on the forearm, back of hands and scrotum from chronic prolonged contact. The major threat of ingestion occurs from the 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 death. Ingestion may cause gastrointestinal disturbances including irritation, nausea, vomiting and diarrhea. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Tetrachloroethylene (PCE)

Tetrachloroethylene (or perchloroethylene) is used primarily for commercial dry cleaning and metal degreasing. Exposure to this compound can cause effects on the central nervous system, mucous membranes, eyes and skin, and to a lesser extent the lungs, liver and kidneys. Symptoms of nervous system effects include incoordination, followed at increasing concentrations by dizziness, headache, vertigo light narcosis and unconsciousness. Skin burns, blistering and reddening of the skin have been reported upon skin exposure to the pure product. Eye irritation occurs when exposure to vapor or liquid occurs. PEC is a confirmed animal carcinogen with unknown relevance to humans. * The Washington State PEL – (TWA) is 25 ppm over an 8-hour period and a STEL of 38 ppm. The ACGIH TLV-STEL is recommended to be no greater than 100 ppm. The odor threshold for PCE is 15 ppm; the odor is sharp and sweet. PCE is typically detected by the PID.

Trichloroethene (TCE)

Central nervous system effects are the primary effects noted from acute inhalation exposure to trichloroethene (TCE) in humans, with symptoms including sleepiness, confusion, and feelings of euphoria. Effects on the gastrointestinal system, liver, kidneys, and skin have also been noted. TCE absorption by inhalation, dermal, and oral exposure is very rapid. TCE is metabolized in humans and animals to a number of substances that are known to be toxic including chloral hydrate, trichloroacetic acid, dichloroacetic acid, and trichloroethanol.

TCE is very lipophilic; hence, all routes of exposure can contribute to TCE absorption. Inhalation is the most important route of TCE uptake by which absorption is very rapid. The initial rate of uptake of inhaled TCE is very high, leveling off after a few hours of exposure. TCE defats the skin and disrupts the stratum corneum, thereby enhancing its own absorption. The rate of absorption probably decreases with greater dermal disruption. However, dermal route is generally not a significant route of exposure. TCE is a flammable colorless liquid with an odor similar to ether or chloroform. The odor threshold for TCE is 28 ppm. The PEL is 100 ppm (OSHA) or 50 ppm (ACGIH) for an 8-hour average. The PID will typically detect TCE.

Additional Hazards

Additional hazards that are specific to your site should be identified here or on the Job Hazard Analyses (JHA) Form 3.

Daily field logs should include evaluation of:

- *Physical Hazards* (excavations and shoring, equipment, traffic, tripping, heat stress, cold stress and others)

- *Biological Hazards* (snakes, spiders, bees/wasps, animals, discarded needles, poison ivy, pollen, and others present)
- *Ergonomic Hazards* (lifting heavy loads, tight work spaces, etc.)
- *Chemical Hazards* (odors, spills, free product, airborne particulates and others present)

AIR MONITORING PLAN

An air monitoring plan has been prepared as part of development of this HASP. The air monitoring plan is based on the results of the chemical exposure assessment and the known and potential inhalation hazards on site. The air monitoring plan addresses steps necessary to limit worker exposure. Non-occupational exposures are not addressed in this plan.

Work upwind if at all possible.

Check Instrumentation to be Used

☐ Multi-Gas Detector (may include oxygen, carbon monoxide, hydrogen sulfide, lower explosive limit)

☐ Dust Monitor

☐ Other (i.e., detector tubes or badges) Please specify: Click here to enter text.

Check Monitoring Frequency/Locations And Type (Specify: Work Space, Borehole, Breathing Zone):

☐ Continuous during soil disturbance activities or handling samples

☐ 15 minutes

☐ 30 minutes

☐ Hourly

Additional Personal Air Monitoring for Specific Chemical Exposure

Action Levels for Volatile Organic Chemicals

- The workspace will be monitored using a photoionization detector (PID). These instruments must be properly maintained, calibrated and charged (refer to the instrument manuals for details). Zero this meter in the same relative humidity as the area in which it will be used and allow at least a 10-minute warm-up prior to zeroing. Do not zero in a contaminated area.
- An initial vapor measurement survey of the site should be conducted to detect “hot spots” if contaminated soil is exposed at the surface. Vapor measurement surveys of the workspace should be conducted at least hourly or more often if persistent petroleum-related odors are detected. Additionally, if vapor concentrations exceed 5 parts per million (ppm) above background continuously for a 5-minute period as measured in the breathing zone, upgrade to Level C personal protective equipment (PPE) or move to a non-contaminated area.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed one-half the threshold limit value (TLV). Because of the variety of chemicals, the PID will not indicate exposure to a specific permissible exposure limit (PEL) and is therefore not a preferred tool for determining worker exposure to chemicals. If odors are detected, then employees shall upgrade to respirators with Organic Vapor cartridges and will contact the Health and Safety Program Manager for other sampling options.

AIR MONITORING ACTION LEVELS

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	Background to 5 ppm in breathing zone	Use Level D or Modified Level D PPE
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	5 to 50 ppm in breathing zone	Upgrade to Level C PPE
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	> 50 ppm in breathing zone	Stop work and evacuate the area. Contact Health and Safety Program Manager for guidance.
Combustible Atmosphere	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1,000 ppm	Depends on contaminant. The PEL is usually exceeded before the lower explosive limit (LEL).
Combustible Atmosphere	Environmental Remedial Actions	PID or 4-gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1,000 ppm	Stop work and evacuate the site. Contact Health and Safety Program Manager for guidance.
Oxygen Deficient/ Enriched Atmosphere	Environmental Remedial Actions Confined Spaces	Oxygen meter or 4-gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	<19.5 >23.5%	Continue work if inside range. If outside range, evacuate area and contact Health and Safety Program Manager.

SITE CONTROL PLAN

Work zones will be considered to be within 50 feet of the drill rig, backhoe, or other equipment. Employees should work upwind of the machinery if possible. To the extent practicable, use the buddy system. Do not approach heavy equipment unless you are sure the operator sees you and has indicated it is safe to approach. All personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see Section 3.0 above.

Traffic or Vehicle Access Control Plans

Soil and groundwater sampling will be conducted inside and surrounding the C-1 Hangar at the locations presented in the RI Work Plan. The Hangar and Building are vacant and traffic control is not anticipated. Soil and groundwater sampling will be conducted inside the C-1 Building. The building is expected to be vacant at the time of sampling and traffic control is not anticipated. Outdoor sampling locations should be outside any roadways or walkways and delineated with orange traffic cones for greater visibility.

Site Work Zones

An exclusion zone, contamination reduction zone, and support zone should be established around working areas. Personnel leaving the facility or on break should exit the exclusion zone through the contamination reduction zone. The contamination reduction zone, at a minimum, should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands at the Facility before eating or leaving the facility.

Hot zone/exclusion zone: *Within 10 feet of borings or excavations*

Method of Delineation/Excluding Non-Site Personnel

☐ Fence

☐ Survey Tape

☐ Traffic Cones

☐ Other: Click here to enter text.

Buddy System

Personnel on site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on site, a buddy system can be arranged with subcontractor/ contractor personnel.

Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown) and an agreed upon location for an emergency assembly area.

In instances where communication cannot be maintained, you should consider suspending work until it can be restored. If this is not an option, the following are some examples for communication:

- Hand gripping throat: Out of air, can't breathe.
- Gripping partner's wrist or placing both hands around waist: Leave area immediately, no debate.
- Hands on top of head: Need assistance.
- Thumbs up: Okay, I'm all right; or, I understand.
- Thumbs down: No, negative.

Emergency Action

In the event of an emergency, employees with convene in a designated area Identified on the JHA Form 3. Employees should communicate with others working on site and the PM to determine the Emergency Action Plan for each site. All personnel from GeoEngineers and subcontractor(s) should be made aware of the Emergency Action for the site at each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see Section 3.0 above.

Decontamination Procedures

Decontamination, at a minimum, should include removing and disposing of PPE when exiting the exclusion zone; and washing your hands. Decontamination may also consist of removing outer protective gloves and washing soiled boots and gloves using bucket and brush provided on site in the contamination reduction zone. If needed, inner gloves will then be removed, and respirator, hands and face will be washed in either a portable wash station or a bathroom facility at the site. Employees will perform decontamination procedures and wash before eating, drinking or leaving the site.

Waste Disposal or Storage

Used PPE is to be placed in a plastic bag for disposal.

Drill Cutting Disposal or Storage:

☐ On site, pending analysis and further action

☐ Secured (list method): sealed drums

☐ Other (describe destination, responsible parties): Click here to enter text.

PERSONAL PROTECTIVE EQUIPMENT

After the initial and/or daily hazard assessment has been completed the appropriate personal protective equipment (PPE) will be selected to ensure worker safety. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted before the start of site operations. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted before the start of site operations.

Site activities include sampling air and soil vapor and handling and sampling solid subsurface material (material may potentially be saturated with contaminated materials and groundwater). Depth-to-groundwater measurements will be performed as well. Site hazards include potential exposure to hazardous materials, and physical hazards such as trips/falls, heavy equipment, and contaminant exposure.

Air monitoring will be conducted to determine the level of respiratory protection.

- Half-face combination organic vapor/high efficiency particulate air (HEPA) or P100 cartridge respirators will be available on site to be used as necessary. P100 cartridges are to be used only if PID measurements are below the site action limit. P100 cartridges are used for protection against dust, metals and asbestos, while the combination organic vapor/HEPA cartridges are protective against both dust and vapor. Ensure that the PID or TLV will detect the chemicals of concern on site.

- Level D PPE, unless a higher level of protection is required, will be worn at all times on the site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc.
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

Check Applicable Personal Protection Gear to be Used:

☐ Hardhat (if overhead hazards, or client requests)

☐ Steel-toed boots (if crushing hazards are a potential or if client requests)

☐ Safety glasses (if dust, particles, or other hazards are present or client requests)

☐ Reflective vest (if working near traffic or equipment)

☐ Hearing protection (if it is difficult to carry on a conversation 3 feet away)

☐ Rubber boots (if wet conditions)

Gloves (Specify):

☐ Nitrile

☐ Latex

☐ Liners

☐ Leather

☐ Other (specify) Click here to enter text.

Protective Clothing:

☐ Tyvek (if dry conditions are encountered, Tyvek is sufficient) (modified Level D or Level C)

☐ Saranex (personnel shall use Saranex if liquids are handled or splash may be an issue) (modified Level D or Level C)

☐ Cotton (Level D)

☐ Rain gear (as needed) (Level D)

☐ Layered warm clothing (as needed) (Level D)

Inhalation Hazard Protection:

☐ Level D (no respirator)

☐ Level C (respirators with organic vapor/HEPA P100 filters)

☐ Level B (Self Contained Breathing Apparatus— STOP, Consult the HSM)

Personal Protective Clothing Inspections

PPE clothing ensembles designated for use during site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.

- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

Respirator Selection, Use and Maintenance

If respirators are required, site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear respiratory protection in accordance with 29 CFR 1910.134. Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used. Respirators will be stored in a protective container.

Respirator Cartridges

If the action levels identified in the Air Monitoring Action Levels Table in Section 5.0, are exceeded, site personnel should don respiratory protection appropriate for the known or suspected chemical of concern. For most sites, a half-face or full-face air purifying respirator with a National Institute for Occupational Safety and Health (NIOSH)-approved organic vapor/HEPA P100 combination cartridge (Level C), will be appropriate for the known or suspected chemicals of concern. Monitoring frequency should be continuous while using Level C respiratory protection. The SSO closely monitor personnel using respiratory protection, including observing for signs of fatigue or respiratory distress, the potential for cartridge breakthrough or increased resistance to inhalation, and the need for changes in the level of respiratory protection based on air monitoring. The frequency and duration of breaks should be increased for personnel working in respiratory protection. If at any time on-site air monitoring indicates Level B respiratory protection is warranted, personnel should leave the exclusion zone and consult with the HSM.

If site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated site contaminants. The respirator/cartridge combination shall be approved and NIOSH-certified. A cartridge change-out schedule shall be developed based on known site contaminants, anticipated contaminant concentrations and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change-out schedule prior to the initiation of site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste or feel, although breakthrough is not an acceptable method of determining the change-out schedule.

Respirator Inspection and Cleaning

Site personnel shall inspect respirators prior to each use in accordance with the manufacturer's instructions. In addition, site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned, to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer's instructions.

ADDITIONAL ELEMENTS

Cold Stress Prevention

Working in cold environments presents many hazards to site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).

The combination of wind and cold temperatures increases the degree of cold stress experienced by site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas and warm beverages shall be provided during periods of cold weather.

Heat Stress Prevention

Keep workers hydrated in a hot outdoor environment requires more water be provided than at other times of the year. When employee exposure is at or above an applicable temperature listed in the Heat Stress table below, Project Managers will ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times
- All employees have the opportunity to drink at least one quart of drinking water per hour

HEAT STRESS

Type of Clothing	Outdoor Temperature Action Levels
Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52°
Double-layer woven clothes including coveralls, jackets and sweatshirts	77°
All other clothing	89°

Emergency Response

- Personnel on site should use the “buddy system” (pairs).
- Visual contact should be maintained between “pairs” on site, with the team remaining in proximity to assist each other in case of emergencies.
- If any member of the field crew experiences any adverse exposure symptoms while on site, the entire field crew should immediately halt work and act according to the instructions provided by the SSO.
- Wind indicators visible to all on-site personnel should be provided by the SSO to indicate possible routes for upwind escape. Alternatively, the SSO may ask on-site personnel to observe the wind direction periodically during site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.

- If an accident occurs, the Site Safety Officer and the injured person are to complete, within 24 hours, an Accident Report (Form 4) for submittal to the PM, the HSPM, and HR. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

MISCELLANEOUS

Personnel Medical Surveillance

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of "Employees Covered" in OSHA 1910.120(f)(2), which states that a medical surveillance program is required for the following employees:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
2. All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.
4. Members of HAZMAT teams.

Sampling, Managing and Handling Drums and Containers

Drums and containers used during drilling shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupturing may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred. Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

Entry Procedures for Tanks or Vaults (Confined Spaces)

GeoEngineers employees shall not enter confined spaces to perform work unless they have been properly trained and with hands-on experience in the use of retrieval equipment. If a project requires confined space entry, please include a copy of the confined space permit and include the training documentation in this HASP.

Trenches greater than 4 feet in depth with the potential for buildup of a hazardous atmosphere are considered confined spaces.

Sanitation

Sanitary facilities are available on site. The location of the restroom will be identified by personnel at Paine Field.

Lighting

Work is anticipated to be performed during daylight hours. Work may extend slightly into the evening provided adequate lighting is used (e.g. portable flood lights).

DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

- Daily Field Log
- FORM 1—Health and Safety Pre-Entry Briefing and Acknowledgment of Site Health and Safety Plan for use by employees, subcontractors and visitors
- FORM 2—Safety Meeting Record
- FORM 3—Job Hazard Analyses (JHA) Form
- FORM 4—Accident/Exposure Report Form

NOTE: The Field Log is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

APPROVALS

1. Plan Prepared

September 2, 2022

Signature Date

2. Plan Approval

September 2, 2022

PM Signature Date

3. Health & Safety Manager

Lucas Miller (not reviewed) September 2, 2022

HSM Signature Date

FORM 1
HEALTH AND SAFET PRE-ENTRY BRIEFING AND ACKNOWLEDGEMENT OF THE SITE HEALTH AND SAFETY PLAN FOR GEOENGINEERS' EMPLOYEES, SUBCONTRACTORS AND VISITORS
REMEDIAL INVESTIGATION
C-1 HANGAR AND C-1 BUILDING
FILE NO. 05530-014-02

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any site activity is started.
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.
- Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks.
- Update all information to reflect current sight activities and hazards.
- All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety Officer.
- The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards.

(All of GeoEngineers' Site workers shall complete this form, which should remain attached to the HASP and be filed with other project documentation). Please be advised that this site-specific HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

I hereby verify that a copy of the current HASP has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures.

Print Name	Signature	Date

FORM 2
SAFETY MEETING RECORD
REMEDIAL INVESTIGATION PLANNING AND IMPLEMENTATION
C-1 HANGAR AND C-1 BUILDING
FILE NO. 05530-014-02

Safety meetings should include a discussion of emergency response, site communications and site hazards.

- Use in conjunction with the HASP and Job Hazard Analyses (JHA) Form 3 to help identify hazards.

Date: ______________________________ **Site Safety Officer (SSO):**____________________________________

Topics: ____

Attendees:

Print Name **Signature:**

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FORM 3

JOB HAZARD ANALYSES (JHA) FORM
REMEDIAL INVESTIGATION PLANNING AND IMPLEMENTATION
C-1 HANGAR AND C-1 BUILDING
FILE NO. 05530-014-02

This form can be used for analyses of daily hazards where there are multiple tasks and ongoing projects and for record keeping purposes. Make copies as needed.

Project: C-1 Hangar and C-1 Building **File No:** 05530-014-00	**Date:**	**Site Location:** Paine Field, Snohomish County, WA

Development Team:	**Position/Title:**	**Reviewed by:**	**Position/Title:**
Name	Position	Name	Position
Name	Position	Name	Position

Minimum Required Protective Equipment: (see critical actions for task-specific requirements)

PPE	**Equipment**	**Tools**	**Actions**
☒ Hard Hat	☐ Safety Beacons	☒ Cell/Satellite Phone	☒ Stay Visible
☒ High Visibility Vest	☐ Safety Cones	☐ Digital Camera	☒ Equipment Inspection
☒ Safety Shoes/Waders	☒ First Aid Kit	☐ iPad	☒ Work in Pairs
☒ Gloves	☒ Fire Extinguisher	☐	☒ Safety Control/Traffic Plan
☒ Safety Glasses	☐ Eye Wash/ Drinking Water	☐	☐

Job Steps	**Potential Hazards**	**Critical Actions to Mitigate Hazards**
Pre-Job Activities	Example: Unfamiliar locations, congestion, unpaved roads, Mechanical Failure, Flat Tires Vehicle Fire, Exhaust Leaks, Vehicle Collision, Internal Projectiles	■ Inspect the vehicle before departure: ▪ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage. ▪ Check lights, wipers, fluid levels, and seat belts. ■ Study the area maps, photos and use GPS and compass skills. ■ Identify the safest spot to park field vehicles.
Familiarize crew with the task and location of site	Crew does not notify site owner / manager. Unaware of the job site hazards and steps to prevent injury. Appropriate personnel protective equipment not worn. Other Hazards	■ Example: Conduct a tailgate safety meeting discussing the jobs, the hazards and actions that will be taken to prevent injury. ■ Discuss “Stop Work Authority” as it applies to each site member. ■ Discuss appropriate PPE including high visibility clothing such as reflective vest. ■ Notify attendant and/or site owner/manager of work activities and location. ■ Discuss appropriate PPE including high visibility clothing such as reflective vest. ■ Set up exclusion zone surrounding work area.

Driving to work site location (Highway Driving)	Unfamiliar road, Mechanical Failure, Flat Tires, Vehicle Fire, Vehicle Collision. Other Hazards	■ Inspect the vehicle before departure: o Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage. o Check lights, wipers, fluid levels, and seat belts. ■ Study the area maps, photos and use GPS and compass skills. ■ Use only vehicles appropriate for the work needs and the driving conditions expected. ■ Ensure the vehicle has a complete and current first aid kit and fire extinguisher. ■ Place heavy objects behind a secure safety cage if they must be carried in a passenger compartment. ■ Use parking brake, and don't leave vehicle unattended while it is running. ■ Ensure vehicle has fuel to get to and from your destinations. ■ Inform your Project Manager of your destination and estimated time of return. ■ Carry extra food, water, and clothing. ■ Drive defensively.
Driving on Unimproved Roads **(Off-Highway Driving)**	Encountering Other Vehicles on Narrow Unfamiliar Road, Narrow, Rough Roads, Animal / Object Collision, Running / Skidding Off Road, Icy / Muddy Roads Flying Debris (Rocks, etc.), Poor Visibility Backing, Run-Away Vehicle, Roadway Obstacles Project Manager unaware of location.	■ Stay on the main roadway. Pull over on firm ground and avoid soft shoulders, if a stop is necessary. ■ Drive on maintained trails when possible. ■ Drive with care in tall brush and grass. Watch for wildlife, fallen trees, rocks, and other obstacles. ■ Slow down, especially on corners. Maintain a safe speed at all times. ■ Follow from a safe distance. ■ Know when and how to use 4WD. ■ Use only vehicles appropriate to the road conditions. Learn these conditions before you go. ■ Pull over to allow larger vehicles (ie: trucks and trailers) to pass from either direction. ■ Don't travel the road at all if there is high potential for vehicle damage. ■ Park so that backing up will not be necessary. ■ Use a spotter or get out to check behind vehicle.

		■ Use ground guide to walk the path on questionable roadways. ■ When removing debris from the roadway, use care, lift properly, and use proper equipment and PPE. ■ When descending a long grade, use lower gears to control speed rather than brakes. ■ Keep vehicle well ventilated by opening a window at least 6 inches, when idling or heating for a period. ■ Keep all windows clear of snow, ice, mud, and anything else obstructing the driver's view. ■ Keep vehicle windows clean, inside and out, and washer fluid full. Replace damaged or worn wipers.
Traveling on Foot	Falls, Foot Injuries, and Stress and Impact Injuries Forest Fires Lightning Personal Safety	■ Identify and use safe travel routes. Do not exceed physical abilities or equipment design. ■ Use pack equipment properly. Carry weight on hips, not back. ■ Warm up and stretch the appropriate muscle groups before and after hitting the trail. ■ Test and use secure footing. Move cautiously and deliberately. Never run. ■ In heavy undergrowth, particularly off-trail, slow down and watch carefully. ■ Carry tools on the downhill side. ■ Wear safety-toed boots with good, non-skid soles that are tall enough to support ankles. ■ Know basic first aid. Completion of a basic first aid course is required. ■ Use footwear appropriate to the terrain and load being carried. ■ Know how to fall. Roll, protect the head and neck, and do not extend arms to break the fall. ■ Wear fire retardant clothing ■ Refer to GeoEngineers Personal Safety Program - Never you're your personal safety. Leave the area and contact your Project Manager. ■ Travel on maintained trails when possible.
	Biological Hazards	■ Discuss applicable hazard mitigation measures - Insects, Snakes, Wildlife, Vegetation

Slope Evaluation	Slips, Trips and Falls	■ Travel on maintained trails when possible. ■ Take extra precautions when encountering steep, loose, wet trail conditions. ■ Always carry tools on your downhill side. ■ Use a rope for stability if needed / tie off to trees / have throw rope with on-shore buddy. ■ Take slow deliberate steps as conditions dictate. ■ Use a flashlight after dark. ■ Travel after dark only in an emergency. ■ Wear appropriate footwear for conditions.
Communication	Additional Hazards, i.e., No communication in case of emergency	■ Verify cell phone is working. ■ Maintain communication with Project Manager throughout job task. ■ Verify location and contact numbers for emergency medical assistance or 911.
	Additional Hazards, i.e., Emergency	■ **Dial 911** ■ Hospital Route (Attached)

Required Control Measures: (check the box when complete)

☐ Perform a pre-work vehicle inspection (First Aid kit, fire extinguisher).
☐ Drive defensively looking out for the other guy.
☐ Conduct a pre-work safety meeting.
☐ Use a Safety Watch to monitor equipment Minimum Approach Distance (MAD) and to keep personnel clear if needed.
☐ Wear Personal Protective Equipment (PPE).
☐ Ensure training is current (First Aid, defensive driving, etc.).
☐ Conduct Task Safety Assessments throughout the job.

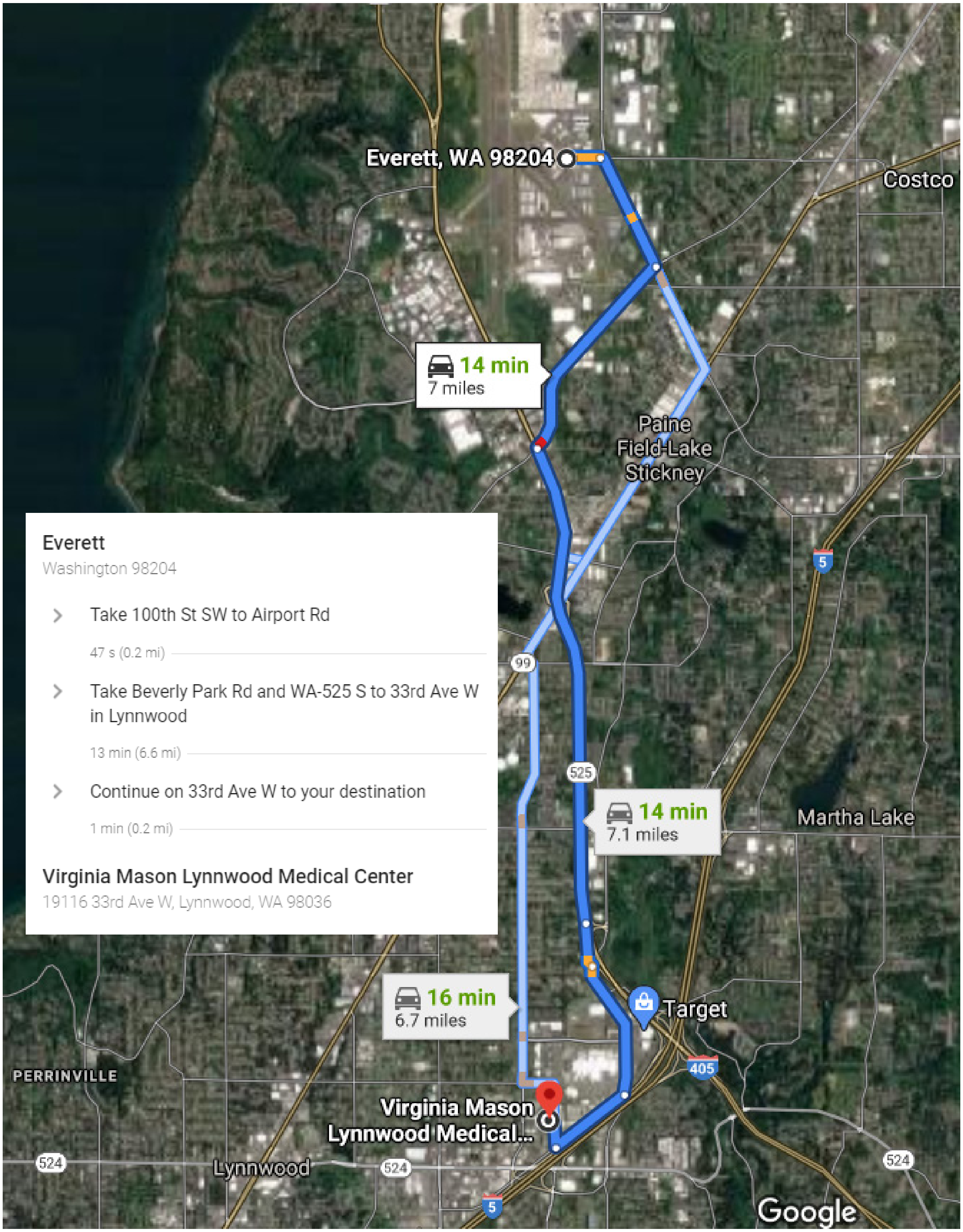
Additional Comments:

Click here to enter text.

DAILY HAZARD ASSESSMENT RECORD OF SAFETY MEETINGS

Signature **Date** **Signature** **Date**

Directions to Nearest Hospital



Everett

Washington 98204

> Take 100th St SW to Airport Rd

47 s (0.2 mi)

> Take Beverly Park Rd and WA-525 S to 33rd Ave W in Lynnwood

13 min (6.6 mi)

> Continue on 33rd Ave W to your destination

1 min (0.2 mi)

Virginia Mason Lynnwood Medical Center

19116 33rd Ave W, Lynnwood, WA 98036

FORM 4
ACCIDENT/EXPOSURE REPORT FORM
REMEDIAL INVESTIGATION PLANNING AND IMPLEMENTATION
C-1 HANGAR AND C-1 PRECISION BUILDING
FILE NO. 05530-014-02

To (Supervisor): ______________________ From (Employee): ______________________

Telephone (with area code): ______________________

Name of injured or ill employee: ______________________

Date of accident: Time of accident: Exact location of accident:

Narrative description of: **accident**/**exposure** (circle one):

Medical attention given on site:

Nature of illness or injury and part of body involved: Lost Time? Yes ☐ No ☐

Probably Disability (check one):

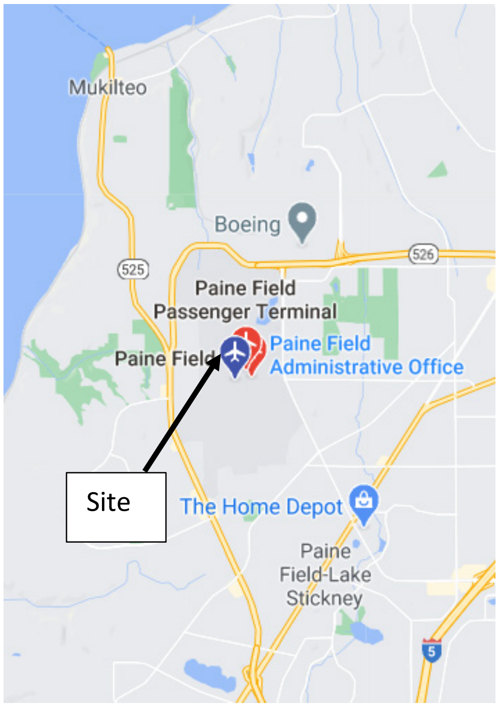
Fatal	Lost work day with days away from work	Lost work day with days of restricted activity	No lost work day	First Aid only
☐	☐	☐	☐	☐

Corrective action taken by reporting unit and corrective action that remains to be taken (by whom and when):

Employee Signature: Date:

Name of Supervisor:

ATTACHMENT
SITE MAP
REMEDIAL INVESTIGATION PLANNING AND IMPLEMENTATION
C-1 HANGAR AND C-1 BUILDING
FILE NO. 5530-014-02



Project Name: C-1 Hangar and C-1 Building **File No:** 05530-014-02	**Date:**	**Site Location:** Paine Field, Snohomish County, WA

Application:

This COVID-19 supplementary JHA is designed to meet the requirements of GeoEngineers' Field Safety During COVID-19 protocols and the COVID-19 Response Plan as well as the recommendations provided by the Centers for Disease Control and Prevention (CDC) and other applicable state or federal agencies.

PPE/Supplies/Actions Equipment: (select those applicable to this jobsite)

PPE	Supplies	Tools	Actions
☐ Eye Protection	☐ Hand Washing Soap	☐ Cell Phone/Satellite	☐ Maximize Social Distance (≥6ft)
☐ Gloves	☐ Hand Washing Water Supply	☐ Scanning Thermometer	☐ Meeting Location Planning
☐ Cloth Face Covering	☐ Hand Sanitizer	☐ Water Basin	☐ Hand Washing
☐ N95 Mask	☐ Sanitizing Wipes	☐	☐ High Touch Surface Sanitation
☐ Disposable Coveralls	☐	☐	☐
☐	☐	☐	☐
☐	☐	☐	☐

Job Steps	Potential Hazard	Critical Actions to Mitigate Hazard
Mobilization to worksite	Transmission of COVID-19 Virus	■ Pack hand sanitizer and wipes for use during all modes of business travel. ■ Assign hand sanitizer to vehicle when able. ■ Sanitize "high touch" areas: keys, steering wheels, dash controls, door handles, mirror adjustments, shifter, blinkers, head rests, etc. ■ Re-Fueling: Use sampling gloves or wash hands after using the pump at a gas station. When possible, do this before you get back into the vehicle. ■ Intra-Site Transportation: Maintain social distancing on transport skiffs or multi-passenger ATVs. Request multiple trips if overcrowded. Keep your field PPE on during travel.
Pre-work Safety Meetings	Transmission of COVID-19 Virus	■ Review site maps, photos and routes prior to site arrival to anticipate present staffing or public density areas. ■ Conduct a tailgate safety meeting in location that can accommodate ≥6' social distancing. ■ Keep group sizes as small as possible (≤ 10 people or smaller depending on individual state guidance). ■ Meeting attendance should be verbally announced and recorded by a single representative to avoid contact with shared supplies/equipment/computers/work surfaces. ■ Use verbal greetings. Do not shake hands, hug, fist bump, or high five. ■ Wear face coverings if social distances cannot be maintained. ■ Use own supply of pens, notebooks and similar field supplies.

Site Operations	Transmission of COVID-19 Virus	■ Maximize social distances to the greatest extent feasible. ■ If tasks or locations require sharing workspaces in proximity to others with <6' separation, wear a face covering. ■ Sanitize shared tools or equipment ■ Use own vehicle as site office rather than shared spaces. ■ Wash ungloved hands after contacting shared surfaces. ■ Sanitize personal items regularly (cell phone, water bottle, clipboards, notebooks). ■ Set up exclusion zones surrounding public interface areas if < 6' separation. ■ Wear face covering if traveling off site for lunch/coffee/supplies and recommended social distances cannot be maintained. ■ Leave job site if experiencing onset of COVID-19 symptoms.
Positive or Assumed Positive COVID-19 Result at Job Site	Transmission of COVID-19 Virus	■ Contact your manager as soon as information is received of a positive or assumed positive result on the jobsite. ■ Determine if you have had close and prolonged personal proximity to the individual. ■ Based on proximity, you may be asked to remove yourself from the worksite. ■ Your manager will provide guidance for how to proceed safely following worksite withdrawal.

Additional Comments:

DAILY JHA RECORD OF SAFETY MEETINGS

Name of Attendees **Date**

____

____

____

____

____

____

____

____

Signature of Individual Verifying the Above **Date**

____

APPENDIX G

Inadvertent Discovery Plan

INADVERTENT DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit https://ecology.wa.gov/accessibility. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s): Former Precision Engines Building C-1 Location: Snohomish County Airport

Project Lead/Organization: Snohomish County Airport County: Snohomish

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. ***Always assume these are live and never touch or move.***
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. **If you suspect that the discovery includes human remains, also follow Sections 5 and 6.**

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact
Name: Andrew C. Rardin
Organization: Snohomish County Airpor
Phone: 425-508-7472
Email: andrew.rardin@snoco.org

Alternate Contact
Name: Jacob Letts
Organization: GeoEngineers
Phone: 206.228.4375
Email: jletts@geoengineers.com

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager
Name:
Program:
Phone:
Email:

Alternate or Cultural Resource Contact
Name: Ali Furmall
Program: Toxics Cleanup Program
Phone: 509-655-0538
Email: ali.furmall@ecy.wa.gov

STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

<u>DAHP Contacts:</u>

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe: Tulalip Tribes
Name: Richard Young
Title: Cultural Resources Manager
Phone: 360-716-2652
Email: ryoung@tulaliptribes-nsn.gov

Tribe: Stillaguamish Tribe of Indians
Name: Kerry Lyste
Title: THPO, Cultural Resources
Phone: 360-652-7362 ext. 226
Email: klyste@stillaguamish.com

Tribe: Muckleshoot Indian Tribe
Name: Laura Murphy
Title: Archaeologist Cultural Resources
Phone: 253-876-3272
Email: laura.murphy@muckleshoot.nsn.us

Tribe: Samish Indian Nation
Name: Jackie Ferry
Title: THPO
Phone: 360-293-6404 ext. 126
Email: jferry@samishtribe.nsn.us

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:

Agency: NA
Name:
Title:
Phone:
Email:

State Agency:

Agency: NA
Name:
Title:
Phone:
Email:

6. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Follow the steps under ***Stop-Protect-Notify.*** For specific instructions on how to handle a human remains discovery, see: *RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions*.

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist
Guy.Tasa@dahp.wa.gov

(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

   Enter contact information below (required):
   - Local Medical Examiner or Coroner name and phone: J. Matthew Lacy, M.D. 425-438-6205
   - Local Law Enforcement main name and phone: Adam Fortney, 425-388-3026
   - Local Non-Emergency phone number (911 if without a non-emergency number): Snohomish County Sheriff's Office, 425-407-3999
2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

Further activities:

- Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation. Organizations may also participate in consultation.
- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) apply and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law RCW 27.53 and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site’s significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP’s inadvertent discovery language website.

Ecology's IDP Video (https://www.youtube.com/watch?v=ioX-4cXfbDY)

Informational Resources

DAHP (https://dahp.wa.gov)

Washington State Archeology (DAHP 2003)
(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

Association of Washington Archaeologists (https://www.archaeologyinwashington.com)

Potentially Interested Tribes

Interactive Map of Tribes by Area
(https://dahp.wa.gov/archaeology/tribal-consultation-information)

WSDOT Tribal Contact Website
(https://wsdot.wa.gov/tribal/TribalContacts.htm)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Sauk-Suiattle Indian Tribe
Kevin Joseph, THPO
kJoseph@sauk-suiattle.com
Phone: 360-436-0333
Cultural Resources
thpo@sauk-suiattle.com

Snoqualmie Tribe
Steven Mullen-Moses, Director
Archaeology and Historic Preservation
425-292-0249x2010
steve@snoqualmietribe.us

Suquamish Tribe
Dennis Lewarch, THPO
Phone: 360-394-8529
dlewarch@Suquamish.nsn.us

Swinomish Indian Tribal Community
Josephine Jefferson, CR Technician
jpeters@swinomish.nsn.us
Phone: 360-466-7352

Implement the IDP if you see…

Chipped stone artifacts.

Examples are:

- Glass-like material.
- Angular material.
- “Unusual” material or shape for the area.
- Regularity of flaking.
- Variability of size.

Stone artifacts from Oregon.

Stone artifacts from Washington.

Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see…

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.

Above: Fishing Weight - credit CRITFC Treaty Fishing Rights website.

Artifacts from unknown locations (left and right images).

Implement the IDP if you see…

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (dentalium) or tusk.

Upper Left:*Bone Awls from Oregon.*

Upper Center: *Bone Wedge from California.*

Upper Right: *Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using Antalis pretiosa shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.*

Above: *Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.*

Implement the IDP if you see…

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.

Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry*.

Implement the IDP if you see…

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- “Unusual” accumulations of rock (especially fire-cracked rock).
- “Unusual” shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a “layer cake” appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the “unusual” or out of place (for example, rock piles in areas with otherwise few rocks).

Shell Midden pocket in modern fill discovered in sewer trench.

Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.

Hearth excavated near Hamilton, WA.

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.

Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.

Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*

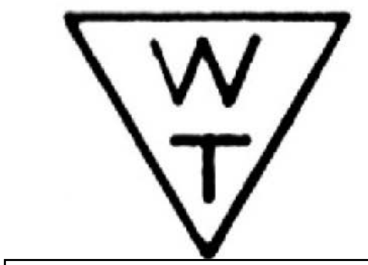
Right, from Top to Bottom: *Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Implement the IDP if you see…

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.

Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: *Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.*



Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).

Can opening dates, courtesy of W.M. Schroeder.

Implement the IDP if you see…

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.

Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

Implement the IDP if you see...

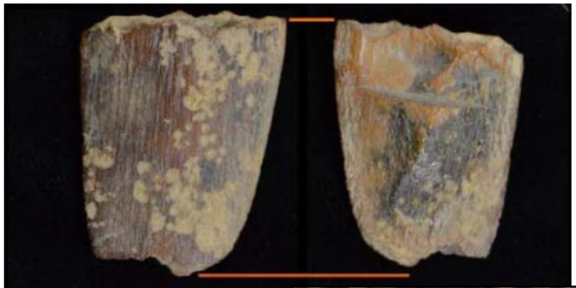
Potential human remains.

Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.

Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45KI1200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.



Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: *Read the plan!*

GeoEngineers