Expanded Groundwater Interim Remedial Measure Completion Report
Tigard Cleaners
Tigard, Oregon
ESCI No. 6158

Prepared for:
Oregon Department of Environmental Quality
Task Order No. 71-18-2

February 23, 2023
2326-01/Task 8

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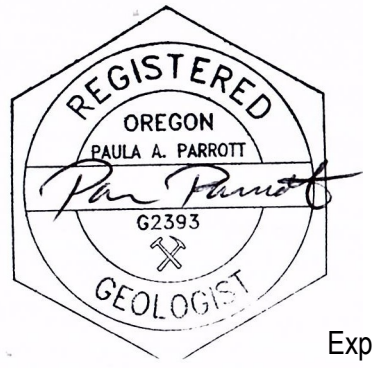
Carmen Owens
Senior Engineer



Exp 7/31/2023

Paula Parrott, R.G.
Senior Associate Hydrogeologist

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1.0 Introduction

This Expanded Groundwater Interim Remedial Measure (IRM) Completion Report (Expanded IRM Report) presents the methods and results of recent activities conducted at the Tigard Cleaners Site located at 12519 SW Main Street in Tigard, Oregon (the Site; Figure 1). The Site has operated as a dry-cleaning facility since the 1950s, and previous investigations conducted at the Site have identified concentrations of dry-cleaning chemicals, including tetrachloroethene (PCE) and trichloroethene (TCE), in soil gas below the facility at concentrations above occupational risk-based screening levels. Previous activities at the Site have included the 2018 implementation of bioremediation injections intended to reduce the potential for unacceptable vapor intrusion to the Site buildings (which, while successful in significantly reducing PCE and TCE concentrations, is nearing the end of its expected viability). Therefore, an expanded groundwater IRM was implemented with the goal of aiding in the complete degradation process of PCE in groundwater and also reducing source-area PCE concentrations. Reducing the source-area PCE concentrations with follow-up *in-situ* bioremediation is expected to reduce groundwater concentrations to acceptable levels, limiting the potential for migration of vapors into the occupied tenant spaces while also reducing the time needed to reach protective concentrations. This report was prepared for the Oregon Department of Environmental Quality (DEQ) under Task 8 of Task Order 71-18-2.

1.1 Scope of Work

The scope of work was completed in general accordance with the *Groundwater IRM Work Plan* (Work Plan) prepared by Apex Companies, LLC (Apex), dated December 28, 2021 (Apex, 2021c). In general, the work consisted of the following tasks:

- Collect pre-injection samples from select monitoring wells for chlorinated hydrocarbon biodegrading markers (i.e., concentration of Dehalococcoides ribonucleic acid [Dhc RNA], a genus of microorganisms that aid in the complete degradation of PCE);
- Perform subsurface injection of a bioremediation substrate across the target treatment area to further enhance naturally-occurring reductive dechlorination of the target chloroethenes, specifically EOS Pro electron donor solution and BAC-9 microbial consortium manufactured by EOS Remediation, LLC (EOS);
- Perform subsurface injection targeting the source area with a zero-valent iron (ZVI) slurry to affect abiotic degradation of the chloroethene molecules while also enhancing anaerobic reductive dechlorination, specifically CleanER-10 from EOS;
- Complete a post-injection media monitoring event (including the collection of groundwater, ambient air, and sub-slab vapor samples) to observe and document the progression and effectiveness of the bioremediation application;

- Manage investigation-derived-waste (IDW); and
- Prepare this report.

These activities are discussed in further detail within this report.

2.0 Background

2.1 Site Location and Description

The Site is located at 12519 SW Main Street in a commercial area of Tigard, Oregon (Figures 1 and 2) with residential development approximately 150 feet to the northwest. Tigard Cleaners is located between Kepler's Upholstery shop at 12511 Main Street (hydraulically upgradient, to the east) and Weichert Elite Realty at 12525 Main Street (downgradient to the west). The Site is also adjacent to a brownfield development to the west at 12533-12537 SW Main Street (referred to as the Saxony-Pacific Property).

The Site is zoned as Mixed Use Central Business District (MU CBD). The City of Tigard is located in the Willamette Valley Basin, Washington County, Oregon. The Site itself is generally flat with a very slight slope towards the southwest and a local surface water drainage feature (Fanno Creek). It is located approximately 155 feet above sea level.

Near-surface lithology in the vicinity of the Site consists primarily of clays, clayey silts, and fine sands to depths of at least 50 feet below ground surface (bgs; the deepest exploration completed at the Site). Based on regional geology reports, it is expected that alluvial soils extend to a depth of about 50 feet bgs, overlying sedimentary deposits (the Troutdale Formation equivalent, which would extend to a depth of about 500 feet bgs) and the Columbia River Basalts. During recent drilling activities, it was observed that clays and silts in the upper 20 feet from the ground surface were tight with low permeability. Fine-grained sand zones with greater permeability were encountered in the exploration boreholes at depths between approximately 18 and 25 feet bgs and between 35 and 45 feet bgs, referred to as the upper and lower conductive zones, respectively. Between the conductive zones were generally low-permeability silts and clays.

The static groundwater level at the Site has been observed in shallow monitoring wells at depths between 3.3 feet and 6.9 feet bgs. The groundwater flow direction has been observed to be southerly and west-southwesterly with an increasing gradient toward the southern edge of the Site (observed gradient ranging from 0.0025 feet/foot [ft/ft] to 0.5 ft/ft).

2.2 Site History

The Site is listed in DEQ's ECSI database as ECSI ID 6158 and is an active participant in the DEQ's Dry Cleaner Program. The Site is located in downtown Tigard, Oregon and consists of two tax lots. The active

dry-cleaning business operates in the main building that fronts SW Main Street and a small, detached building on the north side of the property, herein referred to as the main building and back building, respectively. Dry-cleaning operations that used PCE were reportedly conducted in the main building from the 1950s through the late 1970s when the operations moved to the back building. The existing dry-cleaning machine was installed in 1995.

Previous investigations conducted at the Site have identified concentrations of dry-cleaning chemicals, including PCE and TCE, in groundwater, ambient air, and soil vapor below the facility at concentrations above occupational risk-based concentration (RBC) screening levels (Apex, 2017a; AMEC Foster Wheeler [AMEC], 2016; Associated Environmental Group [AEG], 2016; DEQ, 2016). A Phase II site assessment (AMEC, 2017) concluded that dense non-aqueous phase liquids (DNAPLs) were likely present beneath both Site buildings, but the lateral extent of the chloroethene plumes exceeding RBCs was limited to an area less than 20 feet south and west of the Site.

In August 2017, Apex, on behalf of the DEQ, completed a vapor control IRM which included: the installation of a vapor control system (VCS); installation of two additional groundwater monitoring wells; completion of two deep borings (completed to 50 feet bgs) with depth-discrete groundwater sampling; installation of four additional sub-slab vapor monitoring points in the Site buildings; and two rounds of follow-up media monitoring (Apex, 2017b). Results from the August 2017 IRM implementation and associated sampling were reported in the 2017 *Interim Remedial Measure Report* (IRM Report; Apex, 2017b). Consistent with previous sampling events, PCE and associated degradation by-products (TCE, cis-1,2-dichloroethene [cis-1,2-DCE], and vinyl chloride) were identified at the Site in groundwater at concentrations that exceeded the applicable DEQ RBCs.

Lithologic observations from the depth-discrete groundwater samples identified two fine-grained sand zones with greater permeability, referred to as the upper and lower conductive zones. The upper conductive zone was observed between approximately 18 feet and 25 feet bgs, and the lower conductive zone was observed between approximately 35 feet and 45 feet bgs. Lab results from depth-discrete groundwater samples revealed concentrations of chloroethenes above DEQ RBCs at depths ranging from 13 feet to 50 feet bgs (coincident with the deeper conductive zones), which suggests that the plume has infiltrated to the deeper transmissive layers beneath the Site and that the dissolved-phase contaminant plume likely had extended laterally downgradient toward the Saxony-Pacific Property southwest of the Site. The report also concluded that enhanced bioremediation is a viable interim action technology to enhance the process of naturally occurring reductive dechlorination at the Site, facilitating a decrease in the concentrations of volatile organics in the groundwater and saturated soil.

In December 2017, Apex completed a round of focused ambient air and sub-slab vapor sampling from Tigard Cleaner's main building and Kepler's. The purpose of this sampling event was to further assess the potential source of the relatively higher TCE concentrations that had been encountered in Kepler's. TCE and PCE concentrations were consistent with previous observations; TCE concentrations in ambient air and in soil

vapor collected from Kepler's remained an order of magnitude greater than those from the Site buildings. An inventory of chemicals used at Kepler's was completed on November 10, 2017 and did not identify products in their current inventory that contained TCE, but it is unknown whether historical practices may have used TCE-containing products.

In May 2018, Apex, on behalf of the DEQ, completed a Groundwater IRM which included: injection of an *in situ* bioremediation substrate (Electron Donor Solution – Extended Release [EDS-ER] from Tersus Environmental, LLC [Tersus]) and active cultures; installation of two intermediate-zone monitoring wells; installation of two additional sub-slab vapor pins in Kepler's tenant space; tracing Kepler's sanitary line to the municipal connection; and completion of one round of media monitoring approximately one month following IRM implementation. Groundwater IRM activities and results from the following media monitoring event (June 2018) were presented in the *Groundwater Interim Remedial Measure Completion Report*, submitted to DEQ on August 21, 2018 (Apex, 2018a). The report concluded that the results from the June 2018 media monitoring event were consistent with past sampling events; PCE and associated degradation byproducts were present at the Site in groundwater, sub-slab vapors, and ambient air at concentrations that exceed applicable DEQ RBCs. Early evidence of reductive dechlorination as a result of the enhanced bioremediation activity was observed in wells MW-3 and MW-6, evidenced by reduced concentrations of PCE and TCE and elevated concentrations of DCE and vinyl chloride (which are degradation byproducts of the reductive dechlorination of PCE and TCE).

During the *in situ* bioremediation substrate injections, Apex field personnel noticed a small quantity of substrate had migrated to Fanno Creek, located approximately 300 feet southwest of the Site. The substrate was found to be entering the creek through a previously unidentified legacy stormwater pipe. Injections were paused to allow adjustment of the injection plan and prevent further impact to the stormwater pipe. After relocating injection points, injections proceeded with no further disruption to Fanno Creek. Apex staff sampled water from the outfall pipe on two occasions to evaluate the potential for groundwater impacted by chlorinated solvents to enter Fanno Creek via the legacy stormwater pipe during different groundwater level conditions. Samples were collected on August 1, 2018 and November 5, 2020 which represent dry and wet season conditions. Results from the samples contained low levels of chlorinated volatile organic compounds (VOCs). However, the potential influence of historically higher groundwater level conditions on the outfall are unknown.

Additional post-injection media monitoring events were conducted at the Site in September 2018 and February 2019 and involved collecting groundwater, ambient air, sub-slab vapor, and VCS effluent samples. Results from these monitoring events were presented in the *Fall 2018 Data Summary Report* (Apex, 2018b) and in the *February 2019 Data Summary Report* (Apex, 2019a), respectively. The reports concluded that concentrations of PCE and associated degradation byproducts were present at the Site in groundwater, sub-slab vapors, and ambient air at concentrations that continue to exceed applicable DEQ RBCs. However, evidence of increased reductive dechlorination as a result of the groundwater IRM was observed in most monitoring wells at different stages of the reductive dechlorination process.

TCE concentrations in ambient air and sub-slab vapors beneath Kepler's continued to exceed applicable DEQ RBCs and were at least one order of magnitude higher than TCE concentrations in historical air and vapor samples collected from beneath Tigard Cleaners. Additionally, the ratio between PCE and TCE in samples collected from Kepler's was inconsistent with samples collected from Tigard Cleaners. Additional investigations were conducted during the February 2019 event that included collecting a grab groundwater sample and grab soil sample upgradient of well MW-4, near the wall between Tigard Cleaner's main building and Kepler's. The grab groundwater sample did not contain detectable concentrations of PCE or TCE. Low levels of PCE and TCE were detected in the grab soil sample at concentrations below the applicable RBCs. The ratio between PCE and TCE in the soil sample was similar to the ratio observed in groundwater collected from well MW-4 (and ratios observed in sub-slab samples collected beneath the slab of Tigard Cleaner's main building). Based on the results of the additional investigation and historical data, the report concluded that it is likely that the TCE concentrations detected in the Kepler's building are unrelated to activities at Tigard Cleaners and are associated with a separate (but undefined) source.

Additional media monitoring events have been conducted on a semi-annual basis from May 2019 to present. Monitoring events involved collecting groundwater, ambient air, and VCS effluent samples. Sub-slab vapor samples were collected during the routine monitoring events through 2019. Results from these events were presented in the subsequent data summary reports (May 2019 - Apex, 2019b; September 2019 - Apex, 2019c; May 2020 - Apex, 2020a; Fall 2020 - Apex, 2020b; and June 2021 – Apex, 2021a). Report findings were generally consistent with previous media monitoring events at the Site, and evidence of increased reductive dechlorination as a result of the groundwater IRM was observed in most monitoring wells, but at different stages of the reductive dechlorination process.

The June 2021 Data Summary Report (Apex, 2021a) stated that since implementation of the groundwater IRM in May 2018, PCE and TCE concentrations had significantly decreased while concentrations of DCE and vinyl chloride had increased in Site monitoring wells; overall, the average PCE and TCE concentrations across the Site had decreased by approximately 80 and 90 percent, respectively (relative to historical highs), while DCE and vinyl chloride concentrations had increased on average by 200 and 800 percent, respectively, relative to pre-IRM implementation concentrations. These results were consistent with the ongoing (but incomplete) reductive dechlorination process. As of 2021, DCE is the dominant chloroethene form in the monitoring wells. This demonstrates that the overall process of reductive dechlorination had reached a more advanced stage across the Site. Concentrations of DCE in 2021 had dropped from previously observed high concentrations, further supporting that the reductive dechlorination process was proceeding (with corresponding increases in vinyl chloride concentrations), except in the source area where DCE concentrations remained elevated. This is likely the result of significant degradation of TCE still occurring in the source area (since vinyl chloride concentrations were also increasing, indicating the DCE is being dechlorinated). The injection substrate used in the May 2018 groundwater IRM is beyond the midpoint of its expected effectiveness lifespan, and reduced rates of reductive dechlorination in source-area wells were

observed during the 2021 monitoring events. The report recommended an evaluation of potential additional actions at the Site in anticipation of the continued depletion of the bioremediation substrate.

3.0 Expanded Groundwater IRM

The expanded groundwater IRM was conducted in general accordance with the Work Plan (Apex, 2021c). The activities are described below in detail.

3.1 Preparatory Activities

Site Health and Safety Plan. A Site-specific health and safety plan (HASP) was prepared for the field activities and included in the Work Plan. The HASP was prepared in general accordance with the Occupational Safety and Health Administration (OSHA) and the Oregon Administrative Rules (OAR). A copy of the HASP was maintained on-site during the field activities.

Property Access. Property access was coordinated by Apex with the property owners, tenants, and DEQ. Because the IRM included the injection of materials into the ground, Apex coordinated with DEQ to verify that the injections were covered by the previous Underground Injection Control (UIC) permit prior to beginning bioremediation injections at the Site.

Subcontractor Solicitation. Apex solicited subcontractors to conduct a utility locating survey, perform bioremediation substrate injections, and perform Dhc RNA analysis. Each subcontractor was competitively procured in collaboration with the DEQ. The injection materials were obtained from EOS based on the selection process described in the Subsurface Injection Remediation Material Review memo (Apex, 2021b). Additional analytical laboratory services were provided by Pace Analytical under the existing State of Oregon Price Agreement.

Utility Locating. Prior to the injection activities, underground utility lines were located and marked in the vicinity of the proposed ground disturbance locations. Apex procured a private utility locate subcontractor, Applied Professional Services, to locate underground utilities, and contacted the Oregon Utility Notification Center, who in turn notified the various utility companies in the area to mark any underground installations.

3.2 Pre-Injection Monitoring Event

Prior to the injection event, on May 26, 2022, select monitoring wells were sampled to assess the concentrations of Dhc RNA present in groundwater. No samples for VOC analysis were collected or analyzed during this event. Monitoring wells were selected to represent the general variations in groundwater characteristics based on known hydrogeology and historical groundwater monitoring results. Groundwater samples were collected from monitoring wells MW-5, located upgradient of the treatment area; MW-4, located

within the main building source area; MW-1, located within the back building source area; MW-6, located downgradient of the back building source area; and MW-2i, an intermediate-zone well located downgradient of the main building source area (Figure 2). Samples were collected as described in the Sampling and Analysis Plan (SAP) in Appendix B of the Work Plan.

3.3 Expanded Groundwater IRM Activities

The groundwater IRM was implemented at the Site between August 14 and 26, 2022 to address volatile organics in the groundwater and saturated soil. IRM activities included the injection of the treatment solutions into two target treatment zones. The higher-concentration source areas were targeted with a combination of an emulsified vegetable oil, ZVI, active microbial cultures, sodium bicarbonate (pH buffer), and a sodium ascorbate (chlorine neutralizer) solution. A broader area of relatively lower concentrations was treated with a less aggressive solution that did not include the ZVI. Additionally, a soil boring was completed to determine the depth to the bottom of the transmissive zone in the southwestern portion of the Site. The target treatment zones, injection boring locations, and soil boring location are shown on Figure 3.

3.3.1 Soil Boring

A soil boring was completed at location B-1 (Figure 3) on August 17, 2022 via direct push drilling methods using a Geoprobe rig to a depth of 35 feet bgs. As noted above, the boring was completed to determine the bottom of the transmissive zone in the southwestern portion of the site and aid in determining target injection depth.

Lithologic Logging. Continuous soil samples were collected every 2 and a half feet during the soil boring advancement and were described by an Apex geologist using the Unified Soil Classification System (USCS) in general accordance with ASTM 2487/2488. Other features such as sorting, sedimentary features, mineralogy, degree of weathering, and contacts with other soil types were noted when/if relevant.

The predominant soil types encountered during drilling consisted of low-plasticity silt and clay with two intervals of silty sand, from 10 to 12.5 feet bgs and from 22.5 to 30 feet bgs. The two clay layers were encountered at approximately 7.5 to 10 feet bgs and again at 32.5 to 35 feet bgs (the terminus of the boring). The silty sand layers between the silt and clay layers correspond to the previously identified upper and lower conductive zones. The boring log is included in Appendix A.

Borehole Abandonment. The boring was abandoned by backfilling with hydrated bentonite and finishing the surface to match the surrounding area.

3.3.2 In Situ Enhanced Bioremediation Injection

The expanded groundwater IRM was implemented at the Site between August 16 and 26, 2022 to address volatile organics in the groundwater and saturated soil. The remedial strategy consisted of dividing the Site into two target treatment zones: one with focused, more intense treatment of the relatively higher-concentration source area, and one with less aggressive treatment of the larger lower-concentration treatment area. The large treatment area includes the entire area of groundwater impacted by chloroethene concentrations above cleanup goals. The focused source treatment areas include two narrow areas in the vicinity of the residual chloroethene source areas that are located approximately beneath former dry-cleaning equipment in the main and back buildings (Figure 3).

The remedial strategy in the large target area consisted of injecting emulsified vegetable oil (which will act as an EDS), active microbial cultures (including dehalococcoides, a genus of microorganisms that are known to aid in the complete degradation of PCE), and a pH buffer (sodium bicarbonate). Sodium ascorbate was also added to the water prior to mixing in the rest of the solution to neutralize chlorine from the municipal water source. To distribute the injection substrate evenly throughout the larger treatment area, the locations were spaced 15 feet apart within the larger target area with alternate rows offset by half of the spacing, where applicable.

The remedial plan in the focused source areas consisted of injecting an emulsified vegetable oil in conjunction with a ZVI solution and active microbial cultures (along with sodium ascorbate to neutralize chlorine). In addition to the reductive dechlorination of the chloroethenes being enhanced by the EDS, the ZVI will abiotically degrade the chloroethene molecules coming into direct contact with it, contributing to an anaerobic environment suitable for reductive dechlorination and also buffering the pH as it oxidizes so that no separate pH buffer solution was needed in the focused treatment areas. To distribute the injection substrate evenly throughout the focused treatment areas, the injection locations were spaced approximately 5 feet apart.

Due to limited drill rig access within the focus areas, ten of the injections (FA-1i through FA-10i; shown on Figure 3) were completed using a limited access, direct push drill rig from within the interior of the buildings to a depth of 15 feet bgs. To reach the lower injection boring target intervals in these locations, an angled boring was employed using the full-size injection equipment from an adjacent, exterior location, and the injections continued from depths of between 15 feet bgs and 30 feet bgs. The injections at locations FA-1e through FA-9e and FA-11 through FA-14 were completed using an angled boring from an adjacent exterior location across all depth intervals.

Injections in the larger target area were completed vertically with the exception of E-5a. This location was completed with both a vertical and angled boring to reach the area between the main and back buildings that could not be addressed with a vertical boring due to the presence of underground utilities in that area.

Injection Method and Quantity. EOS-Pro, CleanER-10, BAC-9, and sodium bicarbonate were injected using a bottom-up methodology, starting at the lower conductive zone (a depth of approximately 30 to 35 feet bgs) and continuing in successively shallower 5-foot increments to the top of the saturated zone (at a depth of approximately 5 to 10 feet bgs). This bottom-up methodology was used rather than the top-down methodology prescribed in the work plan so the screens used to inject the biosubstrate would not get clogged. A summary of injection volume and depth for each location is shown on Table 1.

The expanded IRM injections were completed using direct-push technology. The water for the injection solution was obtained from the municipal water supply and dechlorinated and treated with BAC-9 Primer (an anoxic bioaugmentation media) and sodium ascorbate prior to use. Batches of treated water were tested for dissolved oxygen (DO), oxidation-reduction potential (ORP), and pH prior to use. EOS Pro and BAC-9 Cultures were mixed with the prepared water to form a dilution of approximately 5 to 1 (Water: EOS Pro + BAC-9 Culture). This solution was injected at the target depth and then flushed with enough water to replace approximately 10 percent porewater volume at each depth interval. Polyethylene tanks were used to allow simultaneous mixing and injection. Dilution of the solution was accomplished by combining the EOS Pro concentrate and cultures with the dechlorinated/anoxic water and stirring with a recirculation pump (minimizing the potential for contact with oxygen by keeping agitation to a minimum above the tank water surface. Flow rates during injection ranged from 1.8 to 9 gallons per minute. A total fluid volume of approximately 8,105 gallons of solution was injected through the drill stem of the injection probe equipment via a non-contact pump. No significant daylighting was observed during the injection event, other than that noted above in injection point E9, which was terminated due to oversaturation. Injection pressures ranged between 20 and 60 pounds per square inch (psi).

Borehole Abandonment. Following the IRM injection at each location, each boring was abandoned by backfilling with hydrated bentonite and finishing the surface to match the surrounding area.

3.4 First Post-Injection Monitoring

The scope of work for the October 2022 post-injection monitoring event was completed in general accordance with the Work Plan (Apex 2021c). The monitoring was completed approximately two months after completion of the injections.

Groundwater Levels. On October 18 and 19, 2022, groundwater levels were measured in Site monitoring wells to the nearest 0.01 foot bgs. The measured depths to groundwater and resultant groundwater elevations are included in Table 2 and are presented on Figure 4. Historical measurements are provided in Appendix C.

During the post-injection monitoring event, groundwater at the Site was encountered at depths between 4.80 feet and 7.26 feet bgs in the upper conductive zone and between 4.29 feet and 8.23 feet bgs in wells screened in the intermediate conductive zone. The groundwater flow gradient is predominantly to the west-southwest towards Fanno Creek, which is consistent with previous observations.

Groundwater Monitoring. A post-injection groundwater monitoring event was conducted on October 18 and 19, 2022. Samples were collected in accordance with the SAP. During the monitoring event, groundwater samples were collected from nine monitoring wells (MW-1 through MW-7, MW-2i, and MW-6i). Samples from all wells were analyzed for VOCs. Samples from wells MW-1, MW-2, MW-4, MW-5, and MW-6 were analyzed for total organic carbon (TOC). Based on communication with DEQ, select monitoring wells (MW-3, MW-4, and MW-5) were analyzed for per- and polyfluoroalkyl substances (PFAS).

Ambient Air and Vapor Monitoring. Ambient air samples were collected from inside Kepler's Upholstery to evaluate the indoor air quality. In addition, an outdoor air sample was collected to evaluate if a correlation exists between outdoor air concentrations and indoor ambient air concentrations. The outdoor ambient air sample was located approximately 10 feet northwest of the main building of Tigard Cleaners (Figure 2). Each of the samples were collected in six-liter Summa canisters with eight-hour flow controllers and were collected from typical breathing air spaces, set at an approximate height of 3 to 5 feet above ground surface.

An air sample of the system effluent (sample EX) was collected from the vent stack for the VCS to assess system effectiveness and the potential need for vapor treatment. The system effluent sample was collected in a one-liter Summa canister with a 200-cubic-centimeters-per-minute (cc/min) flow controller over a period of approximately five minutes. The system was observed to be running normally during the monitoring event.

3.5 Handling of Investigation-Derived Waste

IDW consisted of decontamination water, monitoring well purge water, and personal protective equipment (PPE). Water IDW was placed in properly-labeled drums and temporarily stored at a pre-approved location at the Site. Sampling materials and PPE were disposed of as solid waste.

3.6 Work Plan Deviations

Some injection boring locations (FA-1i, FA-3i, FA-6i, FA-7i, FA-8i, FA-9i, and FA-10i) were adjusted from the locations proposed in the Work Plan to accommodate buried utilities and limited space for drilling equipment. The injection at location E-9 was not completed because substrate upwelling in the parking lot was seen as soon as pumping began. Due to time constraints, borings E-15, E-16, and E-17 were not completed. The substrate intended for these injections was added to nearby locations.

An ambient air sample was not collected from inside Weichert Elite Real Estate (formerly Clear Payments and Future State) due to lack of access. Multiple attempts were made to contact the tenant by Apex and the landlord with no responses. Apex will continue to attempt to contact the tenant to secure access to the building for future sampling events.

4.0 Monitoring Results

The following section describes the results of the pre- and post-injection groundwater monitoring events.

4.1 Analyses Performed

Groundwater Samples. For the post-injection monitoring event only, groundwater from each sampled groundwater monitoring well was analyzed for VOCs by U.S. Environmental Protection Agency (EPA) Method 8260D. Additionally, groundwater samples collected from monitoring wells MW-1, MW-2, MW-4, MW-5, and MW-6 were analyzed for TOC by EPA Method 9060A. During the pre-injection event only, select groundwater samples (MW-1, MW-4, MW-5, MW-6, and MW-2i) were analyzed for Dhc RNA by real-time polymerase chain reaction (PCR) analysis. During the post-injection monitoring event only, select monitoring wells (MW-3, MW-4, and MW-5) were analyzed for PFAS by Draft EPA Method 1663.

Ambient Air and Vapor Samples. The ambient air and vapor samples were analyzed for selected VOCs by EPA TO-15 analysis.

Quality Assurance and Quality Control. Quality assurance/quality control (QA/QC) procedures were used throughout this project. The review in Appendix B includes the QA assessment for this project. This QA assessment includes sampling and custody procedures, QA sampling analyses (such as analysis of duplicates), detection limit goals, and laboratory QC and QA reporting. In summary, the review noted that the data are of acceptable quality and are suitable for their intended purposes.

4.2 Groundwater Chemical Results – Dhc RNA

Table 3 summarizes the results for real-time PCR analysis of Dhc RNA. These samples were collected during the pre-injection monitoring event to assess for the presence of Dhc bacteria. Each copy of RNA is equivalent to approximately one Dhc bacteria. MW-5, located upgradient of the treatment area, did not have detectable amounts of Dhc RNA. Source area wells MW-1 and MW-4 had 1,664,539 and 3,219 copies of Dhc RNA per 100 milliliters (mL) of sample, respectively. Downgradient wells MW-2i and MW-6 had 34,995 and 3,362,979 copies of Dhc RNA per 100 mL, respectively. The detection of Dhc RNA within and downgradient of the source areas shows the potential for additional growth of these bacteria with the addition of the EOS Pro into the subsurface as well as the potential for higher degradation rates for PCE and associated degradation compounds.

4.3 Groundwater Chemical Results – VOCs

Table 4 presents the results for chlorinated VOCs in groundwater. Figure 5 summarizes the results for select VOCs (PCE, TCE, vinyl chloride, and DCE). The results are presented as pie charts, which show the

percentage of each VOC by molar concentration. Additionally, the size of each pie chart represents the total molar chloroethene concentration of VOCs in each well.

PCE and TCE were detected above method reporting limits (MRLs) in one of the nine groundwater samples collected during the sampling event (MW-4). Concentrations of PCE and TCE in MW-4 were 78,000 micrograms per liter (µg/L) and 11,500 µg/L, respectively. Both concentrations are increases compared to the sample collected from this location during the previous monitoring event, and the PCE concentration is a historical maximum. Decreased PCE and TCE concentrations were noted in the samples collected from monitoring wells MW-1 and MW-3 compared to previous events where PCE and TCE were detected at concentrations well above the MRLs.

DCE was detected in eight of the nine groundwater samples collected during the monitoring event. DCE concentrations above the MRL ranged from 0.950 µg/L in well MW-6i to 217,000 µg/L in source-area well MW-1. DCE concentrations decreased from 2021 to October 2022 in samples collected from all wells except MW-4 and MW-2i. The relatively higher concentrations detected in samples collected from those monitoring wells during this monitoring event remain below historical highs.

Vinyl chloride was detected in seven of the nine groundwater samples collected during the October 2022 monitoring event (not detected in monitoring wells MW-6i and MW-5). Detected concentrations of vinyl chloride ranged from 2.88 µg/L in MW-2 to 13,000 µg/L in MW-1. Vinyl chloride concentrations in groundwater decreased compared to the last monitoring event in all wells except MW-1 and MW-4.

In general, concentrations of chlorinated hydrocarbons decreased in Site monitoring wells with the exception of MW-4. Concentrations of TCE, PCE, and DCE detected in the sample collected from MW-4 in October 2022 increased compared to the previous event, with PCE detected at the highest concentration for that location.

Reductive Dechlorination of PCE. Evidence of reductive dechlorination (the stepwise substitution of a chlorine atom on a saturated chloroethene molecule with a hydrogen atom) was observed in most monitoring wells (at varying degrees) during this event and is discussed in more detail below. Concentration trend plots for PCE, TCE, DCE, and vinyl chloride in select monitoring wells are available in Appendix D.

Results from the injections are expected to increase microorganism populations which will in turn increase the associated breakdown of PCE and its reduction to the associated degradation byproducts. This process of reductive dechlorination (the stepwise substitution of a chlorine atom on a chlorinated hydrocarbon with a hydrogen atom, thereby reducing the hydrocarbon from the fully saturated form [PCE] to a less saturated form [TCE, DCE, and vinyl chloride]) is expected to occur over an extended period of time. Given the extended release nature of the substrate, significant reductions in chlorinated VOC concentrations will likely not be evident for at least six months (and perhaps as much as a year to see the scale of the bioremediation

effectiveness). Expected results include a decrease in PCE concentrations and an initial increase of the associated degradation products (i.e. TCE, DCE, and vinyl chloride) followed by significant decreases in the byproduct concentrations as the microorganisms continue the reductive dechlorination process.

During the post-injection groundwater monitoring event, source area wells MW-1 and MW-3 showed a decrease in PCE and TCE concentrations while MW-4 and MW-2i showed increased DCE and vinyl chloride concentrations as compared to the pre-injection monitoring event. This is likely early evidence of increased reductive dechlorination happening in the vicinity of these wells. Additional groundwater monitoring is needed to assess contaminant concentration trends in these wells and other site monitoring wells as treatment progresses.

Risk-Based Screening. Concentrations of detected chloroethene VOCs were compared to the applicable DEQ risk-based screening levels which include:

- Groundwater volatilization to outdoor air for urban residential and occupational exposure scenarios;
- Groundwater vapor intrusion into buildings for urban residential and occupational exposure scenarios; and
- Groundwater direct contact under construction and excavation worker exposure scenarios.

The RBCs used in the risk screening were chosen based on the current and reasonably likely future receptors and probable exposure pathways. These RBCs are listed with the data in Table 4. Analytical results exceeding one or more of the screening levels are shaded in the tables.

PCE and TCE were detected above the method detection limit in only one well, MW-4. The TCE concentration detected in the sample collected from monitoring well MW-4 was above all applicable RBCs except groundwater volatilization to outdoor air for the urban residential scenario. The PCE concentration detected in the sample collected from monitoring well MW-4 was above all applicable RBCs except groundwater volatilization to outdoor air for the occupational scenario.

Cis-1,2-DCE has only one relevant RBC, groundwater in excavations for construction and excavation workers. Three of eight detections of cis-1,2-DCE were above this RBC (samples collected from monitoring wells MW-1, MW-4, and MW-2i).

Seven of eight detections of vinyl chloride were above the RBC for groundwater vapor intrusion into buildings for the urban residential scenario, the lowest of the five applicable RBCs. The vinyl chloride concentrations detected in three wells (MW-1, MW-4, and MW-2i) were above all relevant RBCs.

These RBC exceedances are consistent with those seen in samples collected during previous monitoring events. Additional groundwater monitoring is needed to assess contaminant concentration trends in Site monitoring wells as treatment progresses.

4.4 Groundwater Chemical Results – TOC

Samples collected from monitoring wells MW-1, MW-2, MW-4, MW-5, and MW-6 were analyzed for TOC, which is representative of the bioremediation substrate (which is in turn representative of the bioavailable hydrocarbon supply required for facilitating the reductive dechlorination process). Analytical results are summarized in Table 5.

TOC was detected in samples collected from monitoring wells MW-1 and MW-4 at concentrations one order of magnitude higher than those detected during the previous monitoring event. These wells are within the focused target areas where injections were spaced closely together. TOC was not detected in samples collected from monitoring wells MW-5, MW-2, and MW-6. MW-5 is upgradient of the source area and injections were not completed near this well. MW-2 and MW-6 are located in the larger target area where injections were spaced farther apart than in the focus areas. It is expected that TOC concentrations will rise in these wells over time.

4.5 Groundwater Chemical Results – PFAS

Groundwater samples for PFAS analysis were collected from monitoring wells MW-3, MW-5, and MW-7 during the post-injection monitoring event (Table 6). PFAS compounds were detected in each of the three samples. Only one PFAS compound was detected slightly above the limit of qualification (LOQ; perfluorooctane sulfonic acid [PFOS]) in the sample collected from monitoring well MW-3. The most PFAS compounds were detected in the sample collected from upgradient monitoring well MW-5, with 10 of the 40 analyzed compounds detected. The relatively highest concentrations of PFAS were also detected in this sample. Five PFAS compounds were detected in the sample collected from monitoring well MW-7. Given the distribution of PFAS concentrations, it is unlikely that the higher concentrations detected in the sample collected from monitoring well MW-5 are related to the operation of the dry-cleaning business at the Site.

PFAS concentrations were compared to EPA and DEQ Health Advisory Levels (HALs) for drinking water. PFOS was detected above the LOQ in all three wells sampled at concentrations above the EPA HAL, but below the DEQ HAL. Perfluorooctanoic acid (PFOA) was detected above the LOQ in samples collected from monitoring wells MW-5 and MW-7. Both wells had concentrations of PFOA above the EPA HAL, while the PFOA concentration detected in the sample collected from monitoring well MW-5 was also above the DEQ HAL.

4.6 Ambient Air Results – VOCs

This section summarizes the analytical results from the air and vapor samples collected during the post-injection monitoring event. Analytical results are included in Tables 7 and 8 and are shown on Figure 6. Laboratory analytical reports are included in Appendix B.

PCE and TCE were detected above the MRL in both the indoor and outdoor ambient air samples. Concentrations of both analytes were higher inside Kepler's (AMB-5/KU-1) than outside. The concentration of TCE detected in the sample collected from inside Kepler's was an order of magnitude higher than that detected in the sample collected during the last sampling event, and higher than previous monitoring events at 7,980 micrograms per cubic meter (µg/m^3). This concentration is below the Occupational Safety and Health Administration Permissible Exposure Limit for an 8-hour time weighted average (OSHA PEL-TWA) of 535,000 µg/m^3. Cis-1,2-DCE and vinyl chloride were not detected above MRLs in either ambient air sample analyzed.

Risk-Based Screening. Analytical results of the indoor air samples were compared to the DEQ RBCs (DEQ, 2018) chosen based on the current and reasonably likely future receptors and probable exposure pathways. The selected RBCs include ingestion by air inhalation in occupational (current) and urban residential (potential future) scenarios. The RBCs are listed with the data in Table 7. Analytical results exceeding the associated RBC are shaded in the table.

The indoor ambient air sample located inside Kepler's exceeded the RBCs for air inhalation for both applicable scenarios for TCE. The outdoor ambient sample exceeded the air inhalation for urban residential scenario for TCE.

4.7 System Effluent Vapor Results – VOCs

All reported chlorinated VOCs were detected above the MRL in the system effluent sample collected during the post-injection monitoring event. The noted decrease in PCE concentration and increase in TCE, cis-1,2-DCE, and vinyl chloride concentrations in the system effluent sample may be early evidence of dechlorination resulting from the recent injections.

Risk-Based Screening. The effluent discharge from the vapor collection system had detected concentrations above reporting limits for several VOCs, including PCE, TCE, cis-1,2-DCE, and vinyl chloride. VOC concentrations from the vapor collection system effluent sample were compared to RBCs calculated using the EPA SCREEN3 vapor distribution model (EPA, 1995) for modified urban residential inhalation from a stack (Apex, 2017a), as shown on Table 8. No analytes were detected in the system effluent at concentrations that exceed the acceptable discharge concentrations. Therefore, it is concluded that no emission controls are needed for the discharge to be protective for surrounding receptors (concentrations in the discharge are also expected to continue to decrease with sustained operation).

5.0 Conclusions

Pre-Injection Dhc RNA Analysis. Groundwater samples analyzed for Dhc RNA from select monitoring wells showed that Dhc bacteria were already present in both the source area and downgradient and are available to aid in the complete degradation of PCE.

Expanded GW IRM. A total of 8,095 gallons of EOS Pro, BAC-9, Clean-ER, and dechlorinated water were injected into the subsurface during the expanded GW IRM activities.

Reductive dechlorination is the most commonly encountered natural process associated with the degradation of PCE and is typically evidenced by the presence of the degradation byproducts (TCE, cis-1,2-DCE, vinyl chloride, and ethene). Previous subsurface explorations determined that reductive dichlorination is an active process at the Site. By injecting EOS Pro (emulsified oil) and Bac-9 (microorganisms) into the subsurface, an increased rate of reductive dechlorination is expected. Preliminary evidence of increased reductive dechlorination as a result of the expanded GW IRM is observed in monitoring wells MW-1 and MW-3, which showed a decrease in PCE and TCE concentrations while MW-4 and MW-2i showed increased DCE and/or vinyl chloride. As the injection products continue to migrate and increase contact with more microorganisms in the target zones, greater rates of reductive dechlorination are anticipated. Additionally, Clean-ER (ZVI) is expected to increase abiotic degradation of the chloroethene molecules while also enhancing anaerobic reductive dechlorination near the PCE source.

Post-Injection Groundwater Monitoring. Consistent with prior sampling events, PCE and associated degradation byproducts remain present in Site groundwater and ambient air at concentrations that exceed applicable DEQ RBCs.

Groundwater samples collected from the upgradient well (MW-5) and the well immediately downgradient of the main Tigard Cleaner's building (MW-2) were relatively clean with little to no detected VOCs. Concentrations of PCE, TCE, cis-1,2-DCE, and vinyl chloride in groundwater collected from source area monitoring well MW-4 exceed at least one applicable RBC, and the concentrations of PCE represent a historical maximum. Groundwater collected from monitoring well MW-3 near the back building source area contains vinyl chloride at concentrations above applicable RBCs. Concentrations of cis-1,2-DCE and vinyl chloride in groundwater collected from MW-1 (located immediately downgradient of the back building) exceed at least one applicable RBC. Groundwater collected from downgradient wells MW-6 and MW-7 exceeds at least one applicable RBC for vinyl chloride.

Intermediate wells MW-2i and MW-6i are located downgradient of the identified source areas near the shallow monitoring wells with the same identification number. Groundwater collected from MW-6i contains lower concentrations of chloroethenes than MW-6 and does not exceed any RBCs. Groundwater collected from MW-2i, however, contains higher concentrations of chloroethenes than MW-2. Contaminant concentrations in groundwater collected from MW-2 did not exceed any RBCs; however, groundwater from MW-2i exceeded

at least one RBC for cis-1,2-DCE and vinyl chloride. These results indicate the groundwater contaminant plume is present in the lower sand layers downgradient from the main building and back building source area, but at lower concentrations near the back-building source.

TOC was previously identified as a likely limiting factor to enhanced bioremediation. The selected injection substrate product is intended to provide sufficient carbon and hydrogen to enhance the microbially-induced reductive dechlorination process and was injected across the target treatment area. Groundwater sample results showed increased concentrations of TOC as compared to the previous sampling event in wells MW-1 and MW-4, located in the source area. It is anticipated that TOC concentrations throughout the treatment area will continue to rise over the next year, and then decrease as the carbon source is utilized by the microbial population. Monitoring well MW-5, located upgradient of the contaminant plume, showed decreases in TOC. This may indicate a decrease or fluctuation in naturally occurring organic carbon entering the source areas.

PFAS was detected in all three monitoring wells sampled for these compounds. PFOS was detected above the LOQ in all three sampled wells at concentrations above the EPA HAL, but below the DEQ HAL. PFOA was detected above the LOQ in MW-5 and MW-7. Both of these wells had concentrations of PFOA above the EPA HAL, while MW-5 was above the DEQ HAL. Given the distribution of PFAS concentrations, it is unlikely that the higher concentrations detected in the sample collected from monitoring well MW-5 are related to the operation of the dry-cleaning business at the Site.

Air samples collected from inside Kepler's (AMB-5) contained concentrations of TCE that exceed occupational air inhalation RBCs, consistent with historical sampling results. The concentration of TCE was an order of magnitude higher than that detected in the sample collected during the last sampling event, and higher than previous monitoring events, but below the OSHA PEL-TWA of 535,000 µg/m^3.. The ratio of the TCE to PCE concentration in AMB-5 is disproportionate compared to the other indoor air samples, and the TCE concentration in this one sample is uniquely higher than the PCE concentration by an order of magnitude. None of the groundwater monitoring wells (including MW-4 and MW-5, the two wells nearest the Kepler's sample) show relatively higher TCE concentrations than PCE, and the Kepler's sample is located upgradient of the source area. However, in other monitoring wells located downgradient of source areas (MW-1, MW-6, and MW-7), higher concentrations of TCE relative to PCE are observed. There are no monitoring wells at Kepler's space nor upgradient of MW-4 to verify if groundwater in the area reflects the ratio of PCE to TCE observed at Kepler's.

No analytes were detected in the effluent from the vapor collection system at concentrations that exceed the acceptable effluent discharge concentrations. Therefore, it is concluded that no emission controls are needed for the discharge in order to be protective for surrounding receptors.

While the degradation of the chloroethene VOCs continues to occur across the Site, it is likely that DNAPLs are present beneath both site buildings. These likely source areas were the target of the focused-area

treatment which included more aggressive treatment as compared to the dissolved phase plume. The dissolved-phase contaminant plume likely extends laterally downgradient onto the Saxony Pacific Property west of the Site, and the plume has infiltrated to the deeper transmissive layers beneath the Site. It is anticipated that the expanded GW IRM described in this report will lead to a decrease in PCE concentrations and an initial increase of the associated degradation products (*i.e.* TCE, DCE, and vinyl chloride) followed by significant decreases in the byproduct concentrations as the microorganisms continue the reductive dechlorination process.

6.0 References

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Table 1
Injection Summary
Tigard Cleaners
Tigard, Oregon

Injection Location	Injection Volume (Gallons)	Injection Depth (ft bgs)	Angle (Degrees)
Focus Area 1 (EOS Pro/CleanER-10/BAC-9)			
FA-6i	81	5-17	0
FA-6e	81	20-35	10
FA-7i	81	5-17	0
FA-7e	81	20-35	10
FA-8i	81	5-17	0
FA-8e	81	20-35	10
FA-9i	81	5-17	0
FA-9e	81	20-35	10
FA-10i	81	5-17	0
FA-10e	81	20-35	10
FA-12	161	10-30	10
FA-13	161	10-35	10
Focus Area 2 (EOS Pro/CleanER-10/BAC-9)			
FA-1i	81	5-17	0
FA-1e	81	20-35	9
FA-2i	81	5-17	0
FA-2e	81	20-35	14
FA-3i	81	5-17	0
FA-3e	81	20-35	14
FA-4i	81	5-17	0
FA-4e	81	20-35	14
FA-5i	81	5-15	0
FA-5e	81	20-35	7
FA-11	161	10-35	10
FA-14	162	5-35	10
Larger Target Area (EOS Pro/$NaHCO_3$/BAC-9)			
E-1	432	5-30	0
E-2	431	6-35	0
E-3	504	5-36	0
E-4	504	10-35	0
E-5v	10	30-35	0
E-5a	432	10-35	8
E-6	432	10-35	0
E-7	432	10-35	0
E-8	360	10-35	0
E-9	288	20-35	0
E-10	432	20-35	0
E-11	360	10-35	0
E-12	360	15-35	0
E-13	432	10-35	0
E-14	433	10-35	0
Total	**8,105**		

Table 2
Groundwater Elevation Data
Tigard Cleaners
Tigard, Oregon

Well Identification	Date	Screened Interval (feet bgs)	Top of Casing (feet MSL)	Depth to Water (feet bgs)	Depth to Product (feet bgs)	Product Thickness (feet bgs)	Groundwater Elevation (feet MSL)
Shallow Wells							
MW-1							
	10/16/2020	7-17	154.054	5.30	--	--	148.75
	6/7/2021			7.41	--	--	146.64
	10/20/2021			5.03	--	--	149.02
	10/19/2022			4.90	--	--	149.15
MW-2							
	10/16/2020	7-17	154.85	4.66	--	--	150.19
	6/7/2021			4.24	--	--	150.61
	10/20/2021			3.11	--	--	151.74
	10/19/2022			7.26	--	--	147.59
MW-3							
	6/7/2021	7-17	155.293	5.80	--	--	149.49
	10/20/2021			5.87	--	--	149.42
	5/26/2022			--	--	--	--
	10/19/2022			6.27	--	--	149.02
MW-4							
	10/16/2020	7-17	155.54	5.40	--	--	150.14
	6/7/2021			5.61	--	--	149.93
	10/20/2021			5.48	--	--	150.06
	10/19/2022			5.70	--	--	149.84
MW-5							
	10/16/2020	7-17	154.688	4.58	--	--	150.11
	6/7/2021			4.48	--	--	150.21
	10/20/2021			4.40	--	--	150.29
	10/19/2022			4.80	--	--	149.89
MW-6							
	10/16/2020	10-20	153.319	5.29	--	--	148.03
	6/7/2021			9.33	--	--	143.99
	10/20/2021			9.42	--	--	143.90
	10/19/2022			4.82	--	--	148.50
MW-7							
	10/16/2020	10-20	153.992	4.50	--	--	149.49
	6/7/2021			6.16	--	--	147.83
	10/20/2021			4.94	--	--	149.05
	10/19/2022			4.85	--	--	149.14
Intermediate Wells							
MW-2i							
	10/16/2020	33.25-43.25	154.21	4.93	--	--	149.28
	6/7/2021			4.27	--	--	149.94
	10/20/2021			6.20	--	--	148.01
	10/19/2022			4.29	--	--	149.92
MW-6i							
	10/16/2020	24.58-34.58	153.17	8.12	--	--	145.05
	6/7/2021			6.21	--	--	146.96
	10/20/2021			7.90	--	--	145.27
	10/19/2022			8.23	--	--	144.94

Notes:

1. bgs = below ground surface.
2. feet MSL = feet above mean sea level.
3. -- = Data not available or no product was measured.

Table 3
Groundwater Analytical Results for Dhc RNA
Tigard Cleaners
Tigard, Oregon

Well Identification	Date	Dehalococcoides 16S rRNA
Copies/100 mL		
Upgradient		
MW-5	5/26/2022	None Detected
Source Area		
MW-1	5/26/2022	1,664,539
MW-4	5/26/2022	3,219
Downgradient		
MW-2i	5/26/2022	34,995
MW-6	5/26/2022	3,362,979

Table 4
Groundwater Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Upgradient						
Grab GW SOUTH						
	1/28/2019	<1.00	<1.00	**0.64**	<1.00	**<1.00**
MW-5						
	10/16/2020	<1.00	<1.00	**0.463 J**	<1.00	<1.00
	6/7/2021	<1.00	<1.00	**0.188 J**	<1.00	**0.561 J**
	10/20/2021	<1.00	**0.261 J**	**9.06**	<1.00	**0.433 J+**
	10/18/2022	<1.00	<1.00	<1.00	<1.00	<1.00
Source Area						
MW-1						
	10/16/2020	**11000 J**	**34,200**	**384,000**	<20000	**15,800 J**
	6/7/2021	<20000	<20000	**452,000**	<20000	**90,000 J+**
	10/20/2021	**9940 J**	**21,200**	**279,000**	<20000	**18,700 J+**
	10/19/2022	<500	<500	**217,000**	967	**37,200**
MW-3						
	10/16/2020	**1,740**	**1,060**	**5,490**	<100	**703**
	6/7/2021	**2,620**	**1,350**	**5,630**	**24.1 J**	**1020 J+**
	10/20/2021	**1,560**	**821**	**3,150**	<100	**467 J+**
	10/19/2022	<100	<100	**2,520**	<100	**92.2 J**
MW-4						
	10/16/2020	**14,800**	**5,200**	**117,000**	<2000	**26,500**
	6/7/2021	**13,300**	**5,890**	**74,200**	<2000	**28000 J+**
	10/20/2021	**27,400**	**9,890**	**64,900**	<2000	**21,700**
	10/19/2022	**78,000**	**11,500**	**76,400**	<2000	**13,000**
Downgradient						
MW-2						
	10/16/2020	<1.00	<1.00	**5.45**	<1.00	**3.21**
	6/7/2021	<1.00	<1.00	**62.8**	**0.367 J**	**79.0 J+**
	10/20/2021	<1.00	<1.00	**32.2**	**0.166 J**	**34.2 J+**
	10/18/2022	<1.00	<1.00	**8.55**	**0.287 J**	**2.88**
MW-2i						
	10/16/2020	<500	<500	**36,500**	<500	**9,610**
	6/7/2021	<500	<500	**31,100**	<500	**13500 J+**
	10/20/2021	<500	<500	**19,600**	<500	**4820 J+**
	10/19/2022	<500	<500	**34,000**	<500	**8,700**

Please see notes at end of table.

Table 4
Groundwater Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
MW-6						
	10/16/2020	<250	<250	**5,550**	<250	**4,460**
	6/7/2021	<250	<250	**921**	<250	**1060 J+**
	10/20/2021	<25.0	**9.65 J**	**1,970**	**5.35 J**	**879**
	10/18/2022	<25.0	<25.0	**1,320**	**5.94 J**	**906**
MW-6i						
	10/16/2020	<1.00	<1.00	**1.31**	**0.201 J**	**2.29**
	6/7/2021	<1.00	<1.00	**0.818 J**	**0.336 J**	<1.00
	10/20/2021	<1.00	<1.00	**0.779 J**	**0.232 J**	<1.00
	10/18/2022	<1.00	<1.00	**0.950 J**	**0.236 J**	<1.00
MW-7						
	10/16/2020	<25.0	<25.0	**2,290**	<25.0	**2,110**
	6/7/2021	<5.00	<5.00	**229**	**1.41 J**	**336 J+**
	10/20/2021	<5.00	<5.00	**101**	**1.15 J**	**259 J+**
	10/18/2022	<5.00	<5.00	**45.9**	<5.00	**46.0**
GW Volatilization to Outdoor Air	Urban Residential	150,000	6,900	>S	>S	430
	Occupational	>S	20,000	>S	>S	5,900
GW Vapor Intrusion into Buildings	Urban Residential	8,700	430	>S	>S	21
	Occupational	48,000	3,700	>S	>S	880
GW in Excavations	Construction and Excavation Worker	5,600	430	18,000	180,000	960

Notes:

µg/L = micrograms per liter.

PCE = Tetrachloroethene

TCE = Trichloroethene

cis-1,2,-DCE = cis-1,2-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

DEQ Risk-Based Concentrations from Oregon Department of Environmental Quality's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites,* revised May 2018.

Bold values indicate concentration detected above the method detection limit.

Shaded values indicate concentrations detected above one or more applicable RBCs.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

>S = The RBC exceeds the solubility limit of the analyte.

J = The reported concentration is an estimated quantity.

J+ = Result is an estimated concentration and may be biased high.

Table 5
Groundwater Analytical Results for Total Organic Carbon
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Total Organic Carbon (µg/L)
Upgradient		
MW-5		
	10/16/2020	**18,400**
	6/7/2021	**6,620**
	10/20/2021	**5,310**
	10/18/2022	<1000
Source Area		
MW-4		
	10/16/2020	**28,200**
	6/7/2021	**25,300**
	10/21/2021	**19,500**
	10/19/2022	**111,000 J**
Downgradient		
MW-1		
	10/16/2020	**11,500**
	6/7/2021	**32,400**
	10/20/2021	**11,700**
	10/19/2022	**129,000 J**
MW-2		
	10/16/2020	--
	6/7/2021	--
	10/20/2021	--
	10/19/2022	<1000
MW-6		
	10/16/2020	**6,520**
	6/7/2021	**4,310**
	10/20/2021	**4,620**
	10/18/2022	<1000

Notes:

µg/L = micrograms per liter.

Bold values indicate concentration detected above the method detection

< = Concentration was not detected above the shown minimum reporting

-- = Not analyzed or not available.

J = The reported concentration is an estimated quantity.

Table 6
Groundwater Analytical Results for PFAS
Tigard Cleaners
Tigard, Oregon

Sample ID	MW-3	MW-5	MW-7	EPA HALs	DEQ HAL
Sample Date	10/18/2022	10/18/2022	10/18/2022		
Concentration in ng/L					
PFAS by Draft EPA Method 1663					
11Cl-PF3OUdS	<4.33	<4.29	<4.22	--	--
3:3FTCA	<5.41	<5.36	<5.27	--	--
4:2 FTS	<4.33	<4.29	<4.22	--	--
5:3FTCA	<27.1	<26.8	<26.4	--	--
6:2 FTS	<4.33	<4.29	<4.22	--	--
7:3FTCA	<27.1	<26.8	<26.4	--	--
8:2 FTS	<4.33	<4.29	<4.22	--	--
9Cl-PF3ONS	<4.33	<4.29	<4.22	--	--
ADONA	<4.33	<4.29	<4.22	--	--
NEtFOSA	<1.08	<1.07	<1.05	--	--
NEtFOSAA	<1.08	<1.07	<1.05	--	--
NEtFOSE	<10.8	<10.7	<10.5	--	--
NMeFOSA	<1.08	<1.07	<1.05	--	--
NMeFOSAA	<1.08	<1.07	<1.05	--	--
NMeFOSE	<10.8	<10.7	<10.5	--	--
NFDHA	<2.16	<2.15	<2.11	--	--
PFEESA	<2.16	<2.15	<2.11	--	--
HFPO-DA	<4.33	<4.29	<4.22	10	--
PFMPA	<2.16	<2.15	<2.11	--	--
PFMBA	<2.16	<2.15	<2.11	--	--
PFBS	<1.08	**7.23**	<1.05	2,000	--
PFBA	<4.33	**6.64**	<4.22	--	--
PFDS	<1.08	<1.07	<1.05	--	--
PFDA	<1.08	15.5	<1.05	--	--
PFDoA	<1.08	<1.07	<1.05	--	--
PFHpS	<1.08	<1.07	<1.05	--	--
PFHpA	<1.08	**18.8**	**10.8**	--	--
PFHxS	<1.08	**10.9**	<1.05	--	30
PFHxA	<1.08	**14.6**	**8.99**	--	--
PFNS	<1.08	<1.07	<1.05	--	--
PFNA	<1.08	**8.07**	<1.05	--	30
FOSA	<1.08	<1.07	<1.05	--	
PFOS	**1.15**	**29.5**	**4.16**	0.02	30
PFOA	<1.08	**35.3**	**27.4**	0.004	30
PFPeS	<1.08	<1.07	<1.05	--	--
PFPeA	<2.16	**9.61**	**6.83**	--	--
PFTA	<1.08	<1.07	<1.05	--	--
PFTrDA	<1.08	<1.07	<1.05	--	--
PFUnA	<1.08	<1.07	<1.05	--	--
PFDoS	<1.08	<1.07	<1.05	--	--
ΣPFOS, PFOA, PFNA, PFHxS	**1.15**	**83.8**	**31.6**	--	30

Please see notes at end of table.

Table 6
Groundwater Analytical Results for PFAS
Tigard Cleaners
Tigard, Oregon

Notes:

PFAS = Per- and Polyfluorinated Substances

ng/L = nanograms per liter

< = Concentration was not detected above the shown limit of quantitation.

Bold values indicate concentration detected above the limit of quantitation.

Shaded values indicate concentrations detected above one or more applicable HALs.

EPA HALs = Environmental Protection Agency Health Advisory Levels Screening Levels

DEQ HALs = The Oregon Drinking Water Health Advisory Level (HAL); this applies to each individual compound or the combined concentration of PFHxS, PFOS, PFOA, and PFNA. Not detected values are summed as zero.

Definitions:

11Cl-PF3OUdS	*11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B minor)*
3:3FTCA	*3:3 Fluorotelomer Carboxylic Acid*
4:2 FTS	*Fluorotelomer sulfonate (C4)*
5:3FTCA	*5:3 Fluorotelomer carboxylic acid*
6:2 FTS	*Fluorotelomer sulfonate (C6)*
7:3FTCA	*7:3 Fluorotelomer carboxylic acid*
8:2 FTS	*Fluorotelomer sulfonate (C8)*
9Cl-PF3ONS	*9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (F-53B major)*
ADONA	*4,8-Dioxa-3H-perfluorononanoate*
NEtFOSA	*N-ethyl perfluorooctane sulfonamide*
NEtFOSAA	*N-ethyl perfluorooctanesulfonamidoacetic acid (C8)*
NEtFOSE	*N-ethyl perfluorooctane sulfonamido ethanol*
NMeFOSA	*N-methyl perfluorooctane sulfonamide*
NMeFOSAA	*N-Methylperfluorooctane sulfonamidoacetic acid*
NMeFOSE	*N-methyl perfluorooctanesulfonamidoethanol*
NFDHA	*Nonafluoro-3,6-dioxaheptanoic acid*
PFEESA	*Perfluoro(2-ethoxyethane)sulfonic acid*
HFPO-DA	*Perfluoro-2-proxypropanoic acid*
PFMPA	*Perfluoro-3-methoxypropanoic acid*
PFMBA	*Perfluoro-4-methoxybutanoic acid*
PFBS	*Perfluorobutanesulfonic acid*
PFBA	*Perfluorobutanoic acid*
PFDS	*Perfluorodecane sulfonic acid*
PFDA	*Perfluorodecanoic acid*
PFDoA	*Perfluorododecanoic acid*
PFHpS	*Perfluoroheptanesulfonic acid*
PFHpA	*Perfluoroheptanoic acid*
PFHxS	*Perfluorohexanesulfonic acid*
PFHxA	*Perfluorohexanoic acid*
PFNS	*Perfluorononanesulfonic acid*
PFNA	*Perfluorononanoic acid*
FOSA	*Perfluorooctane Sulfonamide*
PFOS	*Perfluorooctanesulfonic acid*
PFOA	*Perfluorooctanoic acid*
PFPeS	*Perfluoropentanesulfonic acid*
PFPeA	*Perfluoropentanoic acid*
PFTA	*Perfluorotetradecanoic acid*
PFTrDA	*Perfluorotridecanoic acid*
PFUnA	*Perfluoroundecanoic acid*
PFDoS	*Perfluorododecane sulfonate*

Table 7
Ambient Air Analytical Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/m3				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Main Building						
Clear Payments (former Future State)						
AMB-4 / FC-1						
	11/5/2020	<1.36	<1.07	<0.793	<0.793	<0.511
	6/17/2021	**3.02**	<1.07	<0.793	<0.793	<0.511
	10/20/2021	**3.15**	**2.40**	<0.793	<0.793	<0.511
	11/3/2022	--	--	--	--	--
Kepler's						
AMB-5 / KU-1						
	10/16/2020	**9.17**	**750**	<0.793	<0.793	<0.511
	6/17/2021	**5.68**	**151**	<0.793	<0.793	<0.511
	10/20/2021	**27.0**	**863**	<15.9	<15.9	<10.2
	11/3/2022	**18.5**	**7,980**	<0.793	<0.793	<0.511
Background Ambient						
AMB-OUT						
	10/16/2020	**3.06**	<1.07	<0.793	<0.793	<0.511
	6/17/2021	**36.2**	**1.52**	<0.793	<0.793	<0.511
	10/21/2021	**1.72**	<1.07	<0.793	<0.793	<0.511
	11/3/2022	**5.78**	**1.19**	<0.793	<0.793	<0.511
Air Inhalation	Urban Residential	26	1.0	>Pv	>Pv	0.20
	Occupational	47	2.9	>Pv	>Pv	2.8

Notes:

µg/m^3 = microgram per cubic meter

PCE = Tetrachloroethene

TCE = Trichloroethene

cis-1,2,-DCE = cis-1,2-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

DEQ Risk-Based Concentrations from Oregon Department of Environmental Quality's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* , revised May 2018.

Bold values indicate concentration detected above the minimum reporting limit.

Shaded values indicate concentrations detected above one or more applicable RBCs.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

>Pv = The calculated RBC exceeds the vapor pressure of the pure chemical. This chemical cannot create an unacceptable risk via this pathway.

Table 8
Vapor Collection System Discharge Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/m3				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
EX						
	10/16/2020	**401**	**152**	**116**	**0.797**	**12.9**
	6/17/2021	**213**	**86.8**	**28.9**	<0.793	**0.726**
	10/20/2021	**188**	**71.3**	**21.3**	<0.793	<0.511
	11/3/2022	**126**	**108**	**31.4**	<0.793	**7.62**
Acceptable Effluent Discharge Concentrations		229,500	8,830	--	--	1,800

Notes:

µg/m^3 = microgram per cubic meter

PCE = Tetrachloroethene

TCE = Trichloroethene

cis-1,2,-DCE = cis-1,2-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

Acceptable Effluent Discharge Concentrations were derived by adjusting DEQ RBCs for urban residential air inhalation by the attenuation factor calculated from the EPA SCREEN3 dispersion model.

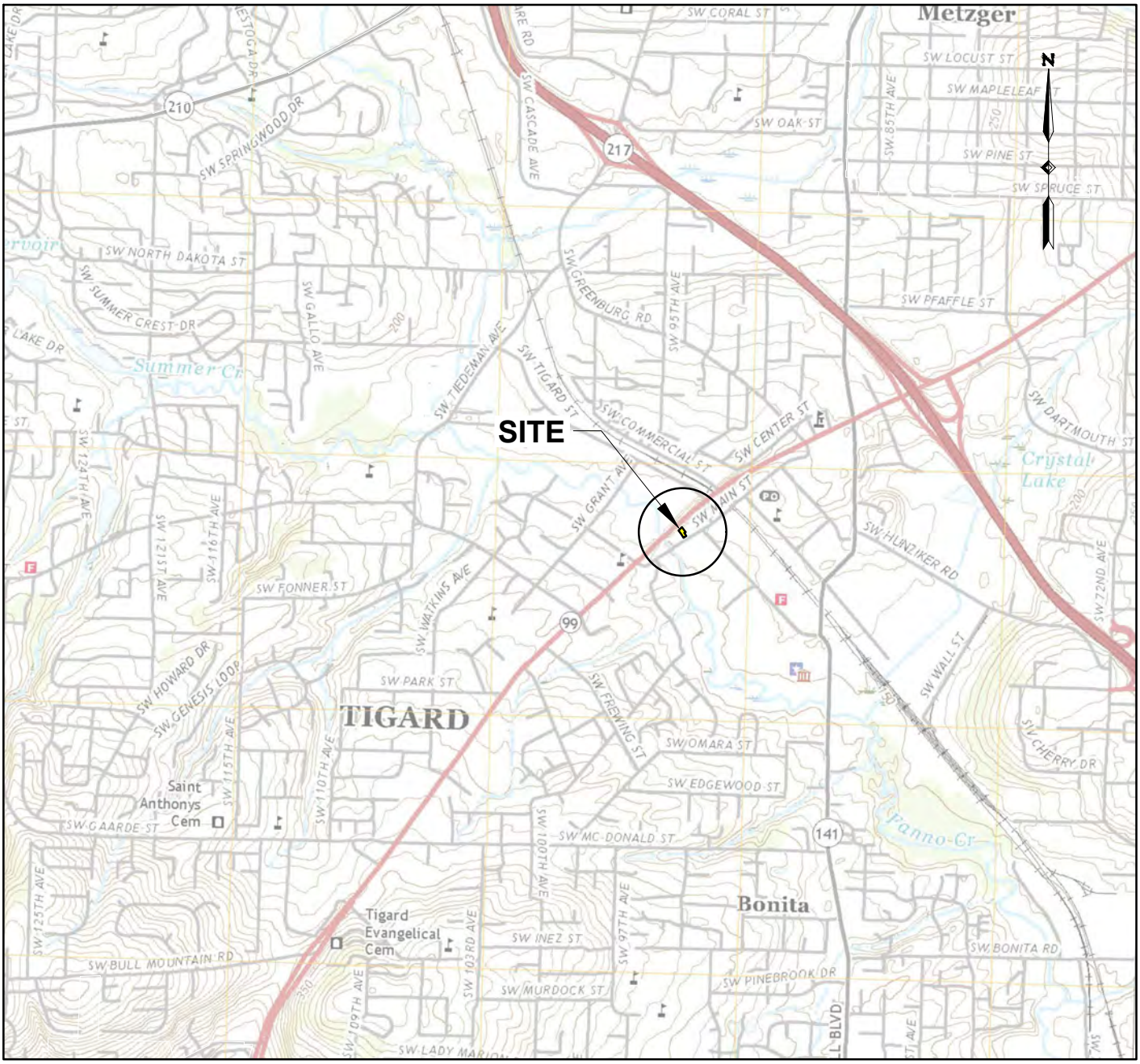
DEQ RBCs = Oregon Department of Environmental Quality's Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised May 2018.

EPA SCREEN3 = United State Environmental Protection Agency SCREEN3 Model and User's Guide, EPA 454/B-95-004, 1995.

Bold values indicate concentration detected above the minimum reporting limit.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

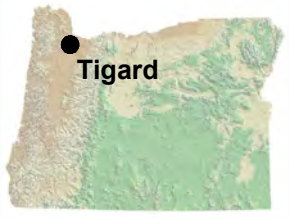


Beaverton, Oregon

United States Geological Survey
7.5 Minute Series Topographic Map
Contour Interval: 10 feet
Scale: 1 inch = 24,000 feet
Date: 2020

0 2,000 4,000

Scale in Feet



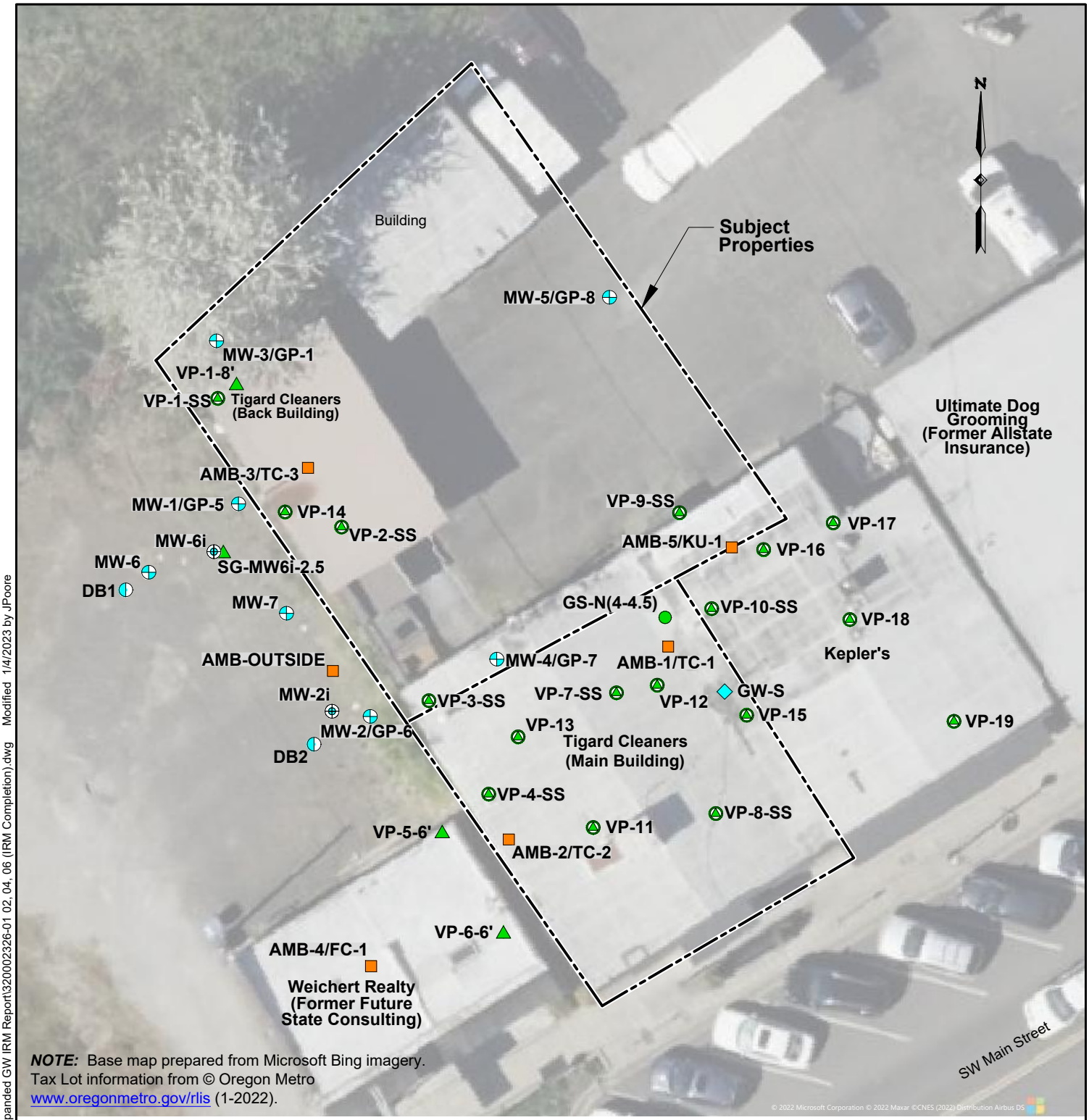
OREGON

Site Location Map

Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002326-01	Drawn: JP	Approved: CO	Figure 1
	February 2023			

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Expanded GW IRM Report\320002326-01 01 (Site Location).dwg Modified 1/4/2023 by JPoore



NOTE: Base map prepared from Microsoft Bing imagery.
Tax Lot information from © Oregon Metro
www.oregonmetro.gov/rlis (1-2022).

Legend:

- **MW-1** Shallow Monitoring Well Location
- **MW-2i** Intermediate Monitoring Well Location
- **DB1** Deep Boring and Depth-Discrete Sample Location
- **VP-11** Sub-Slab Vapor Sample Location
- **VP-6-6'** Soil Gas Sample Location
- **AMB-1/TC-1** Ambient Air Sample Location
- **GS-N(4-4.5)** Grab Soil Sample Location and (Depth Collected in Feet BGS)
- **GW-S** Grab Groundwater Sample Location

0 20 40
Scale in Feet

Site Plan

Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002326-01	Drawn: JP	Approved: CO	Figure 2
	February 2023			

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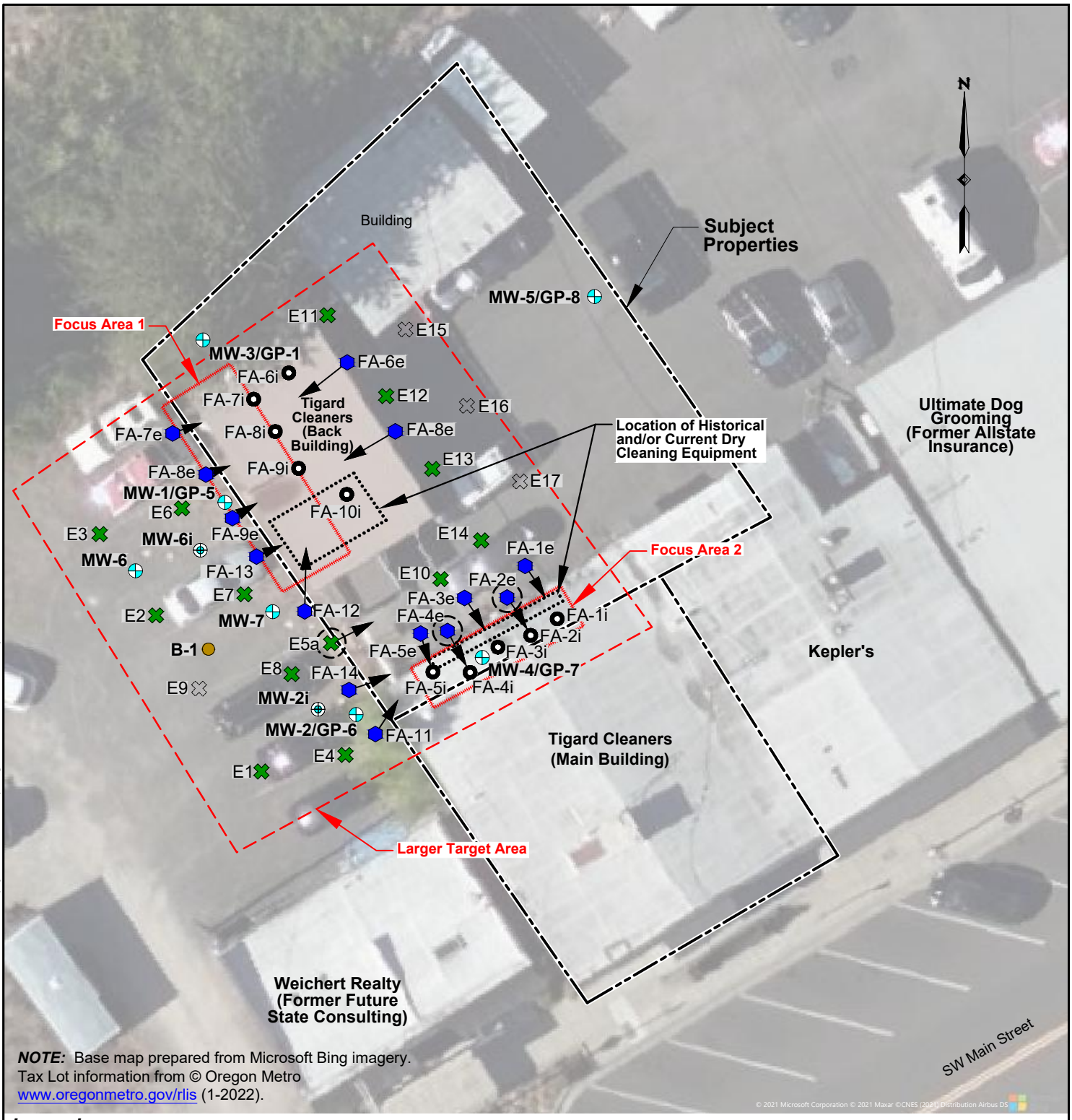

NOTE: Base map prepared from Microsoft Bing imagery.
Tax Lot information from © Oregon Metro
www.oregonmetro.gov/rlis (1-2022).

Legend:

- **MW-1** — Shallow Monitoring Well Location
- **MW-2i** — Intermediate Monitoring Well Location
- Boring Injection Location (Larger Target Area)
- Location Not Injected
- Boring Injection Location (Focus Area)
- Angled Boring Location
- Hand Auger Boring Injection Location (For Depths <15 Feet BGS)
- Angled and Vertical Boring Injection Location
- Soil Boring Location

0 20 40
Scale in Feet

Injection Boring Locations

Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002326-01	Drawn: JP	Approved: CO	Figure **3**
	February 2023			

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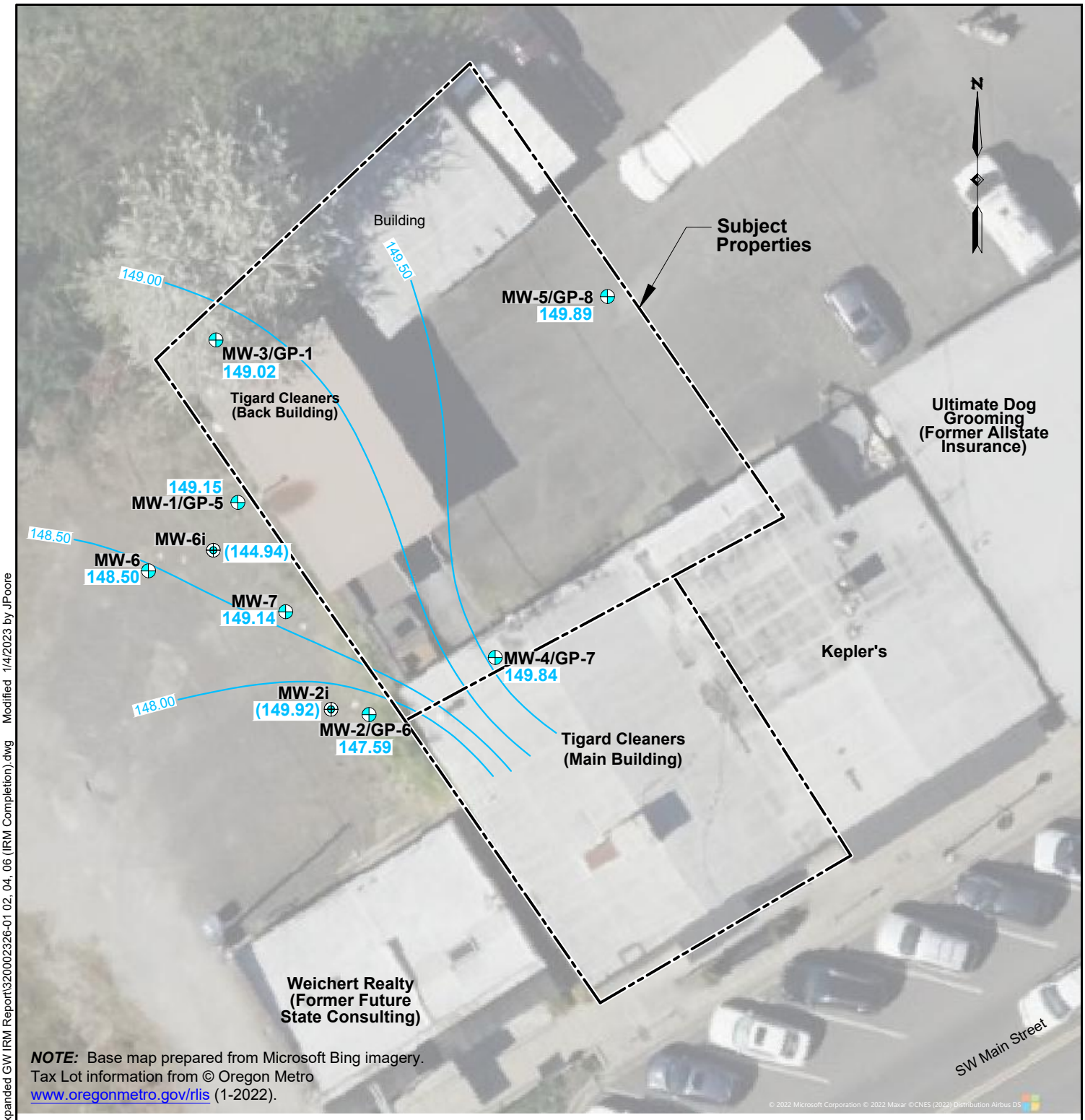


Legend:

- **MW-1** — Shallow Monitoring Well Location
- **MW-2i** — Intermediate Monitoring Well Location
- **149.15** — Groundwater Elevation in Feet Above MSL
- **(144.94)** — Elevation Not Used for Contouring
- 148.00 — Groundwater Elevation Contour in Feet Above MSL

0 20 40

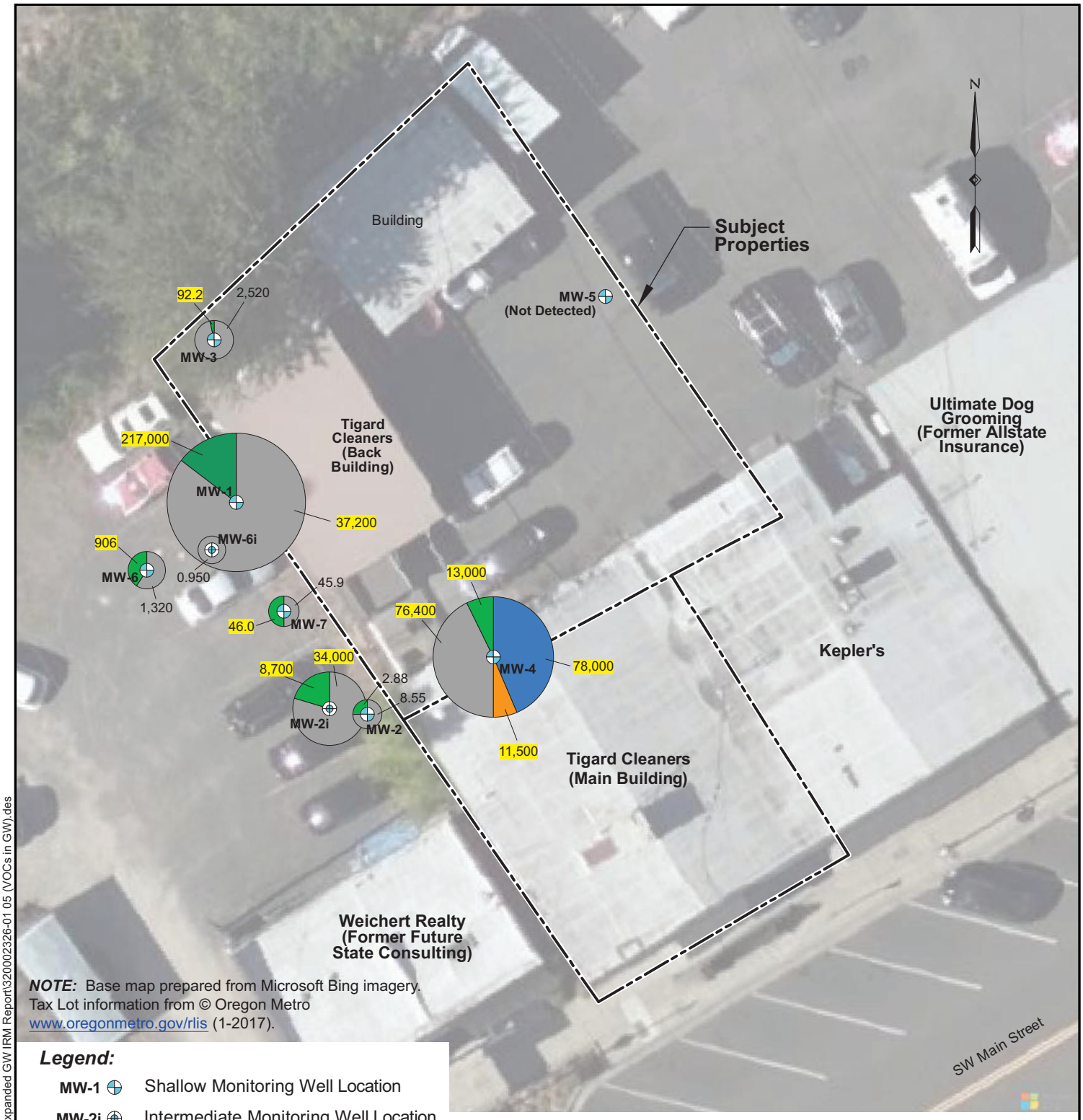
Scale in Feet

Shallow Groundwater Elevations - October 18, 2022

Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002326-01	Drawn: JP	Approved: CO	Figure **4**
	February 2023			

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Expanded GW IRM Report\320002326-01 02, 04, 06 (IRM Completion).dwg Modified 1/4/2023 by JPoore



NOTE: Base map prepared from Microsoft Bing imagery. Tax Lot information from © Oregon Metro www.oregonmetro.gov/rlis (1-2017).

Legend:

MW-1 Shallow Monitoring Well Location

MW-2i Intermediate Monitoring Well Location

Detected Chloroethenes:

MW-2i

8,700 34,000

Concentration in µg/L (ppb)

Highlight = Concentration Exceeds One or More of the DEQ Risk-Based Concentrations (See Table 2)

Note: Size of Chart Proportional to Total Molar Chloroethene Concentration

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
cDCE	CIS-1,2-DICHLOROETHENE
VC	VINYL CHLORIDE

0 20 40

Scale in Feet

VOCs Results in Groundwater - October 18-19, 2022

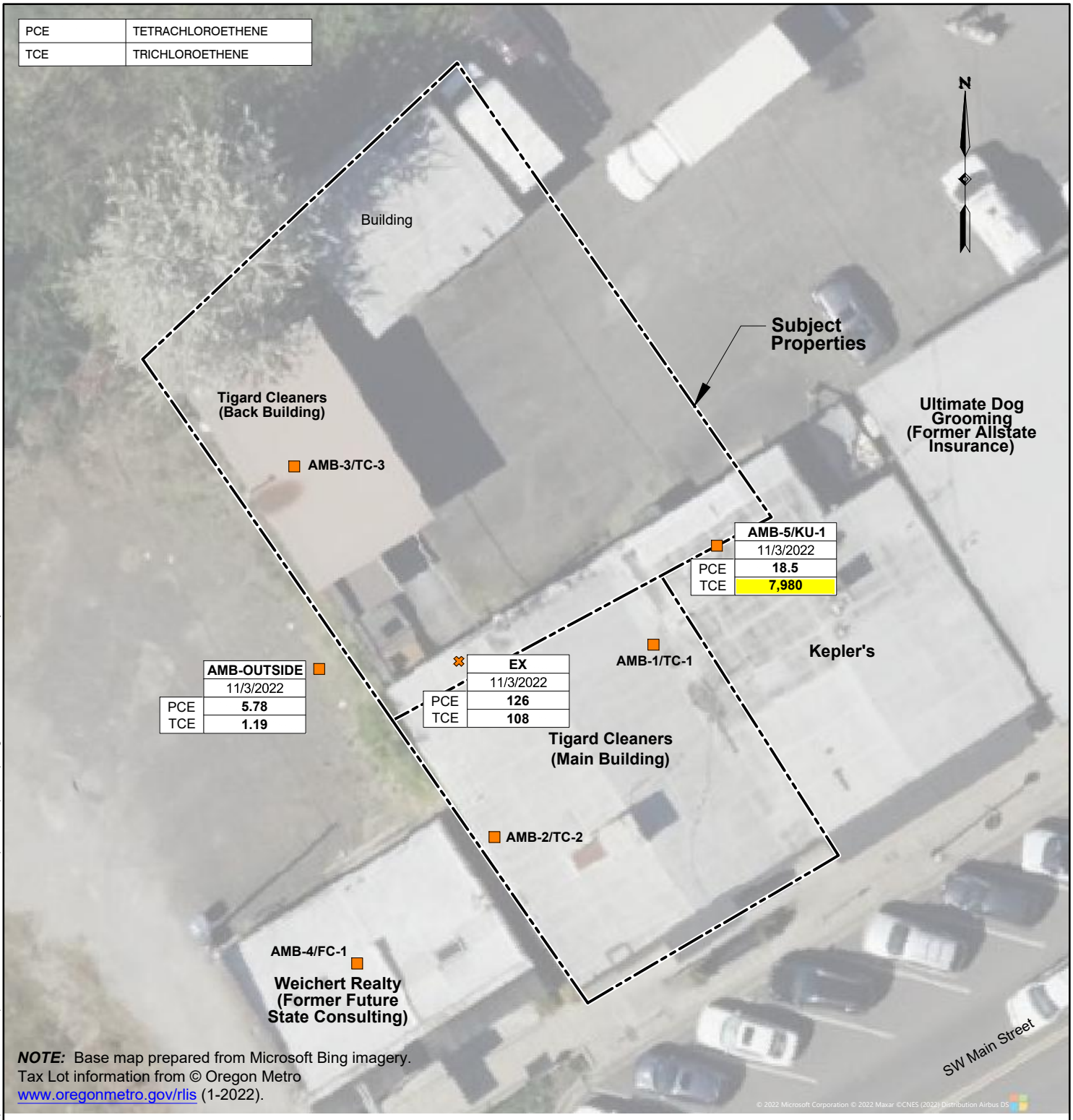
Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

Apex Companies, LLC
15618 SW 72nd Avenue
Tigard, Oregon 97224

Project Number:	Drawn:	Approved:	Figure
320002326-01	JP	CO	5

February 2023

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Expanded GW IRM Report\320002326-01 05 (VOCs in GW).des



Legend:

AMB-1/TC-1 Ambient Air Sample Location (Summa)

EX Soil Vapor Extraction System Exhaust Sample Location (Summa)

AMB-5/KU-1	
11/3/2022	
PCE	18.5
TCE	7,980

Sampling Date

Concentration in µg/m^3

Analyte Sampled

Highlighted Values Exceeds Applicable Risk-Based Screening Levels

0 20 40

Scale in Feet

Ambient Air and Soil Vapor Extraction System Exhaust Results - November 3, 2022

Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002326-01	Drawn: JP	Approved: CO	Figure 6
	February 2023			

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Expanded GW IRM Report\320002326-01 02, 04, 06 (IRM Completion).dwg Modified 1/4/2023 by JPoore

Appendix A

Boring Log

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, and grain size, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
MAJOR CONSTITUENT with additional remarks; color, moisture, minor constituents, density/consistency.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and push probe explorations is estimated based on visual observation and is presented parenthetically on test pit and push probe exploration logs.

SAND and GRAVEL Density	Standard Penetration Resistance in Blows/Foot
Very loose	0 - 4
Loose	4 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	>50

SILT or CLAY Density	Standard Penetration Resistance in Blows/Foot	Approximate Shear Strength in TSF
Very soft	0 - 2	<0.125
Soft	2 - 4	0.125 - 0.25
Medium stiff	4 - 8	0.25 - 0.5
Stiff	8 - 15	0.5 - 1.0
Very Stiff	15 - 30	1.0 - 2.0
Hard	>30	>2.0

Moisture

Dry	Little perceptible moisture.
Sl. Moist	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

Minor Constituents

	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Sampling Symbols

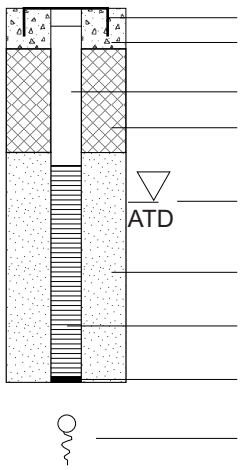
BORING AND PUSH-PROBE SYMBOLS

- Recovery
- No Recovery
- Temporarily Screened Interval
- PID — Photoionization Detector Reading
- W — Water Sample
- Sample Submitted for Chemical Analysis
- NS — No Sheen
- SS — Slight Sheen
- MS — Moderate Sheen
- HS — Heavy Sheen
- BF — Biogenic Film

TEST PIT SOIL SAMPLES

- Grab (Jar)
- Bag
- Shelby Tube

Groundwater Observations and Monitoring Well Construction



- Flush Mounted Monument Concrete Surface Seal
- Well Casing
- Bentonite Seal
- Groundwater Level on Date or (ATD) At Time of Drilling
- Sand Pack
- Well Screen
- End Cap
- Groundwater Seepage (Test Pits)

Key to Exploration Logs

Tigard Cleaners Expanded Groundwater IRM Completion Report
12519 SW Main Street
Tigard, Oregon

APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number: 320002326-01	Drawn: JP	Approved: CO/CS	Figure
	November 2022			**Key**

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Expended GW IRM Report\Logs

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Tigard Cleaners 12519 SW Main Street Tigard, Oregon	Boring Number: **B-1** Project Number: **320002326-01** Logged By: C. Stout Date: August 17, 2022 Site Conditions: -- Drilling Contractor: Holt Drilling Equipment: -- Sampler Type: Direct Push/Acetate Sleeve Depth to Water (ATD): 7' Surface Elevation: Not Measured

Depth, feet	Core Interval/Recovery	Laboratory Sample ID	PID	Sheen	Lithologic Description
					GRAVEL with silt (GW-GM); grayish brown, dry to slightly moist, fine to coarse-grained, well graded, non-plastic, (65% gravel, 25% silt, 10% sand).
					SILT with gravel (ML); olive brown (2.5Y 4/4), moist to very moist, fine to coarse-grained, well graded, non-plastic, (55% silt, 35% gravel, 10% sand).
5					SILT (ML); dark gray, wet, fine-grained, poorly graded, low plasticity, (80% silt, 20% clay).
					— Becomes wet.
					CLAY (CL); dark gray, wet, fine-grained, poorly graded, medium plasticity, (65% clay, 35% silt).
10					SILT with sand (ML); grayish brown, wet, medium to coarse-grained, poorly graded, low plasticity, (60% silt, 25% sand, 15% clay).
					SILT (ML); dark gray, wet, poorly graded, low plasticity, (100% silt).
15					SILT (ML); dark gray, wet, fine-grained, low plasticity, (80% silt, 10% sand, 10% clay).
					SILT (ML); dark gray, wet, low to medium plasticity, (80% silt, 20% clay). Some odor.
20					SILT (ML); bluish gray, wet, fine-grained, low plasticity, (100% silt).
					Silty SAND (SM); dark grayish brown, wet, fine-grained, poorly graded, non-plastic, (65% sand, 35% silt).
25					Silty SAND (SM); bluish gray, wet, fine-grained, poorly graded, non-plastic, (80% sand, 20% silt).
					Silty SAND (SM); bluish gray, wet, fine-grained, poorly graded, low plasticity, (55% sand, 45% silt).
30					SILT (ML); olive gray, wet, fine-grained, low plasticity, (80% silt, 10% sand, 10% clay).
					CLAY (CL); olive gray, wet, fine-grained, medium plasticity, (65% clay, 35% silt).
35					Bottom of Boring at 35.0' BGS.

Boring Details and Notes:

Appendix B

Laboratory Analytical Reports and Quality Assurance Report

Appendix B – QA/QC Review

This appendix documents the results of a quality assurance/quality control (QA/QC) review of the analytical data for groundwater and vapor samples collected as part of the May and October 2022 media monitoring activities at Tigard Cleaners. Samples were analyzed by Pace Analytical of Mount Juliet, Tennessee. Copies of the analytical laboratory reports are included in this appendix, referenced as follows:

Report	Report Date	Sampling Event
612201291	June 16, 2022	Groundwater Sampling
L1549094	October 21, 2022	Groundwater Sampling
L1549614	October 22, 2022	Groundwater Sampling
L1554497	November 5, 2022	Air Sampling

1.0 Analytical Methods

Chemical analyses for groundwater included in this QA Report consisted of the following:

- Dehalococcoides ribonucleic acid (Dhc RNA) by real-time polymerase chain reaction (PCR) analysis;
- Volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260D;
- Total organic carbon (TOC) by EPA Method 9060A; and
- Per- and polyfluorinated substances (PFAS) by Draft EPA Method 1663.

Ambient air and vapor collection system discharge chemical analysis consisted of the following:

- VOCs by EPA Method TO-15.

2.0 Data Validation

The QA review included examination and validation of the laboratory data packages for the following:

- Analytical preparation and quantitation methods;
- Analytical method holding times;
- Sample handling;
- Chain of custody procedures;
- Detection and reporting limits;
- Method blank detections;
- Laboratory control samples, matrix spikes, and surrogates to assess accuracy; and
- Laboratory control sample duplicates, laboratory duplicates, matrix spike duplicates, and field duplicates to assess precision.

The QA/QC review did not include a review of raw data.

This QA/QC review documents the relationship between analytical findings and data quality objectives based on precision and accuracy. It also summarizes possible error or bias and the effect on data quality and usability.

The laboratory QC samples provided in data packages were used to evaluate laboratory contamination or background interferences, sample preparation efficiency and instrumentation performance. The QC samples provided by the analytical laboratory (consistent with Environmental Protection Agency [EPA] guidance) include: method blanks, laboratory control samples (LCS/LCSD), matrix spikes (MS/MSD), and laboratory duplicates. Surrogates are also required for VOC analysis to assess sample preparation efficiency and matrix interferences.

2.1 Data Qualifiers

Any data that is found to have possible bias or error was qualified and flagged. The following are definitions of qualifiers used in this data quality report and data tables.

J	The reported concentration is an estimated quantity.
UJ	The not detected result is estimated at the reporting limit.

3.0 Data Quality Assurance Review

The general QA objectives for this project were to develop and implement procedures for obtaining, evaluating, and confirming the usability of data of a specified quality. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain of custody procedures.

Reporting limits and analytical results were compared to cleanup and screening levels for each parameter in the matrix of concern. Precision, accuracy, completeness, and comparability parameters used to indicate data quality are discussed below.

3.1 Reporting Limits

Reporting limits are the lowest concentration an instrument is capable of accurately detecting an analyte. Reporting limits are determined by the laboratory and are based on instrumentation capabilities, the matrix of field samples, sample preparation procedures and EPA suggested reporting limits.

The reporting limits were generally consistent with method standards and were below screening level values when possible; however, dilutions were performed on groundwater samples collected from wells MW-1, MW-2i, MW-3, MW-4, MW-5, and MW-6 and analyzed for VOCs. Some reporting limits were above risk-based screening levels. Several analytes were identified by the laboratory at concentrations that were between the laboratory reporting limit (RL) and the method detection limit (MDL). These concentrations are estimated values and have been 'J' flagged accordingly.

3.2 Holding Times and Sample Receipt

The holding time is the minimum amount of time the sample can be stored before analytes start to degrade and are not representative of initial sampling concentrations. Holding times are defined by analytical methods. Samples were analyzed within the method specified holding time. The groundwater samples from the October 2022 sampling event were analyzed outside hold time for TOC in wells MW-1 and MW-4. Detected target analytes analyzed out of hold time are 'J' flagged and not detected analytes are 'UJ' flagged.

The integrity of the samples received by the laboratory was documented by the Pace Analytical *Sample Receipt Checklist* or *Cooler Receipt Form,* which ensures that samples are representative of the field and were not compromised during shipment. The water containers were received by the analytical laboratory on ice below 6°C; all containers were intact and unbroken. The chain of custody documents followed an unbroken procedure and were relinquished by the Apex Companies sampler and received by the analytical laboratory as indicated by signatures. The sample ID, collection time, and requested analyses were all clearly and properly filled in by the Apex Companies sampler.

3.3 Method Blanks

A method – or laboratory – blank is a sample prepared in the laboratory along with the actual samples and analyzed for the same parameters at the same time. It is used to assess if detected compounds may have been the result of contamination or background levels in the laboratory. No analyte were detected in the method blanks.

3.4 Accuracy

Accuracy is assessed through the comparison of analytes of known concentration to concentrations determined analytically. A percent recovery is calculated from the analytical concentration to the known concentration of analyte, which must be within control limits established by methods. If the percent recovery is outside of control limits, then data might be compromised. The analytical laboratory will provide quality control samples and surrogates to help determine the accuracy of the data provided. These quality control samples and surrogates are discussed below.

3.4.1 Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control duplicate samples (LCSD) were analyzed by the laboratory to assess the accuracy of the analytical methods. One set of LCS and LCSDs were analyzed per analytical batch. The samples were prepared from an analyte-free matrix that is then spiked with known levels of constituents of interest (COI; i.e. a standard). The concentrations were measured, and the results compared to the known spiked levels. This comparison is expressed as percent recovery. Constituents were within recovery limits.

3.4.2 Matrix Samples

A matrix spike QC sample is used to assess the performance of the analytical method by determining potential matrix interferences. Matrix spike (MS) and matrix spike duplicate (MSD) analyses are performed on one environmental sample per analytical batch. A matrix spike sample uses an environmental sample that is spiked with known concentrations of analytes of interest. The matrix spike is then prepared and analyzed with the same analytical procedures as environmental samples in the analytical batch. The resulting concentration of the matrix spike is then compared to the known – or true – values added to the non-spiked environmental sample concentration. This comparison is expressed as a percent recovery. Matrix spike samples were within laboratory control limits.

3.4.3 Surrogates

Surrogates are organic compounds that are similar in chemical composition to the analytes of interest but are not likely to be found in the environment. They are spiked into environmental and batch QC samples prior to sample preparation and analysis. Surrogate recoveries for environmental samples are used to evaluate matrix interference and sample preparation and analysis efficiency on a sample-specific basis. Surrogates were recovered within control limits.

3.4.4 Instrument Calibration and Reported Results

The continuing calibration standard responded low for acrolein in wells MW-1,MW-2, MW-2i, MW-3, MW-4, MW-5, MW-6, MW-6i, MW-7 and 2,2-Dichloropropane in MW-1. The continuing calibration standard responded high for 2-Butanone (MEK) in well MW-2 MW-6i, acetone in MW-6i. The results for these analytes should be considered estimated with a low bias. These analytes are not shown in the report tables and are therefore not flagged.

3.4.5 Equipment Blanks

An equipment blank is a sample prepared in the field by rinsing equipment with blank water after decontamination. The laboratory then analyzes that rinsate water for target analytes to determine if cross-

contamination may have been present in the field. An equipment blank was collected during PFAS groundwater sampling. No analytes were detected in the field blank.

3.5 Precision

Precision is measured by how close concentrations of duplicate analyses are to each other. These duplicate analyses are of separate aliquots of the same sample that are prepared or analyzed at the same (or similar) time. Precision in the field ensures that samples taken are representative of field concentrations. Field precision is demonstrated by field duplicates. Analytical precision is measured by the laboratory through duplicate analysis of samples and quality control samples. Precision is estimated by the relative percent difference (RPD) between the original analysis and the duplicate analysis.

3.5.1 Laboratory Control Samples

LCSD analyte concentrations were compared to LCS analyte concentrations to assess the precision of the analytical method. This comparison can be expressed by the relative percent difference (RPD) between the LCS and LCSD samples.

The RPD for chloromethane was outside of the control limit for analytical batch WG1949557. Chloromethane was not detected in the associated groundwater samples and results were not flagged.

3.5.2 Matrix Spike Duplicate

Similar to the LCS/LCSD, the analytical batch MS/MSD analyte concentrations are also compared to each other and expressed as an RPD. RPD values were within control limits.

3.5.3 Field Duplicate

A field duplicate is a second field sample collected from a selected sample location. Field duplicate samples serve as a check on laboratory precision and sampling quality, as well as potential variability of the sample matrix. The field duplicate is analyzed and compared to the original sample to assess precision. This comparison can be expressed by the RPD between the original and duplicate samples. Only detections greater than the reporting limit are controlled and used for quality control purposes.

A field duplicate was collected from well MW-4 for VOCs. A field duplicate was collected from well MW-5 for PFAS. RPD values between the primary and duplicate samples were within the 30 percent control limit.

4.0 Conclusion

In conclusion, the QA objectives have been met and the data are of sufficient quality for use in this project.

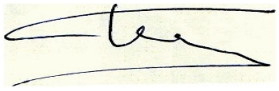
EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675/ 786-0262
http://www.emsl.com E-mail: Dnalab2@EMSL.com

Client:	Apex Companies, LLC 3015 SW First Avenue Portland, OR 97201	EMSL Order ID: Date Received: Date Analyzed:	612201291 6/9/2022 6/15/2022
Attn:	Paula Parrott	Date Reported:	6/16/2022
Project:	Tigard Cleaners	Date Amended:	

Real-Time PCR Analysis for Dehalococcoides 16S rRNA

EMSL Test: M273

Lab Sample Number	Client Sample ID	Description	Amount Received (mL)	Amount Sampled (mL)	Copies/100 mL
1291-1	1	MW-1	1000	1000	1,664,539
1291-2	2	MW-2i	1025	1025	34,995
1291-3	3	MW-4	1000	1000	3,219
1291-4	4	MW-5	1000	1000	None Detected
1291-5	5	MW-6	1000	1000	3,362,979



Sergey Balashov, Ph.D.
PCR Laboratory Director

ANALYTICAL REPORT

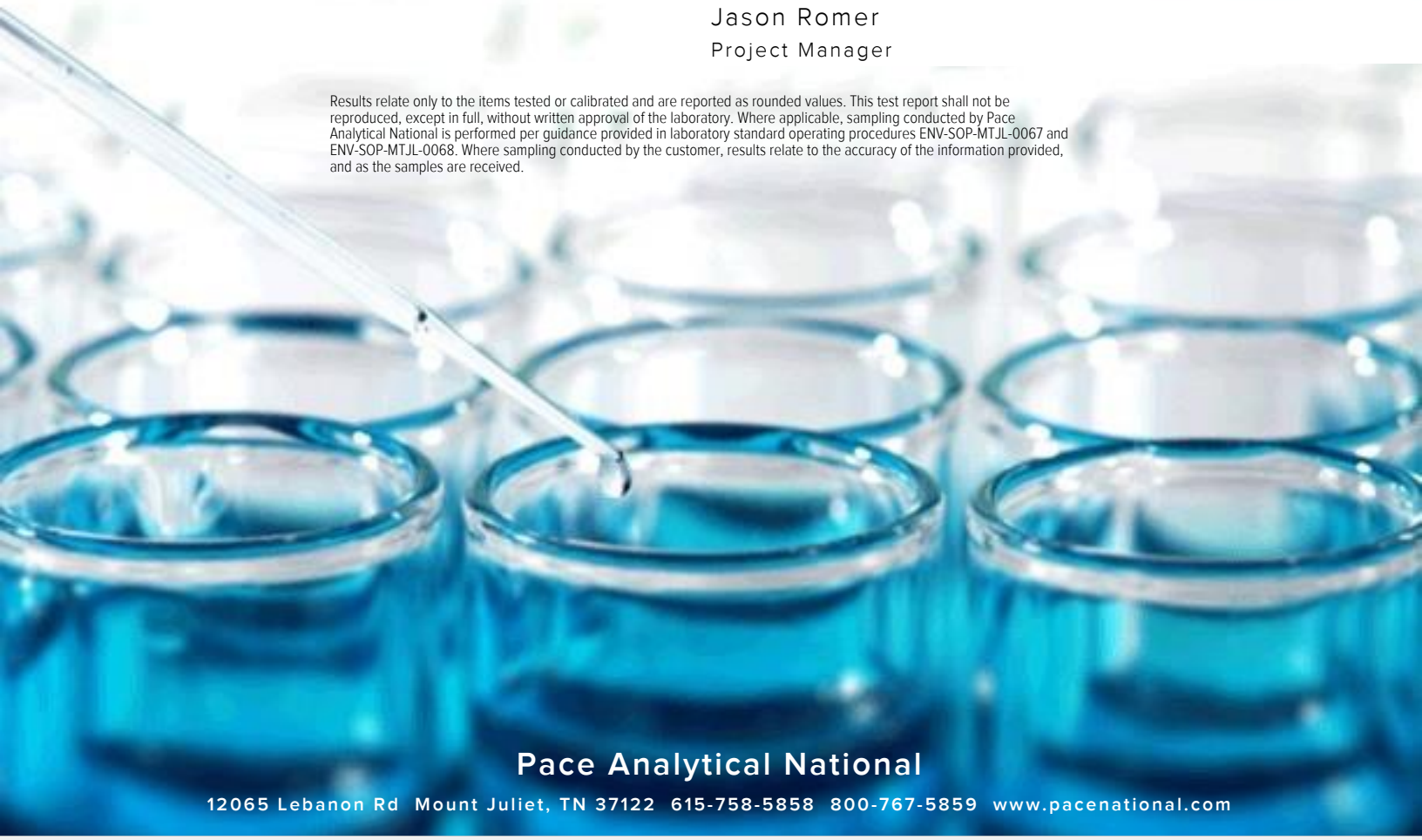
December 13, 2022

Oregon Dept. of Env. Quality - ODEQ

Sample Delivery Group:	L1549094
Samples Received:	10/21/2022
Project Number:	2326-01
Description:	Tigard Dry Cleaners
Report To:	Mark Pugh

Entire Report Reviewed By:

Jason Romer
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

MW-3 L1549094-01 GW

Collected by	Collected date/time	Received date/time
	10/19/22 10:30	10/21/22 16:12

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Subcontracted Analyses	WG1947046	1	12/13/22 00:00	12/13/22 00:00	-	Baton Rouge, LA 70820

MW-5 L1549094-02 GW

Collected by	Collected date/time	Received date/time
	10/18/22 12:58	10/21/22 16:12

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Subcontracted Analyses	WG1947046	1	12/13/22 00:00	12/13/22 00:00	-	Baton Rouge, LA 70820

MW-7 L1549094-03 GW

Collected by	Collected date/time	Received date/time
	10/18/22 14:15	10/21/22 16:12

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Subcontracted Analyses	WG1947046	1	12/13/22 00:00	12/13/22 00:00	-	Baton Rouge, LA 70820

EB-1 L1549094-04 GW

Collected by	Collected date/time	Received date/time
	10/19/22 12:05	10/21/22 16:12

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Subcontracted Analyses	WG1947046	1	12/13/22 00:00	12/13/22 00:00	-	Baton Rouge, LA 70820

DUP-1 L1549094-05 GW

Collected by	Collected date/time	Received date/time
	10/18/22 12:58	10/21/22 16:12

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Subcontracted Analyses	WG1947046	1	12/13/22 00:00	12/13/22 00:00	-	Baton Rouge, LA 70820

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jason Romer
Project Manager

Project Narrative

L1549094 -01, -02, -03, -04, -05 contains subout data that is included after the chain of custody.

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

SDG	Sample Delivery Group.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

L1549094

OREGON DEQ State of Oregon Sample Chain of Custody OREGONDEQ

Agency, Authorized Purchaser or Agent:	**Contract Laboratory Name: Pace** **Lab Batch #:**	**Lab Selection Criteria:** ☐ Proximity (if TAT < 48 hrs) ☐ Prior work on same project ☒ Cost (for anticipated analyses) ☐ Other labs disqualified or unable to perform requested services ☐ Emergency work	**Turn Around Time:** ☒ 10 days (std.) ☐ 5 days ☐ 72 hours ☐ 48 hours ☐ 24 hours ☐ Other ____
Send Lab Report To: Mark Pugh Address: **Department of Environmental Quality** **700 NE Multnomah St., Suite 600** **Portland, OR 97232** Tel. #: (503) 229-5587 E-mail: PUGH.Mark@deq.state.or.us	**Invoice To:** ODEQ/Business Office Address: 700 NE Multnomah St., Suite 600 Portland, OR 97232 Tel. #: (800) 452-4011		

Project Name: Tigard Cleaners
Project #: 320002326-01

Sample ID#	Collection Date/Time	Matrix	Number of Containers	Sample Preservative: HCl	Requested Analyses: PFAS EPA Method 1663	Comments
MW-3	10/19 @ 1030	GW	2		X	
MW-5	10/18 @ 1258	GW	3		X	
MW-7	10/18 @ 1415	GW	3		X	
EB-1	10/19 @ 1205	GW	3		X	
Dup-1	10/18 @ 1258	GW	3		X	

Notes: In addition, please send results to: M.Stevens@apexcos.com; Paula.Richardson@apexcos.com; COwens@apexcos.com; Kelsi.Evans@apexcos.com

Relinquished By: Robert Schettler	Agency/Agent: Apex Companies	Received By:	Agency/Agent:
Signature:	Time & Date: 1100 10/21/22	Signature:	Time & Date:
Relinquished By:	Agency/Agent:	Received By:	Agency/Agent:
Signature:	Time & Date:	Signature:	Time & Date:

THIS PURCHASE IS SUBMITTED PURSUANT TO STATE OF OREGON SOLICITATION #**102-1098-07** AND PRICE AGREEMENT # **[8903]**. THE PRICE AGREEMENT INCLUDING CONTRACT TERMS AND CONDITIONS AND SPECIAL CONTRACT TERMS AND CONDITIONS (T'S &C'S) CONTAINED IN THE PRICE AGREEMENT ARE HEREBY INCORPORATED BY REFERENCE AND SHALL APPLY TO THIS PURCHASE AND SHALL TAKE PRECEDENCE OVER ALL OTHER CONFLICTING T'S AND C'S, EXPRESS OR IMPLIED.

LELAP Certificate Number: 01955
A2LA Accredited (DoD ELAP-QSM 5.4) Certificate Number: 6429.01

ANALYTICAL RESULTS

PERFORMED BY

Pace Analytical Gulf Coast
7979 Innovation Park Dr.
Baton Rouge, LA 70820
(225) 769-4900

Report Date 12/13/2022

Report # 222102410

Project WG1947046 L1549094

Samples Collected 10/18/22 - 10/19/22

Deliver To	***Additional Recipients***
Brian Ford	SuboutTeam, Pace Analytical Services
Pace Analytical Services, Inc	Jimmy Huckaba, Pace Analytical Services, Inc.
12065 Lebanon Road	Angela Ford, Pace Analytical Services, Inc.
Mount Juliet, TN 37122	

A2LA ACCREDITED
CERT # 6429.01

Laboratory Endorsement

Sample analysis was performed in accordance with approved methodologies provided by the Environmental Protection Agency or other recognized agencies. The samples and their corresponding extracts will be maintained for a period of 30 days unless otherwise arranged. Following this retention period the samples will be disposed in accordance with Pace Gulf Coast's Standard Operating Procedures.

Common Abbreviations that may be Utilized in this Report

ND	Indicates the result was Not Detected at the specified reporting limit
NO	Indicates the sample did not ignite when preliminary test performed for EPA Method 1030
DO	Indicates the result was Diluted Out
MI	Indicates the result was subject to Matrix Interference
TNTC	Indicates the result was Too Numerous To Count
SUBC	Indicates the analysis was Sub-Contracted
FLD	Indicates the analysis was performed in the Field
DL	Detection Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
RE	Re-analysis
CF	HPLC or GC Confirmation
00:01	Reported as a time equivalent to 12:00 AM

Reporting Flags that may be Utilized in this Report

J or I	Indicates the result is between the MDL and LOQ
J	DOD flag on analyte in the parent sample for MS/MSD outside acceptance criteria
U	Indicates the compound was analyzed for but not detected
B or V	Indicates the analyte was detected in the associated Method Blank
Q	Indicates a non-compliant QC Result (See Q Flag Application Report)
*****	Indicates a non-compliant or not applicable QC recovery or RPD – see narrative
E	Organics **-** The result is estimated because it exceeded the instrument calibration range
E	Metals - % diference for the serial dilution is > 10%
L	Reporting Limits adjusted to meet risk-based limit.
P	RPD between primary and confirmation result is greater than 40
DL	Diluted analysis – when appended to Client Sample ID

Sample receipt at Pace Gulf Coast is documented through the attached chain of custody. In accordance with NELAC, this report shall be reproduced only in full and with the written permission of Pace Gulf Coast. The results contained within this report relate only to the samples reported. The documented results are presented within this report.

This report pertains only to the samples listed in the Report Sample Summary and should be retained as a permanent record thereof. The results contained within this report are intended for the use of the client. Any unauthorized use of the information contained in this report is prohibited.

I certify that this data package is in compliance with The NELAC Institute (TNI) Standard 2009 and terms and conditions of the contract and Statement of Work both technically and for completeness, for other than the conditions in the case narrative. Release of the data contained in this hardcopy data package and in the computer readable data submitted has been authorized by the Quality Assurance Manager or his/her designee, as verified by the following signature.

Estimated uncertainty of measurement is available upon request. This report is in compliance with the DOD QSM as specified in the contract if applicable.

Authorized Signature
Pace Gulf Coast Report 222102410

Certifications

Certification	Certification Number
A2LA Accredited (DoD ELAP-QSM 5.4)	6429.01
Alabama	01955
Arkansas	88-0655
Colorado	01955
Delaware	01955
Florida	E87854
Georgia	01955
Hawaii	01955
Idaho	01955
Illinois	200048
Indiana	01955
Kansas	E-10354
Kentucky	95
Louisiana	01955
Maryland	01955
Massachusetts	01955
Michigan	01955
Mississippi	01955
Missouri	01955
Montana	N/A
Nebraska	01955
New Mexico	01955
North Carolina	618
North Dakota	R-195
Oklahoma	9403
South Carolina	73006001
South Dakota	01955
Tennessee	01955
Texas	T104704178
Vermont	01955
Virginia	460215
Washington	C929
USDA Soil Permit	P330-16-00234

Case Narrative

Client: Pace Analytical Services **Report:** 222102410

Pace Analytical Gulf Coast received and analyzed the sample(s) listed
on the Report Sample Summary page of this report. Receipt of the sample(s) is documented
by the attached chain of custody. This applies only to the sample(s) listed in this report.
No sample integrity or quality control exceptions were identified unless noted below.

COC ANOMALIES

COC Anomalies\Changes - Only 1 container for sample MW-3. The screening analysis for TSS content cannot be performed (Ruth Welsh(Do Not 10/24/2022 10:12)

SEMI-VOLATILES MASS SPECTROMETRY

Samples 22210241002 (MW-5), 22210241003 (MW-7) and 22210241005 (DUP-1) were re-extracted outside holding time for 6:2FTS and PFOS contamination in the LLLCS. Both data sets are being reported

In the PFAS EPA 1633 Draft analysis for prep batch 754004, the LCS and/or LCSD recoveries are above the upper control limits for 6:2FTS andPFOS. This analyte was not detected in the associated samples.

MISCELLANEOUS

Sample 22210241001 (MW-3) was received with a minimal volume of sample.

Sample Summary

Lab ID	Client ID	Matrix	Collect Date	Receive Date
22210241001	MW-3	Water	10/19/22 10:30	10/22/22 10:48
22210241002	MW-5	Water	10/18/22 12:58	10/22/22 10:48
22210241003	MW-7	Water	10/18/22 14:15	10/22/22 10:48
22210241004	EB-1	Water	10/19/22 12:05	10/22/22 10:48
22210241005	DUP-1	Water	10/18/22 12:58	10/22/22 10:48

Detect Summary

Results and Detection Limits are adjusted for dilution and moisture when applicable

SM 2540 D-2011

Lab ID	Client ID	Parameter	Units	Result	Dil.	%Moist
22210241002	MW-5	Total Suspended Solids	mg/L	37	1	NA
22210241003	MW-7	Total Suspended Solids	mg/L	16	1	NA
22210241005	DUP-1	Total Suspended Solids	mg/L	65	1	NA

PFAS EPA 1633 Draft

Lab ID	Client ID	Parameter	Units	Result	Dil.	%Moist
22210241001	MW-3	Perfluorooctanesulfonic acid (PFOS)	ng/L	1.15	1	NA
22210241002	MW-5	Perfluorobutanesulfonic acid (PFBS)	ng/L	7.23	1	NA
22210241002	MW-5	Perfluorobutanoic acid (PFBA)	ng/L	6.64	1	NA
22210241002	MW-5	Perfluorodecanoic acid (PFDA)	ng/L	15.5	1	NA
22210241002	MW-5	Perfluoroheptanoic acid (PFHpA)	ng/L	18.8	1	NA
22210241002	MW-5	Perfluorohexanesulfonic acid (PFHxS)	ng/L	10.9	1	NA
22210241002	MW-5	Perfluorohexanoic acid (PFHxA)	ng/L	14.6	1	NA
22210241002	MW-5	Perfluorononanoic acid (PFNA)	ng/L	8.07	1	NA
22210241002	MW-5	Perfluorooctanesulfonic acid (PFOS)	ng/L	29.5	1	NA
22210241002	MW-5	Perfluorooctanesulfonic acid (PFOS)	ng/L	65.6	1	NA
22210241002	MW-5	Perfluorooctanoic acid (PFOA)	ng/L	35.3	1	NA
22210241002	MW-5	Perfluoropentanoic acid (PFPeA)	ng/L	9.61	1	NA
22210241003	MW-7	Perfluoroheptanoic acid (PFHpA)	ng/L	10.8	1	NA
22210241003	MW-7	Perfluorohexanoic acid (PFHxA)	ng/L	8.99	1	NA
22210241003	MW-7	Perfluorooctanesulfonic acid (PFOS)	ng/L	4.16	1	NA
22210241003	MW-7	Perfluorooctanesulfonic acid (PFOS)	ng/L	8.52	1	NA
22210241003	MW-7	Perfluorooctanoic acid (PFOA)	ng/L	27.4	1	NA
22210241003	MW-7	Perfluoropentanoic acid (PFPeA)	ng/L	6.83	1	NA
22210241005	DUP-1	Perfluorobutanesulfonic acid (PFBS)	ng/L	5.43	1	NA
22210241005	DUP-1	Perfluorobutanoic acid (PFBA)	ng/L	5.04	1	NA
22210241005	DUP-1	Perfluorodecanoic acid (PFDA)	ng/L	12.7	1	NA
22210241005	DUP-1	Perfluoroheptanoic acid (PFHpA)	ng/L	15.0	1	NA
22210241005	DUP-1	Perfluorohexanesulfonic acid (PFHxS)	ng/L	9.44	1	NA
22210241005	DUP-1	Perfluorohexanoic acid (PFHxA)	ng/L	12.1	1	NA
22210241005	DUP-1	Perfluorononanoic acid (PFNA)	ng/L	6.67	1	NA
22210241005	DUP-1	Perfluorooctanesulfonic acid (PFOS)	ng/L	23.7	1	NA
22210241005	DUP-1	Perfluorooctanesulfonic acid (PFOS)	ng/L	64.0	1	NA
22210241005	DUP-1	Perfluorooctanoic acid (PFOA)	ng/L	28.7	1	NA
22210241005	DUP-1	Perfluoropentanoic acid (PFPeA)	ng/L	8.06	1	NA

Sample Results

MW-3

Collect Date	10/19/2022 10:30	**Lab ID**	22210241001
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 06:54	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
763051-92-9	11Cl-PF3OUdS	ND	4.33	ng/L
356-02-5	3:3FTCA	ND	5.41	ng/L
757124-72-4	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	4.33	ng/L
914637-49-3	5:3FTCA	ND	27.1	ng/L
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	4.33	ng/L
812-70-4	7:3FTCA	ND	27.1	ng/L
39108-34-4	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	4.33	ng/L
756426-58-1	9Cl-PF3ONS	ND	4.33	ng/L
919005-14-4	ADONA	ND	4.33	ng/L
4151-50-2	NEtFOSA	ND	1.08	ng/L
2991-50-6	NEtFOSAA	ND	1.08	ng/L
1691-99-2	NEtFOSE	ND	10.8	ng/L
31506-32-8	NMeFOSA	ND	1.08	ng/L
2355-31-9	NMeFOSAA	ND	1.08	ng/L
24448-09-7	NMeFOSE	ND	10.8	ng/L
151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.16	ng/L
113507-82-7	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.16	ng/L
13252-13-6	Perfluoro-2-proxypropanoic acid (HFPO-DA)	ND	4.33	ng/L
377-73-1	Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	2.16	ng/L
863090-89-5	Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	2.16	ng/L
375-73-5	Perfluorobutanesulfonic acid (PFBS)	ND	1.08	ng/L
375-22-4	Perfluorobutanoic acid (PFBA)	ND	4.33	ng/L
335-77-3	Perfluorodecane sulfonic acid (PFDS)	ND	1.08	ng/L
335-76-2	Perfluorodecanoic acid (PFDA)	ND	1.08	ng/L
307-55-1	Perfluorododecanoic acid (PFDoA)	ND	1.08	ng/L
375-92-8	Perfluoroheptanesulfonic acid (PFHpS)	ND	1.08	ng/L
375-85-9	Perfluoroheptanoic acid (PFHpA)	ND	1.08	ng/L
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	ND	1.08	ng/L
307-24-4	Perfluorohexanoic acid (PFHxA)	ND	1.08	ng/L
68259-12-1	Perfluorononanesulfonic acid (PFNS)	ND	1.08	ng/L
375-95-1	Perfluorononanoic acid (PFNA)	ND	1.08	ng/L
754-91-6	Perfluorooctane Sulfonamide (FOSA)	ND	1.08	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**1.15**	**1.08**	ng/L
335-67-1	Perfluorooctanoic acid (PFOA)	ND	1.08	ng/L
2706-91-4	Perfluoropentanesulfonic acid (PFPeS)	ND	1.08	ng/L
2706-90-3	Perfluoropentanoic acid (PFPeA)	ND	2.16	ng/L
376-06-7	Perfluorotetradecanoic acid (PFTA)	ND	1.08	ng/L
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	ND	1.08	ng/L
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND	1.08	ng/L

Sample Results

MW-3

Collect Date	10/19/2022 10:30	**Lab ID**	22210241001
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 06:54	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
79780-39-5	PFDoS	ND	1.08	ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-4:2FTS-EIS	13C2-4:2FTS	54.1	66	ng/L	122	20 - 150
13C2-6:2FTS-EIS	13C2-6:2FTS	54.1	52.3	ng/L	97	20 - 150
13C2-8:2FTS-EIS	13C2-8:2FTS	54.1	37.3	ng/L	69	20 - 150
13C2-PFDoA-EIS	13C2-PFDoA	13.5	6.12	ng/L	45	20 - 150
13C2-PFTeDA-EIS	13C2-PFTeDA	13.5	6.51	ng/L	48	20 - 150
13C3-HFPODA-EIS	13C3-HFPO-DA	108	78.2	ng/L	72	20 - 150
13C3-PFBS-EIS	13C3-PFBS	27.1	19.1	ng/L	71	20 - 150
13C3-PFHxS-EIS	13C3-PFHxS	27.1	20	ng/L	74	20 - 150
13C4-PFBA-EIS	13C4-PFBA	108	33.6	ng/L	31	20 - 150
13C4-PFHpA-EIS	13C4-PFHpA	27.1	18.6	ng/L	69	20 - 150
13C5-PFHxA-EIS	13C5-PFHxA	27.1	20.1	ng/L	74	20 - 150
13C5-PFPeA-EIS	13C5-PFPeA	54.1	41.9	ng/L	77	20 - 150
13C6-PFDA-EIS	13C6-PFDA	13.5	8.32	ng/L	61	20 - 150
13C7-PFUnA-EIS	13C7-PFUnA	13.5	7.08	ng/L	52	20 - 150
13C8-PFOA-EIS	13C8-PFOA	27.1	20.2	ng/L	75	20 - 150
13C8-PFOS-EIS	13C8-PFOS	27.1	17	ng/L	63	20 - 150
13C8-PFOSA-EIS	13C8-PFOSA	27.1	14.7	ng/L	54	20 - 150
13C9-PFNA-EIS	13C9-PFNA	13.5	9.46	ng/L	70	20 - 150
D3-NMeFOSA-EIS	D3-NMeFOSA	27.1	12.7	ng/L	47	20 - 150
D3-NMeFOSAA-EIS	D3-NMeFOSAA	54.1	29.2	ng/L	54	20 - 150
D5-NEtFOSA-EIS	D5-NEtFOSA	27.1	11.8	ng/L	43	20 - 150
D5-NEtFOSAA-EIS	D5-NEtFOSAA	54.1	27.5	ng/L	51	20 - 150
D7-NMeFOSE-EIS	D7-NMeFOSE	271	117	ng/L	43	20 - 150
D9-NEtFOSE-EIS	D9-NEtFOSE	271	112	ng/L	41	20 - 150

Sample Results

MW-5				
	Collect Date	10/18/2022 12:58	**Lab ID**	22210241002
	Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 07:10	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
763051-92-9	11Cl-PF3OUdS	ND	4.29	ng/L
356-02-5	3:3FTCA	ND	5.36	ng/L
757124-72-4	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	4.29	ng/L
914637-49-3	5:3FTCA	ND	26.8	ng/L
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	4.29	ng/L
812-70-4	7:3FTCA	ND	26.8	ng/L
39108-34-4	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	4.29	ng/L
756426-58-1	9Cl-PF3ONS	ND	4.29	ng/L
919005-14-4	ADONA	ND	4.29	ng/L
4151-50-2	NEtFOSA	ND	1.07	ng/L
2991-50-6	NEtFOSAA	ND	1.07	ng/L
1691-99-2	NEtFOSE	ND	10.7	ng/L
31506-32-8	NMeFOSA	ND	1.07	ng/L
2355-31-9	NMeFOSAA	ND	1.07	ng/L
24448-09-7	NMeFOSE	ND	10.7	ng/L
151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.15	ng/L
113507-82-7	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.15	ng/L
13252-13-6	Perfluoro-2-proxypropanoic acid (HFPO-DA)	ND	4.29	ng/L
377-73-1	Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	2.15	ng/L
863090-89-5	Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	2.15	ng/L
375-73-5	**Perfluorobutanesulfonic acid (PFBS)**	**7.23**	**1.07**	ng/L
375-22-4	**Perfluorobutanoic acid (PFBA)**	**6.64**	**4.29**	ng/L
335-77-3	Perfluorodecane sulfonic acid (PFDS)	ND	1.07	ng/L
335-76-2	**Perfluorodecanoic acid (PFDA)**	**15.5**	**1.07**	ng/L
307-55-1	Perfluorododecanoic acid (PFDoA)	ND	1.07	ng/L
375-92-8	Perfluoroheptanesulfonic acid (PFHpS)	ND	1.07	ng/L
375-85-9	**Perfluoroheptanoic acid (PFHpA)**	**18.8**	**1.07**	ng/L
355-46-4	**Perfluorohexanesulfonic acid (PFHxS)**	**10.9**	**1.07**	ng/L
307-24-4	**Perfluorohexanoic acid (PFHxA)**	**14.6**	**1.07**	ng/L
68259-12-1	Perfluorononanesulfonic acid (PFNS)	ND	1.07	ng/L
375-95-1	**Perfluorononanoic acid (PFNA)**	**8.07**	**1.07**	ng/L
754-91-6	Perfluorooctane Sulfonamide (FOSA)	ND	1.07	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**29.5**	**1.07**	ng/L
335-67-1	**Perfluorooctanoic acid (PFOA)**	**35.3**	**1.07**	ng/L
2706-91-4	Perfluoropentanesulfonic acid (PFPeS)	ND	1.07	ng/L
2706-90-3	**Perfluoropentanoic acid (PFPeA)**	**9.61**	**2.15**	ng/L
376-06-7	Perfluorotetradecanoic acid (PFTA)	ND	1.07	ng/L
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	ND	1.07	ng/L
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND	1.07	ng/L

Sample Results

MW-5	**Collect Date**	10/18/2022 12:58	**Lab ID**	22210241002
	Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 07:10	754386	SLR2	NA

CAS#	Parameter	Result	LOQ			Units
79780-39-5	PFDoS	ND	1.07			ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-4:2FTS-EIS	13C2-4:2FTS	53.6	74	ng/L	138	20 - 150
13C2-6:2FTS-EIS	13C2-6:2FTS	53.6	61.5	ng/L	115	20 - 150
13C2-8:2FTS-EIS	13C2-8:2FTS	53.6	45.8	ng/L	85	20 - 150
13C2-PFDoA-EIS	13C2-PFDoA	13.4	7.5	ng/L	56	20 - 150
13C2-PFTeDA-EIS	13C2-PFTeDA	13.4	7.81	ng/L	58	20 - 150
13C3-HFPODA-EIS	13C3-HFPO-DA	107	85.2	ng/L	79	20 - 150
13C3-PFBS-EIS	13C3-PFBS	26.8	20.8	ng/L	77	20 - 150
13C3-PFHxS-EIS	13C3-PFHxS	26.8	21.4	ng/L	80	20 - 150
13C4-PFBA-EIS	13C4-PFBA	107	82.6	ng/L	77	20 - 150
13C4-PFHpA-EIS	13C4-PFHpA	26.8	20.1	ng/L	75	20 - 150
13C5-PFHxA-EIS	13C5-PFHxA	26.8	21.8	ng/L	81	20 - 150
13C5-PFPeA-EIS	13C5-PFPeA	53.6	44.8	ng/L	83	20 - 150
13C6-PFDA-EIS	13C6-PFDA	13.4	9.2	ng/L	69	20 - 150
13C7-PFUnA-EIS	13C7-PFUnA	13.4	8.33	ng/L	62	20 - 150
13C8-PFOA-EIS	13C8-PFOA	26.8	21.4	ng/L	80	20 - 150
13C8-PFOS-EIS	13C8-PFOS	26.8	19.8	ng/L	74	20 - 150
13C8-PFOSA-EIS	13C8-PFOSA	26.8	15.5	ng/L	58	20 - 150
13C9-PFNA-EIS	13C9-PFNA	13.4	10.6	ng/L	79	20 - 150
D3-NMeFOSA-EIS	D3-NMeFOSA	26.8	13.3	ng/L	50	20 - 150
D3-NMeFOSAA-EIS	D3-NMeFOSAA	53.6	32	ng/L	60	20 - 150
D5-NEtFOSA-EIS	D5-NEtFOSA	26.8	12.2	ng/L	46	20 - 150
D5-NEtFOSAA-EIS	D5-NEtFOSAA	53.6	30.6	ng/L	57	20 - 150
D7-NMeFOSE-EIS	D7-NMeFOSE	268	127	ng/L	47	20 - 150
D9-NEtFOSE-EIS	D9-NEtFOSE	268	124	ng/L	46	20 - 150

Sample Results

MW-5				
	Collect Date	10/18/2022 12:58	Lab ID	22210241002
	Receive Date	10/22/2022 10:48	Matrix	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/27/22 04:30	754540	PFAS EPA 1633 Draft	1	12/10/22 20:14	755815	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	3.77	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**65.6**	**0.943**	ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-6:2FTS-EIS	13C2-6:2FTS	47.2	60.1	ng/L	127	20 - 150
13C8-PFOS-EIS	13C8-PFOS	23.6	18.2	ng/L	77	20 - 150

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	10/25/22 14:00	752615	JGD	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**37**	**5**	mg/L

Sample Results

MW-7				
	Collect Date	10/18/2022 14:15	**Lab ID**	22210241003
	Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 08:00	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
763051-92-9	11Cl-PF3OUdS	ND	4.22	ng/L
356-02-5	3:3FTCA	ND	5.27	ng/L
757124-72-4	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	4.22	ng/L
914637-49-3	5:3FTCA	ND	26.4	ng/L
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	4.22	ng/L
812-70-4	7:3FTCA	ND	26.4	ng/L
39108-34-4	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	4.22	ng/L
756426-58-1	9Cl-PF3ONS	ND	4.22	ng/L
919005-14-4	ADONA	ND	4.22	ng/L
4151-50-2	NEtFOSA	ND	1.05	ng/L
2991-50-6	NEtFOSAA	ND	1.05	ng/L
1691-99-2	NEtFOSE	ND	10.5	ng/L
31506-32-8	NMeFOSA	ND	1.05	ng/L
2355-31-9	NMeFOSAA	ND	1.05	ng/L
24448-09-7	NMeFOSE	ND	10.5	ng/L
151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.11	ng/L
113507-82-7	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.11	ng/L
13252-13-6	Perfluoro-2-proxypropanoic acid (HFPO-DA)	ND	4.22	ng/L
377-73-1	Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	2.11	ng/L
863090-89-5	Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	2.11	ng/L
375-73-5	Perfluorobutanesulfonic acid (PFBS)	ND	1.05	ng/L
375-22-4	Perfluorobutanoic acid (PFBA)	ND	4.22	ng/L
335-77-3	Perfluorodecane sulfonic acid (PFDS)	ND	1.05	ng/L
335-76-2	Perfluorodecanoic acid (PFDA)	ND	1.05	ng/L
307-55-1	Perfluorododecanoic acid (PFDoA)	ND	1.05	ng/L
375-92-8	Perfluoroheptanesulfonic acid (PFHpS)	ND	1.05	ng/L
375-85-9	**Perfluoroheptanoic acid (PFHpA)**	**10.8**	**1.05**	ng/L
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	ND	1.05	ng/L
307-24-4	**Perfluorohexanoic acid (PFHxA)**	**8.99**	**1.05**	ng/L
68259-12-1	Perfluorononanesulfonic acid (PFNS)	ND	1.05	ng/L
375-95-1	Perfluorononanoic acid (PFNA)	ND	1.05	ng/L
754-91-6	Perfluorooctane Sulfonamide (FOSA)	ND	1.05	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**4.16**	**1.05**	ng/L
335-67-1	**Perfluorooctanoic acid (PFOA)**	**27.4**	**1.05**	ng/L
2706-91-4	Perfluoropentanesulfonic acid (PFPeS)	ND	1.05	ng/L
2706-90-3	**Perfluoropentanoic acid (PFPeA)**	**6.83**	**2.11**	ng/L
376-06-7	Perfluorotetradecanoic acid (PFTA)	ND	1.05	ng/L
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	ND	1.05	ng/L
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND	1.05	ng/L

Sample Results

MW-7	**Collect Date**	10/18/2022 14:15	**Lab ID**	22210241003
	Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 08:00	754386	SLR2	NA

CAS#	Parameter	Result	LOQ			Units
79780-39-5	PFDoS	ND	1.05			ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-4:2FTS-EIS	13C2-4:2FTS	52.7	69	ng/L	131	20 - 150
13C2-6:2FTS-EIS	13C2-6:2FTS	52.7	58.2	ng/L	110	20 - 150
13C2-8:2FTS-EIS	13C2-8:2FTS	52.7	40.4	ng/L	77	20 - 150
13C2-PFDoA-EIS	13C2-PFDoA	13.2	6.17	ng/L	47	20 - 150
13C2-PFTeDA-EIS	13C2-PFTeDA	13.2	5.9	ng/L	45	20 - 150
13C3-HFPODA-EIS	13C3-HFPO-DA	105	79.9	ng/L	76	20 - 150
13C3-PFBS-EIS	13C3-PFBS	26.4	19	ng/L	72	20 - 150
13C3-PFHxS-EIS	13C3-PFHxS	26.4	19.1	ng/L	72	20 - 150
13C4-PFBA-EIS	13C4-PFBA	105	55.7	ng/L	53	20 - 150
13C4-PFHpA-EIS	13C4-PFHpA	26.4	18.4	ng/L	70	20 - 150
13C5-PFHxA-EIS	13C5-PFHxA	26.4	20.4	ng/L	77	20 - 150
13C5-PFPeA-EIS	13C5-PFPeA	52.7	40.7	ng/L	77	20 - 150
13C6-PFDA-EIS	13C6-PFDA	13.2	8.44	ng/L	64	20 - 150
13C7-PFUnA-EIS	13C7-PFUnA	13.2	7.04	ng/L	53	20 - 150
13C8-PFOA-EIS	13C8-PFOA	26.4	20	ng/L	76	20 - 150
13C8-PFOS-EIS	13C8-PFOS	26.4	17.3	ng/L	66	20 - 150
13C8-PFOSA-EIS	13C8-PFOSA	26.4	12.9	ng/L	49	20 - 150
13C9-PFNA-EIS	13C9-PFNA	13.2	9.49	ng/L	72	20 - 150
D3-NMeFOSA-EIS	D3-NMeFOSA	26.4	11.1	ng/L	42	20 - 150
D3-NMeFOSAA-EIS	D3-NMeFOSAA	52.7	27.8	ng/L	53	20 - 150
D5-NEtFOSA-EIS	D5-NEtFOSA	26.4	10.4	ng/L	39	20 - 150
D5-NEtFOSAA-EIS	D5-NEtFOSAA	52.7	26.3	ng/L	50	20 - 150
D7-NMeFOSE-EIS	D7-NMeFOSE	264	105	ng/L	40	20 - 150
D9-NEtFOSE-EIS	D9-NEtFOSE	264	100	ng/L	38	20 - 150

Sample Results

MW-7

Collect Date	10/18/2022 14:15	**Lab ID**	22210241003
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/27/22 04:30	754540	PFAS EPA 1633 Draft	1	12/10/22 20:30	755815	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	6.85	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**8.52**	**1.71**	ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-6:2FTS-EIS	13C2-6:2FTS	85.6	97.8	ng/L	114	20 - 150
13C8-PFOS-EIS	13C8-PFOS	42.8	34.9	ng/L	82	20 - 150

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	10/25/22 14:00	752615	JGD	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**16**	**5**	mg/L

Sample Results

EB-1

Collect Date	10/19/2022 12:05	**Lab ID**	22210241004
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 08:17	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
763051-92-9	11Cl-PF3OUdS	ND	4.26	ng/L
356-02-5	3:3FTCA	ND	5.32	ng/L
757124-72-4	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	4.26	ng/L
914637-49-3	5:3FTCA	ND	26.6	ng/L
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	4.26	ng/L
812-70-4	7:3FTCA	ND	26.6	ng/L
39108-34-4	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	4.26	ng/L
756426-58-1	9Cl-PF3ONS	ND	4.26	ng/L
919005-14-4	ADONA	ND	4.26	ng/L
4151-50-2	NEtFOSA	ND	1.06	ng/L
2991-50-6	NEtFOSAA	ND	1.06	ng/L
1691-99-2	NEtFOSE	ND	10.6	ng/L
31506-32-8	NMeFOSA	ND	1.06	ng/L
2355-31-9	NMeFOSAA	ND	1.06	ng/L
24448-09-7	NMeFOSE	ND	10.6	ng/L
151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.13	ng/L
113507-82-7	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.13	ng/L
13252-13-6	Perfluoro-2-proxypropanoic acid (HFPO-DA)	ND	4.26	ng/L
377-73-1	Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	2.13	ng/L
863090-89-5	Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	2.13	ng/L
375-73-5	Perfluorobutanesulfonic acid (PFBS)	ND	1.06	ng/L
375-22-4	Perfluorobutanoic acid (PFBA)	ND	4.26	ng/L
335-77-3	Perfluorodecane sulfonic acid (PFDS)	ND	1.06	ng/L
335-76-2	Perfluorodecanoic acid (PFDA)	ND	1.06	ng/L
307-55-1	Perfluorododecanoic acid (PFDoA)	ND	1.06	ng/L
375-92-8	Perfluoroheptanesulfonic acid (PFHpS)	ND	1.06	ng/L
375-85-9	Perfluoroheptanoic acid (PFHpA)	ND	1.06	ng/L
355-46-4	Perfluorohexanesulfonic acid (PFHxS)	ND	1.06	ng/L
307-24-4	Perfluorohexanoic acid (PFHxA)	ND	1.06	ng/L
68259-12-1	Perfluorononanesulfonic acid (PFNS)	ND	1.06	ng/L
375-95-1	Perfluorononanoic acid (PFNA)	ND	1.06	ng/L
754-91-6	Perfluorooctane Sulfonamide (FOSA)	ND	1.06	ng/L
1763-23-1	Perfluorooctanesulfonic acid (PFOS)	ND	1.06	ng/L
335-67-1	Perfluorooctanoic acid (PFOA)	ND	1.06	ng/L
2706-91-4	Perfluoropentanesulfonic acid (PFPeS)	ND	1.06	ng/L
2706-90-3	Perfluoropentanoic acid (PFPeA)	ND	2.13	ng/L
376-06-7	Perfluorotetradecanoic acid (PFTA)	ND	1.06	ng/L
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	ND	1.06	ng/L
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND	1.06	ng/L

Sample Results

EB-1

Collect Date	10/19/2022 12:05	**Lab ID**	22210241004
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 08:17	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
79780-39-5	PFDoS	ND	1.06	ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-4:2FTS-EIS	13C2-4:2FTS	53.2	18.6	ng/L	35	20 - 150
13C2-6:2FTS-EIS	13C2-6:2FTS	53.2	19.3	ng/L	36	20 - 150
13C2-8:2FTS-EIS	13C2-8:2FTS	53.2	17.2	ng/L	32	20 - 150
13C2-PFDoA-EIS	13C2-PFDoA	13.3	3.64	ng/L	27	20 - 150
13C2-PFTeDA-EIS	13C2-PFTeDA	13.3	3.71	ng/L	28	20 - 150
13C3-HFPODA-EIS	13C3-HFPO-DA	106	35.5	ng/L	33	20 - 150
13C3-PFBS-EIS	13C3-PFBS	26.6	8.57	ng/L	32	20 - 150
13C3-PFHxS-EIS	13C3-PFHxS	26.6	8.58	ng/L	32	20 - 150
13C4-PFBA-EIS	13C4-PFBA	106	35.7	ng/L	34	20 - 150
13C4-PFHpA-EIS	13C4-PFHpA	26.6	7.97	ng/L	30	20 - 150
13C5-PFHxA-EIS	13C5-PFHxA	26.6	8.72	ng/L	33	20 - 150
13C5-PFPeA-EIS	13C5-PFPeA	53.2	18.7	ng/L	35	20 - 150
13C6-PFDA-EIS	13C6-PFDA	13.3	4.12	ng/L	31	20 - 150
13C7-PFUnA-EIS	13C7-PFUnA	13.3	3.87	ng/L	29	20 - 150
13C8-PFOA-EIS	13C8-PFOA	26.6	8.73	ng/L	33	20 - 150
13C8-PFOS-EIS	13C8-PFOS	26.6	8.12	ng/L	31	20 - 150
13C8-PFOSA-EIS	13C8-PFOSA	26.6	7.01	ng/L	26	20 - 150
13C9-PFNA-EIS	13C9-PFNA	13.3	4.39	ng/L	33	20 - 150
D3-NMeFOSA-EIS	D3-NMeFOSA	26.6	6.58	ng/L	25	20 - 150
D3-NMeFOSAA-EIS	D3-NMeFOSAA	53.2	16.3	ng/L	31	20 - 150
D5-NEtFOSA-EIS	D5-NEtFOSA	26.6	6.27	ng/L	24	20 - 150
D5-NEtFOSAA-EIS	D5-NEtFOSAA	53.2	15.9	ng/L	30	20 - 150
D7-NMeFOSE-EIS	D7-NMeFOSE	266	67.7	ng/L	25	20 - 150
D9-NEtFOSE-EIS	D9-NEtFOSE	266	65	ng/L	24	20 - 150

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Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	10/25/22 14:00	752615	JGD	NA

CAS#	Parameter	Result	LOQ	Units
C-009	Total Suspended Solids	ND	5	mg/L

Sample Results

DUP-1

Collect Date	10/18/2022 12:58	**Lab ID**	22210241005
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 08:33	754386	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
763051-92-9	11Cl-PF3OUdS	ND	4.28	ng/L
356-02-5	3:3FTCA	ND	5.35	ng/L
757124-72-4	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	ND	4.28	ng/L
914637-49-3	5:3FTCA	ND	26.8	ng/L
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	4.28	ng/L
812-70-4	7:3FTCA	ND	26.8	ng/L
39108-34-4	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ND	4.28	ng/L
756426-58-1	9Cl-PF3ONS	ND	4.28	ng/L
919005-14-4	ADONA	ND	4.28	ng/L
4151-50-2	NEtFOSA	ND	1.07	ng/L
2991-50-6	NEtFOSAA	ND	1.07	ng/L
1691-99-2	NEtFOSE	ND	10.7	ng/L
31506-32-8	NMeFOSA	ND	1.07	ng/L
2355-31-9	NMeFOSAA	ND	1.07	ng/L
24448-09-7	NMeFOSE	ND	10.7	ng/L
151772-58-6	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.14	ng/L
113507-82-7	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.14	ng/L
13252-13-6	Perfluoro-2-proxypropanoic acid (HFPO-DA)	ND	4.28	ng/L
377-73-1	Perfluoro-3-methoxypropanoic acid (PFMPA)	ND	2.14	ng/L
863090-89-5	Perfluoro-4-methoxybutanoic acid (PFMBA)	ND	2.14	ng/L
375-73-5	**Perfluorobutanesulfonic acid (PFBS)**	**5.43**	**1.07**	ng/L
375-22-4	**Perfluorobutanoic acid (PFBA)**	**5.04**	**4.28**	ng/L
335-77-3	Perfluorodecane sulfonic acid (PFDS)	ND	1.07	ng/L
335-76-2	**Perfluorodecanoic acid (PFDA)**	**12.7**	**1.07**	ng/L
307-55-1	Perfluorododecanoic acid (PFDoA)	ND	1.07	ng/L
375-92-8	Perfluoroheptanesulfonic acid (PFHpS)	ND	1.07	ng/L
375-85-9	**Perfluoroheptanoic acid (PFHpA)**	**15.0**	**1.07**	ng/L
355-46-4	**Perfluorohexanesulfonic acid (PFHxS)**	**9.44**	**1.07**	ng/L
307-24-4	**Perfluorohexanoic acid (PFHxA)**	**12.1**	**1.07**	ng/L
68259-12-1	Perfluorononanesulfonic acid (PFNS)	ND	1.07	ng/L
375-95-1	**Perfluorononanoic acid (PFNA)**	**6.67**	**1.07**	ng/L
754-91-6	Perfluorooctane Sulfonamide (FOSA)	ND	1.07	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**23.7**	**1.07**	ng/L
335-67-1	**Perfluorooctanoic acid (PFOA)**	**28.7**	**1.07**	ng/L
2706-91-4	Perfluoropentanesulfonic acid (PFPeS)	ND	1.07	ng/L
2706-90-3	**Perfluoropentanoic acid (PFPeA)**	**8.06**	**2.14**	ng/L
376-06-7	Perfluorotetradecanoic acid (PFTA)	ND	1.07	ng/L
72629-94-8	Perfluorotridecanoic acid (PFTrDA)	ND	1.07	ng/L
2058-94-8	Perfluoroundecanoic acid (PFUnA)	ND	1.07	ng/L

Sample Results

DUP-1

Collect Date	10/18/2022 12:58	**Lab ID**	22210241005
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft (Continued)

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/15/22 03:30	754004	PFAS EPA 1633 Draft	1	11/20/22 08:33	754386	SLR2	NA

CAS#	Parameter	Result	LOQ			Units
79780-39-5	PFDoS	ND	1.07			ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-4:2FTS-EIS	13C2-4:2FTS	53.5	64.5	ng/L	121	20 - 150
13C2-6:2FTS-EIS	13C2-6:2FTS	53.5	55.9	ng/L	104	20 - 150
13C2-8:2FTS-EIS	13C2-8:2FTS	53.5	40.6	ng/L	76	20 - 150
13C2-PFDoA-EIS	13C2-PFDoA	13.4	7.84	ng/L	59	20 - 150
13C2-PFTeDA-EIS	13C2-PFTeDA	13.4	8.04	ng/L	60	20 - 150
13C3-HFPODA-EIS	13C3-HFPO-DA	107	82.5	ng/L	77	20 - 150
13C3-PFBS-EIS	13C3-PFBS	26.8	19.8	ng/L	74	20 - 150
13C3-PFHxS-EIS	13C3-PFHxS	26.8	20.4	ng/L	76	20 - 150
13C4-PFBA-EIS	13C4-PFBA	107	83.2	ng/L	78	20 - 150
13C4-PFHpA-EIS	13C4-PFHpA	26.8	19.2	ng/L	72	20 - 150
13C5-PFHxA-EIS	13C5-PFHxA	26.8	20.7	ng/L	77	20 - 150
13C5-PFPeA-EIS	13C5-PFPeA	53.5	43.1	ng/L	80	20 - 150
13C6-PFDA-EIS	13C6-PFDA	13.4	9.25	ng/L	69	20 - 150
13C7-PFUnA-EIS	13C7-PFUnA	13.4	8.68	ng/L	65	20 - 150
13C8-PFOA-EIS	13C8-PFOA	26.8	21.5	ng/L	80	20 - 150
13C8-PFOS-EIS	13C8-PFOS	26.8	18.8	ng/L	70	20 - 150
13C8-PFOSA-EIS	13C8-PFOSA	26.8	14.8	ng/L	55	20 - 150
13C9-PFNA-EIS	13C9-PFNA	13.4	10.1	ng/L	76	20 - 150
D3-NMeFOSA-EIS	D3-NMeFOSA	26.8	13.1	ng/L	49	20 - 150
D3-NMeFOSAA-EIS	D3-NMeFOSAA	53.5	32.1	ng/L	60	20 - 150
D5-NEtFOSA-EIS	D5-NEtFOSA	26.8	13.1	ng/L	49	20 - 150
D5-NEtFOSAA-EIS	D5-NEtFOSAA	53.5	30.6	ng/L	57	20 - 150
D7-NMeFOSE-EIS	D7-NMeFOSE	268	130	ng/L	48	20 - 150
D9-NEtFOSE-EIS	D9-NEtFOSE	268	129	ng/L	48	20 - 150

Sample Results

DUP-1

Collect Date	10/18/2022 12:58	**Lab ID**	22210241005
Receive Date	10/22/2022 10:48	**Matrix**	Water

PFAS EPA 1633 Draft

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
11/27/22 04:30	754540	PFAS EPA 1633 Draft	1	12/10/22 20:46	755815	SLR2	NA

CAS#	Parameter	Result	LOQ	Units
27619-97-2	6:2 Fluorotelomer sulfonic acid (6:2FTS)	ND	4.61	ng/L
1763-23-1	**Perfluorooctanesulfonic acid (PFOS)**	**64.0**	**1.15**	ng/L

CAS#	Surrogate	Conc Spiked	Conc Rec	Units	%Recovery	%Rec Limits
13C2-6:2FTS-EIS	13C2-6:2FTS	57.6	72.7	ng/L	126	20 - 150
13C8-PFOS-EIS	13C8-PFOS	28.8	25.1	ng/L	87	20 - 150

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Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	10/25/22 14:00	752615	JGD	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**65**	**5**	mg/L

LC-MS/MS QC Summary

Analytical Batch	Client ID	MB754004	LCS754004
754386	Lab ID	2420908	2420909
Prep Batch	Sample Type	MB	LCS
754004	Prep Date	11/15/22 03:30	11/15/22 03:30
Prep Method	Analysis Date	11/20/22 04:24	11/20/22 04:40
PFAS EPA 1633 Draft	Matrix	Water	Water

PFAS EPA 1633 Draft		Units Result	ng/L LOQ	Spike Added	Result	%R	Control Limits%R
11Cl-PF3OUdS	763051-92-9	ND	4.00	94.7	107	113	40 - 150
3:3FTCA	356-02-5	ND	5.00	125	141	113	40 - 150
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	ND	4.00	93.9	110	117	40 - 150
5:3FTCA	914637-49-3	ND	25.0	626	719	115	40 - 150
6:2 Fluorotelomer sulfonic acid (6:2FTS)	27619-97-2	ND	4.00	95.2	121	127	40 - 150
7:3FTCA	812-70-4	ND	25.0	626	702	112	40 - 150
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	ND	4.00	96.2	120	125	40 - 150
9Cl-PF3ONS	756426-58-1	ND	4.00	93.6	110	117	40 - 150
ADONA	919005-14-4	ND	4.00	94.7	111	117	40 - 150
NEtFOSA	4151-50-2	ND	1.00	25.0	29.2	117	40 - 150
NEtFOSAA	2991-50-6	ND	1.00	25.0	28.9	116	40 - 150
NEtFOSE	1691-99-2	ND	10.0	250	311	124	40 - 150
NMeFOSA	31506-32-8	ND	1.00	25.0	29.5	118	40 - 150
NMeFOSAA	2355-31-9	ND	1.00	25.0	28.0	112	40 - 150
NMeFOSE	24448-09-7	ND	10.0	250	311	124	40 - 150
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	ND	2.00	50.1	56.0	112	40 - 150
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	113507-82-7	ND	2.00	44.6	52.6	118	40 - 150
Perfluoro-2-proxypropanoic acid (HFPO-DA)	13252-13-6	ND	4.00	100	119	118	40 - 150
Perfluoro-3-methoxypropanoic acid (PFMPA)	377-73-1	ND	2.00	50.1	59.3	118	40 - 150
Perfluoro-4-methoxybutanoic acid (PFMBA)	863090-89-5	ND	2.00	50.1	58.6	117	40 - 150
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ND	1.00	22.2	25.9	116	40 - 150
Perfluorobutanoic acid (PFBA)	375-22-4	ND	4.00	100	116	116	40 - 150
Perfluorodecane sulfonic acid (PFDS)	335-77-3	ND	1.00	24.2	27.7	115	40 - 150
Perfluorodecanoic acid (PFDA)	335-76-2	ND	1.00	25.0	28.8	115	40 - 150
Perfluorododecanoic acid (PFDoA)	307-55-1	ND	1.00	25.0	28.9	115	40 - 150
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ND	1.00	23.9	28.0	117	40 - 150
Perfluoroheptanoic acid (PFHpA)	375-85-9	ND	1.00	25.0	28.5	114	40 - 150
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ND	1.00	22.9	25.3	111	40 - 150
Perfluorohexanoic acid (PFHxA)	307-24-4	ND	1.00	25.0	28.5	114	40 - 150
Perfluorononanesulfonic acid (PFNS)	68259-12-1	ND	1.00	24.1	27.7	115	40 - 150
Perfluorononanoic acid (PFNA)	375-95-1	ND	1.00	25.0	29.4	117	40 - 150
Perfluorooctane Sulfonamide (FOSA)	754-91-6	ND	1.00	25.0	30.2	121	40 - 150
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ND	1.00	23.2	26.5	114	40 - 150
Perfluorooctanoic acid (PFOA)	335-67-1	ND	1.00	25.0	28.0	112	40 - 150
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	ND	1.00	23.6	26.9	114	40 - 150
Perfluoropentanoic acid (PFPeA)	2706-90-3	ND	2.00	50.1	58.5	117	40 - 150
Perfluorotetradecanoic acid (PFTA)	376-06-7	ND	1.00	25.0	28.5	114	40 - 150
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ND	1.00	25.0	28.3	113	40 - 150
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ND	1.00	25.0	30.9	123	40 - 150
PFDoS	79780-39-5	ND	1.00	24.3	23.6	97	40 - 150
Extracted Internal Standard(EIS)	**CAS#**	**Area**	**%R**	**CalArea**	**Area**	**%R**	**Limits**
13C2-4:2FTS	13C2-4:2FTS-EIS	42.9	86	50	40	80	20 - 150
13C2-6:2FTS	13C2-6:2FTS-EIS	42.3	85	50	42.2	84	20 - 150
13C2-8:2FTS	13C2-8:2FTS-EIS	36.9	74	50	40	80	20 - 150
13C2-PFDoA	13C2-PFDoA-EIS	6.82	55	12.5	8.54	68	20 - 150
13C2-PFTeDA	13C2-PFTeDA-EIS	6.86	55	12.5	8.49	68	20 - 150
13C3-HFPO-DA	13C3-HFPODA-EIS	73.1	73	100	79.8	80	20 - 150
13C3-PFBS	13C3-PFBS-EIS	18.8	75	25	19.2	77	20 - 150
13C3-PFHxS	13C3-PFHxS-EIS	18.2	73	25	19.6	78	20 - 150
13C4-PFBA	13C4-PFBA-EIS	73.1	73	100	79.7	80	20 - 150
13C4-PFHpA	13C4-PFHpA-EIS	16.8	67	25	18.3	73	20 - 150
13C5-PFHxA	13C5-PFHxA-EIS	18	72	25	19.8	79	20 - 150
13C5-PFPeA	13C5-PFPeA-EIS	37	74	50	40.9	82	20 - 150
13C6-PFDA	13C6-PFDA-EIS	8.64	69	12.5	10	80	20 - 150
13C7-PFUnA	13C7-PFUnA-EIS	7.63	61	12.5	9.4	75	20 - 150
13C8-PFOA	13C8-PFOA-EIS	18.3	73	25	20	80	20 - 150
13C8-PFOS	13C8-PFOS-EIS	16.9	68	25	19.7	79	20 - 150
13C8-PFOSA	13C8-PFOSA-EIS	15	60	25	16.7	67	20 - 150

LC-MS/MS QC Summary

Analytical Batch	Client ID	MB754004	LCS754004
754386	Lab ID	2420908	2420909
Prep Batch	Sample Type	MB	LCS
754004	Prep Date	11/15/22 03:30	11/15/22 03:30
Prep Method	Analysis Date	11/20/22 04:24	11/20/22 04:40
PFAS EPA 1633 Draft	Matrix	Water	Water

PFAS EPA 1633 Draft		Units Result	ng/L LOQ	Spike Added	Result	%R	Control Limits%R
13C9-PFNA	13C9-PFNA-EIS	8.8	70	12.5	9.7	78	20 - 150
D3-NMeFOSA	D3-NMeFOSA-EIS	14.6	58	25	15.4	62	20 - 150
D3-NMeFOSAA	D3-NMeFOSAA-EIS	31.5	63	50	38	76	20 - 150
D5-NEtFOSA	D5-NEtFOSA-EIS	13.8	55	25	15.4	62	20 - 150
D5-NEtFOSAA	D5-NEtFOSAA-EIS	30	60	50	36.5	73	20 - 150
D7-NMeFOSE	D7-NMeFOSE-EIS	137	55	250	149	59	20 - 150
D9-NEtFOSE	D9-NEtFOSE-EIS	130	52	250	145	58	20 - 150

Analytical Batch	Client ID	MB754540	LCS754540
755686	Lab ID	2424064	2424065
Prep Batch	Sample Type	MB	LCS
754540	Prep Date	11/27/22 04:30	11/27/22 04:30
Prep Method	Analysis Date	12/08/22 22:40	12/08/22 22:56
PFAS EPA 1633 Draft	Matrix	Water	Water

PFAS EPA 1633 Draft		Units Result	ng/L LOQ	Spike Added	Result	%R	Control Limits%R
6:2 Fluorotelomer sulfonic acid (6:2FTS)	27619-97-2	ND	4.00	95.2	104	110	40 - 150
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ND	1.00	23.2	25.6	110	40 - 150
Extracted Internal Standard(EIS)	**CAS#**	**Area**	**%R**	**CalArea**	**Area**	**%R**	**Limits**
13C2-6:2FTS	13C2-6:2FTS-EIS	40.6	81	50	44.2	88	20 - 150
13C8-PFOS	13C8-PFOS-EIS	20.3	81	25	19.6	78	20 - 150

General Chemistry QC Summary

Analytical Batch	Client ID	MB752615	
752615	Lab ID	2412535	
	Sample Type	MB	
	Prep Date	NA	
	Analysis Date	10/25/22 14:00	
	Matrix	Water	
SM 2540 D-2011		Units Result	mg/L LOQ
Total Suspended Solids	C-009	ND	5

Client ID: 4367 - Pace Analytical Services
SDG: 222102410
PM: RWe

CHAIN-OF-CUSTODY / Analytical Requ

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant

Section A	Section B	Section C	
Required Client Information:	Required Project Information:	Invoice Information:	
Company: Pace Analytical	Report To: Pace Analytical Subout Team	Attention: Mark Pugh	
Address: 12065 Lebanon Rd.	Copy To:	Company Name:	
Juliet, TN 37122		Address:	Regulatory Agency
Email: MTJLSuboutTeam@pacelabs.com	Purchase Order #: L1549094	Pace Quote:	
Phone: (615) 773-9756 Fax: (615) 758-5859	Project Name: Tigard Dry Cleaners	Pace Project Manager: Ruth Welsh	State / Location
Requested Due Date: 28-Nov	Project #: 2326-01	Pace Profile #: 38076	OR

ITEM #	SAMPLE ID One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	PFAS by 1663	Residual Chlorine (Y/N)	Requested Analysis Filtered (Y/N)
1	MW-3	WT				19-Oct	10:30		1								1		X		Excel file 1
2	MW-5	WT				18-Oct	12:58		1								1		X		Excel file 2
3	MW-7	WT				18-Oct	14:15		1								1		X		Excel file 3
4	EB-1	WT				19-Oct	12:05		1								1		X		Excel file 4
5	DUP-1	WT				18-Oct	12:58		1								1		X		Excel file 5
6																					
7																					
8																					
9																					
10																					
11																					
12																					

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	James C Huckaba	21-Oct	16:34				
ce Analytical Batch: WG1947046							
ce Analytical SDGs: L1549094							
cation: Baton Rouge, LA 70820							

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

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Client ID: 4367 - Pace Analytical Services
SDG: 222102410
PM: RWe

OREGON DEQ State of Oregon Sample Chain of Custody OREC

Agency, Authorized Purchaser or Agent:

Send Lab Report To: Mark Pugh
Address: **Department of Environmental Quality**
700 NE Multnomah St., Suite 600
Portland, OR 97232
Tel. #: (503) 229-5587
E-mail: PUGH.Mark@deq.state.or.us

Contract Laboratory Name: Pace

Lab Batch #:

Invoice To: ODEQ/Business Office
Address: 700 NE Multnomah St., Suite 600
Portland, OR 97232
Tel. #: (800) 452-4011

Lab Selec
- ☐ Proximity (if TAT < 48 hrs)
- ☐ Prior work on same project
- ☒ Cost (for anticipated analyses)
- ☐ Other labs disqualified or unable to perform requested services
- ☐ Emergency work

- ☒ 10 days (std.)
- ☐ 5 days
- ☐ 72 hours
- ☐ 48 hours
- ☐ 24 hours
- ☐ Other _____

Project Name: Tigard Cleaners
Project #: 320002326-01

Sample Preservative

HCl										

Requested Analyses

Sample ID#	Collection Date/Time	Matrix	Number of Containers	PFAS EPA Method 1663									Comments
MW-3	10/19 @ 1030	GW	2	X									
MW-5	10/18 @ 1258	GW	3	X									
MW-7	10/18 @ 1415	GW	3	X									
EB-1	10/19 @ 1205	GW	3	X									
Dup-1	10/18 @ 1258	GW	3	X									

Notes: In addition, please send results to: M.Stevens@apexcos.com; Paula.Richardson@apexcos.com; COwens@apexcos.com; Kelsi.Evans@apexcos.com

2194376629B 1.4 E42

Relinquished By: Robert Schettler	Agency/Agent: Apex Companies	Received By:	Agency/Agent:
Signature:	Time & Date: 1100 10/21/22	Signature:	Time & Date:
Relinquished By: FedEx	Agency/Agent: 10-22-22 10:48	Received By: Dodie McClure	Agency/Agent: 10-22-22 10:48
Signature:	Time & Date:	Signature:	Time & Date:

THIS PURCHASE IS SUBMITTED PURSUANT TO STATE OF OREGON SOLICITATION **#102-1098-07** AND PRICE AGREEMENT # **[8903]**. THE PRICE AGREEMENT INCLUDING CONTRACT TERMS AND CONDITIONS AND SPECIAL CONTRACT TERMS AND CONDITIONS (T'S &C'S) CONTAINED IN THE PRICE AGREEMENT ARE HEREBY INCORPORATED BY REFERENCE AND SHALL APPLY TO THIS PURCHASE AND SHALL TAKE PRECEDENCE OVER ALL OTHER CONFLICTING T'S AND C'S, EXPRESS OR IMPLIED.

Version: 4/4/2008

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 222102410	
Client **PM** RWe 4367 - Pace Analytical Services	**Transport Method** FEDEX
Profile Number 302126	**Received By** McCune, Dodie N.
Line Item(s) 1 - PFAS - 1633	**Receive Date(s)** 10/22/22

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by Pace Gulf Coast?	☑	☐

COOLERS

Airbill	Thermometer ID: E42	Temp °C
279437662973		1.4

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

ANALYTICAL REPORT

November 21, 2022

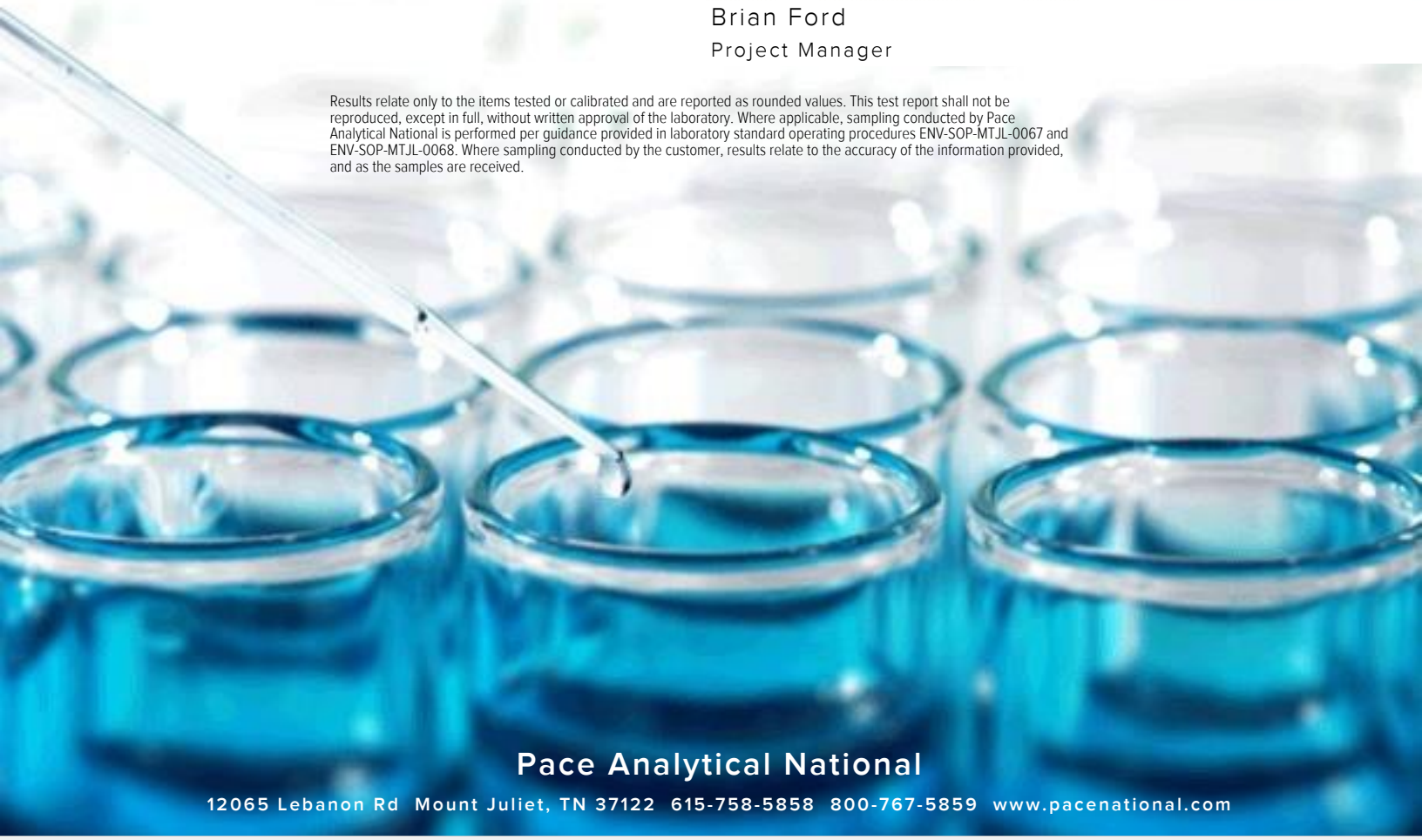
Oregon Dept. of Env. Quality - ODEQ

Sample Delivery Group:	L1549614
Samples Received:	10/22/2022
Project Number:	320002326-01
Description:	Tigard Dry Cleaners
Report To:	Mark Pugh

Entire Report Reviewed By:

Brian Ford

Project Manager



Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

MW-1 L1549614-01 GW

			Collected by	Collected date/time	Received date/time	
				10/19/22 09:15	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1954488	2	11/19/22 12:59	11/19/22 12:59	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1951468	500	10/30/22 22:18	10/30/22 22:18	JAH	Mt. Juliet, TN

MW-2 L1549614-02 GW

			Collected by	Collected date/time	Received date/time	
				10/18/22 13:35	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1954488	1	11/06/22 04:49	11/06/22 04:49	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	1	10/27/22 17:48	10/27/22 17:48	DWR	Mt. Juliet, TN

MW-2I L1549614-03 GW

			Collected by	Collected date/time	Received date/time	
				10/19/22 10:00	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	500	10/27/22 19:29	10/27/22 19:29	DWR	Mt. Juliet, TN

MW-3 L1549614-04 GW

			Collected by	Collected date/time	Received date/time	
				10/19/22 10:30	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	100	10/27/22 19:49	10/27/22 19:49	DWR	Mt. Juliet, TN

MW-4 L1549614-05 GW

			Collected by	Collected date/time	Received date/time	
				10/19/22 11:15	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1954488	2	11/19/22 13:17	11/19/22 13:17	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	2000	10/27/22 20:09	10/27/22 20:09	DWR	Mt. Juliet, TN

MW-5 L1549614-06 GW

			Collected by	Collected date/time	Received date/time	
				10/18/22 12:58	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1954488	1	11/06/22 05:29	11/06/22 05:29	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	1	10/27/22 18:08	10/27/22 18:08	DWR	Mt. Juliet, TN

MW-6 L1549614-07 GW

			Collected by	Collected date/time	Received date/time	
				10/18/22 14:45	10/22/22 09:00	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG1954488	1	11/06/22 05:42	11/06/22 05:42	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	25	10/27/22 20:30	10/27/22 20:30	DWR	Mt. Juliet, TN

MW-6I L1549614-08 GW

Collected by	Collected date/time	Received date/time
	10/18/22 18:20	10/22/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	1	10/27/22 18:28	10/27/22 18:28	JHH	Mt. Juliet, TN

MW-7 L1549614-09 GW

Collected by	Collected date/time	Received date/time
	10/18/22 14:15	10/22/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	5	10/27/22 20:51	10/27/22 20:51	DWR	Mt. Juliet, TN

DUP-1 L1549614-10 GW

Collected by	Collected date/time	Received date/time
	10/19/22 11:15	10/22/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1949557	50	10/27/22 21:11	10/27/22 21:11	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG1951468	1000	10/30/22 22:39	10/30/22 22:39	JAH	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	129000	Q	204	2000	2	11/19/2022 12:59	WG1954488

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		5650	25000	500	10/30/2022 22:18	WG1951468
Acrolein	U	C3	1270	25000	500	10/30/2022 22:18	WG1951468
Acrylonitrile	U		336	5000	500	10/30/2022 22:18	WG1951468
Benzene	U		47.1	500	500	10/30/2022 22:18	WG1951468
Bromobenzene	U		59.0	500	500	10/30/2022 22:18	WG1951468
Bromodichloromethane	U		68.0	500	500	10/30/2022 22:18	WG1951468
Bromoform	U		64.5	500	500	10/30/2022 22:18	WG1951468
Bromomethane	U		303	2500	500	10/30/2022 22:18	WG1951468
n-Butylbenzene	U		78.5	500	500	10/30/2022 22:18	WG1951468
sec-Butylbenzene	U		62.5	500	500	10/30/2022 22:18	WG1951468
tert-Butylbenzene	U		63.5	500	500	10/30/2022 22:18	WG1951468
Carbon disulfide	U		48.1	500	500	10/30/2022 22:18	WG1951468
Carbon tetrachloride	U		64.0	500	500	10/30/2022 22:18	WG1951468
Chlorobenzene	U		58.0	500	500	10/30/2022 22:18	WG1951468
Chlorodibromomethane	U		70.0	500	500	10/30/2022 22:18	WG1951468
Chloroethane	U		96.0	2500	500	10/30/2022 22:18	WG1951468
Chloroform	U		55.5	2500	500	10/30/2022 22:18	WG1951468
Chloromethane	U		480	1250	500	10/30/2022 22:18	WG1951468
2-Chlorotoluene	U		53.0	500	500	10/30/2022 22:18	WG1951468
4-Chlorotoluene	U		57.0	500	500	10/30/2022 22:18	WG1951468
1,2-Dibromo-3-Chloropropane	U		138	2500	500	10/30/2022 22:18	WG1951468
1,2-Dibromoethane	U		63.0	500	500	10/30/2022 22:18	WG1951468
Dibromomethane	U		61.0	500	500	10/30/2022 22:18	WG1951468
1,2-Dichlorobenzene	U		53.5	500	500	10/30/2022 22:18	WG1951468
1,3-Dichlorobenzene	U		55.0	500	500	10/30/2022 22:18	WG1951468
1,4-Dichlorobenzene	U		60.0	500	500	10/30/2022 22:18	WG1951468
Dichlorodifluoromethane	U		187	2500	500	10/30/2022 22:18	WG1951468
1,1-Dichloroethane	U		50.0	500	500	10/30/2022 22:18	WG1951468
1,2-Dichloroethane	U		40.9	500	500	10/30/2022 22:18	WG1951468
1,1-Dichloroethene	U		94.0	500	500	10/30/2022 22:18	WG1951468
cis-1,2-Dichloroethene	217000	E	63.0	500	500	10/30/2022 22:18	WG1951468
trans-1,2-Dichloroethene	967		74.5	500	500	10/30/2022 22:18	WG1951468
1,2-Dichloropropane	U		74.5	500	500	10/30/2022 22:18	WG1951468
1,1-Dichloropropene	U		71.0	500	500	10/30/2022 22:18	WG1951468
1,3-Dichloropropane	U		55.0	500	500	10/30/2022 22:18	WG1951468
cis-1,3-Dichloropropene	U		55.5	500	500	10/30/2022 22:18	WG1951468
trans-1,3-Dichloropropene	U		59.0	500	500	10/30/2022 22:18	WG1951468
2,2-Dichloropropane	U	C3	80.5	500	500	10/30/2022 22:18	WG1951468
Di-isopropyl ether	U		52.5	500	500	10/30/2022 22:18	WG1951468
Ethylbenzene	U		68.5	500	500	10/30/2022 22:18	WG1951468
Hexachloro-1,3-butadiene	U		169	500	500	10/30/2022 22:18	WG1951468
Isopropylbenzene	U		52.5	500	500	10/30/2022 22:18	WG1951468
p-Isopropyltoluene	U		60.0	500	500	10/30/2022 22:18	WG1951468
2-Butanone (MEK)	U		595	5000	500	10/30/2022 22:18	WG1951468
Methylene Chloride	U		215	2500	500	10/30/2022 22:18	WG1951468
4-Methyl-2-pentanone (MIBK)	U		239	5000	500	10/30/2022 22:18	WG1951468
Methyl tert-butyl ether	U		50.5	500	500	10/30/2022 22:18	WG1951468
Naphthalene	U		500	2500	500	10/30/2022 22:18	WG1951468
n-Propylbenzene	U		49.7	500	500	10/30/2022 22:18	WG1951468
Styrene	U		59.0	500	500	10/30/2022 22:18	WG1951468

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1,2-Tetrachloroethane	U		73.5	500	500	10/30/2022 22:18	WG1951468
1,1,2,2-Tetrachloroethane	U		66.5	500	500	10/30/2022 22:18	WG1951468
1,1,2-Trichlorotrifluoroethane	U		90.0	500	500	10/30/2022 22:18	WG1951468
Tetrachloroethene	U		150	500	500	10/30/2022 22:18	WG1951468
Toluene	U		139	500	500	10/30/2022 22:18	WG1951468
1,2,3-Trichlorobenzene	U		115	500	500	10/30/2022 22:18	WG1951468
1,2,4-Trichlorobenzene	U		241	500	500	10/30/2022 22:18	WG1951468
1,1,1-Trichloroethane	U		74.5	500	500	10/30/2022 22:18	WG1951468
1,1,2-Trichloroethane	U		79.0	500	500	10/30/2022 22:18	WG1951468
Trichloroethene	U		95.0	500	500	10/30/2022 22:18	WG1951468
Trichlorofluoromethane	U		80.0	2500	500	10/30/2022 22:18	WG1951468
1,2,3-Trichloropropane	U		119	1250	500	10/30/2022 22:18	WG1951468
1,2,4-Trimethylbenzene	U		161	500	500	10/30/2022 22:18	WG1951468
1,2,3-Trimethylbenzene	53.1	J	52.0	500	500	10/30/2022 22:18	WG1951468
1,3,5-Trimethylbenzene	U		52.0	500	500	10/30/2022 22:18	WG1951468
Vinyl chloride	37200		117	500	500	10/30/2022 22:18	WG1951468
Xylenes, Total	U		87.0	1500	500	10/30/2022 22:18	WG1951468
(S) Toluene-d8	*101*			*80.0-120*		*10/30/2022 22:18*	WG1951468
(S) 4-Bromofluorobenzene	*98.8*			*77.0-126*		*10/30/2022 22:18*	WG1951468
(S) 1,2-Dichloroethane-d4	*107*			*70.0-130*		*10/30/2022 22:18*	WG1951468

Wet Chemistry by Method 9060A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
TOC (Total Organic Carbon)	U		102	1000	1	11/06/2022 04:49	WG1954488

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	44.1	J	11.3	50.0	1	10/27/2022 17:48	WG1949557
Acrolein	U	C3	2.54	50.0	1	10/27/2022 17:48	WG1949557
Acrylonitrile	U		0.671	10.0	1	10/27/2022 17:48	WG1949557
Benzene	0.343	J	0.0941	1.00	1	10/27/2022 17:48	WG1949557
Bromobenzene	U		0.118	1.00	1	10/27/2022 17:48	WG1949557
Bromodichloromethane	U		0.136	1.00	1	10/27/2022 17:48	WG1949557
Bromoform	U		0.129	1.00	1	10/27/2022 17:48	WG1949557
Bromomethane	U		0.605	5.00	1	10/27/2022 17:48	WG1949557
n-Butylbenzene	0.517	J	0.157	1.00	1	10/27/2022 17:48	WG1949557
sec-Butylbenzene	1.01		0.125	1.00	1	10/27/2022 17:48	WG1949557
tert-Butylbenzene	0.148	J	0.127	1.00	1	10/27/2022 17:48	WG1949557
Carbon disulfide	U		0.0962	1.00	1	10/27/2022 17:48	WG1949557
Carbon tetrachloride	U		0.128	1.00	1	10/27/2022 17:48	WG1949557
Chlorobenzene	U		0.116	1.00	1	10/27/2022 17:48	WG1949557
Chlorodibromomethane	U		0.140	1.00	1	10/27/2022 17:48	WG1949557
Chloroethane	U		0.192	5.00	1	10/27/2022 17:48	WG1949557
Chloroform	U		0.111	5.00	1	10/27/2022 17:48	WG1949557
Chloromethane	U	J3	0.960	2.50	1	10/27/2022 17:48	WG1949557
2-Chlorotoluene	U		0.106	1.00	1	10/27/2022 17:48	WG1949557
4-Chlorotoluene	U		0.114	1.00	1	10/27/2022 17:48	WG1949557
1,2-Dibromo-3-Chloropropane	U		0.276	5.00	1	10/27/2022 17:48	WG1949557
1,2-Dibromoethane	U		0.126	1.00	1	10/27/2022 17:48	WG1949557
Dibromomethane	U		0.122	1.00	1	10/27/2022 17:48	WG1949557
1,2-Dichlorobenzene	U		0.107	1.00	1	10/27/2022 17:48	WG1949557
1,3-Dichlorobenzene	U		0.110	1.00	1	10/27/2022 17:48	WG1949557
1,4-Dichlorobenzene	0.135	J	0.120	1.00	1	10/27/2022 17:48	WG1949557
Dichlorodifluoromethane	U		0.374	5.00	1	10/27/2022 17:48	WG1949557
1,1-Dichloroethane	U		0.100	1.00	1	10/27/2022 17:48	WG1949557
1,2-Dichloroethane	U		0.0819	1.00	1	10/27/2022 17:48	WG1949557
1,1-Dichloroethene	U		0.188	1.00	1	10/27/2022 17:48	WG1949557
cis-1,2-Dichloroethene	8.55		0.126	1.00	1	10/27/2022 17:48	WG1949557
trans-1,2-Dichloroethene	0.287	J	0.149	1.00	1	10/27/2022 17:48	WG1949557
1,2-Dichloropropane	U		0.149	1.00	1	10/27/2022 17:48	WG1949557
1,1-Dichloropropene	U		0.142	1.00	1	10/27/2022 17:48	WG1949557
1,3-Dichloropropane	U		0.110	1.00	1	10/27/2022 17:48	WG1949557
cis-1,3-Dichloropropene	U		0.111	1.00	1	10/27/2022 17:48	WG1949557
trans-1,3-Dichloropropene	U		0.118	1.00	1	10/27/2022 17:48	WG1949557
2,2-Dichloropropane	U		0.161	1.00	1	10/27/2022 17:48	WG1949557
Di-isopropyl ether	0.108	J	0.105	1.00	1	10/27/2022 17:48	WG1949557
Ethylbenzene	1.71		0.137	1.00	1	10/27/2022 17:48	WG1949557
Hexachloro-1,3-butadiene	U		0.337	1.00	1	10/27/2022 17:48	WG1949557
Isopropylbenzene	1.84		0.105	1.00	1	10/27/2022 17:48	WG1949557
p-Isopropyltoluene	1.13		0.120	1.00	1	10/27/2022 17:48	WG1949557
2-Butanone (MEK)	13.3	C5	1.19	10.0	1	10/27/2022 17:48	WG1949557
Methylene Chloride	U		0.430	5.00	1	10/27/2022 17:48	WG1949557
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0	1	10/27/2022 17:48	WG1949557
Methyl tert-butyl ether	U		0.101	1.00	1	10/27/2022 17:48	WG1949557
Naphthalene	U		1.00	5.00	1	10/27/2022 17:48	WG1949557
n-Propylbenzene	2.36		0.0993	1.00	1	10/27/2022 17:48	WG1949557
Styrene	U		0.118	1.00	1	10/27/2022 17:48	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1,2-Tetrachloroethane	U		0.147	1.00	1	10/27/2022 17:48	WG1949557
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	10/27/2022 17:48	WG1949557
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	10/27/2022 17:48	WG1949557
Tetrachloroethene	U		0.300	1.00	1	10/27/2022 17:48	WG1949557
Toluene	1.09		0.278	1.00	1	10/27/2022 17:48	WG1949557
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/27/2022 17:48	WG1949557
1,2,4-Trichlorobenzene	U		0.481	1.00	1	10/27/2022 17:48	WG1949557
1,1,1-Trichloroethane	U		0.149	1.00	1	10/27/2022 17:48	WG1949557
1,1,2-Trichloroethane	U		0.158	1.00	1	10/27/2022 17:48	WG1949557
Trichloroethene	U		0.190	1.00	1	10/27/2022 17:48	WG1949557
Trichlorofluoromethane	U		0.160	5.00	1	10/27/2022 17:48	WG1949557
1,2,3-Trichloropropane	U		0.237	2.50	1	10/27/2022 17:48	WG1949557
1,2,4-Trimethylbenzene	4.79		0.322	1.00	1	10/27/2022 17:48	WG1949557
1,2,3-Trimethylbenzene	4.05		0.104	1.00	1	10/27/2022 17:48	WG1949557
1,3,5-Trimethylbenzene	3.55		0.104	1.00	1	10/27/2022 17:48	WG1949557
Vinyl chloride	2.88		0.234	1.00	1	10/27/2022 17:48	WG1949557
Xylenes, Total	1.99	J	0.174	3.00	1	10/27/2022 17:48	WG1949557
(S) Toluene-d8	*104*			*80.0-120*		*10/27/2022 17:48*	WG1949557
(S) 4-Bromofluorobenzene	*92.5*			*77.0-126*		*10/27/2022 17:48*	WG1949557
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*10/27/2022 17:48*	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		5650	25000	500	10/27/2022 19:29	WG1949557
Acrolein	U	C3	1270	25000	500	10/27/2022 19:29	WG1949557
Acrylonitrile	U		336	5000	500	10/27/2022 19:29	WG1949557
Benzene	U		47.1	500	500	10/27/2022 19:29	WG1949557
Bromobenzene	U		59.0	500	500	10/27/2022 19:29	WG1949557
Bromodichloromethane	U		68.0	500	500	10/27/2022 19:29	WG1949557
Bromoform	U		64.5	500	500	10/27/2022 19:29	WG1949557
Bromomethane	U		303	2500	500	10/27/2022 19:29	WG1949557
n-Butylbenzene	U		78.5	500	500	10/27/2022 19:29	WG1949557
sec-Butylbenzene	U		62.5	500	500	10/27/2022 19:29	WG1949557
tert-Butylbenzene	U		63.5	500	500	10/27/2022 19:29	WG1949557
Carbon disulfide	U		48.1	500	500	10/27/2022 19:29	WG1949557
Carbon tetrachloride	U		64.0	500	500	10/27/2022 19:29	WG1949557
Chlorobenzene	U		58.0	500	500	10/27/2022 19:29	WG1949557
Chlorodibromomethane	U		70.0	500	500	10/27/2022 19:29	WG1949557
Chloroethane	U		96.0	2500	500	10/27/2022 19:29	WG1949557
Chloroform	U		55.5	2500	500	10/27/2022 19:29	WG1949557
Chloromethane	U	J3	480	1250	500	10/27/2022 19:29	WG1949557
2-Chlorotoluene	U		53.0	500	500	10/27/2022 19:29	WG1949557
4-Chlorotoluene	U		57.0	500	500	10/27/2022 19:29	WG1949557
1,2-Dibromo-3-Chloropropane	U		138	2500	500	10/27/2022 19:29	WG1949557
1,2-Dibromoethane	U		63.0	500	500	10/27/2022 19:29	WG1949557
Dibromomethane	U		61.0	500	500	10/27/2022 19:29	WG1949557
1,2-Dichlorobenzene	U		53.5	500	500	10/27/2022 19:29	WG1949557
1,3-Dichlorobenzene	U		55.0	500	500	10/27/2022 19:29	WG1949557
1,4-Dichlorobenzene	U		60.0	500	500	10/27/2022 19:29	WG1949557
Dichlorodifluoromethane	U		187	2500	500	10/27/2022 19:29	WG1949557
1,1-Dichloroethane	U		50.0	500	500	10/27/2022 19:29	WG1949557
1,2-Dichloroethane	U		40.9	500	500	10/27/2022 19:29	WG1949557
1,1-Dichloroethene	202	J	94.0	500	500	10/27/2022 19:29	WG1949557
cis-1,2-Dichloroethene	34000		63.0	500	500	10/27/2022 19:29	WG1949557
trans-1,2-Dichloroethene	U		74.5	500	500	10/27/2022 19:29	WG1949557
1,2-Dichloropropane	U		74.5	500	500	10/27/2022 19:29	WG1949557
1,1-Dichloropropene	U		71.0	500	500	10/27/2022 19:29	WG1949557
1,3-Dichloropropane	U		55.0	500	500	10/27/2022 19:29	WG1949557
cis-1,3-Dichloropropene	U		55.5	500	500	10/27/2022 19:29	WG1949557
trans-1,3-Dichloropropene	U		59.0	500	500	10/27/2022 19:29	WG1949557
2,2-Dichloropropane	U		80.5	500	500	10/27/2022 19:29	WG1949557
Di-isopropyl ether	U		52.5	500	500	10/27/2022 19:29	WG1949557
Ethylbenzene	U		68.5	500	500	10/27/2022 19:29	WG1949557
Hexachloro-1,3-butadiene	U		169	500	500	10/27/2022 19:29	WG1949557
Isopropylbenzene	U		52.5	500	500	10/27/2022 19:29	WG1949557
p-Isopropyltoluene	U		60.0	500	500	10/27/2022 19:29	WG1949557
2-Butanone (MEK)	U		595	5000	500	10/27/2022 19:29	WG1949557
Methylene Chloride	U		215	2500	500	10/27/2022 19:29	WG1949557
4-Methyl-2-pentanone (MIBK)	U		239	5000	500	10/27/2022 19:29	WG1949557
Methyl tert-butyl ether	U		50.5	500	500	10/27/2022 19:29	WG1949557
Naphthalene	U		500	2500	500	10/27/2022 19:29	WG1949557
n-Propylbenzene	U		49.7	500	500	10/27/2022 19:29	WG1949557
Styrene	U		59.0	500	500	10/27/2022 19:29	WG1949557
1,1,1,2-Tetrachloroethane	U		73.5	500	500	10/27/2022 19:29	WG1949557
1,1,2,2-Tetrachloroethane	U		66.5	500	500	10/27/2022 19:29	WG1949557
1,1,2-Trichlorotrifluoroethane	U		90.0	500	500	10/27/2022 19:29	WG1949557
Tetrachloroethene	U		150	500	500	10/27/2022 19:29	WG1949557
Toluene	U		139	500	500	10/27/2022 19:29	WG1949557
1,2,3-Trichlorobenzene	U		115	500	500	10/27/2022 19:29	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,2,4-Trichlorobenzene	U		241	500	500	10/27/2022 19:29	WG1949557
1,1,1-Trichloroethane	U		74.5	500	500	10/27/2022 19:29	WG1949557
1,1,2-Trichloroethane	U		79.0	500	500	10/27/2022 19:29	WG1949557
Trichloroethene	U		95.0	500	500	10/27/2022 19:29	WG1949557
Trichlorofluoromethane	U		80.0	2500	500	10/27/2022 19:29	WG1949557
1,2,3-Trichloropropane	U		119	1250	500	10/27/2022 19:29	WG1949557
1,2,4-Trimethylbenzene	U		161	500	500	10/27/2022 19:29	WG1949557
1,2,3-Trimethylbenzene	U		52.0	500	500	10/27/2022 19:29	WG1949557
1,3,5-Trimethylbenzene	U		52.0	500	500	10/27/2022 19:29	WG1949557
Vinyl chloride	8700		117	500	500	10/27/2022 19:29	WG1949557
Xylenes, Total	U		87.0	1500	500	10/27/2022 19:29	WG1949557
(S) Toluene-d8	*104*			*80.0-120*		*10/27/2022 19:29*	WG1949557
(S) 4-Bromofluorobenzene	*94.8*			*77.0-126*		*10/27/2022 19:29*	WG1949557
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*10/27/2022 19:29*	WG1949557

Sample Narrative:

L1549614-03 WG1949557: Target compounds too high to run at a lower dilution.

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		1130	5000	100	10/27/2022 19:49	WG1949557
Acrolein	U	C3	254	5000	100	10/27/2022 19:49	WG1949557
Acrylonitrile	U		67.1	1000	100	10/27/2022 19:49	WG1949557
Benzene	U		9.41	100	100	10/27/2022 19:49	WG1949557
Bromobenzene	U		11.8	100	100	10/27/2022 19:49	WG1949557
Bromodichloromethane	U		13.6	100	100	10/27/2022 19:49	WG1949557
Bromoform	U		12.9	100	100	10/27/2022 19:49	WG1949557
Bromomethane	U		60.5	500	100	10/27/2022 19:49	WG1949557
n-Butylbenzene	U		15.7	100	100	10/27/2022 19:49	WG1949557
sec-Butylbenzene	U		12.5	100	100	10/27/2022 19:49	WG1949557
tert-Butylbenzene	U		12.7	100	100	10/27/2022 19:49	WG1949557
Carbon disulfide	U		9.62	100	100	10/27/2022 19:49	WG1949557
Carbon tetrachloride	U		12.8	100	100	10/27/2022 19:49	WG1949557
Chlorobenzene	U		11.6	100	100	10/27/2022 19:49	WG1949557
Chlorodibromomethane	U		14.0	100	100	10/27/2022 19:49	WG1949557
Chloroethane	U		19.2	500	100	10/27/2022 19:49	WG1949557
Chloroform	U		11.1	500	100	10/27/2022 19:49	WG1949557
Chloromethane	U	J3	96.0	250	100	10/27/2022 19:49	WG1949557
2-Chlorotoluene	U		10.6	100	100	10/27/2022 19:49	WG1949557
4-Chlorotoluene	U		11.4	100	100	10/27/2022 19:49	WG1949557
1,2-Dibromo-3-Chloropropane	U		27.6	500	100	10/27/2022 19:49	WG1949557
1,2-Dibromoethane	U		12.6	100	100	10/27/2022 19:49	WG1949557
Dibromomethane	U		12.2	100	100	10/27/2022 19:49	WG1949557
1,2-Dichlorobenzene	U		10.7	100	100	10/27/2022 19:49	WG1949557
1,3-Dichlorobenzene	U		11.0	100	100	10/27/2022 19:49	WG1949557
1,4-Dichlorobenzene	U		12.0	100	100	10/27/2022 19:49	WG1949557
Dichlorodifluoromethane	U		37.4	500	100	10/27/2022 19:49	WG1949557
1,1-Dichloroethane	U		10.0	100	100	10/27/2022 19:49	WG1949557
1,2-Dichloroethane	U		8.19	100	100	10/27/2022 19:49	WG1949557
1,1-Dichloroethene	U		18.8	100	100	10/27/2022 19:49	WG1949557
cis-1,2-Dichloroethene	2520		12.6	100	100	10/27/2022 19:49	WG1949557
trans-1,2-Dichloroethene	U		14.9	100	100	10/27/2022 19:49	WG1949557
1,2-Dichloropropane	U		14.9	100	100	10/27/2022 19:49	WG1949557
1,1-Dichloropropene	U		14.2	100	100	10/27/2022 19:49	WG1949557
1,3-Dichloropropane	U		11.0	100	100	10/27/2022 19:49	WG1949557
cis-1,3-Dichloropropene	U		11.1	100	100	10/27/2022 19:49	WG1949557
trans-1,3-Dichloropropene	U		11.8	100	100	10/27/2022 19:49	WG1949557
2,2-Dichloropropane	U		16.1	100	100	10/27/2022 19:49	WG1949557
Di-isopropyl ether	U		10.5	100	100	10/27/2022 19:49	WG1949557
Ethylbenzene	U		13.7	100	100	10/27/2022 19:49	WG1949557
Hexachloro-1,3-butadiene	U		33.7	100	100	10/27/2022 19:49	WG1949557
Isopropylbenzene	U		10.5	100	100	10/27/2022 19:49	WG1949557
p-Isopropyltoluene	U		12.0	100	100	10/27/2022 19:49	WG1949557
2-Butanone (MEK)	U		119	1000	100	10/27/2022 19:49	WG1949557
Methylene Chloride	U		43.0	500	100	10/27/2022 19:49	WG1949557
4-Methyl-2-pentanone (MIBK)	U		47.8	1000	100	10/27/2022 19:49	WG1949557
Methyl tert-butyl ether	88.8	J	10.1	100	100	10/27/2022 19:49	WG1949557
Naphthalene	U		100	500	100	10/27/2022 19:49	WG1949557
n-Propylbenzene	U		9.93	100	100	10/27/2022 19:49	WG1949557
Styrene	U		11.8	100	100	10/27/2022 19:49	WG1949557
1,1,1,2-Tetrachloroethane	U		14.7	100	100	10/27/2022 19:49	WG1949557
1,1,2,2-Tetrachloroethane	U		13.3	100	100	10/27/2022 19:49	WG1949557
1,1,2-Trichlorotrifluoroethane	U		18.0	100	100	10/27/2022 19:49	WG1949557
Tetrachloroethene	U		30.0	100	100	10/27/2022 19:49	WG1949557
Toluene	U		27.8	100	100	10/27/2022 19:49	WG1949557
1,2,3-Trichlorobenzene	U		23.0	100	100	10/27/2022 19:49	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,2,4-Trichlorobenzene	U		48.1	100	100	10/27/2022 19:49	WG1949557
1,1,1-Trichloroethane	U		14.9	100	100	10/27/2022 19:49	WG1949557
1,1,2-Trichloroethane	U		15.8	100	100	10/27/2022 19:49	WG1949557
Trichloroethene	U		19.0	100	100	10/27/2022 19:49	WG1949557
Trichlorofluoromethane	U		16.0	500	100	10/27/2022 19:49	WG1949557
1,2,3-Trichloropropane	U		23.7	250	100	10/27/2022 19:49	WG1949557
1,2,4-Trimethylbenzene	U		32.2	100	100	10/27/2022 19:49	WG1949557
1,2,3-Trimethylbenzene	U		10.4	100	100	10/27/2022 19:49	WG1949557
1,3,5-Trimethylbenzene	U		10.4	100	100	10/27/2022 19:49	WG1949557
Vinyl chloride	92.2	J	23.4	100	100	10/27/2022 19:49	WG1949557
Xylenes, Total	U		17.4	300	100	10/27/2022 19:49	WG1949557
(S) Toluene-d8	*102*			*80.0-120*		*10/27/2022 19:49*	WG1949557
(S) 4-Bromofluorobenzene	*97.3*			*77.0-126*		*10/27/2022 19:49*	WG1949557
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*10/27/2022 19:49*	WG1949557

Sample Narrative:

L1549614-04 WG1949557: Target compounds too high to run at a lower dilution.

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Wet Chemistry by Method 9060A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	111000	J5 Q	204	2000	2	11/19/2022 13:17	WG1954488

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		22600	100000	2000	10/27/2022 20:09	WG1949557
Acrolein	U	C3	5080	100000	2000	10/27/2022 20:09	WG1949557
Acrylonitrile	U		1340	20000	2000	10/27/2022 20:09	WG1949557
Benzene	U		188	2000	2000	10/27/2022 20:09	WG1949557
Bromobenzene	U		236	2000	2000	10/27/2022 20:09	WG1949557
Bromodichloromethane	U		272	2000	2000	10/27/2022 20:09	WG1949557
Bromoform	U		258	2000	2000	10/27/2022 20:09	WG1949557
Bromomethane	U		1210	10000	2000	10/27/2022 20:09	WG1949557
n-Butylbenzene	U		314	2000	2000	10/27/2022 20:09	WG1949557
sec-Butylbenzene	U		250	2000	2000	10/27/2022 20:09	WG1949557
tert-Butylbenzene	U		254	2000	2000	10/27/2022 20:09	WG1949557
Carbon disulfide	U		192	2000	2000	10/27/2022 20:09	WG1949557
Carbon tetrachloride	U		256	2000	2000	10/27/2022 20:09	WG1949557
Chlorobenzene	U		232	2000	2000	10/27/2022 20:09	WG1949557
Chlorodibromomethane	U		280	2000	2000	10/27/2022 20:09	WG1949557
Chloroethane	U		384	10000	2000	10/27/2022 20:09	WG1949557
Chloroform	U		222	10000	2000	10/27/2022 20:09	WG1949557
Chloromethane	U	J3	1920	5000	2000	10/27/2022 20:09	WG1949557
2-Chlorotoluene	U		212	2000	2000	10/27/2022 20:09	WG1949557
4-Chlorotoluene	U		228	2000	2000	10/27/2022 20:09	WG1949557
1,2-Dibromo-3-Chloropropane	U		552	10000	2000	10/27/2022 20:09	WG1949557
1,2-Dibromoethane	U		252	2000	2000	10/27/2022 20:09	WG1949557
Dibromomethane	U		244	2000	2000	10/27/2022 20:09	WG1949557
1,2-Dichlorobenzene	U		214	2000	2000	10/27/2022 20:09	WG1949557
1,3-Dichlorobenzene	U		220	2000	2000	10/27/2022 20:09	WG1949557
1,4-Dichlorobenzene	U		240	2000	2000	10/27/2022 20:09	WG1949557
Dichlorodifluoromethane	U		748	10000	2000	10/27/2022 20:09	WG1949557
1,1-Dichloroethane	U		200	2000	2000	10/27/2022 20:09	WG1949557
1,2-Dichloroethane	U		164	2000	2000	10/27/2022 20:09	WG1949557
1,1-Dichloroethene	U		376	2000	2000	10/27/2022 20:09	WG1949557
cis-1,2-Dichloroethene	76400		252	2000	2000	10/27/2022 20:09	WG1949557
trans-1,2-Dichloroethene	U		298	2000	2000	10/27/2022 20:09	WG1949557
1,2-Dichloropropane	U		298	2000	2000	10/27/2022 20:09	WG1949557
1,1-Dichloropropene	U		284	2000	2000	10/27/2022 20:09	WG1949557
1,3-Dichloropropane	U		220	2000	2000	10/27/2022 20:09	WG1949557
cis-1,3-Dichloropropene	U		222	2000	2000	10/27/2022 20:09	WG1949557
trans-1,3-Dichloropropene	U		236	2000	2000	10/27/2022 20:09	WG1949557
2,2-Dichloropropane	U		322	2000	2000	10/27/2022 20:09	WG1949557
Di-isopropyl ether	U		210	2000	2000	10/27/2022 20:09	WG1949557
Ethylbenzene	U		274	2000	2000	10/27/2022 20:09	WG1949557
Hexachloro-1,3-butadiene	U		674	2000	2000	10/27/2022 20:09	WG1949557
Isopropylbenzene	U		210	2000	2000	10/27/2022 20:09	WG1949557
p-Isopropyltoluene	U		240	2000	2000	10/27/2022 20:09	WG1949557
2-Butanone (MEK)	U		2380	20000	2000	10/27/2022 20:09	WG1949557
Methylene Chloride	U		860	10000	2000	10/27/2022 20:09	WG1949557
4-Methyl-2-pentanone (MIBK)	U		956	20000	2000	10/27/2022 20:09	WG1949557
Methyl tert-butyl ether	U		202	2000	2000	10/27/2022 20:09	WG1949557
Naphthalene	U		2000	10000	2000	10/27/2022 20:09	WG1949557
n-Propylbenzene	U		199	2000	2000	10/27/2022 20:09	WG1949557
Styrene	U		236	2000	2000	10/27/2022 20:09	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,1,1,2-Tetrachloroethane	U		294	2000	2000	10/27/2022 20:09	WG1949557
1,1,2,2-Tetrachloroethane	U		266	2000	2000	10/27/2022 20:09	WG1949557
1,1,2-Trichlorotrifluoroethane	U		360	2000	2000	10/27/2022 20:09	WG1949557
Tetrachloroethene	78000		600	2000	2000	10/27/2022 20:09	WG1949557
Toluene	U		556	2000	2000	10/27/2022 20:09	WG1949557
1,2,3-Trichlorobenzene	U		460	2000	2000	10/27/2022 20:09	WG1949557
1,2,4-Trichlorobenzene	U		962	2000	2000	10/27/2022 20:09	WG1949557
1,1,1-Trichloroethane	U		298	2000	2000	10/27/2022 20:09	WG1949557
1,1,2-Trichloroethane	U		316	2000	2000	10/27/2022 20:09	WG1949557
Trichloroethene	11500		380	2000	2000	10/27/2022 20:09	WG1949557
Trichlorofluoromethane	U		320	10000	2000	10/27/2022 20:09	WG1949557
1,2,3-Trichloropropane	U		474	5000	2000	10/27/2022 20:09	WG1949557
1,2,4-Trimethylbenzene	U		644	2000	2000	10/27/2022 20:09	WG1949557
1,2,3-Trimethylbenzene	U		208	2000	2000	10/27/2022 20:09	WG1949557
1,3,5-Trimethylbenzene	U		208	2000	2000	10/27/2022 20:09	WG1949557
Vinyl chloride	13000		468	2000	2000	10/27/2022 20:09	WG1949557
Xylenes, Total	U		348	6000	2000	10/27/2022 20:09	WG1949557
(S) Toluene-d8	*103*			*80.0-120*		*10/27/2022 20:09*	WG1949557
(S) 4-Bromofluorobenzene	*99.4*			*77.0-126*		*10/27/2022 20:09*	WG1949557
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*10/27/2022 20:09*	WG1949557

Sample Narrative:

L1549614-05 WG1949557: Target compounds too high to run at a lower dilution.

Wet Chemistry by Method 9060A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
TOC (Total Organic Carbon)	U		102	1000	1	11/06/2022 05:29	WG1954488

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		11.3	50.0	1	10/27/2022 18:08	WG1949557
Acrolein	U	C3	2.54	50.0	1	10/27/2022 18:08	WG1949557
Acrylonitrile	U		0.671	10.0	1	10/27/2022 18:08	WG1949557
Benzene	0.197	J	0.0941	1.00	1	10/27/2022 18:08	WG1949557
Bromobenzene	U		0.118	1.00	1	10/27/2022 18:08	WG1949557
Bromodichloromethane	U		0.136	1.00	1	10/27/2022 18:08	WG1949557
Bromoform	U		0.129	1.00	1	10/27/2022 18:08	WG1949557
Bromomethane	U		0.605	5.00	1	10/27/2022 18:08	WG1949557
n-Butylbenzene	U		0.157	1.00	1	10/27/2022 18:08	WG1949557
sec-Butylbenzene	0.367	J	0.125	1.00	1	10/27/2022 18:08	WG1949557
tert-Butylbenzene	U		0.127	1.00	1	10/27/2022 18:08	WG1949557
Carbon disulfide	U		0.0962	1.00	1	10/27/2022 18:08	WG1949557
Carbon tetrachloride	U		0.128	1.00	1	10/27/2022 18:08	WG1949557
Chlorobenzene	U		0.116	1.00	1	10/27/2022 18:08	WG1949557
Chlorodibromomethane	U		0.140	1.00	1	10/27/2022 18:08	WG1949557
Chloroethane	U		0.192	5.00	1	10/27/2022 18:08	WG1949557
Chloroform	U		0.111	5.00	1	10/27/2022 18:08	WG1949557
Chloromethane	U	J3	0.960	2.50	1	10/27/2022 18:08	WG1949557
2-Chlorotoluene	U		0.106	1.00	1	10/27/2022 18:08	WG1949557
4-Chlorotoluene	U		0.114	1.00	1	10/27/2022 18:08	WG1949557
1,2-Dibromo-3-Chloropropane	U		0.276	5.00	1	10/27/2022 18:08	WG1949557
1,2-Dibromoethane	U		0.126	1.00	1	10/27/2022 18:08	WG1949557
Dibromomethane	U		0.122	1.00	1	10/27/2022 18:08	WG1949557
1,2-Dichlorobenzene	U		0.107	1.00	1	10/27/2022 18:08	WG1949557
1,3-Dichlorobenzene	U		0.110	1.00	1	10/27/2022 18:08	WG1949557
1,4-Dichlorobenzene	U		0.120	1.00	1	10/27/2022 18:08	WG1949557
Dichlorodifluoromethane	U		0.374	5.00	1	10/27/2022 18:08	WG1949557
1,1-Dichloroethane	U		0.100	1.00	1	10/27/2022 18:08	WG1949557
1,2-Dichloroethane	U		0.0819	1.00	1	10/27/2022 18:08	WG1949557
1,1-Dichloroethene	U		0.188	1.00	1	10/27/2022 18:08	WG1949557
cis-1,2-Dichloroethene	U		0.126	1.00	1	10/27/2022 18:08	WG1949557
trans-1,2-Dichloroethene	U		0.149	1.00	1	10/27/2022 18:08	WG1949557
1,2-Dichloropropane	U		0.149	1.00	1	10/27/2022 18:08	WG1949557
1,1-Dichloropropene	U		0.142	1.00	1	10/27/2022 18:08	WG1949557
1,3-Dichloropropane	U		0.110	1.00	1	10/27/2022 18:08	WG1949557
cis-1,3-Dichloropropene	U		0.111	1.00	1	10/27/2022 18:08	WG1949557
trans-1,3-Dichloropropene	U		0.118	1.00	1	10/27/2022 18:08	WG1949557
2,2-Dichloropropane	U		0.161	1.00	1	10/27/2022 18:08	WG1949557
Di-isopropyl ether	U		0.105	1.00	1	10/27/2022 18:08	WG1949557
Ethylbenzene	U		0.137	1.00	1	10/27/2022 18:08	WG1949557
Hexachloro-1,3-butadiene	U		0.337	1.00	1	10/27/2022 18:08	WG1949557
Isopropylbenzene	1.27		0.105	1.00	1	10/27/2022 18:08	WG1949557
p-Isopropyltoluene	U		0.120	1.00	1	10/27/2022 18:08	WG1949557
2-Butanone (MEK)	U		1.19	10.0	1	10/27/2022 18:08	WG1949557
Methylene Chloride	U		0.430	5.00	1	10/27/2022 18:08	WG1949557
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0	1	10/27/2022 18:08	WG1949557
Methyl tert-butyl ether	7.22		0.101	1.00	1	10/27/2022 18:08	WG1949557
Naphthalene	U		1.00	5.00	1	10/27/2022 18:08	WG1949557
n-Propylbenzene	0.338	J	0.0993	1.00	1	10/27/2022 18:08	WG1949557
Styrene	U		0.118	1.00	1	10/27/2022 18:08	WG1949557

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1,2-Tetrachloroethane	U		0.147	1.00	1	10/27/2022 18:08	WG1949557
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	10/27/2022 18:08	WG1949557
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	10/27/2022 18:08	WG1949557
Tetrachloroethene	U		0.300	1.00	1	10/27/2022 18:08	WG1949557
Toluene	U		0.278	1.00	1	10/27/2022 18:08	WG1949557
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/27/2022 18:08	WG1949557
1,2,4-Trichlorobenzene	U		0.481	1.00	1	10/27/2022 18:08	WG1949557
1,1,1-Trichloroethane	U		0.149	1.00	1	10/27/2022 18:08	WG1949557
1,1,2-Trichloroethane	U		0.158	1.00	1	10/27/2022 18:08	WG1949557
Trichloroethene	U		0.190	1.00	1	10/27/2022 18:08	WG1949557
Trichlorofluoromethane	U		0.160	5.00	1	10/27/2022 18:08	WG1949557
1,2,3-Trichloropropane	U		0.237	2.50	1	10/27/2022 18:08	WG1949557
1,2,4-Trimethylbenzene	U		0.322	1.00	1	10/27/2022 18:08	WG1949557
1,2,3-Trimethylbenzene	U		0.104	1.00	1	10/27/2022 18:08	WG1949557
1,3,5-Trimethylbenzene	U		0.104	1.00	1	10/27/2022 18:08	WG1949557
Vinyl chloride	U		0.234	1.00	1	10/27/2022 18:08	WG1949557
Xylenes, Total	U		0.174	3.00	1	10/27/2022 18:08	WG1949557
(S) Toluene-d8	*100*			*80.0-120*		*10/27/2022 18:08*	WG1949557
(S) 4-Bromofluorobenzene	*94.4*			*77.0-126*		*10/27/2022 18:08*	WG1949557
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*10/27/2022 18:08*	WG1949557

Wet Chemistry by Method 9060A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
TOC (Total Organic Carbon)	U		102	1000	1	11/06/2022 05:42	WG1954488

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		282	1250	25	10/27/2022 20:30	WG1949557
Acrolein	U	C3	63.5	1250	25	10/27/2022 20:30	WG1949557
Acrylonitrile	U		16.8	250	25	10/27/2022 20:30	WG1949557
Benzene	U		2.35	25.0	25	10/27/2022 20:30	WG1949557
Bromobenzene	U		2.95	25.0	25	10/27/2022 20:30	WG1949557
Bromodichloromethane	U		3.40	25.0	25	10/27/2022 20:30	WG1949557
Bromoform	U		3.22	25.0	25	10/27/2022 20:30	WG1949557
Bromomethane	U		15.1	125	25	10/27/2022 20:30	WG1949557
n-Butylbenzene	U		3.93	25.0	25	10/27/2022 20:30	WG1949557
sec-Butylbenzene	U		3.13	25.0	25	10/27/2022 20:30	WG1949557
tert-Butylbenzene	U		3.18	25.0	25	10/27/2022 20:30	WG1949557
Carbon disulfide	U		2.41	25.0	25	10/27/2022 20:30	WG1949557
Carbon tetrachloride	U		3.20	25.0	25	10/27/2022 20:30	WG1949557
Chlorobenzene	U		2.90	25.0	25	10/27/2022 20:30	WG1949557
Chlorodibromomethane	U		3.50	25.0	25	10/27/2022 20:30	WG1949557
Chloroethane	9.12	J	4.80	125	25	10/27/2022 20:30	WG1949557
Chloroform	U		2.78	125	25	10/27/2022 20:30	WG1949557
Chloromethane	U	J3	24.0	62.5	25	10/27/2022 20:30	WG1949557
2-Chlorotoluene	U		2.65	25.0	25	10/27/2022 20:30	WG1949557
4-Chlorotoluene	U		2.85	25.0	25	10/27/2022 20:30	WG1949557
1,2-Dibromo-3-Chloropropane	U		6.90	125	25	10/27/2022 20:30	WG1949557
1,2-Dibromoethane	U		3.15	25.0	25	10/27/2022 20:30	WG1949557
Dibromomethane	U		3.05	25.0	25	10/27/2022 20:30	WG1949557
1,2-Dichlorobenzene	U		2.68	25.0	25	10/27/2022 20:30	WG1949557
1,3-Dichlorobenzene	U		2.75	25.0	25	10/27/2022 20:30	WG1949557
1,4-Dichlorobenzene	U		3.00	25.0	25	10/27/2022 20:30	WG1949557
Dichlorodifluoromethane	U		9.35	125	25	10/27/2022 20:30	WG1949557
1,1-Dichloroethane	U		2.50	25.0	25	10/27/2022 20:30	WG1949557
1,2-Dichloroethane	U		2.05	25.0	25	10/27/2022 20:30	WG1949557
1,1-Dichloroethene	U		4.70	25.0	25	10/27/2022 20:30	WG1949557
cis-1,2-Dichloroethene	1320		3.15	25.0	25	10/27/2022 20:30	WG1949557
trans-1,2-Dichloroethene	5.94	J	3.73	25.0	25	10/27/2022 20:30	WG1949557
1,2-Dichloropropane	U		3.73	25.0	25	10/27/2022 20:30	WG1949557
1,1-Dichloropropene	U		3.55	25.0	25	10/27/2022 20:30	WG1949557
1,3-Dichloropropane	U		2.75	25.0	25	10/27/2022 20:30	WG1949557
cis-1,3-Dichloropropene	U		2.78	25.0	25	10/27/2022 20:30	WG1949557
trans-1,3-Dichloropropene	U		2.95	25.0	25	10/27/2022 20:30	WG1949557
2,2-Dichloropropane	U		4.03	25.0	25	10/27/2022 20:30	WG1949557
Di-isopropyl ether	U		2.63	25.0	25	10/27/2022 20:30	WG1949557
Ethylbenzene	U		3.43	25.0	25	10/27/2022 20:30	WG1949557
Hexachloro-1,3-butadiene	U		8.43	25.0	25	10/27/2022 20:30	WG1949557
Isopropylbenzene	U		2.63	25.0	25	10/27/2022 20:30	WG1949557
p-Isopropyltoluene	U		3.00	25.0	25	10/27/2022 20:30	WG1949557
2-Butanone (MEK)	U		29.8	250	25	10/27/2022 20:30	WG1949557
Methylene Chloride	U		10.7	125	25	10/27/2022 20:30	WG1949557
4-Methyl-2-pentanone (MIBK)	U		12.0	250	25	10/27/2022 20:30	WG1949557
Methyl tert-butyl ether	U		2.53	25.0	25	10/27/2022 20:30	WG1949557
Naphthalene	U		25.0	125	25	10/27/2022 20:30	WG1949557
n-Propylbenzene	U		2.48	25.0	25	10/27/2022 20:30	WG1949557
Styrene	U		2.95	25.0	25	10/27/2022 20:30	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,1,1,2-Tetrachloroethane	U		3.68	25.0	25	10/27/2022 20:30	WG1949557
1,1,2,2-Tetrachloroethane	U		3.33	25.0	25	10/27/2022 20:30	WG1949557
1,1,2-Trichlorotrifluoroethane	U		4.50	25.0	25	10/27/2022 20:30	WG1949557
Tetrachloroethene	U		7.50	25.0	25	10/27/2022 20:30	WG1949557
Toluene	U		6.95	25.0	25	10/27/2022 20:30	WG1949557
1,2,3-Trichlorobenzene	U		5.75	25.0	25	10/27/2022 20:30	WG1949557
1,2,4-Trichlorobenzene	U		12.0	25.0	25	10/27/2022 20:30	WG1949557
1,1,1-Trichloroethane	U		3.73	25.0	25	10/27/2022 20:30	WG1949557
1,1,2-Trichloroethane	U		3.95	25.0	25	10/27/2022 20:30	WG1949557
Trichloroethene	U		4.75	25.0	25	10/27/2022 20:30	WG1949557
Trichlorofluoromethane	U		4.00	125	25	10/27/2022 20:30	WG1949557
1,2,3-Trichloropropane	U		5.93	62.5	25	10/27/2022 20:30	WG1949557
1,2,4-Trimethylbenzene	U		8.05	25.0	25	10/27/2022 20:30	WG1949557
1,2,3-Trimethylbenzene	U		2.60	25.0	25	10/27/2022 20:30	WG1949557
1,3,5-Trimethylbenzene	U		2.60	25.0	25	10/27/2022 20:30	WG1949557
Vinyl chloride	906		5.85	25.0	25	10/27/2022 20:30	WG1949557
Xylenes, Total	U		4.35	75.0	25	10/27/2022 20:30	WG1949557
(S) Toluene-d8	*103*			*80.0-120*		*10/27/2022 20:30*	WG1949557
(S) 4-Bromofluorobenzene	*97.0*			*77.0-126*		*10/27/2022 20:30*	WG1949557
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*10/27/2022 20:30*	WG1949557

Sample Narrative:

L1549614-07 WG1949557: Target compounds too high to run at a lower dilution.

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	88.7	C5	11.3	50.0	1	10/27/2022 18:28	WG1949557
Acrolein	U	C3	2.54	50.0	1	10/27/2022 18:28	WG1949557
Acrylonitrile	U		0.671	10.0	1	10/27/2022 18:28	WG1949557
Benzene	0.107	J	0.0941	1.00	1	10/27/2022 18:28	WG1949557
Bromobenzene	U		0.118	1.00	1	10/27/2022 18:28	WG1949557
Bromodichloromethane	U		0.136	1.00	1	10/27/2022 18:28	WG1949557
Bromoform	U		0.129	1.00	1	10/27/2022 18:28	WG1949557
Bromomethane	U		0.605	5.00	1	10/27/2022 18:28	WG1949557
n-Butylbenzene	U		0.157	1.00	1	10/27/2022 18:28	WG1949557
sec-Butylbenzene	U		0.125	1.00	1	10/27/2022 18:28	WG1949557
tert-Butylbenzene	U		0.127	1.00	1	10/27/2022 18:28	WG1949557
Carbon disulfide	U		0.0962	1.00	1	10/27/2022 18:28	WG1949557
Carbon tetrachloride	U		0.128	1.00	1	10/27/2022 18:28	WG1949557
Chlorobenzene	U		0.116	1.00	1	10/27/2022 18:28	WG1949557
Chlorodibromomethane	U		0.140	1.00	1	10/27/2022 18:28	WG1949557
Chloroethane	U		0.192	5.00	1	10/27/2022 18:28	WG1949557
Chloroform	U		0.111	5.00	1	10/27/2022 18:28	WG1949557
Chloromethane	U	J3	0.960	2.50	1	10/27/2022 18:28	WG1949557
2-Chlorotoluene	U		0.106	1.00	1	10/27/2022 18:28	WG1949557
4-Chlorotoluene	U		0.114	1.00	1	10/27/2022 18:28	WG1949557
1,2-Dibromo-3-Chloropropane	U		0.276	5.00	1	10/27/2022 18:28	WG1949557
1,2-Dibromoethane	U		0.126	1.00	1	10/27/2022 18:28	WG1949557
Dibromomethane	U		0.122	1.00	1	10/27/2022 18:28	WG1949557
1,2-Dichlorobenzene	U		0.107	1.00	1	10/27/2022 18:28	WG1949557
1,3-Dichlorobenzene	U		0.110	1.00	1	10/27/2022 18:28	WG1949557
1,4-Dichlorobenzene	U		0.120	1.00	1	10/27/2022 18:28	WG1949557
Dichlorodifluoromethane	U		0.374	5.00	1	10/27/2022 18:28	WG1949557
1,1-Dichloroethane	U		0.100	1.00	1	10/27/2022 18:28	WG1949557
1,2-Dichloroethane	U		0.0819	1.00	1	10/27/2022 18:28	WG1949557
1,1-Dichloroethene	U		0.188	1.00	1	10/27/2022 18:28	WG1949557
cis-1,2-Dichloroethene	0.950	J	0.126	1.00	1	10/27/2022 18:28	WG1949557
trans-1,2-Dichloroethene	0.236	J	0.149	1.00	1	10/27/2022 18:28	WG1949557
1,2-Dichloropropane	U		0.149	1.00	1	10/27/2022 18:28	WG1949557
1,1-Dichloropropene	U		0.142	1.00	1	10/27/2022 18:28	WG1949557
1,3-Dichloropropane	U		0.110	1.00	1	10/27/2022 18:28	WG1949557
cis-1,3-Dichloropropene	U		0.111	1.00	1	10/27/2022 18:28	WG1949557
trans-1,3-Dichloropropene	U		0.118	1.00	1	10/27/2022 18:28	WG1949557
2,2-Dichloropropane	U		0.161	1.00	1	10/27/2022 18:28	WG1949557
Di-isopropyl ether	U		0.105	1.00	1	10/27/2022 18:28	WG1949557
Ethylbenzene	0.137	J	0.137	1.00	1	10/27/2022 18:28	WG1949557
Hexachloro-1,3-butadiene	U		0.337	1.00	1	10/27/2022 18:28	WG1949557
Isopropylbenzene	U		0.105	1.00	1	10/27/2022 18:28	WG1949557
p-Isopropyltoluene	U		0.120	1.00	1	10/27/2022 18:28	WG1949557
2-Butanone (MEK)	33.2	C5	1.19	10.0	1	10/27/2022 18:28	WG1949557
Methylene Chloride	U		0.430	5.00	1	10/27/2022 18:28	WG1949557
4-Methyl-2-pentanone (MIBK)	2.35	J	0.478	10.0	1	10/27/2022 18:28	WG1949557
Methyl tert-butyl ether	0.359	J	0.101	1.00	1	10/27/2022 18:28	WG1949557
Naphthalene	U		1.00	5.00	1	10/27/2022 18:28	WG1949557
n-Propylbenzene	0.112	J	0.0993	1.00	1	10/27/2022 18:28	WG1949557
Styrene	U		0.118	1.00	1	10/27/2022 18:28	WG1949557
1,1,1,2-Tetrachloroethane	U		0.147	1.00	1	10/27/2022 18:28	WG1949557
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	10/27/2022 18:28	WG1949557
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	10/27/2022 18:28	WG1949557
Tetrachloroethene	U		0.300	1.00	1	10/27/2022 18:28	WG1949557
Toluene	U		0.278	1.00	1	10/27/2022 18:28	WG1949557
1,2,3-Trichlorobenzene	U		0.230	1.00	1	10/27/2022 18:28	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,2,4-Trichlorobenzene	U		0.481	1.00	1	10/27/2022 18:28	WG1949557
1,1,1-Trichloroethane	U		0.149	1.00	1	10/27/2022 18:28	WG1949557
1,1,2-Trichloroethane	U		0.158	1.00	1	10/27/2022 18:28	WG1949557
Trichloroethene	U		0.190	1.00	1	10/27/2022 18:28	WG1949557
Trichlorofluoromethane	U		0.160	5.00	1	10/27/2022 18:28	WG1949557
1,2,3-Trichloropropane	U		0.237	2.50	1	10/27/2022 18:28	WG1949557
1,2,4-Trimethylbenzene	U		0.322	1.00	1	10/27/2022 18:28	WG1949557
1,2,3-Trimethylbenzene	0.254	J	0.104	1.00	1	10/27/2022 18:28	WG1949557
1,3,5-Trimethylbenzene	U		0.104	1.00	1	10/27/2022 18:28	WG1949557
Vinyl chloride	U		0.234	1.00	1	10/27/2022 18:28	WG1949557
Xylenes, Total	0.240	J	0.174	3.00	1	10/27/2022 18:28	WG1949557
(S) Toluene-d8	*102*			*80.0-120*		*10/27/2022 18:28*	WG1949557
(S) 4-Bromofluorobenzene	*93.0*			*77.0-126*		*10/27/2022 18:28*	WG1949557
(S) 1,2-Dichloroethane-d4	*99.1*			*70.0-130*		*10/27/2022 18:28*	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		56.5	250	5	10/27/2022 20:51	WG1949557
Acrolein	U	C3	12.7	250	5	10/27/2022 20:51	WG1949557
Acrylonitrile	U		3.36	50.0	5	10/27/2022 20:51	WG1949557
Benzene	3.64	J	0.471	5.00	5	10/27/2022 20:51	WG1949557
Bromobenzene	U		0.590	5.00	5	10/27/2022 20:51	WG1949557
Bromodichloromethane	U		0.680	5.00	5	10/27/2022 20:51	WG1949557
Bromoform	U		0.645	5.00	5	10/27/2022 20:51	WG1949557
Bromomethane	U		3.03	25.0	5	10/27/2022 20:51	WG1949557
n-Butylbenzene	U		0.785	5.00	5	10/27/2022 20:51	WG1949557
sec-Butylbenzene	0.680	J	0.625	5.00	5	10/27/2022 20:51	WG1949557
tert-Butylbenzene	U		0.635	5.00	5	10/27/2022 20:51	WG1949557
Carbon disulfide	U		0.481	5.00	5	10/27/2022 20:51	WG1949557
Carbon tetrachloride	U		0.640	5.00	5	10/27/2022 20:51	WG1949557
Chlorobenzene	U		0.580	5.00	5	10/27/2022 20:51	WG1949557
Chlorodibromomethane	U		0.700	5.00	5	10/27/2022 20:51	WG1949557
Chloroethane	2.52	J	0.960	25.0	5	10/27/2022 20:51	WG1949557
Chloroform	U		0.555	25.0	5	10/27/2022 20:51	WG1949557
Chloromethane	U	J3	4.80	12.5	5	10/27/2022 20:51	WG1949557
2-Chlorotoluene	U		0.530	5.00	5	10/27/2022 20:51	WG1949557
4-Chlorotoluene	U		0.570	5.00	5	10/27/2022 20:51	WG1949557
1,2-Dibromo-3-Chloropropane	U		1.38	25.0	5	10/27/2022 20:51	WG1949557
1,2-Dibromoethane	U		0.630	5.00	5	10/27/2022 20:51	WG1949557
Dibromomethane	U		0.610	5.00	5	10/27/2022 20:51	WG1949557
1,2-Dichlorobenzene	U		0.535	5.00	5	10/27/2022 20:51	WG1949557
1,3-Dichlorobenzene	U		0.550	5.00	5	10/27/2022 20:51	WG1949557
1,4-Dichlorobenzene	U		0.600	5.00	5	10/27/2022 20:51	WG1949557
Dichlorodifluoromethane	U		1.87	25.0	5	10/27/2022 20:51	WG1949557
1,1-Dichloroethane	U		0.500	5.00	5	10/27/2022 20:51	WG1949557
1,2-Dichloroethane	U		0.409	5.00	5	10/27/2022 20:51	WG1949557
1,1-Dichloroethene	U		0.940	5.00	5	10/27/2022 20:51	WG1949557
cis-1,2-Dichloroethene	45.9		0.630	5.00	5	10/27/2022 20:51	WG1949557
trans-1,2-Dichloroethene	U		0.745	5.00	5	10/27/2022 20:51	WG1949557
1,2-Dichloropropane	U		0.745	5.00	5	10/27/2022 20:51	WG1949557
1,1-Dichloropropene	U		0.710	5.00	5	10/27/2022 20:51	WG1949557
1,3-Dichloropropane	U		0.550	5.00	5	10/27/2022 20:51	WG1949557
cis-1,3-Dichloropropene	U		0.555	5.00	5	10/27/2022 20:51	WG1949557
trans-1,3-Dichloropropene	U		0.590	5.00	5	10/27/2022 20:51	WG1949557
2,2-Dichloropropane	U		0.805	5.00	5	10/27/2022 20:51	WG1949557
Di-isopropyl ether	U		0.525	5.00	5	10/27/2022 20:51	WG1949557
Ethylbenzene	1.53	J	0.685	5.00	5	10/27/2022 20:51	WG1949557
Hexachloro-1,3-butadiene	U		1.69	5.00	5	10/27/2022 20:51	WG1949557
Isopropylbenzene	7.12		0.525	5.00	5	10/27/2022 20:51	WG1949557
p-Isopropyltoluene	U		0.600	5.00	5	10/27/2022 20:51	WG1949557
2-Butanone (MEK)	U		5.95	50.0	5	10/27/2022 20:51	WG1949557
Methylene Chloride	U		2.15	25.0	5	10/27/2022 20:51	WG1949557
4-Methyl-2-pentanone (MIBK)	U		2.39	50.0	5	10/27/2022 20:51	WG1949557
Methyl tert-butyl ether	U		0.505	5.00	5	10/27/2022 20:51	WG1949557
Naphthalene	U		5.00	25.0	5	10/27/2022 20:51	WG1949557
n-Propylbenzene	1.10	J	0.497	5.00	5	10/27/2022 20:51	WG1949557
Styrene	U		0.590	5.00	5	10/27/2022 20:51	WG1949557
1,1,1,2-Tetrachloroethane	U		0.735	5.00	5	10/27/2022 20:51	WG1949557
1,1,2,2-Tetrachloroethane	U		0.665	5.00	5	10/27/2022 20:51	WG1949557
1,1,2-Trichlorotrifluoroethane	U		0.900	5.00	5	10/27/2022 20:51	WG1949557
Tetrachloroethene	U		1.50	5.00	5	10/27/2022 20:51	WG1949557
Toluene	3.45	J	1.39	5.00	5	10/27/2022 20:51	WG1949557
1,2,3-Trichlorobenzene	U		1.15	5.00	5	10/27/2022 20:51	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,2,4-Trichlorobenzene	U		2.41	5.00	5	10/27/2022 20:51	WG1949557
1,1,1-Trichloroethane	U		0.745	5.00	5	10/27/2022 20:51	WG1949557
1,1,2-Trichloroethane	U		0.790	5.00	5	10/27/2022 20:51	WG1949557
Trichloroethene	U		0.950	5.00	5	10/27/2022 20:51	WG1949557
Trichlorofluoromethane	U		0.800	25.0	5	10/27/2022 20:51	WG1949557
1,2,3-Trichloropropane	U		1.19	12.5	5	10/27/2022 20:51	WG1949557
1,2,4-Trimethylbenzene	U		1.61	5.00	5	10/27/2022 20:51	WG1949557
1,2,3-Trimethylbenzene	2.84	J	0.520	5.00	5	10/27/2022 20:51	WG1949557
1,3,5-Trimethylbenzene	0.802	J	0.520	5.00	5	10/27/2022 20:51	WG1949557
Vinyl chloride	46.0		1.17	5.00	5	10/27/2022 20:51	WG1949557
Xylenes, Total	3.71	J	0.870	15.0	5	10/27/2022 20:51	WG1949557
(S) Toluene-d8	*102*			*80.0-120*		*10/27/2022 20:51*	WG1949557
(S) 4-Bromofluorobenzene	*97.0*			*77.0-126*		*10/27/2022 20:51*	WG1949557
(S) 1,2-Dichloroethane-d4	*103*			*70.0-130*		*10/27/2022 20:51*	WG1949557

Sample Narrative:

L1549614-09 WG1949557: Lowest possible dilution due to sample foaming.

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		565	2500	50	10/27/2022 21:11	WG1949557
Acrolein	U	C3	127	2500	50	10/27/2022 21:11	WG1949557
Acrylonitrile	U		33.6	500	50	10/27/2022 21:11	WG1949557
Benzene	U		4.71	50.0	50	10/27/2022 21:11	WG1949557
Bromobenzene	U		5.90	50.0	50	10/27/2022 21:11	WG1949557
Bromodichloromethane	U		6.80	50.0	50	10/27/2022 21:11	WG1949557
Bromoform	U		6.45	50.0	50	10/27/2022 21:11	WG1949557
Bromomethane	U		30.3	250	50	10/27/2022 21:11	WG1949557
n-Butylbenzene	U		7.85	50.0	50	10/27/2022 21:11	WG1949557
sec-Butylbenzene	U		6.25	50.0	50	10/27/2022 21:11	WG1949557
tert-Butylbenzene	U		6.35	50.0	50	10/27/2022 21:11	WG1949557
Carbon disulfide	U		4.81	50.0	50	10/27/2022 21:11	WG1949557
Carbon tetrachloride	U		6.40	50.0	50	10/27/2022 21:11	WG1949557
Chlorobenzene	U		5.80	50.0	50	10/27/2022 21:11	WG1949557
Chlorodibromomethane	U		7.00	50.0	50	10/27/2022 21:11	WG1949557
Chloroethane	U		9.60	250	50	10/27/2022 21:11	WG1949557
Chloroform	U		5.55	250	50	10/27/2022 21:11	WG1949557
Chloromethane	U	J3	48.0	125	50	10/27/2022 21:11	WG1949557
2-Chlorotoluene	U		5.30	50.0	50	10/27/2022 21:11	WG1949557
4-Chlorotoluene	U		5.70	50.0	50	10/27/2022 21:11	WG1949557
1,2-Dibromo-3-Chloropropane	U		13.8	250	50	10/27/2022 21:11	WG1949557
1,2-Dibromoethane	U		6.30	50.0	50	10/27/2022 21:11	WG1949557
Dibromomethane	U		6.10	50.0	50	10/27/2022 21:11	WG1949557
1,2-Dichlorobenzene	U		5.35	50.0	50	10/27/2022 21:11	WG1949557
1,3-Dichlorobenzene	U		5.50	50.0	50	10/27/2022 21:11	WG1949557
1,4-Dichlorobenzene	U		6.00	50.0	50	10/27/2022 21:11	WG1949557
Dichlorodifluoromethane	U		18.7	250	50	10/27/2022 21:11	WG1949557
1,1-Dichloroethane	U		5.00	50.0	50	10/27/2022 21:11	WG1949557
1,2-Dichloroethane	U		4.09	50.0	50	10/27/2022 21:11	WG1949557
1,1-Dichloroethene	91.3		9.40	50.0	50	10/27/2022 21:11	WG1949557
cis-1,2-Dichloroethene	74100		126	1000	1000	10/30/2022 22:39	WG1951468
trans-1,2-Dichloroethene	161		7.45	50.0	50	10/27/2022 21:11	WG1949557
1,2-Dichloropropane	U		7.45	50.0	50	10/27/2022 21:11	WG1949557
1,1-Dichloropropene	U		7.10	50.0	50	10/27/2022 21:11	WG1949557
1,3-Dichloropropane	U		5.50	50.0	50	10/27/2022 21:11	WG1949557
cis-1,3-Dichloropropene	U		5.55	50.0	50	10/27/2022 21:11	WG1949557
trans-1,3-Dichloropropene	U		5.90	50.0	50	10/27/2022 21:11	WG1949557
2,2-Dichloropropane	U		8.05	50.0	50	10/27/2022 21:11	WG1949557
Di-isopropyl ether	U		5.25	50.0	50	10/27/2022 21:11	WG1949557
Ethylbenzene	U		6.85	50.0	50	10/27/2022 21:11	WG1949557
Hexachloro-1,3-butadiene	U		16.9	50.0	50	10/27/2022 21:11	WG1949557
Isopropylbenzene	U		5.25	50.0	50	10/27/2022 21:11	WG1949557
p-Isopropyltoluene	U		6.00	50.0	50	10/27/2022 21:11	WG1949557
2-Butanone (MEK)	U		59.5	500	50	10/27/2022 21:11	WG1949557
Methylene Chloride	U		21.5	250	50	10/27/2022 21:11	WG1949557
4-Methyl-2-pentanone (MIBK)	U		23.9	500	50	10/27/2022 21:11	WG1949557
Methyl tert-butyl ether	U		5.05	50.0	50	10/27/2022 21:11	WG1949557
Naphthalene	U		50.0	250	50	10/27/2022 21:11	WG1949557
n-Propylbenzene	U		4.97	50.0	50	10/27/2022 21:11	WG1949557
Styrene	U		5.90	50.0	50	10/27/2022 21:11	WG1949557
1,1,1,2-Tetrachloroethane	U		7.35	50.0	50	10/27/2022 21:11	WG1949557
1,1,2,2-Tetrachloroethane	U		6.65	50.0	50	10/27/2022 21:11	WG1949557
1,1,2-Trichlorotrifluoroethane	U		9.00	50.0	50	10/27/2022 21:11	WG1949557
Tetrachloroethene	85600		300	1000	1000	10/30/2022 22:39	WG1951468
Toluene	U		13.9	50.0	50	10/27/2022 21:11	WG1949557
1,2,3-Trichlorobenzene	U		11.5	50.0	50	10/27/2022 21:11	WG1949557

Volatile Organic Compounds (GC/MS) by Method 8260D

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
1,2,4-Trichlorobenzene	U		24.1	50.0	50	10/27/2022 21:11	WG1949557
1,1,1-Trichloroethane	U		7.45	50.0	50	10/27/2022 21:11	WG1949557
1,1,2-Trichloroethane	U		7.90	50.0	50	10/27/2022 21:11	WG1949557
Trichloroethene	13800		190	1000	1000	10/30/2022 22:39	WG1951468
Trichlorofluoromethane	U		8.00	250	50	10/27/2022 21:11	WG1949557
1,2,3-Trichloropropane	U		11.9	125	50	10/27/2022 21:11	WG1949557
1,2,4-Trimethylbenzene	19.8	J	16.1	50.0	50	10/27/2022 21:11	WG1949557
1,2,3-Trimethylbenzene	12.3	J	5.20	50.0	50	10/27/2022 21:11	WG1949557
1,3,5-Trimethylbenzene	9.76	J	5.20	50.0	50	10/27/2022 21:11	WG1949557
Vinyl chloride	13200		234	1000	1000	10/30/2022 22:39	WG1951468
Xylenes, Total	U		8.70	150	50	10/27/2022 21:11	WG1949557
(S) Toluene-d8	*100*			*80.0-120*		*10/27/2022 21:11*	WG1949557
(S) Toluene-d8	*104*			*80.0-120*		*10/30/2022 22:39*	WG1951468
(S) 4-Bromofluorobenzene	*95.9*			*77.0-126*		*10/27/2022 21:11*	WG1949557
(S) 4-Bromofluorobenzene	*95.6*			*77.0-126*		*10/30/2022 22:39*	WG1951468
(S) 1,2-Dichloroethane-d4	*103*			*70.0-130*		*10/27/2022 21:11*	WG1949557
(S) 1,2-Dichloroethane-d4	*105*			*70.0-130*		*10/30/2022 22:39*	WG1951468

Method Blank (MB)

(MB) R3857598-2 11/06/22 03:25

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TOC (Total Organic Carbon)	756	J	102	1000

Method Blank (MB)

(MB) R3863118-2 11/19/22 10:46

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TOC (Total Organic Carbon)	302	J	102	1000

L1549623-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1549623-06 11/06/22 05:58 • (DUP) R3857598-3 11/06/22 06:12

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC (Total Organic Carbon)	U	20800	1	200	J3	20

L1549867-07 Original Sample (OS) • Duplicate (DUP)

(OS) L1549867-07 11/06/22 10:44 • (DUP) R3857598-5 11/06/22 12:38

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC (Total Organic Carbon)	1800	1480	1	19.5		20

Laboratory Control Sample (LCS)

(LCS) R3857598-1 11/06/22 03:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TOC (Total Organic Carbon)	75000	84400	113	85.0-115	

Laboratory Control Sample (LCS)

(LCS) R3863118-1 11/19/22 10:30

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TOC (Total Organic Carbon)	75000	78000	104	85.0-115	

L1549614-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1549614-05 11/19/22 13:17 • (MS) R3863118-3 11/19/22 13:38 • (MSD) R3863118-4 11/19/22 14:10

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TOC (Total Organic Carbon)	50000	111000	224000	220000	225	218	2	80.0-120	E J5	E J5	1.62	20

L1549867-08 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1549867-08 11/19/22 14:26 • (MS) R3863118-5 11/19/22 14:49 • (MSD) R3863118-6 11/19/22 15:12

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TOC (Total Organic Carbon)	50000	606	58400	58300	116	115	1	80.0-120			0.240	20

Method Blank (MB)

(MB) R3854653-3 10/27/22 12:13

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		11.3	50.0
Acrolein	U		2.54	50.0
Acrylonitrile	U		0.671	10.0
Benzene	U		0.0941	1.00
Bromobenzene	U		0.118	1.00
Bromodichloromethane	U		0.136	1.00
Bromoform	U		0.129	1.00
Bromomethane	U		0.605	5.00
n-Butylbenzene	U		0.157	1.00
sec-Butylbenzene	U		0.125	1.00
tert-Butylbenzene	U		0.127	1.00
Carbon disulfide	U		0.0962	1.00
Carbon tetrachloride	U		0.128	1.00
Chlorobenzene	U		0.116	1.00
Chlorodibromomethane	U		0.140	1.00
Chloroethane	U		0.192	5.00
Chloroform	U		0.111	5.00
Chloromethane	U		0.960	2.50
2-Chlorotoluene	U		0.106	1.00
4-Chlorotoluene	U		0.114	1.00
1,2-Dibromo-3-Chloropropane	U		0.276	5.00
1,2-Dibromoethane	U		0.126	1.00
Dibromomethane	U		0.122	1.00
1,2-Dichlorobenzene	U		0.107	1.00
1,3-Dichlorobenzene	U		0.110	1.00
1,4-Dichlorobenzene	U		0.120	1.00
Dichlorodifluoromethane	U		0.374	5.00
1,1-Dichloroethane	U		0.100	1.00
1,2-Dichloroethane	U		0.0819	1.00
1,1-Dichloroethene	U		0.188	1.00
cis-1,2-Dichloroethene	U		0.126	1.00
trans-1,2-Dichloroethene	U		0.149	1.00
1,2-Dichloropropane	U		0.149	1.00
1,1-Dichloropropene	U		0.142	1.00
1,3-Dichloropropane	U		0.110	1.00
cis-1,3-Dichloropropene	U		0.111	1.00
trans-1,3-Dichloropropene	U		0.118	1.00
2,2-Dichloropropane	U		0.161	1.00
Di-isopropyl ether	U		0.105	1.00
Ethylbenzene	U		0.137	1.00

Method Blank (MB)

(MB) R3854653-3 10/27/22 12:13

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Hexachloro-1,3-butadiene	U		0.337	1.00
Isopropylbenzene	U		0.105	1.00
p-Isopropyltoluene	U		0.120	1.00
2-Butanone (MEK)	U		1.19	10.0
Methylene Chloride	U		0.430	5.00
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0
Methyl tert-butyl ether	U		0.101	1.00
Naphthalene	U		1.00	5.00
n-Propylbenzene	U		0.0993	1.00
Styrene	U		0.118	1.00
1,1,1,2-Tetrachloroethane	U		0.147	1.00
1,1,2,2-Tetrachloroethane	U		0.133	1.00
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00
Tetrachloroethene	U		0.300	1.00
Toluene	U		0.278	1.00
1,2,3-Trichlorobenzene	U		0.230	1.00
1,2,4-Trichlorobenzene	U		0.481	1.00
1,1,1-Trichloroethane	U		0.149	1.00
1,1,2-Trichloroethane	U		0.158	1.00
Trichloroethene	U		0.190	1.00
Trichlorofluoromethane	U		0.160	5.00
1,2,3-Trichloropropane	U		0.237	2.50
1,2,4-Trimethylbenzene	U		0.322	1.00
1,2,3-Trimethylbenzene	U		0.104	1.00
1,3,5-Trimethylbenzene	U		0.104	1.00
Vinyl chloride	U		0.234	1.00
Xylenes, Total	U		0.174	3.00
(S) Toluene-d8	*103*			*80.0-120*
(S) 4-Bromofluorobenzene	*99.0*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*99.4*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3854653-1 10/27/22 11:12 • (LCSD) R3854653-2 10/27/22 11:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	25.0	32.8	30.5	131	122	19.0-160			7.27	27
Acrolein	25.0	19.6	17.9	78.4	71.6	10.0-160			9.07	26
Acrylonitrile	25.0	29.3	28.9	117	116	55.0-149			1.37	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3854653-1 10/27/22 11:12 • (LCSD) R3854653-2 10/27/22 11:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	5.00	5.35	4.85	107	97.0	70.0-123			9.80	20
Bromobenzene	5.00	5.17	5.31	103	106	73.0-121			2.67	20
Bromodichloromethane	5.00	5.29	5.01	106	100	75.0-120			5.44	20
Bromoform	5.00	5.46	5.19	109	104	68.0-132			5.07	20
Bromomethane	5.00	4.20	4.23	84.0	84.6	10.0-160			0.712	25
n-Butylbenzene	5.00	4.79	4.85	95.8	97.0	73.0-125			1.24	20
sec-Butylbenzene	5.00	5.25	5.09	105	102	75.0-125			3.09	20
tert-Butylbenzene	5.00	5.22	5.23	104	105	76.0-124			0.191	20
Carbon disulfide	5.00	5.07	4.35	101	87.0	61.0-128			15.3	20
Carbon tetrachloride	5.00	5.52	5.09	110	102	68.0-126			8.11	20
Chlorobenzene	5.00	5.55	5.26	111	105	80.0-121			5.37	20
Chlorodibromomethane	5.00	5.45	5.25	109	105	77.0-125			3.74	20
Chloroethane	5.00	4.62	4.07	92.4	81.4	47.0-150			12.7	20
Chloroform	5.00	5.16	5.03	103	101	73.0-120			2.55	20
Chloromethane	5.00	5.66	4.60	113	92.0	41.0-142		J3	20.7	20
2-Chlorotoluene	5.00	5.22	5.31	104	106	76.0-123			1.71	20
4-Chlorotoluene	5.00	5.37	5.34	107	107	75.0-122			0.560	20
1,2-Dibromo-3-Chloropropane	5.00	5.10	5.49	102	110	58.0-134			7.37	20
1,2-Dibromoethane	5.00	5.36	5.25	107	105	80.0-122			2.07	20
Dibromomethane	5.00	5.24	5.07	105	101	80.0-120			3.30	20
1,2-Dichlorobenzene	5.00	4.95	5.18	99.0	104	79.0-121			4.54	20
1,3-Dichlorobenzene	5.00	5.02	5.12	100	102	79.0-120			1.97	20
1,4-Dichlorobenzene	5.00	5.26	5.33	105	107	79.0-120			1.32	20
Dichlorodifluoromethane	5.00	4.81	4.16	96.2	83.2	51.0-149			14.5	20
1,1-Dichloroethane	5.00	5.36	4.94	107	98.8	70.0-126			8.16	20
1,2-Dichloroethane	5.00	5.48	5.09	110	102	70.0-128			7.38	20
1,1-Dichloroethene	5.00	5.38	4.58	108	91.6	71.0-124			16.1	20
cis-1,2-Dichloroethene	5.00	5.10	4.78	102	95.6	73.0-120			6.48	20
trans-1,2-Dichloroethene	5.00	5.17	4.82	103	96.4	73.0-120			7.01	20
1,2-Dichloropropane	5.00	5.38	5.05	108	101	77.0-125			6.33	20
1,1-Dichloropropene	5.00	5.25	4.81	105	96.2	74.0-126			8.75	20
1,3-Dichloropropane	5.00	5.41	5.34	108	107	80.0-120			1.30	20
cis-1,3-Dichloropropene	5.00	5.41	5.34	108	107	80.0-123			1.30	20
trans-1,3-Dichloropropene	5.00	5.34	5.43	107	109	78.0-124			1.67	20
2,2-Dichloropropane	5.00	5.64	5.11	113	102	58.0-130			9.86	20
Di-isopropyl ether	5.00	5.48	5.24	110	105	58.0-138			4.48	20
Ethylbenzene	5.00	5.53	5.25	111	105	79.0-123			5.19	20
Hexachloro-1,3-butadiene	5.00	4.72	4.81	94.4	96.2	54.0-138			1.89	20
Isopropylbenzene	5.00	5.38	5.09	108	102	76.0-127			5.54	20
p-Isopropyltoluene	5.00	5.09	5.16	102	103	76.0-125			1.37	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3854653-1 10/27/22 11:12 • (LCSD) R3854653-2 10/27/22 11:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2-Butanone (MEK)	25.0	30.4	29.6	122	118	44.0-160			2.67	20
Methylene Chloride	5.00	5.04	4.64	101	92.8	67.0-120			8.26	20
4-Methyl-2-pentanone (MIBK)	25.0	29.3	29.2	117	117	68.0-142			0.342	20
Methyl tert-butyl ether	5.00	5.11	5.01	102	100	68.0-125			1.98	20
Naphthalene	5.00	4.68	4.94	93.6	98.8	54.0-135			5.41	20
n-Propylbenzene	5.00	5.28	5.18	106	104	77.0-124			1.91	20
Styrene	5.00	5.13	4.99	103	99.8	73.0-130			2.77	20
1,1,1,2-Tetrachloroethane	5.00	5.06	4.73	101	94.6	75.0-125			6.74	20
1,1,2,2-Tetrachloroethane	5.00	5.14	5.41	103	108	65.0-130			5.12	20
1,1,2-Trichlorotrifluoroethane	5.00	5.75	5.29	115	106	69.0-132			8.33	20
Tetrachloroethene	5.00	5.35	5.16	107	103	72.0-132			3.62	20
Toluene	5.00	5.19	4.99	104	99.8	79.0-120			3.93	20
1,2,3-Trichlorobenzene	5.00	4.73	4.94	94.6	98.8	50.0-138			4.34	20
1,2,4-Trichlorobenzene	5.00	4.60	4.74	92.0	94.8	57.0-137			3.00	20
1,1,1-Trichloroethane	5.00	5.27	4.91	105	98.2	73.0-124			7.07	20
1,1,2-Trichloroethane	5.00	5.25	5.06	105	101	80.0-120			3.69	20
Trichloroethene	5.00	5.43	4.90	109	98.0	78.0-124			10.3	20
Trichlorofluoromethane	5.00	5.13	4.53	103	90.6	59.0-147			12.4	20
1,2,3-Trichloropropane	5.00	5.32	5.57	106	111	73.0-130			4.59	20
1,2,4-Trimethylbenzene	5.00	5.03	5.05	101	101	76.0-121			0.397	20
1,2,3-Trimethylbenzene	5.00	5.11	5.07	102	101	77.0-120			0.786	20
1,3,5-Trimethylbenzene	5.00	5.18	5.25	104	105	76.0-122			1.34	20
Vinyl chloride	5.00	4.32	3.66	86.4	73.2	67.0-131			16.5	20
Xylenes, Total	15.0	16.0	15.4	107	103	79.0-123			3.82	20
(S) Toluene-d8				*103*	*105*	*80.0-120*				
(S) 4-Bromofluorobenzene				*101*	*97.7*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*103*	*102*	*70.0-130*				

Method Blank (MB)

(MB) R3856727-2 10/30/22 20:16

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		11.3	50.0
Acrolein	U		2.54	50.0
Acrylonitrile	U		0.671	10.0
Benzene	U		0.0941	1.00
Bromobenzene	U		0.118	1.00
Bromodichloromethane	U		0.136	1.00
Bromoform	U		0.129	1.00
Bromomethane	U		0.605	5.00
n-Butylbenzene	U		0.157	1.00
sec-Butylbenzene	U		0.125	1.00
tert-Butylbenzene	U		0.127	1.00
Carbon disulfide	U		0.0962	1.00
Carbon tetrachloride	U		0.128	1.00
Chlorobenzene	U		0.116	1.00
Chlorodibromomethane	U		0.140	1.00
Chloroethane	U		0.192	5.00
Chloroform	U		0.111	5.00
Chloromethane	U		0.960	2.50
2-Chlorotoluene	U		0.106	1.00
4-Chlorotoluene	U		0.114	1.00
1,2-Dibromo-3-Chloropropane	U		0.276	5.00
1,2-Dibromoethane	U		0.126	1.00
Dibromomethane	U		0.122	1.00
1,2-Dichlorobenzene	U		0.107	1.00
1,3-Dichlorobenzene	U		0.110	1.00
1,4-Dichlorobenzene	U		0.120	1.00
Dichlorodifluoromethane	U		0.374	5.00
1,1-Dichloroethane	U		0.100	1.00
1,2-Dichloroethane	U		0.0819	1.00
1,1-Dichloroethene	U		0.188	1.00
cis-1,2-Dichloroethene	U		0.126	1.00
trans-1,2-Dichloroethene	U		0.149	1.00
1,2-Dichloropropane	U		0.149	1.00
1,1-Dichloropropene	U		0.142	1.00
1,3-Dichloropropane	U		0.110	1.00
cis-1,3-Dichloropropene	U		0.111	1.00
trans-1,3-Dichloropropene	U		0.118	1.00
2,2-Dichloropropane	U		0.161	1.00
Di-isopropyl ether	U		0.105	1.00
Ethylbenzene	U		0.137	1.00

Method Blank (MB)

(MB) R3856727-2 10/30/22 20:16

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Hexachloro-1,3-butadiene	U		0.337	1.00
Isopropylbenzene	U		0.105	1.00
p-Isopropyltoluene	U		0.120	1.00
2-Butanone (MEK)	U		1.19	10.0
Methylene Chloride	U		0.430	5.00
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0
Methyl tert-butyl ether	U		0.101	1.00
Naphthalene	U		1.00	5.00
n-Propylbenzene	U		0.0993	1.00
Styrene	U		0.118	1.00
1,1,1,2-Tetrachloroethane	U		0.147	1.00
1,1,2,2-Tetrachloroethane	U		0.133	1.00
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00
Tetrachloroethene	U		0.300	1.00
Toluene	U		0.278	1.00
1,2,3-Trichlorobenzene	U		0.230	1.00
1,2,4-Trichlorobenzene	U		0.481	1.00
1,1,1-Trichloroethane	U		0.149	1.00
1,1,2-Trichloroethane	U		0.158	1.00
Trichloroethene	U		0.190	1.00
Trichlorofluoromethane	U		0.160	5.00
1,2,3-Trichloropropane	U		0.237	2.50
1,2,4-Trimethylbenzene	U		0.322	1.00
1,2,3-Trimethylbenzene	U		0.104	1.00
1,3,5-Trimethylbenzene	U		0.104	1.00
Vinyl chloride	U		0.234	1.00
Xylenes, Total	U		0.174	3.00
(S) Toluene-d8	*103*			*80.0-120*
(S) 4-Bromofluorobenzene	*99.7*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*107*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3856727-1 10/30/22 19:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	25.0	28.2	113	19.0-160	
Acrolein	25.0	10.5	42.0	10.0-160	
Acrylonitrile	25.0	29.8	119	55.0-149	

Laboratory Control Sample (LCS)

(LCS) R3856727-1 10/30/22 19:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	5.00	5.08	102	70.0-123	
Bromobenzene	5.00	5.08	102	73.0-121	
Bromodichloromethane	5.00	5.32	106	75.0-120	
Bromoform	5.00	5.41	108	68.0-132	
Bromomethane	5.00	4.47	89.4	10.0-160	
n-Butylbenzene	5.00	4.52	90.4	73.0-125	
sec-Butylbenzene	5.00	4.76	95.2	75.0-125	
tert-Butylbenzene	5.00	5.04	101	76.0-124	
Carbon disulfide	5.00	4.84	96.8	61.0-128	
Carbon tetrachloride	5.00	5.34	107	68.0-126	
Chlorobenzene	5.00	5.41	108	80.0-121	
Chlorodibromomethane	5.00	5.30	106	77.0-125	
Chloroethane	5.00	4.26	85.2	47.0-150	
Chloroform	5.00	5.26	105	73.0-120	
Chloromethane	5.00	5.23	105	41.0-142	
2-Chlorotoluene	5.00	5.13	103	76.0-123	
4-Chlorotoluene	5.00	5.05	101	75.0-122	
1,2-Dibromo-3-Chloropropane	5.00	5.04	101	58.0-134	
1,2-Dibromoethane	5.00	5.60	112	80.0-122	
Dibromomethane	5.00	5.53	111	80.0-120	
1,2-Dichlorobenzene	5.00	4.92	98.4	79.0-121	
1,3-Dichlorobenzene	5.00	4.90	98.0	79.0-120	
1,4-Dichlorobenzene	5.00	5.06	101	79.0-120	
Dichlorodifluoromethane	5.00	5.35	107	51.0-149	
1,1-Dichloroethane	5.00	5.22	104	70.0-126	
1,2-Dichloroethane	5.00	5.61	112	70.0-128	
1,1-Dichloroethene	5.00	4.88	97.6	71.0-124	
cis-1,2-Dichloroethene	5.00	5.13	103	73.0-120	
trans-1,2-Dichloroethene	5.00	4.81	96.2	73.0-120	
1,2-Dichloropropane	5.00	5.40	108	77.0-125	
1,1-Dichloropropene	5.00	4.94	98.8	74.0-126	
1,3-Dichloropropane	5.00	5.48	110	80.0-120	
cis-1,3-Dichloropropene	5.00	5.19	104	80.0-123	
trans-1,3-Dichloropropene	5.00	4.91	98.2	78.0-124	
2,2-Dichloropropane	5.00	3.93	78.6	58.0-130	
Di-isopropyl ether	5.00	5.37	107	58.0-138	
Ethylbenzene	5.00	5.15	103	79.0-123	
Hexachloro-1,3-butadiene	5.00	4.25	85.0	54.0-138	
Isopropylbenzene	5.00	5.05	101	76.0-127	
p-Isopropyltoluene	5.00	4.84	96.8	76.0-125	

Laboratory Control Sample (LCS)

(LCS) R3856727-1 10/30/22 19:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Butanone (MEK)	25.0	31.7	127	44.0-160	
Methylene Chloride	5.00	4.77	95.4	67.0-120	
4-Methyl-2-pentanone (MIBK)	25.0	29.8	119	68.0-142	
Methyl tert-butyl ether	5.00	4.99	99.8	68.0-125	
Naphthalene	5.00	5.13	103	54.0-135	
n-Propylbenzene	5.00	4.96	99.2	77.0-124	
Styrene	5.00	5.03	101	73.0-130	
1,1,1,2-Tetrachloroethane	5.00	4.80	96.0	75.0-125	
1,1,2,2-Tetrachloroethane	5.00	4.28	85.6	65.0-130	
1,1,2-Trichlorotrifluoroethane	5.00	5.30	106	69.0-132	
Tetrachloroethene	5.00	4.98	99.6	72.0-132	
Toluene	5.00	5.05	101	79.0-120	
1,2,3-Trichlorobenzene	5.00	5.10	102	50.0-138	
1,2,4-Trichlorobenzene	5.00	4.60	92.0	57.0-137	
1,1,1-Trichloroethane	5.00	5.20	104	73.0-124	
1,1,2-Trichloroethane	5.00	5.13	103	80.0-120	
Trichloroethene	5.00	5.99	120	78.0-124	
Trichlorofluoromethane	5.00	5.44	109	59.0-147	
1,2,3-Trichloropropane	5.00	5.80	116	73.0-130	
1,2,4-Trimethylbenzene	5.00	4.80	96.0	76.0-121	
1,2,3-Trimethylbenzene	5.00	4.99	99.8	77.0-120	
1,3,5-Trimethylbenzene	5.00	4.93	98.6	76.0-122	
Vinyl chloride	5.00	4.36	87.2	67.0-131	
Xylenes, Total	15.0	15.4	103	79.0-123	
(S) Toluene-d8			*101*	*80.0-120*	
(S) 4-Bromofluorobenzene			*98.8*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*107*	*70.0-130*	

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
C3	The reported concentration is an estimate. The continuing calibration standard associated with this data responded low. Method sensitivity check is acceptable.
C5	The reported concentration is an estimate. The continuing calibration standard associated with this data responded high. Data is likely to show a high bias concerning the result.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
Q	Sample was prepared and/or analyzed past holding time as defined in the method. Concentrations should be considered minimum values.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

D088

OREGON DEQ State of Oregon Sample Chain of Custody OREGONDEQ

Agency, Authorized Purchaser or Agent:	Contract Laboratory Name: Pace	Lab Selection Criteria:	Turn Around Time:
Send Lab Report To: Mark Pugh	**Lab Batch #:**	☐ Proximity (if TAT < 48 hrs) ☐ Prior work on same project	☒ 10 days (std.) ☐ 5 days
Address: **Department of Environmental Quality** **700 NE Multnomah St., Suite 600** **Portland, OR 97232**	**Invoice To:** ODEQ/Business Office Address: 700 NE Multnomah St., Suite 600 Portland, OR 97232	☒ Cost (for anticipated analyses)	☐ 72 hours
Tel. #: (503) 229-5587	Tel. #: (800) 452-4011	☐ Other labs disqualified or unable to perform requested services	☐ 48 hours ☐ 24 hours
E-mail: PUGH.Mark@deq.state.or.us		☐ Emergency work	☐ Other _____

Project Name: Tigard Cleaners
Project #: 320002326-01

Sample Preservative

HCl — L2

Requested Analyses

Sample ID#	Collection Date/Time	Matrix	Number of Containers	VOCs – 8260D	Total Organic Carbon - SW9060/415.1/S M-5310B	Comments L1599614
MW-1	10/19 @ 0915	GW	4	X	X	-01
MW-2	10/18 @ 1335	GW	4	X	X	-02
MW-2i	10/19 @ 1000	GW	3	X		-03
MW-3	10/19 @ 1030	GW	3	X		-04
MW-4	10/19 @ 1115	GW	4	X	X	-05
MW-5	10/18 @ 1258	GW	4	X	X	-06
MW-6	10/18 @ 1445	GW	4	X	X	-07
MW-6i	10/18 @ 1820	GW	3	X		-08
MW-7	10/18 @ 1415	GW	3	X		-09
Dup-1	10/19 @ 1115	GW	3	X		-10

Notes: In addition, please send results to: M.Stevens@apexcos.com; Paula.Richardson@apexcos.com; COwens@apexcos.com; Kelsi.Evans@apexcos.com

Relinquished By: Robert Schettler	Agency/Agent: Apex Companies	Received By: GRACE BARRON	Agency/Agent: PACE
Signature: [signature]	Time & Date: 1100 10/21/22	Signature: [signature]	Time & Date: 10.22.22 0900
Relinquished By:	Agency/Agent:	Received By:	Agency/Agent:
Signature:	Time & Date:	Signature:	Time & Date:

THIS PURCHASE IS SUBMITTED PURSUANT TO STATE OF OREGON SOLICITATION **#102-1098-07** AND PRICE AGRE
TERMS AND CONDITIONS AND SPECIAL CONTRACT TERMS AND CONDITIONS (T'S &C'S) CONTAINED IN THE PR
SHALL APPLY TO THIS PURCHASE AND SHALL TAKE PRECEDENCE OVER ALL OTHER CONFLICTING T'S AND C'S, E

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	✓ Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	✓ Y N	Pres.Correct/Check:	Y N
Correct bottles used:	✓ Y N		
Sufficient volume sent:	✓ Y N		
RAD Screen <0.5 mR/hr:	✓ Y N		

ANALYTICAL REPORT

November 11, 2022

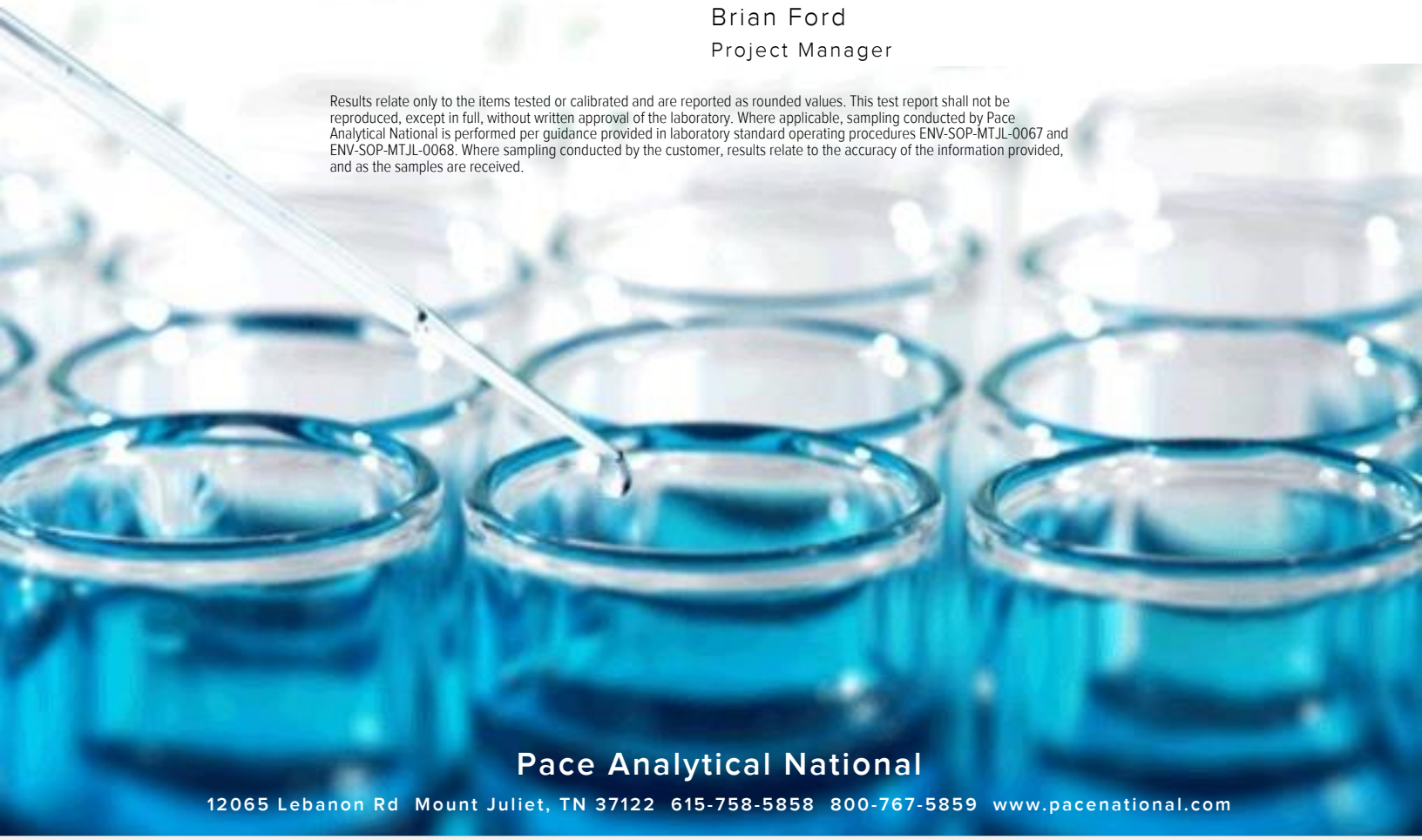
Oregon Dept. of Env. Quality - ODEQ

Sample Delivery Group:	L1554497
Samples Received:	11/05/2022
Project Number:	2326-01
Description:	Tigard Dry Cleaners
Report To:	Mark Pugh

Entire Report Reviewed By:

Brian Ford

Project Manager



Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

EX L1554497-01 Air

Collected by: Franklin Sullivan
Collected date/time: 11/03/22 16:27
Received date/time: 11/05/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG1956060	1	11/09/22 01:54	11/09/22 01:54	MBF	Mt. Juliet, TN

AMB-5 L1554497-02 Air

Collected by: Franklin Sullivan
Collected date/time: 11/03/22 17:02
Received date/time: 11/05/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG1956060	1	11/09/22 02:39	11/09/22 02:39	MBF	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG1956835	20	11/09/22 18:02	11/09/22 18:02	DBB	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG1957449	100	11/10/22 18:03	11/10/22 18:03	MBF	Mt. Juliet, TN

AMB-OUTSIDE L1554497-03 Air

Collected by: Franklin Sullivan
Collected date/time: 11/03/22 16:58
Received date/time: 11/05/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG1956060	1	11/09/22 03:25	11/09/22 03:25	MBF	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford
Project Manager

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	33.5	79.6		1	WG1956060
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG1956060
Benzene	71-43-2	78.10	0.200	0.639	1.31	4.18		1	WG1956060
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG1956060
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG1956060
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG1956060
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG1956060
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG1956060
Carbon disulfide	75-15-0	76.10	0.200	0.622	0.621	1.93		1	WG1956060
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG1956060
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG1956060
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG1956060
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG1956060
Chloromethane	74-87-3	50.50	0.200	0.413	ND	ND		1	WG1956060
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG1956060
Cyclohexane	110-82-7	84.20	0.200	0.689	2.39	8.23		1	WG1956060
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG1956060
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG1956060
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG1956060
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	0.205	1.23		1	WG1956060
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG1956060
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG1956060
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG1956060
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG1956060
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	7.93	31.4		1	WG1956060
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG1956060
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG1956060
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG1956060
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG1956060
1,4-Dioxane	123-91-1	88.10	0.200	0.721	ND	ND		1	WG1956060
Ethanol	64-17-5	46.10	1.25	2.36	32.4	61.1		1	WG1956060
Ethylbenzene	100-41-4	106	0.200	0.867	ND	ND		1	WG1956060
4-Ethyltoluene	622-96-8	120	0.200	0.982	ND	ND		1	WG1956060
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.232	1.30		1	WG1956060
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.362	1.79		1	WG1956060
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG1956060
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG1956060
Heptane	142-82-5	100	0.200	0.818	1.88	7.69		1	WG1956060
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG1956060
n-Hexane	110-54-3	86.20	0.630	2.22	11.2	39.5		1	WG1956060
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG1956060
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG1956060
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG1956060
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	11.6	34.2		1	WG1956060
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG1956060
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG1956060
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG1956060
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG1956060
2-Propanol	67-63-0	60.10	1.25	3.07	4.35	10.7		1	WG1956060
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG1956060
n-Propylbenzene	103-65-1	120	0.200	0.982	ND	ND		1	WG1956060
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG1956060
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG1956060
Tetrachloroethylene	127-18-4	166	0.200	1.36	18.5	126		1	WG1956060
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG1956060
Toluene	108-88-3	92.10	0.500	1.88	0.650	2.45		1	WG1956060

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG1956060
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG1956060
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG1956060
Trichloroethylene	79-01-6	131	0.200	1.07	20.2	108		1	WG1956060
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	ND	ND		1	WG1956060
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	ND	ND		1	WG1956060
2,2,4-Trimethylpentane	540-84-1	114.22	0.200	0.934	0.307	1.43		1	WG1956060
Vinyl chloride	75-01-4	62.50	0.200	0.511	2.98	7.62		1	WG1956060
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG1956060
Vinyl acetate	108-05-4	86.10	0.200	0.704	ND	ND		1	WG1956060
m&p-Xylene	1330-20-7	106	0.400	1.73	0.420	1.82		1	WG1956060
o-Xylene	95-47-6	106	0.200	0.867	ND	ND		1	WG1956060
TPH (GC/MS) Low Fraction	8006-61-9	101	200	826	313	1290		1	WG1956060
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*99.7*				WG1956060

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	125	297	6680	15900		100	WG1957449
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG1956060
Benzene	71-43-2	78.10	0.200	0.639	ND	ND		1	WG1956060
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG1956060
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG1956060
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG1956060
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG1956060
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG1956060
Carbon disulfide	75-15-0	76.10	0.200	0.622	ND	ND		1	WG1956060
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG1956060
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG1956060
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG1956060
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG1956060
Chloromethane	74-87-3	50.50	0.200	0.413	0.698	1.44		1	WG1956060
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG1956060
Cyclohexane	110-82-7	84.20	0.200	0.689	ND	ND		1	WG1956060
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG1956060
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG1956060
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG1956060
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG1956060
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG1956060
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG1956060
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG1956060
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG1956060
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG1956060
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG1956060
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG1956060
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG1956060
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG1956060
1,4-Dioxane	123-91-1	88.10	0.200	0.721	ND	ND		1	WG1956060
Ethanol	64-17-5	46.10	25.0	47.1	115	217		20	WG1956835
Ethylbenzene	100-41-4	106	0.200	0.867	1.38	5.98		1	WG1956060
4-Ethyltoluene	622-96-8	120	0.200	0.982	0.280	1.37		1	WG1956060
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.266	1.49		1	WG1956060
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.420	2.08		1	WG1956060
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG1956060
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG1956060
Heptane	142-82-5	100	4.00	16.4	440	1800		20	WG1956835
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG1956060
n-Hexane	110-54-3	86.20	63.0	222	3470	12200		100	WG1957449
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG1956060
Methylene Chloride	75-09-2	84.90	0.200	0.694	0.839	2.91		1	WG1956060
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG1956060
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	32.5	95.8		1	WG1956060
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG1956060
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG1956060
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG1956060
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG1956060
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG1956060
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG1956060
n-Propylbenzene	103-65-1	120	0.200	0.982	ND	ND		1	WG1956060
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG1956060
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG1956060
Tetrachloroethylene	127-18-4	166	0.200	1.36	2.72	18.5		1	WG1956060
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG1956060
Toluene	108-88-3	92.10	0.500	1.88	9.05	34.1		1	WG1956060

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG1956060
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG1956060
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG1956060
Trichloroethylene	79-01-6	131	4.00	21.4	1490	7980		20	WG1956835
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	0.349	1.71		1	WG1956060
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	ND	ND		1	WG1956060
2,2,4-Trimethylpentane	540-84-1	114.22	0.200	0.934	ND	ND		1	WG1956060
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG1956060
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG1956060
Vinyl acetate	108-05-4	86.10	0.200	0.704	ND	ND		1	WG1956060
m&p-Xylene	1330-20-7	106	0.400	1.73	5.63	24.4		1	WG1956060
o-Xylene	95-47-6	106	0.200	0.867	1.83	7.93		1	WG1956060
TPH (GC/MS) Low Fraction	8006-61-9	101	200	826	4810	19900		1	WG1956060
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*98.1*				WG1956060
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*89.0*				WG1956835
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*91.3*				WG1957449

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	2.88	6.84		1	WG1956060
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG1956060
Benzene	71-43-2	78.10	0.200	0.639	0.479	1.53		1	WG1956060
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG1956060
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG1956060
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG1956060
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG1956060
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG1956060
Carbon disulfide	75-15-0	76.10	0.200	0.622	ND	ND		1	WG1956060
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG1956060
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG1956060
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG1956060
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG1956060
Chloromethane	74-87-3	50.50	0.200	0.413	0.541	1.12		1	WG1956060
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG1956060
Cyclohexane	110-82-7	84.20	0.200	0.689	ND	ND		1	WG1956060
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG1956060
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG1956060
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG1956060
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG1956060
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG1956060
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG1956060
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG1956060
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG1956060
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG1956060
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG1956060
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG1956060
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG1956060
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG1956060
1,4-Dioxane	123-91-1	88.10	0.200	0.721	ND	ND		1	WG1956060
Ethanol	64-17-5	46.10	1.25	2.36	3.60	6.79		1	WG1956060
Ethylbenzene	100-41-4	106	0.200	0.867	ND	ND		1	WG1956060
4-Ethyltoluene	622-96-8	120	0.200	0.982	ND	ND		1	WG1956060
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.233	1.31		1	WG1956060
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.370	1.83		1	WG1956060
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG1956060
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG1956060
Heptane	142-82-5	100	0.200	0.818	ND	ND		1	WG1956060
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG1956060
n-Hexane	110-54-3	86.20	0.630	2.22	ND	ND		1	WG1956060
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG1956060
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG1956060
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG1956060
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG1956060
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG1956060
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG1956060
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG1956060
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG1956060
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG1956060
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG1956060
n-Propylbenzene	103-65-1	120	0.200	0.982	ND	ND		1	WG1956060
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG1956060
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG1956060
Tetrachloroethylene	127-18-4	166	0.200	1.36	0.851	5.78		1	WG1956060
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG1956060
Toluene	108-88-3	92.10	0.500	1.88	ND	ND		1	WG1956060

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG1956060
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG1956060
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG1956060
Trichloroethylene	79-01-6	131	0.200	1.07	0.223	1.19		1	WG1956060
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	ND	ND		1	WG1956060
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	ND	ND		1	WG1956060
2,2,4-Trimethylpentane	540-84-1	114.22	0.200	0.934	ND	ND		1	WG1956060
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG1956060
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG1956060
Vinyl acetate	108-05-4	86.10	0.200	0.704	ND	ND		1	WG1956060
m&p-Xylene	1330-20-7	106	0.400	1.73	ND	ND		1	WG1956060
o-Xylene	95-47-6	106	0.200	0.867	ND	ND		1	WG1956060
TPH (GC/MS) Low Fraction	8006-61-9	101	200	826	ND	ND		1	WG1956060
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*95.4*				WG1956060

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Method Blank (MB)

(MB) R3858385-3 11/08/22 11:50

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
Allyl Chloride	U		0.114	0.200
Benzene	U		0.0715	0.200
Benzyl Chloride	U		0.0598	0.200
Bromodichloromethane	U		0.0702	0.200
Bromoform	U		0.0732	0.600
Bromomethane	U		0.0982	0.200
1,3-Butadiene	U		0.104	2.00
Carbon disulfide	U		0.102	0.200
Carbon tetrachloride	U		0.0732	0.200
Chlorobenzene	U		0.0832	0.200
Chloroethane	U		0.0996	0.200
Chloroform	U		0.0717	0.200
Chloromethane	U		0.103	0.200
2-Chlorotoluene	U		0.0828	0.200
Cyclohexane	U		0.0753	0.200
Dibromochloromethane	U		0.0727	0.200
1,2-Dibromoethane	U		0.0721	0.200
1,2-Dichlorobenzene	U		0.128	0.200
1,3-Dichlorobenzene	U		0.182	0.200
1,4-Dichlorobenzene	U		0.0557	0.200
1,2-Dichloroethane	U		0.0700	0.200
1,1-Dichloroethane	U		0.0723	0.200
1,1-Dichloroethene	U		0.0762	0.200
cis-1,2-Dichloroethene	U		0.0784	0.200
trans-1,2-Dichloroethene	U		0.0673	0.200
1,2-Dichloropropane	U		0.0760	0.200
cis-1,3-Dichloropropene	U		0.0689	0.200
trans-1,3-Dichloropropene	U		0.0728	0.200
1,4-Dioxane	U		0.0833	0.200
Ethanol	U		0.265	1.25
Ethylbenzene	U		0.0835	0.200
4-Ethyltoluene	U		0.0783	0.200
Trichlorofluoromethane	U		0.0819	0.200
Dichlorodifluoromethane	U		0.137	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0793	0.200
1,2-Dichlorotetrafluoroethane	U		0.0890	0.200
Heptane	U		0.104	0.200
Hexachloro-1,3-butadiene	U		0.105	0.630
n-Hexane	U		0.206	0.630

Method Blank (MB)

(MB) R3858385-3 11/08/22 11:50

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Isopropylbenzene	U		0.0777	0.200
Methylene Chloride	U		0.0979	0.200
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.0814	1.25
4-Methyl-2-pentanone (MIBK)	U		0.0765	1.25
Methyl Methacrylate	U		0.0876	0.200
MTBE	U		0.0647	0.200
Naphthalene	U		0.350	0.630
2-Propanol	U		0.264	1.25
Propene	0.160	J	0.0932	1.25
n-Propylbenzene	U		0.0773	0.200
Styrene	U		0.0788	0.200
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
Toluene	U		0.0870	0.500
1,2,4-Trichlorobenzene	U		0.148	0.630
1,1,1-Trichloroethane	U		0.0736	0.200
1,1,2-Trichloroethane	U		0.0775	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0764	0.200
1,3,5-Trimethylbenzene	U		0.0779	0.200
2,2,4-Trimethylpentane	U		0.133	0.200
Vinyl chloride	U		0.0949	0.200
Vinyl Bromide	U		0.0852	0.200
Vinyl acetate	U		0.116	0.200
m&p-Xylene	U		0.135	0.400
o-Xylene	U		0.0828	0.200
TPH (GC/MS) Low Fraction	U		39.7	200
(S) 1,4-Bromofluorobenzene	*94.3*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3858385-1 11/08/22 10:21 • (LCSD) R3858385-2 11/08/22 11:07

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.81	3.82	102	102	70.0-130			0.262	25
Allyl Chloride	3.75	4.06	3.77	108	101	70.0-130			7.41	25
Benzene	3.75	3.83	3.83	102	102	70.0-130			0.000	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3858385-1 11/08/22 10:21 • (LCSD) R3858385-2 11/08/22 11:07

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzyl Chloride	3.75	3.83	3.91	102	104	70.0-152			2.07	25
Bromodichloromethane	3.75	3.87	3.85	103	103	70.0-130			0.518	25
Bromoform	3.75	3.93	3.98	105	106	70.0-130			1.26	25
Bromomethane	3.75	3.89	3.88	104	103	70.0-130			0.257	25
1,3-Butadiene	3.75	3.85	3.80	103	101	70.0-130			1.31	25
Carbon disulfide	3.75	3.90	3.94	104	105	70.0-130			1.02	25
Carbon tetrachloride	3.75	3.84	3.84	102	102	70.0-130			0.000	25
Chlorobenzene	3.75	3.79	3.84	101	102	70.0-130			1.31	25
Chloroethane	3.75	3.93	3.96	105	106	70.0-130			0.760	25
Chloroform	3.75	3.86	3.84	103	102	70.0-130			0.519	25
Chloromethane	3.75	3.91	3.94	104	105	70.0-130			0.764	25
2-Chlorotoluene	3.75	3.77	3.84	101	102	70.0-130			1.84	25
Cyclohexane	3.75	3.97	3.93	106	105	70.0-130			1.01	25
Dibromochloromethane	3.75	3.84	3.82	102	102	70.0-130			0.522	25
1,2-Dibromoethane	3.75	3.84	3.85	102	103	70.0-130			0.260	25
1,2-Dichlorobenzene	3.75	3.80	3.84	101	102	70.0-130			1.05	25
1,3-Dichlorobenzene	3.75	3.80	3.84	101	102	70.0-130			1.05	25
1,4-Dichlorobenzene	3.75	3.72	3.84	99.2	102	70.0-130			3.17	25
1,2-Dichloroethane	3.75	3.86	3.82	103	102	70.0-130			1.04	25
1,1-Dichloroethane	3.75	3.94	3.94	105	105	70.0-130			0.000	25
1,1-Dichloroethene	3.75	3.97	3.94	106	105	70.0-130			0.759	25
cis-1,2-Dichloroethene	3.75	3.96	3.94	106	105	70.0-130			0.506	25
trans-1,2-Dichloroethene	3.75	3.90	3.94	104	105	70.0-130			1.02	25
1,2-Dichloropropane	3.75	3.90	3.91	104	104	70.0-130			0.256	25
cis-1,3-Dichloropropene	3.75	3.83	3.91	102	104	70.0-130			2.07	25
trans-1,3-Dichloropropene	3.75	3.94	3.90	105	104	70.0-130			1.02	25
1,4-Dioxane	3.75	3.68	3.64	98.1	97.1	70.0-140			1.09	25
Ethanol	3.75	3.92	3.98	105	106	55.0-148			1.52	25
Ethylbenzene	3.75	3.91	3.97	104	106	70.0-130			1.52	25
4-Ethyltoluene	3.75	3.90	3.97	104	106	70.0-130			1.78	25
Trichlorofluoromethane	3.75	3.95	3.92	105	105	70.0-130			0.762	25
Dichlorodifluoromethane	3.75	3.70	3.68	98.7	98.1	64.0-139			0.542	25
1,1,2-Trichlorotrifluoroethane	3.75	3.86	3.89	103	104	70.0-130			0.774	25
1,2-Dichlorotetrafluoroethane	3.75	3.96	3.94	106	105	70.0-130			0.506	25
Heptane	3.75	3.75	3.73	100	99.5	70.0-130			0.535	25
Hexachloro-1,3-butadiene	3.75	3.80	3.85	101	103	70.0-151			1.31	25
n-Hexane	3.75	3.91	3.99	104	106	70.0-130			2.03	25
Isopropylbenzene	3.75	3.90	3.95	104	105	70.0-130			1.27	25
Methylene Chloride	3.75	3.84	3.87	102	103	70.0-130			0.778	25
Methyl Butyl Ketone	3.75	3.46	3.43	92.3	91.5	70.0-149			0.871	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3858385-1 11/08/22 10:21 • (LCSD) R3858385-2 11/08/22 11:07

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Methyl Ethyl Ketone	3.75	3.95	3.94	105	105	70.0-130			0.253	25
4-Methyl-2-pentanone (MIBK)	3.75	3.86	3.88	103	103	70.0-139			0.517	25
Methyl Methacrylate	3.75	3.94	3.85	105	103	70.0-130			2.31	25
MTBE	3.75	3.87	3.81	103	102	70.0-130			1.56	25
Naphthalene	3.75	3.56	3.64	94.9	97.1	70.0-159			2.22	25
2-Propanol	3.75	3.98	3.98	106	106	70.0-139			0.000	25
Propene	3.75	3.96	3.93	106	105	64.0-144			0.760	25
n-Propylbenzene	3.75	3.81	3.90	102	104	70.0-130			2.33	25
Styrene	3.75	3.92	3.96	105	106	70.0-130			1.02	25
1,1,2,2-Tetrachloroethane	3.75	3.93	3.95	105	105	70.0-130			0.508	25
Tetrachloroethylene	3.75	3.77	3.81	101	102	70.0-130			1.06	25
Tetrahydrofuran	3.75	3.94	3.99	105	106	70.0-137			1.26	25
Toluene	3.75	3.82	3.78	102	101	70.0-130			1.05	25
1,2,4-Trichlorobenzene	3.75	3.90	4.02	104	107	70.0-160			3.03	25
1,1,1-Trichloroethane	3.75	3.93	3.85	105	103	70.0-130			2.06	25
1,1,2-Trichloroethane	3.75	3.78	3.86	101	103	70.0-130			2.09	25
Trichloroethylene	3.75	3.81	3.83	102	102	70.0-130			0.524	25
1,2,4-Trimethylbenzene	3.75	3.92	3.99	105	106	70.0-130			1.77	25
1,3,5-Trimethylbenzene	3.75	3.86	3.92	103	105	70.0-130			1.54	25
2,2,4-Trimethylpentane	3.75	3.92	3.91	105	104	70.0-130			0.255	25
Vinyl chloride	3.75	3.94	4.02	105	107	70.0-130			2.01	25
Vinyl Bromide	3.75	3.95	3.99	105	106	70.0-130			1.01	25
Vinyl acetate	3.75	3.97	4.06	106	108	70.0-130			2.24	25
m&p-Xylene	7.50	7.83	7.94	104	106	70.0-130			1.40	25
o-Xylene	3.75	3.97	3.97	106	106	70.0-130			0.000	25
TPH (GC/MS) Low Fraction	203	220	209	108	103	70.0-130			5.13	25
(S) 1,4-Bromofluorobenzene				*98.6*	*98.8*	*60.0-140*				

Method Blank (MB)

(MB) R3859269-2 11/09/22 10:34

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ppbv		ppbv	ppbv
Ethanol	U		0.265	1.25
Heptane	U		0.104	0.200
Trichloroethylene	U		0.0680	0.200
(S) 1,4-Bromofluorobenzene	*89.1*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3859269-1 11/09/22 09:52 • (LCSD) R3859269-3 11/09/22 11:37

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppbv	ppbv	ppbv	%	%	%			%	%
Ethanol	3.75	3.70	3.95	98.7	105	55.0-148			6.54	25
Heptane	3.75	4.20	4.21	112	112	70.0-130			0.238	25
Trichloroethylene	3.75	4.25	4.28	113	114	70.0-130			0.703	25
(S) 1,4-Bromofluorobenzene				*93.6*	*92.1*	*60.0-140*				

Method Blank (MB)

(MB) R3859596-3 11/10/22 09:55

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
n-Hexane	U		0.206	0.630
(S) 1,4-Bromofluorobenzene	*88.5*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3859596-1 11/10/22 08:56 • (LCSD) R3859596-2 11/10/22 09:26

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.90	3.80	104	101	70.0-130			2.60	25
n-Hexane	3.75	4.24	4.25	113	113	70.0-130			0.236	25
(S) 1,4-Bromofluorobenzene				*97.4*	*96.5*	*60.0-140*				

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Company Name/Address:
Oregon Dept. of Env. Quality - ODEQ

Billing Information:
Accounts Payable
700 NE Multnomah St, Ste 600
Portland, OR 97232

Report To:
Mark Pugh

Email To:
mark.pugh@state.or.us;mstevens@apexcos.com;Kelsi.Evans@apexcos.com;paula.richardson@apexcos.com

Project Description: **Tigard Dry Cleaners**

City/State Collected: Tigard/Portland OR

Please Circle: PT MT CT ET

Phone:

Client Project #: **2326-01**

Lab Project #: **OREGONDEQ-TIGARD**

Collected by (print): Franklin Sullivan

Site/Facility ID #:

P.O. #:

Collected by (signature):

Rush? (Lab MUST Be Notified)
___ Same Day ___ Three Day
___ Next Day ___ Five Day
___ Two Day

Date Results Needed

Sample ID	Can #	Flow Cont. #	Collection Date	Collection Time	Canister Pressure/Vacuum Initial	Canister Pressure/Vacuum Final	TO-15 Summa	Analysis	Analysis	Analysis	Rem./Contaminant	Sample # (lab only)
Ex	02940	007139	11/3/22	1622-1627	-30	-4	X					-01
AMB-5	021127	20139	11/3/22	0918-1702	-29	-5	X					-02
AMB-Outside	020808	21486	11/3/22	0916-1658	-30	-4	X					-03

Sample Receipt Checklist

		If Applicable	
COC Seal Present/Intact:	Y N		
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	✓ N		
RAD Screen <0.5 mR/hr:	Y N		

Chain of Custody Page ___ of ___

Pace
PEOPLE ADVANCING SCIENCE
MT JULIET, TN
12065 Lebanon Road Mt Juliet, TN 37122
Phone: 615-758-5858 Alt: 800-767-5859
Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace Terms and Conditions found at: https://info.pacelabs.com/hubfs/pas-standard-terms.pdf

SDG # L1554497
B004

Acctnum: **OREGONDEQ**
Template: **T218417**
Prelogin: **P958108**
PM: 110 - Brian Ford
PB:

Shipped Via: **FedEx Ground**

Remarks:

Relinquished by: (Signature)	Date:	Time:	Samples returned via: __ UPS __ FedEx __ Courier __ _____	Tracking #	Hold #
	11/4/22	1114	Received by: (Signature)	Date: Time:	Condition: (lab use only)
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Date: Time:	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 11-5-22 Time: 0900	COC Seal Intact: ___Y ___N ___NA NCF:

Appendix C

Historical data

Table C-1
Groundwater Elevation Data
Tigard Cleaners
Tigard, Oregon

Well Identification	Date	Screened Interval (feet bgs)	Top of Casing (feet MSL)	Depth to Water (feet bgs)	Depth to Product (feet bgs)	Product Thickness (feet bgs)	Groundwater Elevation (feet MSL)
Shallow Wells							
MW-1							
	6/18/2018	7-17	154.054	6.78	--	--	147.27
	9/25/2018			6.86	--	--	147.19
	2/7/2019			5.32	--	--	148.73
	5/30/2019			4.78	--	--	149.27
	9/24/2019			5.08	--	--	148.97
	5/27/2020			7.32	--	--	146.73
	10/16/2020			5.30	--	--	148.75
	6/7/2021			7.41	--	--	146.64
	10/20/2021			5.03	--	--	149.02
	10/19/2022			4.90	--	--	149.15
MW-2							
	6/18/2018	7-17	154.85	4.41	--	--	150.44
	9/25/2018			4.35	--	--	150.50
	2/7/2019			3.65	--	--	151.20
	5/30/2019			3.59	--	--	151.26
	9/24/2019			3.77	--	--	151.08
	5/27/2020			4.12	--	--	150.73
	10/16/2020			4.66	--	--	150.19
	6/7/2021			4.24	--	--	150.61
	10/20/2021			3.11	--	--	151.74
	10/19/2022			7.26	--	--	147.59
MW-3							
	6/18/2018	7-17	155.293	5.91	--	--	149.38
	9/25/2018			6.60	--	--	148.69
	2/7/2019			5.80	--	--	149.49
	5/30/2019			5.48	--	--	149.81
	9/24/2019			5.76	--	--	149.53
	5/27/2020			5.40	--	--	149.89
	10/16/2020			5.79	--	--	149.50
	6/7/2021			5.80	--	--	149.49
	10/20/2021			5.87	--	--	149.42
	10/19/2022			6.27	--	--	149.02

Please see notes at end of table.

Table C-1
Groundwater Elevation Data
Tigard Cleaners
Tigard, Oregon

Well Identification	Date	Screened Interval (feet bgs)	Top of Casing (feet MSL)	Depth to Water (feet bgs)	Depth to Product (feet bgs)	Product Thickness (feet bgs)	Groundwater Elevation (feet MSL)
MW-4							
	6/18/2018	7-17	155.54	5.61	--	--	149.93
	9/25/2018			5.87	--	--	149.67
	2/7/2019			5.33	--	--	150.21
	5/30/2019			5.27	--	--	150.27
	9/24/2019			5.30	--	--	150.24
	5/27/2020			5.29	--	--	150.25
	10/16/2020			5.40	--	--	150.14
	6/7/2021			5.61	--	--	149.93
	10/20/2021			5.48	--	--	150.06
	10/19/2022			5.70	--	--	149.84
MW-5							
	6/18/2018	7-17	154.688	4.62	--	--	150.07
	9/25/2018			4.83	--	--	149.86
	2/7/2019			4.32	--	--	150.37
	5/30/2019			4.30	--	--	150.39
	9/24/2019			4.50	--	--	150.19
	5/27/2020			4.31	--	--	150.38
	10/16/2020			4.58	--	--	150.11
	6/7/2021			4.48	--	--	150.21
	10/20/2021			4.40	--	--	150.29
	10/19/2022			4.80	--	--	149.89
MW-6							
	6/18/2018	10-20	153.319	8.55	--	--	144.77
	9/25/2018			6.08	--	--	147.24
	2/7/2019			6.65	--	--	146.67
	5/30/2019			10.79	--	--	142.53
	9/24/2019			10.33	--	--	142.99
	5/27/2020			11.40	--	--	141.92
	10/16/2020			5.29	--	--	148.03
	6/7/2021			9.33	--	--	143.99
	10/20/2021			9.42	--	--	143.90
	10/19/2022			4.82	--	--	148.50

Please see notes at end of table.

Table C-1
Groundwater Elevation Data
Tigard Cleaners
Tigard, Oregon

Well Identification	Date	Screened Interval (feet bgs)	Top of Casing (feet MSL)	Depth to Water (feet bgs)	Depth to Product (feet bgs)	Product Thickness (feet bgs)	Groundwater Elevation (feet MSL)
MW-7							
	6/18/2018	10-20	153.992	4.39	--	--	149.60
	9/25/2018			5.00	--	--	148.99
	2/7/2019			4.27	--	--	149.72
	5/30/2019			5.31	--	--	148.68
	9/24/2019			4.64	--	--	149.35
	5/27/2020			6.52	--	--	147.47
	10/16/2020			4.50	--	--	149.49
	6/7/2021			6.16	--	--	147.83
	10/20/2021			4.94	--	--	149.05
	10/19/2022			4.85	--	--	149.14
Intermediate Wells							
MW-2i							
	6/18/2018	33.25-43.25	154.21	5.13	--	--	149.08
	9/25/2018			4.70	--	--	149.51
	2/7/2019			4.44	--	--	149.77
	5/30/2019			7.60	--	--	146.61
	9/24/2019			5.02	--	--	149.19
	5/27/2020			7.42	--	--	146.79
	10/16/2020			4.93	--	--	149.28
	6/7/2021			4.27	--	--	149.94
	10/20/2021			6.20	--	--	148.01
	10/19/2022			4.29	--	--	149.92
MW-6i							
	6/18/2018	24.58-34.58	153.17	4.23	--	--	148.94
	9/25/2018			4.19	--	--	148.98
	2/7/2019			5.74	--	--	147.43
	5/30/2019			7.73	--	--	145.44
	9/24/2019			15.18	--	--	137.99
	5/27/2020			20.41	--	--	132.76
	10/16/2020			8.12	--	--	145.05
	6/7/2021			6.21	--	--	146.96
	10/20/2021			7.90	--	--	145.27
	10/19/2022			8.23	--	--	144.94

Notes:

1. bgs = below ground surface.
2. feet MSL = feet above mean sea level.
3. -- = Data not available or no product was measured.

Table C-2
Groundwater Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Upgradient						
Grab GW SOUTH						
	1/28/2019	<1.00	<1.00	**0.64**	<1.00	**<1.00**
MW-5						
	8/31/2017	<1.00	<1.00	**1.37**	<1.00	**0.984 J**
	10/9/2017	<1.00	<1.00	**1.34**	<1.00	**0.509 J**
	6/18/2018	<1.00	<1.00	**1.19**	<1.00	**0.389 J**
	9/25/2018	<1.00	<1.00	**0.640 J**	<1.00	**0.265 J**
	2/5/2019	<1.00	<1.00	**1.21**	<1.00	**0.980 J**
	5/30/2019	<1.00	<1.00	**2.18**	<1.00	**0.501 J**
	9/24/2019	<1.00	<1.00	**0.777 J**	<1.00	<1.00
	5/27/2020	<1.00	<1.00	**0.614 J**	<1.00	**0.239 J**
	10/16/2020	<1.00	<1.00	**0.463 J**	<1.00	<1.00
	6/7/2021	<1.00	<1.00	**0.188 J**	<1.00	**0.561 J**
	10/20/2021	<1.00	**0.261 J**	**9.06**	<1.00	**0.433 J+**
	10/18/2022	<1.00	<1.00	<1.00	<1.00	<1.00
Source Area						
MW-1						
	8/31/2017	**58,000**	**71,700**	**89,300**	**574**	**1,720**
	10/9/2017	**53,300**	**61,500**	**72,200**	**536**	**1,750**
	6/18/2018	**64,100**	**68,700**	**61,500**	**455 J**	**1,130**
	9/25/2018	**42,800**	**95,900**	**122,000**	**781**	**2,160**
	2/7/2019	**2,540**	**23,200**	**308,000**	**1,290**	**7620 J**
	5/30/2019	**3,230**	**9,040**	**375,000**	**1930 J**	**12,800**
	9/24/2019	**10,500**	**25,400**	**439,000**	**2,190**	**36,000**
	5/27/2020	**10,000**	**12500 J**	**536,000**	<20000	**58,700**
	10/16/2020	**11000 J**	**34,200**	**384,000**	<20000	**15,800 J**
	6/7/2021	<20000	<20000	**452,000**	<20000	**90,000 J+**
	10/20/2021	**9940 J**	**21,200**	**279,000**	<20000	**18,700 J+**
	10/19/2022	<500	<500	**217,000**	967	**37,200**
MW-3						
	8/31/2017	**4,000**	**1,890**	**2,000**	**5.61**	**175**
	10/9/2017	**1,700**	**1,090**	**1,190**	**4.49**	**134**
	6/19/2018	**1,110**	**661**	**2,740**	**14.3**	**365**
	9/25/2018	**1,520**	**591**	**3,350**	**106**	**431**
	2/5/2019	**7,160**	**723**	**13,000**	**40.6**	**1,550**
	5/30/2019	**1,220**	**468**	**10,700**	**41.3 J**	**1,410**
	9/24/2019	**214**	**147**	**1,680**	**4.89 J**	**94.9**
	5/27/2020	**726**	**385**	**6,410**	**32.4**	**818**
	10/16/2020	**1,740**	**1,060**	**5,490**	<100	**703**
	6/7/2021	**2,620**	**1,350**	**5,630**	**24.1 J**	**1020 J+**
	10/20/2021	**1,560**	**821**	**3,150**	<100	**467 J+**
	10/19/2022	<100	<100	**2,520**	<100	**92.2 J**
MW-4						
	8/31/2017	**60,600**	**35,400**	**45,200**	**140**	**7,680**
	10/9/2017	**44,000**	**21,900**	**24,400**	**84.1**	**4,930**
	6/18/2018	**55,300**	**37,100**	**62,100**	**314**	**6,090**
	9/25/2018	**9,790**	**5,290**	**86400 J**	<1000	**3630 J**
	2/5/2019	**23,800**	**7,980**	**253,000**	**657**	**24,100**
	5/30/2019	**16,400**	**9,660**	**198,000**	<2000	**22,700**
	9/24/2019	**21,300**	**5,460**	**162,000**	<2000	**21,200**

Please see notes at end of table.

Table C-2
Groundwater Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Upgradient						
MW-4	5/27/2020	**16,800**	**8,830**	**156,000**	<2000	**32,200**
	10/16/2020	**14,800**	**5,200**	**117,000**	<2000	**26,500**
	6/7/2021	**13,300**	**5,890**	**74,200**	<2000	**28000 J+**
	10/20/2021	**27,400**	**9,890**	**64,900**	<2000	**21,700**
	10/19/2022	**78,000**	**11,500**	**76,400**	<2000	**13,000**
Downgradient						
MW-2						
	8/31/2017	**<1.00**	**1.14**	**19.7**	**<1.00**	**6.78**
	10/9/2017	**1.14**	**4.45**	**20.9**	<1.00	**4.05**
	6/19/2018	**0.613 J**	**0.605 J**	**17.7**	<1.00	**12.4**
	9/25/2018	<1.00	<1.00	**43.3**	<1.00	**28.2**
	2/7/2019	<1.00	<1.00	**74.9**	**0.438 J**	**49.6**
	5/30/2019	<1.00	<1.00	**84.1**	**0.608 J**	**52.0**
	9/24/2019	<1.00	<1.00	**7.90**	<1.00	**3.77**
	5/27/2020	<1.00	<1.00	**71.6**	**0.498 J**	**62.9**
	10/16/2020	<1.00	<1.00	**5.45**	<1.00	**3.21**
	6/7/2021	<1.00	<1.00	**62.8**	**0.367 J**	**79.0 J+**
	10/20/2021	<1.00	<1.00	**32.2**	**0.166 J**	**34.2 J+**
	10/18/2022	<1.00	<1.00	**8.55**	**0.287 J**	**2.88**
MW-2i						
	6/19/2018	**365**	**5,800**	**40,300**	**369**	**64.9**
	9/25/2018	<100	<100	**48,300**	**395**	**4,130**
	2/7/2019	**0.507 J**	**1.12**	**51,800**	**40.9**	**7,200**
	5/30/2019	<500	<500	**42,300**	<500	**9,430**
	9/24/2019	<500	<500	**43,500**	<500	**10,300**
	5/27/2020	<500	<500	**20,000**	<500	**1,620**
	10/16/2020	<500	<500	**36,500**	<500	**9,610**
	6/7/2021	<500	<500	**31,100**	<500	**13500 J+**
	10/20/2021	<500	<500	**19,600**	<500	**4820 J+**
	10/19/2022	<500	<500	**34,000**	<500	**8,700**
MW-6						
	8/31/2017	**4,740**	**31,000**	**25,800**	**126**	**2,170**
	10/9/2017	**3,690**	**28,700**	**22,800**	**141**	**2,490**
	6/18/2018	<200	**234**	**35,500**	**156 J**	**1,860**
	9/25/2018	<200	<200	**30,100**	**123 J**	**8,800**
	2/7/2019	<1.00	**4.76**	**43,600**	**152**	**7,660**
	5/30/2019	<250	<250	**28,900**	**138 J**	**5,120**
	9/24/2019	<250	<250	**26,300**	**117 J**	**8,800**
	5/27/2020	<250	<250	**8,070**	<250	**5840 J**
	10/16/2020	<250	<250	**5,550**	<250	**4,460**
	6/7/2021	<250	<250	**921**	<250	**1060 J+**
	10/20/2021	<25.0	**9.65 J**	**1,970**	**5.35 J**	**879**
	10/18/2022	<25.0	<25.0	**1,320**	**5.94 J**	**906**
MW-6i						
	6/18/2018	**1.26**	**1.44**	**2,020**	**10.9**	**91.4**
	9/25/2018	<1.00	<1.00	**0.538 J**	**3.15**	**1.24**
	2/7/2019	<1.00	<1.00	**1.07**	**1.69**	**1.51**
	5/30/2019	<1.00	<1.00	**0.696 J**	**2.35**	**1.73**
	9/24/2019	<1.00	<1.00	**115**	**1.77**	**148**
	5/27/2020	<1.00	0.5	**9.42**	**0.601 J**	**1.23 J**
	10/16/2020	<1.00	<1.00	**1.31**	**0.201 J**	**2.29**

Please see notes at end of table.

Table C-2
Groundwater Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Upgradient						
MW-6i	6/7/2021	<1.00	<1.00	**0.818 J**	**0.336 J**	<1.00
	10/20/2021	<1.00	<1.00	**0.779 J**	**0.232 J**	<1.00
	10/18/2022	<1.00	<1.00	**0.950 J**	**0.236 J**	<1.00
MW-7						
	8/31/2017	**1.59**	**45.0**	**6,710**	**65.8**	**2,120**
	10/9/2017	<500	<500	**13,000**	**300 J+**	**5,580**
	6/19/2018	<1.00	**23.0**	**11,800**	**61.5**	**7,790**
	9/25/2018	<100	<100	**10,500**	**48.8 J**	**5,930**
	2/7/2019	<1.00	<1.00	**5,350**	<1.00	**4,990**
	5/30/2019	<25.0	<25.0	**661**	<25.0	**715**
	9/24/2019	<25.0	<25.0	**273**	<25.0	**325**
	5/27/2020	<25.0	<25.0	**882**	**4.89 J**	**863 J**
	10/16/2020	<25.0	<25.0	**2,290**	<25.0	**2,110**
	6/7/2021	<5.00	<5.00	**229**	**1.41 J**	**336 J+**
	10/20/2021	<5.00	<5.00	**101**	**1.15 J**	**259 J+**
	10/18/2022	<5.00	<5.00	**45.9**	<5.00	**46.0**
GW Volatilization to Outdoor Air	Urban Residential	150,000	6,900	>S	>S	430
	Occupational	>S	20,000	>S	>S	5,900
GW Vapor Intrusion into Buildings	Urban Residential	8,700	430	>S	>S	21
	Occupational	48,000	3,700	>S	>S	880
GW in Excavations	Construction and Excavation Worker	5,600	430	18,000	180,000	960

Notes:
µg/L = micrograms per liter.
PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2,-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
DEQ Risk-Based Concentrations from Oregon Department of Environmental Quality's *Risk-Based Decision Making for the Remed*
Bold values indicate concentration detected above the method detection limit.
Shaded values indicate concentrations detected above one or more applicable RBCs.
< = Concentration was not detected above the shown minimum reporting limit.
-- = Not analyzed or not available.
>S = The RBC exceeds the solubility limit of the analyte.
J = The reported concentration is an estimated quantity.
J+ = Result is an estimated concentration and may be biased high.
J- = Result is an estimated concentration and may be biased low.

Table C-3
Groundwater Analytical Results for Natural Attenuation Parameters
Tigard Cleaners
Tigard, Oregon

Sample ID:	Upgradient								
	MW-5								
Sample Date:	8/31/2017	6/18/2018	2/5/2019	9/24/2019	5/27/2020	10/16/2020	6/7/2021	10/20/2021	10/18/2022
	Concentration in µg/L								
Total Metals									
Calcium	**55,000**	--	--	--	--	--	--	--	--
Iron	**23,400**	--	--	--	--	--	--	--	--
Magnesium	**15,200**	--	--	--	--	--	--	--	--
Manganese	**3,670**	--	--	--	--	--	--	--	--
Potassium	**5,070**	--	--	--	--	--	--	--	--
Dissolved Metals									
Calcium	**59,000**	--	--	--	--	--	--	--	--
Iron	<100	--	--	--	--	--	--	--	--
Magnesium	**17,000**	--	--	--	--	--	--	--	--
Manganese	**3,860**	--	--	--	--	--	--	--	--
Potassium	**5,650**	--	**4,360**	--	--	--	--	--	--
Wet Chemistry									
Hardness	**190,000**	--	--	--	--	--	--	--	--
Alkalinity	**231,000**	--	**273,000**	--	--	--	--	--	--
Chloride	**3,610**	--	**3,560**	**4,720**	--	--	--	--	--
Nitrate	<100	--	<100	<100	--	--	--	--	--
Nitrite	<100	--	<100	<100	--	--	--	--	--
Sulfate	**177** J	--	<5,000	**6,210**	--	--	--	--	--
Orthophosphate	<25	--	**124** J	**233**	--	--	--	--	--
Ammonia Nitrogen	**2,510**	--	**2,550**	**2,090**	--	--	--	--	--
Chemical Oxygen Demand (COD)	<10,000	--	--	--	--	--	--	--	--
Biochemical Oxygen Demand (BOD)	**7,400**	--	--	--	--	--	--	--	--
Total Organic Carbon (TOC)	**3,530**	**2,810**	**3,470**	**18,900**	**6,440**	**18,400**	**6,620**	**5,310**	<1000
Dissolved Organic Carbon (DOC)	**3,560**	**2,830**	**3,010**	--	--	--	--	--	
Volatile Organic Compounds									
Methane	**7,140**	--	**11,600**	**4,830**	--	--	--	--	
Ethane	**13.1**	--	**16.8**	<13.0	--	--	--	--	
Ethene	<13.0	--	<13.0	<13.0	--	--	--	--	

Please see notes at end of table.

Table C-3
Groundwater Analytical Results for M
Tigard Cleaners
Tigard, Oregon

Sample ID:	Source Area								
	MW-4								
Sample Date:	8/31/2017	6/18/2018	2/5/2019	9/24/2019	5/27/2020	10/16/2020	6/7/2021	10/21/2021	10/19/2022
	Concentration in µg/L								
Total Metals									
Calcium	**84,900**	--	--	--	--	--	--	--	--
Iron	**86,800**	--	--	--	--	--	--	--	--
Magnesium	**25,800**	--	--	--	--	--	--	--	--
Manganese	**7,100**	--	--	--	--	--	--	--	--
Potassium	**4,170**	--	--	--	--	--	--	--	--
Dissolved Metals									
Calcium	**84,400**					--	--	--	--
Iron	**18,000**	--	--	--	--	--	--	--	--
Magnesium	**26,200**	--	--	--	--	--	--	--	--
Manganese	**7,040**	--	--	--	--	--	--	--	--
Potassium	**4,500**	--	--	--	--	--	--	--	--
Wet Chemistry									
Hardness	**308,000**	--	--	--	--	--	--	--	--
Alkalinity	**101,000**	--	--	--	--	--	--	--	--
Chloride	**206,000**	--	--	**424,000**	--	--	--	--	--
Nitrate	<100	--	--	<100	--	--	--	--	--
Nitrite	<100	--	--	<100	--	--	--	--	--
Sulfate	**3,260** J	--	--	<5000	--	--	--	--	--
Orthophosphate	<25	--	--	**460**	--	--	--	--	--
Ammonia Nitrogen	**3,010**	--	--	**2,830**	--	--	--	--	--
Chemical Oxygen Demand (COD)	**29,600**	--	--	--	--	--	--	--	--
Biochemical Oxygen Demand (BOD)	**6,300**	--	--	--	--	--	--	--	--
Total Organic Carbon (TOC)	**6,320**	**209,000**	**64,500**	**46,000**	**25,600**	**28,200**	**25,300**	**19,500**	**111,000 J**
Dissolved Organic Carbon (DOC)	**5,960**	**191,000**	**61,300**	--	--	--	--	--	--
Volatile Organic Compounds									
Methane	**11,000**	--	--	**14,900**	--	--	--	--	--
Ethane	**4,130**	--	--	**755**	--	--	--	--	--
Ethene	**3,750**	--	--	**3,720**	--	--	--	--	--

Please see notes at end of table.

Table C-3
Groundwater Analytical Results for M
Tigard Cleaners
Tigard, Oregon

Sample ID:	Downgradient									
	MW-1									MW-2
Sample Date:	8/31/2017	6/18/2018	2/7/2019	9/24/2019	5/27/2020	10/16/2020	6/7/2021	10/20/2021	10/19/2022	10/19/2022
	Concentration in µg/L									
Total Metals										
Calcium	**55,300**	--	--	--	--	--	--	--	--	--
Iron	**9,600**	--	--	--	--	--	--	--	--	--
Magnesium	**17,100**	--	--	--	--	--	--	--	--	--
Manganese	**7,230**	--	--	--	--	--	--	--	--	--
Potassium	**1,860**	--	--	--	--	--	--	--	--	--
Dissolved Metals										
Calcium	**56,000**	--	--	--	--	--	--	--	--	--
Iron	**172**	--	--	--	--	--	--	--	--	--
Magnesium	**17,600**	--	--	--	--	--	--	--	--	--
Manganese	**7,600**	--	--	--	--	--	--	--	--	--
Potassium	**1,870**	--	**3,040**	--	--	--	--	--	--	--
Wet Chemistry										
Hardness	**198,000**	--	--	--	--	--	--	--	--	--
Alkalinity	**113,000**	--	**104,000**	--	--	--	--	--	--	--
Chloride	**92,200***	--	**357,000**	**476,000**	--	--	--	--	--	--
Nitrate	--	--	<100	<100	--	--	--	--	--	--
Nitrite	--	--	<100	<100	--	--	--	--	--	--
Sulfate	**5,310***	--	**4,160** J	**3,830** J	--	--	--	--	--	--
Orthophosphate	**22.0***	--	**399**	**243**	--	--	--	--	--	--
Ammonia Nitrogen	**1,010***	--	**1,100**	**1,780**	--	--	--	--	--	--
Chemical Oxygen Demand (COD)	**55,500**	--	--	--	--	--	--	--	--	--
Biochemical Oxygen Demand (BOD)	<3,330	--	--	--	--	--	--	--	--	--
Total Organic Carbon (TOC)	**4,870***	**13,100**	**11,900**	**15,800**	**15,900**	**11,500**	**32,400**	**11,700**	**129,000 J**	<1000
Dissolved Organic Carbon (DOC)	**11,900**	**7,280**	**11,100**	--	--	--	--	--	--	--
Volatile Organic Compounds										
Methane	--	--	**828**	**3,020**	--	--	--	--	--	--
Ethane	--	--	**56.8**	**90.4**	--	--	--	--	--	--
Ethene	--	--	**447**	**1,550**	--	--	--	--	--	--

Please see notes at end of table.

Table C-3
Groundwater Analytical Results for M
Tigard Cleaners
Tigard, Oregon

Sample ID:	Downgradient										
	MW-6									MW-6I	
Sample Date:	8/31/2017	6/18/2018	2/7/2019	9/24/2019	5/27/2020	10/16/2020	6/7/2021	10/20/2021	10/18/2022	6/18/2018	2/7/2019
	Concentration in µg/L										
Total Metals											
Calcium	**91,300**	--	--	--	--	--	--	--	--	--	--
Iron	**139**	--	--	--	--	--	--	--	--	--	--
Magnesium	**34,700**	--	--	--	--	--	--	--	--	--	--
Manganese	**3,630**	--	--	--	--	--	--	--	--	--	--
Potassium	**4,750**	--	--	--	--	--	--	--	--	--	--
Dissolved Metals											
Calcium	**99,500**	--	--	--	--	--	--	--	--	--	--
Iron	<100	--	--	--	--	--	--	--	--	--	--
Magnesium	**39,300**	--	--	--	--	--	--	--	--	--	--
Manganese	**3,910**	--	--	--	--	--	--	--	--	--	--
Potassium	**5,010**	--	**3,850**	--	--	--	--	--	--	--	--
Wet Chemistry											
Hardness	**348,000**	--	--	--	--	--	--	--	--	--	--
Alkalinity	**303,000**	--	**315,000**	--	--	--	--	--	--	--	--
Chloride	**92,000**	--	**105,000**	**147,000**	--	--	--	--	--	--	--
Nitrate	<100	--	<100	<100	--	--	--	--	--	--	--
Nitrite	<100	--	<100	<100	--	--	--	--	--	--	--
Sulfate	**1,310** J	--	<5000	<5000	--	--	--	--	--	--	--
Orthophosphate	**331**	--	**955**	**45.0**	--	--	--	--	--	--	--
Ammonia Nitrogen	**1,080** J	--	**1,080**	**1,310**	--	--	--	--	--	--	--
Chemical Oxygen Demand (COD)	**22,000**	--	--	--	--	--	--	--	--	--	--
Biochemical Oxygen Demand (BOD)	<3,330	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon (TOC)	**3,940**	**8,670**	**5,570**	**14,700**	**20,200**	**6,520**	**4,310**	**4,620**	<1000	**4,880**	**12,300**
Dissolved Organic Carbon (DOC)	**5,030**	**6,530**	**4,170**	--	--	--	--	--	--	**5,230**	**8,670**
Volatile Organic Compounds											
Methane	**1,310**	--	**10,900**	**13,000**	--	--	--	--	--	--	--
Ethane	**62.5**	--	**174**	**246**	--	--	--	--	--	--	--
Ethene	**797**	--	**903**	**4,150**	--	--	--	--	--	--	--

Please see notes at end of table.

Notes:

µg/L = micrograms per liter.

Bold values indicate concentration detected above the method detection limit.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

J = The reported concentration is an estimated quantity.

Table C-4
Ambient Air Analytical Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/m3				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Main Building						
AMB-1 / TC-1						
	12/12/2016	**948**	**363**	**0.274**	<0.0793	<0.0511
	8/31/2017	**41.5**	**17.7**	**4.47**	<0.793	<0.511
	10/9/2017	**1,070**	**11.3**	<0.793	<0.793	<0.511
	12/4/2017	420	14.0	<0.793	<0.793	<0.511
	6/19/2018	85.5	8.17	<0.793	<0.793	<0.511
	2/5/2019	735	149	<0.793	<0.793	<0.511
AMB-2 / TC-2						
	12/12/2016	**411**	**425**	**0.186**	<0.0793	<0.0511
	8/31/2017	**31.7**	**3.67**	<0.793	<0.793	<0.511
	10/9/2017	**495**	**7.05**	<0.793	<0.793	<0.511
	12/4/2017	291	9.98	<0.793	<0.793	<0.511
	6/19/2018	66.5	3.14	<0.793	<0.793	<0.511
	2/5/2019	362	82.1	6.78	<0.793	0.688
Back Building						
AMB-3 / TC-3						
	12/12/2016	**297**	**24.6**	**0.116**	<0.0793	<0.0511
	8/31/2017	**3,480**	**5.97**	<19.8	<0.793	<0.511
	10/9/2017	**4,900**	**7.84**	<0.793	<0.793	<0.511
	6/19/2018	**921**	**9.8**	<0.793	<0.793	<0.511
	2/5/2019	**102**	**1.31**	<0.793	<0.793	<0.511
Clear Payments (former Future State)						
AMB-4 / FC-1						
	12/12/2016	**3.66**	**1.36**	**0.675**	<0.0793	<0.0511
	8/31/2017	**10.5**	<1.07	<0.793	<0.793	<0.511
	10/9/2017	**6.60**	<1.07	**4.05**	<0.793	<0.511
	6/19/2018	**2.54**	<1.07	<0.793	<0.793	<0.511
	9/25/2018	**4.98**	**2.76**	<0.793	<0.793	<0.511
	2/5/2019	**5.10**	**3.03**	**6.63**	<0.793	**0.651**
	5/30/2019	**1.70**	**1.15**	<0.793	<0.793	<0.511
	9/24/2019	<1.36	<1.07	<0.793	<0.793	<0.511
	5/27/2020	**7.33**	<1.07	<0.793	<0.793	<0.511
	11/5/2020	<1.36	<1.07	<0.793	<0.793	<0.511
	6/17/2021	**3.02**	<1.07	<0.793	<0.793	<0.511
	10/20/2021	**3.15**	**2.40**	<0.793	<0.793	<0.511
	10/18/2022	--	--	--	--	--
Kepler's						
AMB-5 / KU-1						
	12/12/2016	**119**	**168**	**2.16**	<0.0793	<0.0511
	8/31/2017	**10.5**	**514**	<0.793	<0.793	<0.511
	10/9/2017	**71.6**	**541**	**4.43**	**0.918**	<0.511
	12/4/2017	**33.8**	**624**	<0.793	<0.793	<0.511
	6/19/2018	**9.05**	**743**	<0.793	<0.793	<0.511

Please see notes at end of table.

Table C-4
Ambient Air Analytical Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/m3				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
AMB-5 / KU-1	9/25/2018	<33.9	**599**	<19.8	<19.8	<12.8
	2/5/2019	**20.8**	**771**	<0.793	<0.793	<0.511
	5/27/2020	**4.83**	**1,370**	<0.793	<0.793	<0.511
	10/16/2020	**9.17**	**750**	<0.793	<0.793	<0.511
	6/17/2021	**5.68**	**151**	<0.793	<0.793	<0.511
	10/20/2021	**27.0**	**863**	<15.9	<15.9	<10.2
	11/3/2022	**18.5**	**7,980**	<0.793	<0.793	<0.511
Background Ambient						
AMB-OUT						
	5/30/2019	**17.2**	**1.58**	<0.793	<0.793	<0.511
	9/24/2019	**6.12**	<1.07	<0.793	<0.793	<0.511
	5/27/2020	**8.35**	**2.16**	**1.67**	<0.793	<0.511
	10/16/2020	**3.06**	<1.07	<0.793	<0.793	<0.511
	6/17/2021	**36.2**	**1.52**	<0.793	<0.793	<0.511
	10/21/2021	**1.72**	<1.07	<0.793	<0.793	<0.511
	11/3/2022	**5.78**	**1.19**	<0.793	<0.793	<0.511
Air Inhalation	Urban Residential	26	1.0	>Pv	>Pv	0.20
	Occupational	47	2.9	>Pv	>Pv	2.8

Notes:

µg/m^3 = microgram per cubic meter

PCE = Tetrachloroethene

TCE = Trichloroethene

cis-1,2,-DCE = cis-1,2-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

DEQ Risk-Based Concentrations from Oregon Department of Environmental Quality's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* , revised May 2018.

Bold values indicate concentration detected above the minimum reporting limit.

Shaded values indicate concentrations detected above one or more applicable RBCs.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

>Pv = The calculated RBC exceeds the vapor pressure of the pure chemical. This chemical cannot create an unacceptable risk via this pathway.

Table C-5
Vapor Collection System Discharge Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/m3				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
EX						
	8/31/2017	**13,300**	**1,620**	**303**	<1.59	**1.17**
	10/9/2017	**5,440**	**317**	**51.4**	<1.59	**2.15**
	12/4/2017	**1,670**	**222**	**33.6**	<1.59	<1.02
	6/19/2018	**1,010**	**211**	**31.4**	<1.59	<1.02
	2/5/2019	**765**	**152**	**50.8**	<1.59	**10.2**
	5/31/2019	**653**	**163**	**71.8**	<1.59	**16.8**
	9/25/2019	**1,980**	**241**	**176**	**1.48**	**38.1**
	5/27/2020	**183**	**126**	**32.7**	<0.793	**7.95**
	10/16/2020	**401**	**152**	**116**	**0.797**	**12.9**
	6/17/2021	**213**	**86.8**	**28.9**	<0.793	**0.726**
	10/20/2021	**188**	**71.3**	**21.3**	<0.793	<0.511
	11/3/2022	**126**	**108**	**31.4**	<0.793	**7.62**
Acceptable Effluent Discharge Concentrations		229,500	8,830	--	--	1,800

Notes:

µg/m^3 = microgram per cubic meter

PCE = Tetrachloroethene

TCE = Trichloroethene

cis-1,2,-DCE = cis-1,2-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

Acceptable Effluent Discharge Concentrations were derived by adjusting DEQ RBCs for urban residential air inhalation by the attenuation factor calculated from the EPA SCREEN3 dispersion model.

DEQ RBCs = Oregon Department of Environmental Quality's Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised May 2018.

EPA SCREEN3 = United State Environmental Protection Agency SCREEN3 Model and User's Guide, EPA 454/B-95-004, 1995.

Bold values indicate concentration detected above the minimum reporting limit.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

Table C-6
Sub-Slab Vapor Monitoring Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Main Building						
VP-3						
	6/19/2018	<1.59	<1.59	**27.0**	**21.7**	<1.02
	9/25/2018	<1.59	<1.59	**155**	**52.4**	<1.02
	2/5/2019	<1.59	<1.59	**33.3**	**20.3**	<1.02
	5/31/2019	<1.59	<1.59	**144**	**68.0**	<1.02
	9/25/2019	<0.793	<0.793	**45.7**	**18.7**	<0.511
VP-7						
	6/19/2018	<1.59	<1.59	**29.0**	**29.4**	<1.02
	9/25/2018	<1.59	<1.59	**55.8**	**9.56**	<1.02
	2/5/2019	<1.59	<1.59	**98.9**	**63**	<1.02
VP-8						
	12/04/2017	<1.59	<1.59	**56.4**	**3.54**	<1.02
VP-12						
	12/04/2017	**2.89**	<1.59	**8.29**	**2.30**	<1.02
	5/31/2019	<1.59	<1.59	**18.9**	**8.22**	<1.02
	9/25/2019	<0.793	<0.793	**20.8**	**6.57**	<0.511
VP-13						
	5/31/2019	<1.59	<1.59	**24.5**	**9.64**	<1.02
	9/25/2019	<0.793	<0.793	**73.5**	**14.3**	<0.511
VP-15						
	12/04/2017	<1.59	<1.59	**87.6**	**34.6**	<1.02
	5/31/2019	<1.59	<1.59	**40.8**	**27.1**	<1.02
	9/25/2019	<0.793	<0.793	**80.0**	**17.7**	<0.511
Back Building						
VP-14						
	6/19/2018	<1.59	<1.59	**383**	**4.31**	<1.02
	9/25/2018	**69.7**	<1.59	**591**	**48.1**	**6.86**
	2/5/2019	**6.93**	<1.59	**81.7**	**2.34**	**4.49**
	5/31/2019	**6.08**	<1.59	**313**	**9.31**	<1.02
	9/25/2019	**5.71**	<0.793	**402**	**17.5**	<0.511
	12/04/2017	<1.59	<1.59	**22.4**	**405**	<1.02
	2/5/2019	<1.59	<1.59	**10.5**	**429**	<1.02
	12/04/2017	<1.59	<1.59	**29.4**	**509**	<1.02
	6/19/2018	<1.59	<1.59	**19.5**	**502**	<1.02
	9/25/2018	<1.59	<1.59	**21.0**	**267**	<1.02
	4/26/2018	<1.59	<1.59	**76.1**	**146**	<1.02
	6/19/2018	<1.59	<1.59	**10.4**	**467**	<1.02
	9/25/2018	<19.8	<19.8	<33.9	**152**	<12.8
	2/5/2019	<1.59	<1.59	**15.5**	**461**	<1.02
	4/26/2018	<1.59	<1.59	**58.9**	**238**	<1.02
	6/19/2018	<1.59	<1.59	**13.6**	**536**	<1.02
	9/25/2018	<19.8	<19.8	<33.9	**1,230**	<12.8
	2/5/2019	<1.59	<1.59	**26.8**	**480**	<1.02
	2/5/2019	<1.59	<1.59	**17.9**	**921**	<1.02
	2/5/2019	<1.59	<1.59	**28.4**	**512**	<1.02
	5/24/2018	**598**	**8.76 J+**	**7,110**	**663**	**2.27 J+**

Please see notes at end of table.

Table C-6
Sub-Slab Vapor Monitoring Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/L				
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Kepler's						
VP-9						
	12/04/2017	<1.59	<1.59	**22.4**	**405**	<1.02
	2/5/2019	<1.59	<1.59	**10.5**	**429**	<1.02
VP-10						
	12/04/2017	<1.59	<1.59	**29.4**	**509**	<1.02
	6/19/2018	<1.59	<1.59	**19.5**	**502**	<1.02
	9/25/2018	<1.59	<1.59	**21.0**	**267**	<1.02
VP-16						
	4/26/2018	<1.59	<1.59	**76.1**	**146**	<1.02
	6/19/2018	<1.59	<1.59	**10.4**	**467**	<1.02
	9/25/2018	<19.8	<19.8	<33.9	**152**	<12.8
	2/5/2019	<1.59	<1.59	**15.5**	**461**	<1.02
VP-17						
	4/26/2018	<1.59	<1.59	**58.9**	**238**	<1.02
	6/19/2018	<1.59	<1.59	**13.6**	**536**	<1.02
	9/25/2018	<19.8	<19.8	<33.9	**1,230**	<12.8
	2/5/2019	<1.59	<1.59	**26.8**	**480**	<1.02
VP-18						
	2/5/2019	<1.59	<1.59	**17.9**	**921**	<1.02
VP-19						
	2/5/2019	<1.59	<1.59	**28.4**	**512**	<1.02
Saxony Property						
SG-MW6i-2.5						
	5/24/2018	**598**	**8.76**	**7,110**	**663**	**2.27**
Soil Gas Vapor Intrusion into Buildings	Urban Residential	>Pv	>Pv	5,100	200	41
	Occupational	>Pv	>Pv	47,000	2,900	2,800

Notes:

µg/m^3 = microgram per cubic meter

DEQ RBCs = Oregon Department of Environmental Quality's Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised May 2018.

Bold values indicate concentration detected above the method reporting limit.

Shaded values indicate concentrations detected above one or more applicable RBCs.

< = Concentration was not detected above the shown method reporting limit.

-- = Not analyzed or not available.

>Pv = The calculated RBC exceeds the vapor pressure of the pure chemical. This chemical cannot create an unacceptable risk via this pathway.

J+ = Result is an estimated concentration and may be biased high.

Table C-7
Stormwater Pipe Outfall Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID:	OUTFALL		DEQ Ecological Receptor Risk-Based Concentrations
Sample Date:	8/1/2018	11/5/2020	Surface Water Ingestion
Concentrations in µg/L			
Acetone	<50.0	<50.0	44,000
Acrolein	<50.0	<50.0	--
Acrylonitrile	<10.0	<10.0	--
Benzene	<1.00	<1.00	110,000
Bromobenzene	<1.00	<1.00	--
Bromodichloromethane	<1.00	<1.00	--
Bromoform	<1.00	<1.00	--
Bromomethane	<5.00	<5.00	--
n-Butylbenzene	<1.00	<1.00	--
sec-Butylbenzene	<1.00	<1.00	--
tert-Butylbenzene	<1.00	<1.00	--
Carbon Disulfide	<1.00	<1.00	--
Carbon Tetrachloride	<1.00	<1.00	--
Chlorobenzene	<1.00	<1.00	--
Chlorodibromomethane	<1.00	<1.00	--
Chloroethane	<5.00	<5.00	--
Chloroform	<5.00	<5.00	67,000
Chloromethane	<2.50	<2.50	--
2-Chlorotoluene	<1.00	<1.00	--
4-Chlorotoluene	<1.00	<1.00	--
1,2-Dibromo-3-Chloropropane	<5.00	<5.00	--
1,2-Dibromoethane	<1.00	<1.00	--
Dibromomethane	<1.00	<1.00	--
1,2-Dichlorobenzene	<1.00	<1.00	--
1,3-Dichlorobenzene	<1.00	<1.00	--
1,4-Dichlorobenzene	<1.00	<1.00	11,000
Dichlorodifluoromethane	<5.00	<5.00	--
1,1-Dichloroethane	<1.00	<1.00	1,700,000
1,2-Dichloroethane	<1.00	<1.00	19,000
1,1-Dichloroethene	<1.00	<1.00	130,000
cis-1,2-Dichloroethene	**4.92**	**12.5**	200,000
trans-1,2-Dichloroethene	<1.00	<1.00	200,000
1,2-Dichloropropane	<1.00	<1.00	--
1,1-Dichloropropene	<1.00	<1.00	--
1,3-Dichloropropane	<1.00	<1.00	--
cis-1,3-Dichloropropene	<1.00	<1.00	--
trans-1,3-Dichloropropene	<1.00	<1.00	--

Please see notes at end of table.

Table C-7
Stormwater Pipe Outfall Analytical Results for Volatile Organic Compounds
Tigard Cleaners
Tigard, Oregon

Sample ID:	OUTFALL		DEQ Ecological Receptor Risk-Based Concentrations
Sample Date:	8/1/2018	11/5/2020	Surface Water Ingestion
Concentrations in µg/L			
2,2-Dichloropropane	<1.00	<1.00	--
di-Isopropyl Ether	<1.00	<1.00	--
Ethylbenzene	<1.00	<1.00	--
Hexachloro-1,3-Butadiene	<1.00	<1.00	--
Isopropylbenzene	<1.00	<1.00	--
p-Isopropyltoluene	<1.00	<1.00	--
2-Butanone (MEK)	<10.0	<10.0	7,900,000
Methylene Chloride	<5.00	<5.00	26,000
4-Methyl-2-Pentanone (MIBK)	<10.0	<10.0	--
Methyl Tert-Butyl Ether	<1.00	**0.436** J	--
Naphthalene	<5.00	<5.00	--
n-Propylbenzene	<1.00	<1.00	--
Styrene	<1.00	<1.00	--
1,1,1,2-Tetrachloroethane	<1.00	<1.00	--
1,1,2,2-Tetrachloroethane	<1.00	<1.00	--
1,1,2-Trichlorotrifluoroethane	<1.00	<1.00	--
Tetrachloroethene	**0.908** J	**5.59** J+	8,900
Toluene	<1.00	<1.00	110,000
1,2,3-Trichlorobenzene	<1.00	<1.00	--
1,2,4-Trichlorobenzene	<1.00	<1.00	6,600
1,1,1-Trichloroethane	<1.00	<1.00	4,400,000
1,1,2-Trichloroethane	<1.00	<1.00	--
Trichloroethene	<1.00	**2.15**	440,000
Trichlorofluoromethane	<5.00	<5.00	--
1,2,3-Trichloropropane	<2.50	<2.50	--
1,2,4-Trimethylbenzene	<1.00	<1.00	--
1,2,3-Trimethylbenzene	<1.00	<1.00	--
1,3,5-Trimethylbenzene	<1.00	<1.00	--
Vinyl Chloride	**0.904** J	**1.04**	--
Xylenes, Total	<3.00	<3.00	9,400

Notes:

µg/L = micrograms per liter.

DEQ Ecological Receptor Risk-Based Concentrations from the *Conducting Ecological Risk Assessments* guidance (September 14, 2020).

Bold values indicate concentration detected above the method detection limit.

Shaded values indicate concentrations detected above one or more applicable RBCs.

< = Concentration was not detected above the shown minimum reporting limit.

-- = Not analyzed or not available.

J = The reported concentration is an estimated quantity.

J+ = Result is an estimated concentration and may be biased high.

Table C-8
Soil Analytical Results
Tigard Cleaners
Tigard, Oregon

			DEQ RBCs		
Sample ID:	**GRAB SOIL NORTH**		Soil Vapor Intrusion into Buildings | Occupational	Soil Ingestion, Dermal Contact, and Inhalation | Construction Worker	Soil Ingestion, Dermal Contact, and Inhalation | Excavation Worker
Sample Date:	1/28/2019				
Concentrations in mg/kg					
Acetone	**0.0543**		--	--	--
Acrylonitrile	<0.0178		1.0	40	1,100
Benzene	<0.00142		2.1	380	11,000
Bromobenzene	<0.0178		--	--	--
Bromodichloromethane	<0.00355		0.53	230	6,300
Bromoform	<0.0355		110	2,700	74,000
Bromomethane	<0.0178		17	370	10,000
n-Butylbenzene	<0.0178		--	--	--
sec-Butylbenzene	<0.0178		--	--	--
tert-Butylbenzene	<0.00711		--	--	--
Carbon Disulfide	<0.0178		--	--	--
Carbon Tetrachloride	<0.00711		1.6	320	8,900
Chlorobenzene	<0.00355		--	4,700	130,000
Chlorodibromomethane	<0.00355		2.9	210	5,800
Chloroethane	<0.00711		--	--	--
Chloroform	**0.00377**		0.41	410	11,000
Chloromethane	<0.0178		300	25,000	700,000
2-Chlorotoluene	<0.00355		--	--	--
4-Chlorotoluene	<0.00711		--	--	--
1,2-Dibromo-3-Chloropropane	<0.0355	UJ	--	--	--
1,2-Dibromoethane	<0.00355		0.16	9.0	250.00
Dibromomethane	<0.00711		--	--	--
1,2-Dichlorobenzene	<0.00711		--	20,000	560,000
1,3-Dichlorobenzene	<0.00711		--	--	--
1,4-Dichlorobenzene	<0.00711		13	1,300	36,000
Dichlorodifluoromethane	<0.00355		--	--	--
1,1-Dichloroethane	<0.00355		5.9	3,200	89,000
1,2-Dichloroethane	<0.00355		1.0	200	5,600
1,1-Dichloroethene	<0.00355		680	13,000	370,000
cis-1,2-Dichloroethene	<0.00355		--	710	20,000
trans-1,2-Dichloroethene	<0.00711		--	7,100	200,000
1,2-Dichloropropane	<0.00711		--	--	--
1,1-Dichloropropene	<0.00355		--	--	--
1,3-Dichloropropane	<0.00711		--	--	--
cis-1,3-Dichloropropene	<0.00355		--	--	--
trans-1,3-Dichloropropene	<0.00711		--	--	--
2,2-Dichloropropane	<0.00355		--	--	--
di-Isopropyl Ether	<0.00142		--	--	--
Ethylbenzene	<0.00355		17	1,700	49,000
Hexachloro-1,3-Butadiene	<0.0355		--	--	--
Isopropylbenzene	<0.00355		--	27,000	750,000
p-Isopropyltoluene	<0.00711		--	--	--
2-Butanone (MEK)	<0.0355		--	--	--
Methylene Chloride	<0.0355		950	2,100	58,000
4-Methyl-2-Pentanone (MIBK)	<0.0355		--	--	--
Methyl Tert-Butyl Ether	<0.00142		110	12,000	320,000

See notes and end of table

Table C-8
Soil Analytical Results
Tigard Cleaners
Tigard, Oregon

			DEQ RBCs		
Sample ID:	**GRAB SOIL NORTH**		Soil Vapor Intrusion into Buildings | Occupational	Soil Ingestion, Dermal Contact, and Inhalation | Construction Worker	Soil Ingestion, Dermal Contact, and Inhalation | Excavation Worker
Sample Date:	1/28/2019				
Concentrations in mg/kg					
Naphthalene	<0.0178		83	580	16,000
n-Propylbenzene	<0.00711		--	--	--
Styrene	<0.0178		--	56,000	--
1,1,1,2-Tetrachloroethane	<0.00355		--	--	--
1,1,2,2-Tetrachloroethane	<0.00355	UJ	--	--	--
1,1,2-Trichlorotrifluoroethane	<0.00355		--	--	--
Tetrachloroethene	**0.0338**		36	1,800	50,000
Toluene	**0.00352**	J	--	28,000	770,000
1,2,3-Trichlorobenzene	<0.00355		--	--	--
1,2,4-Trichlorobenzene	<0.0178		--	--	--
1,1,1-Trichloroethane	<0.00355		--	470,000	--
1,1,2-Trichloroethane	<0.00355		4.2	54	1,500.00
Trichloroethene	**0.0077**	J+	2.3	130	3,700.0
Trichlorofluoromethane	<0.00355		--	69,000	--
1,2,3-Trichloropropane	<0.0178		--	--	--
1,2,4-Trimethylbenzene	<0.00711		--	2,900	81,000
1,2,3-Trimethylbenzene	<0.00711	UJ	--	--	--
1,3,5-Trimethylbenzene	<0.00711		--	2,900	81,000
Vinyl Chloride	<0.00355		2.2	34	950
Xylenes, Total	<0.00924		--	20,000	560,000

Notes:

mg/kg = milligrams per kilogram

DEQ RBCs = Oregon Department of Environmental Quality's Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised May 2018.

Bold values indicate concentration detected above the method reporting limit.

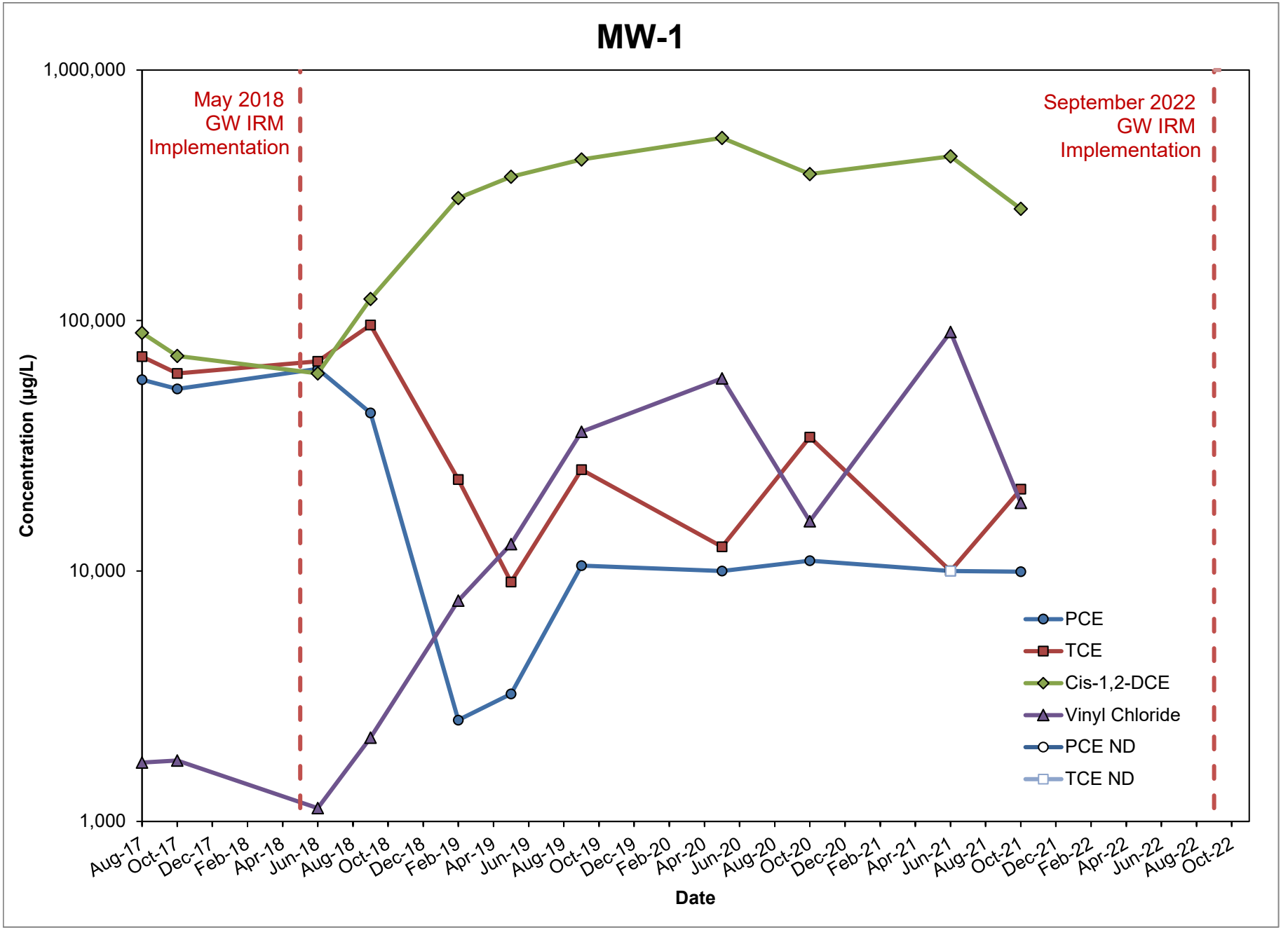
Shaded values indicate concentrations detected above one or more applicable RBCs.

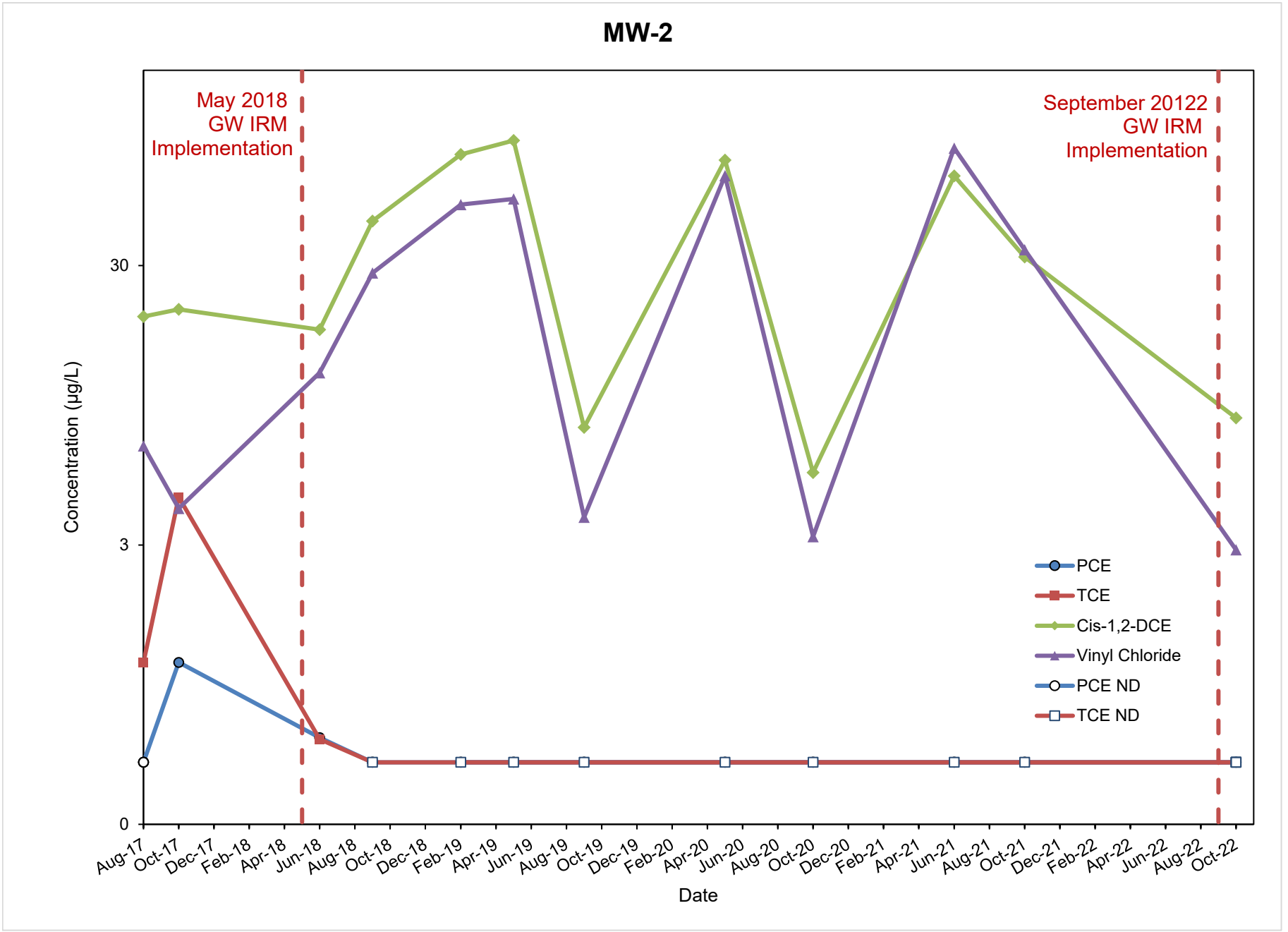
< = Concentration was not detected above the shown method reporting limit.

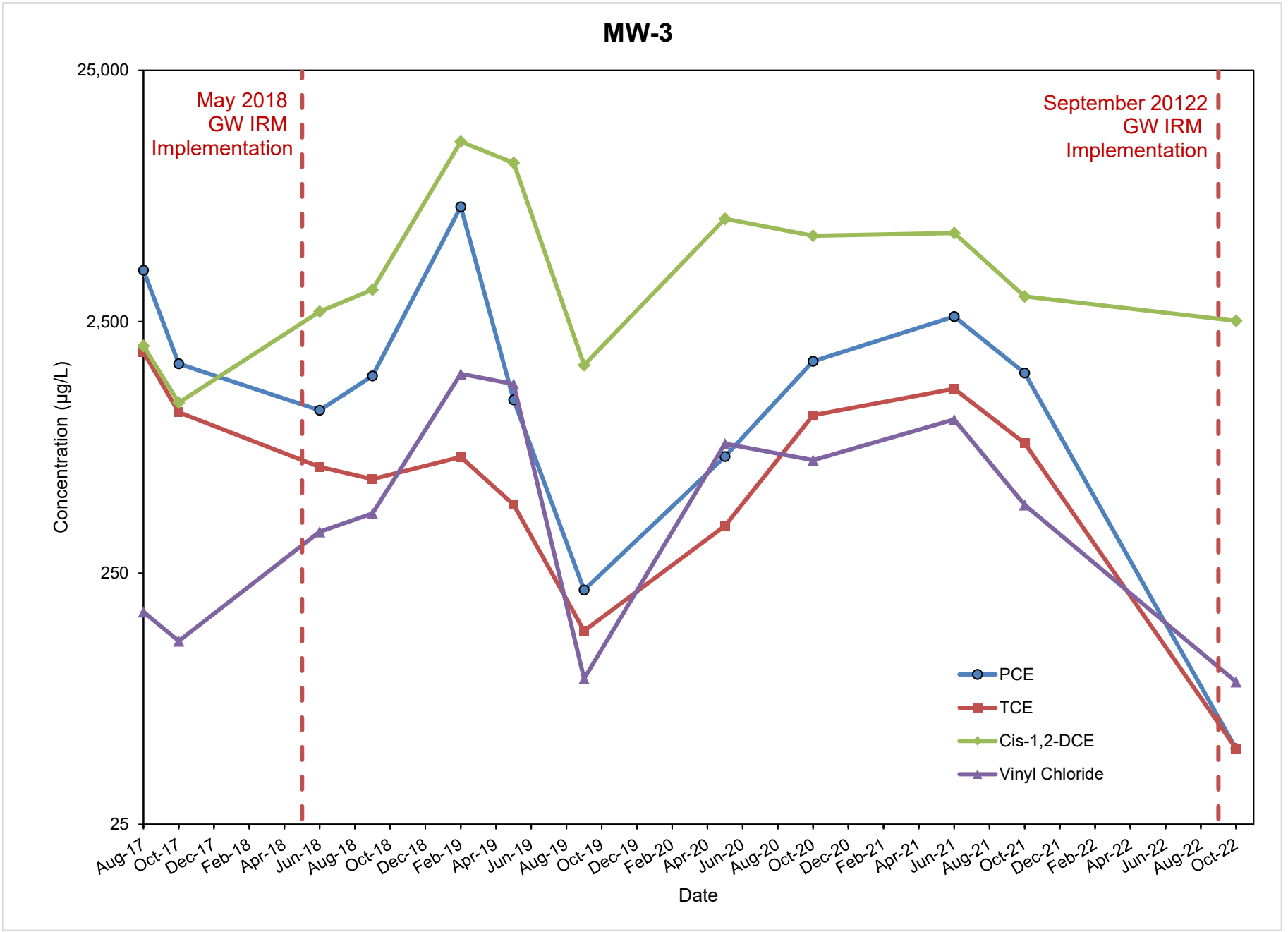
-- = Not analyzed or not available.

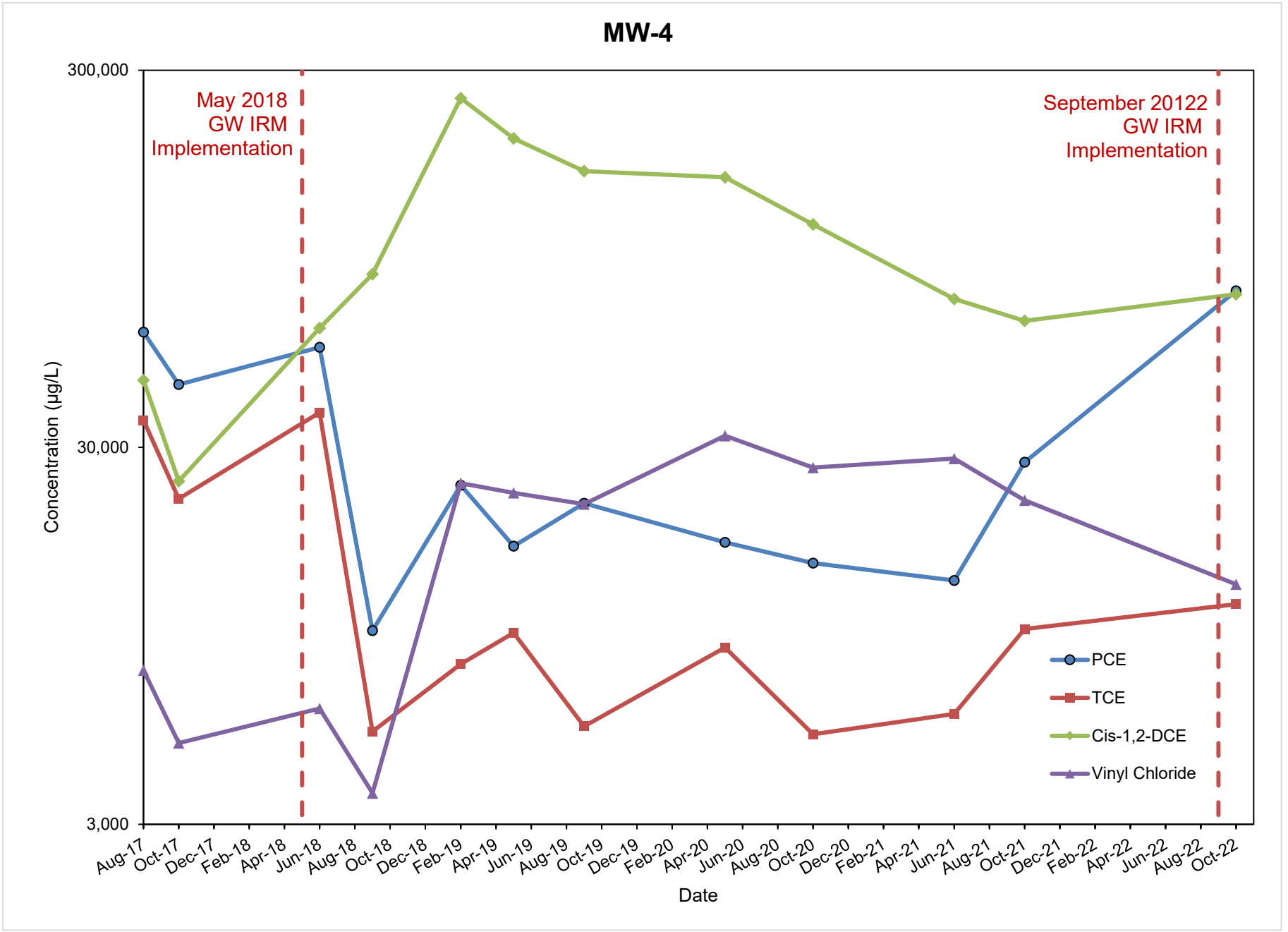
Appendix D

Trend Plots


MW-1
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
1,000,000
100,000
10,000
1,000
Concentration (µg/L)
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Date


MW-2
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
Concentration (µg/L)
30
3
0
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Date


MW-3
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
25,000
2,500
250
25
Concentration (µg/L)
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Date


MW-4
300,000
30,000
3,000
Concentration (µg/L)
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
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Apr-20
Jun-20
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Oct-20
Dec-20
Feb-21
Apr-21
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Aug-21
Oct-21
Dec-21
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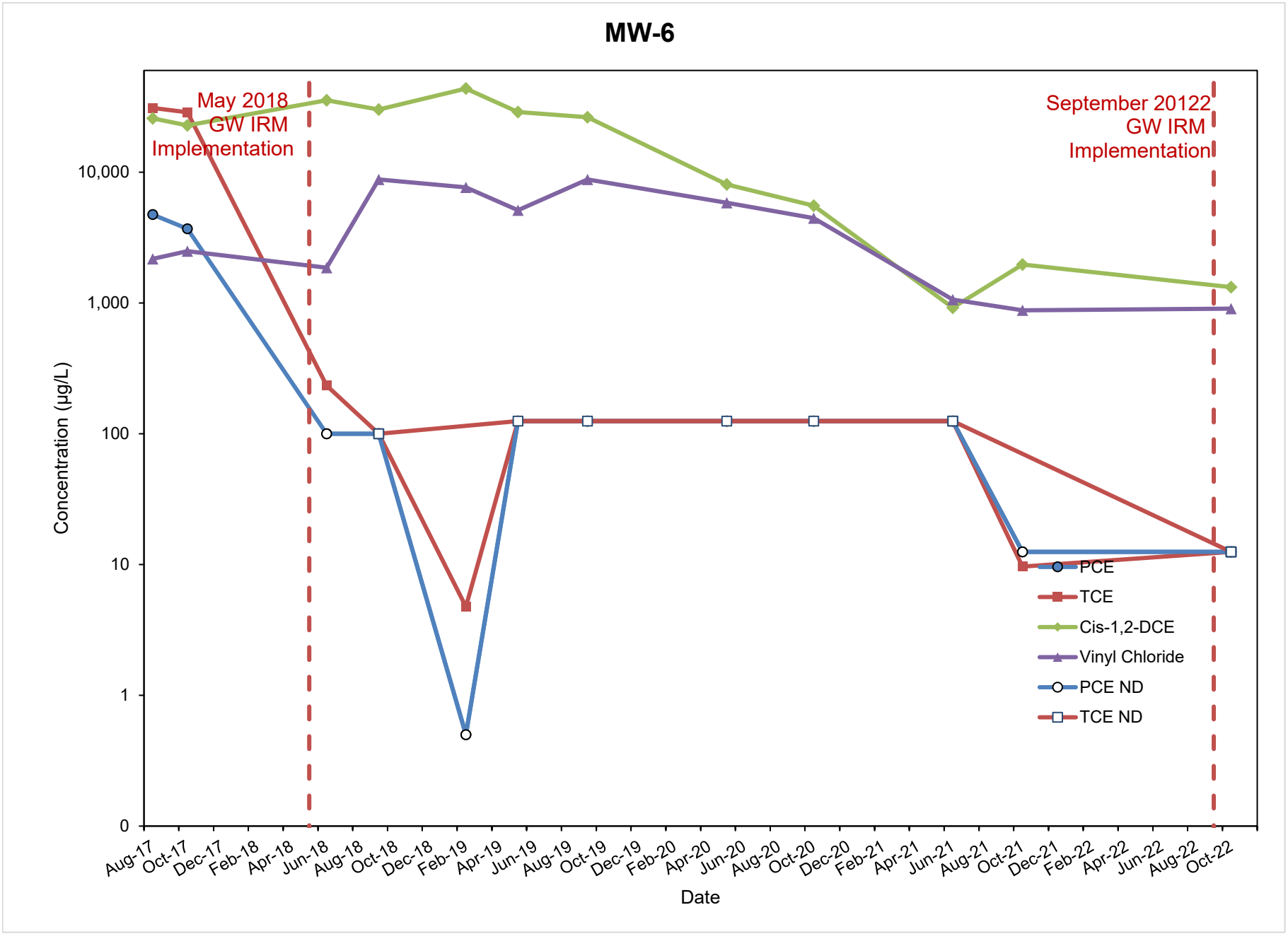
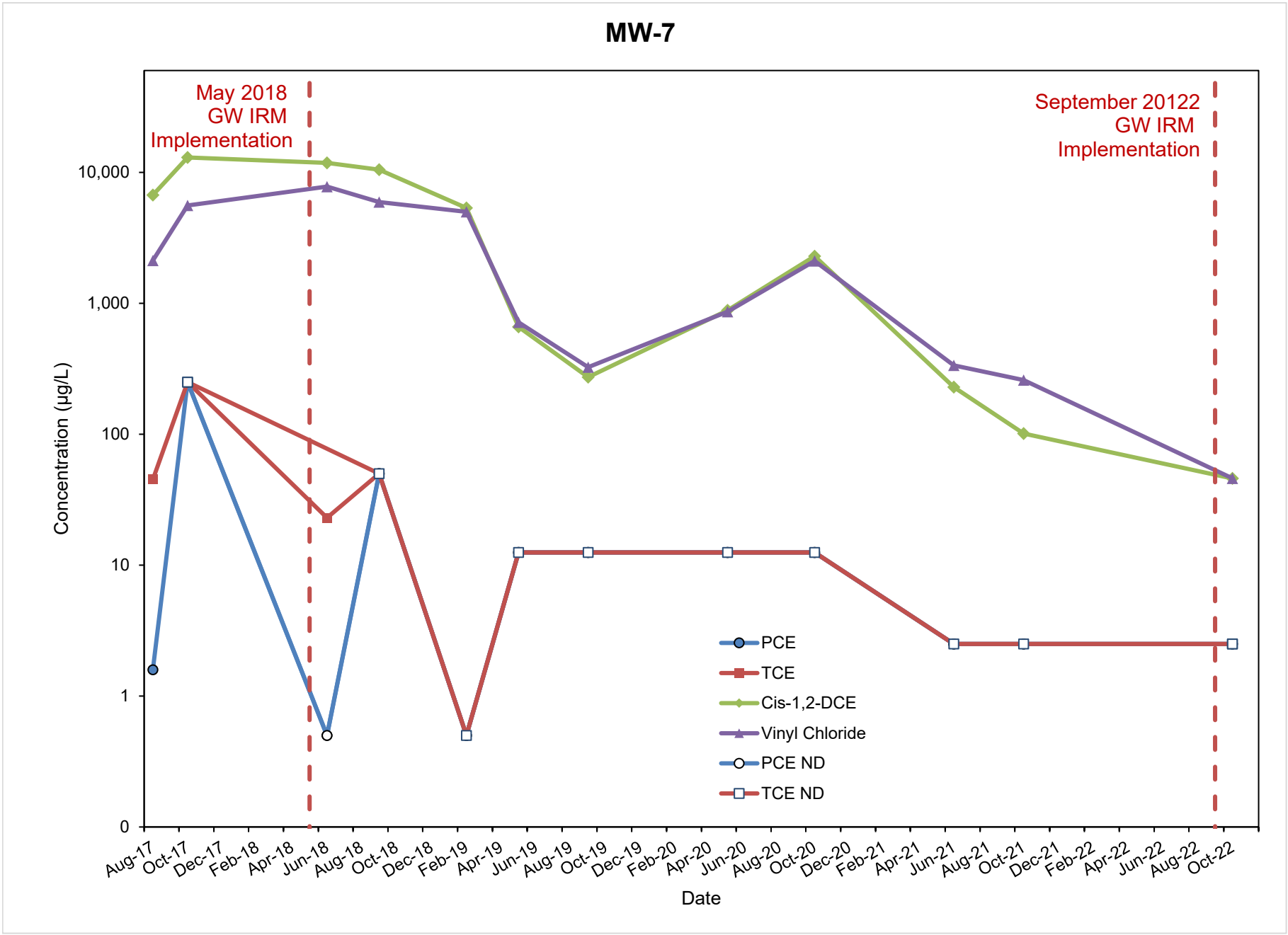
Apr-22
Jun-22
Aug-22
Oct-22
Date


MW-6
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
Concentration (µg/L)
10,000
1,000
100
10
1
0
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND


MW-7
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
Concentration (µg/L)
10,000
1,000
100
10
1
0
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
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Aug-21
Oct-21
Dec-21
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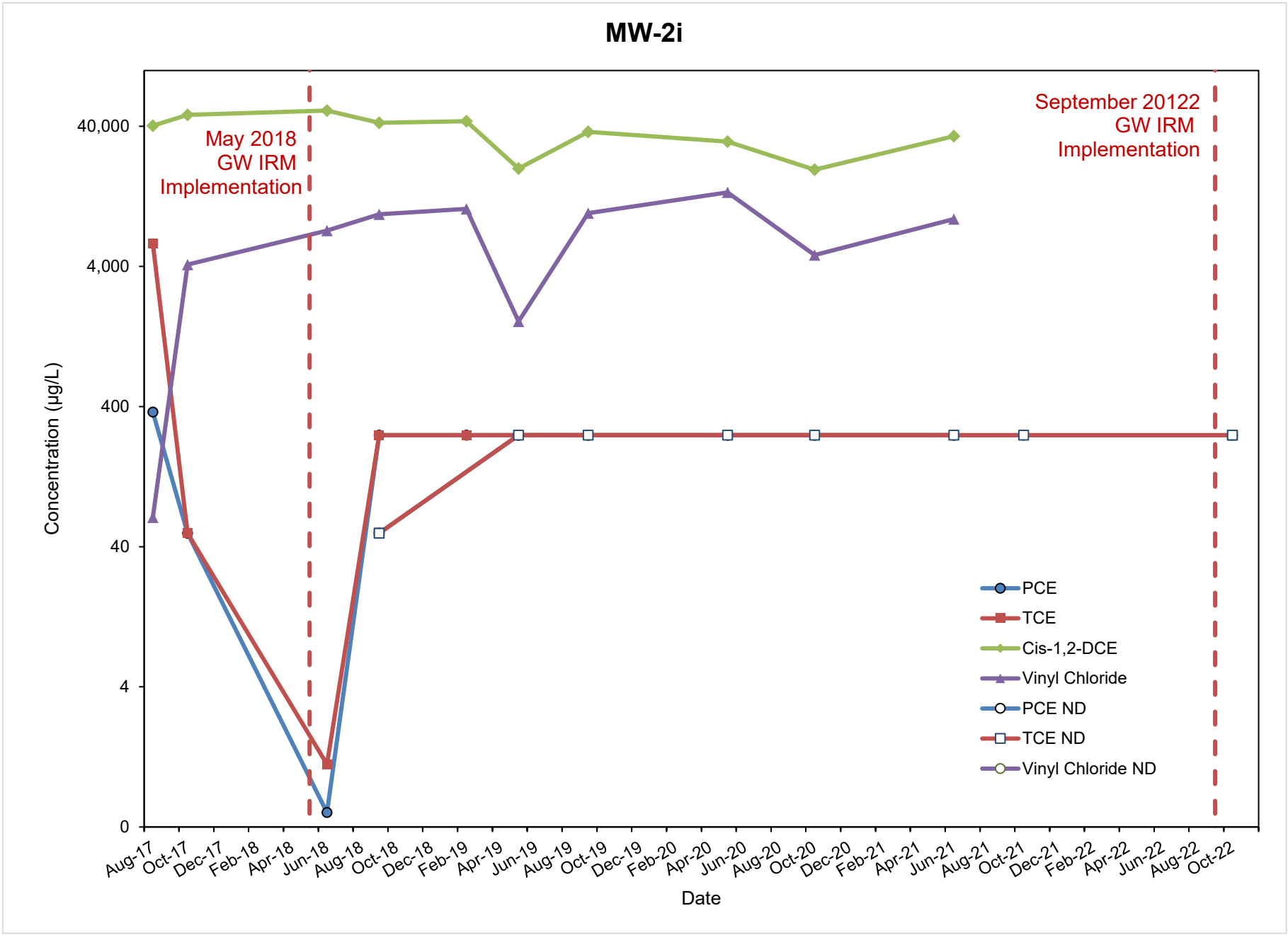
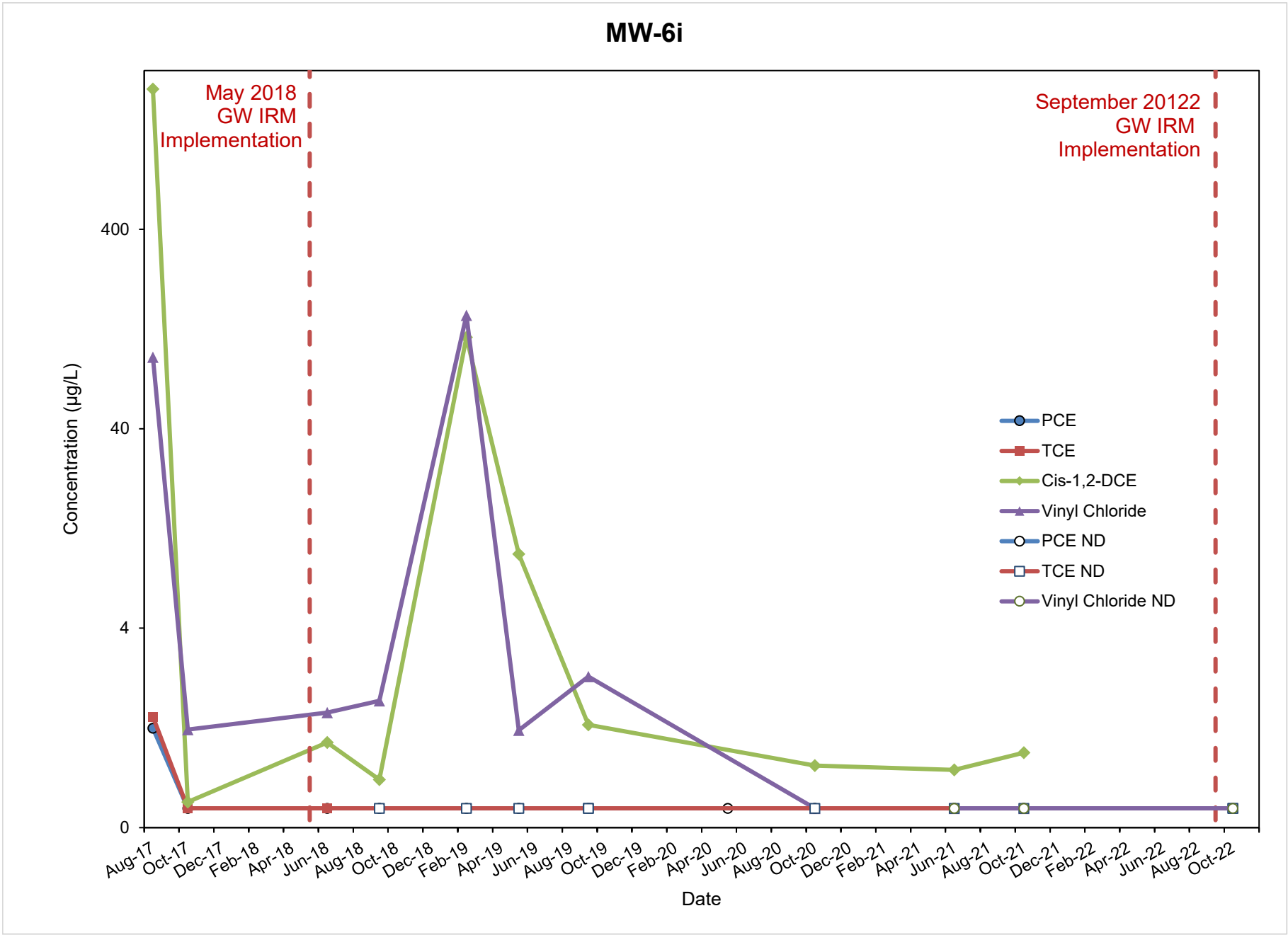
Apr-22
Jun-22
Aug-22
Oct-22
Date


MW-2i
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
40,000
4,000
400
40
4
0
Concentration (µg/L)
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Vinyl Chloride ND


MW-6i
May 2018
GW IRM
Implementation
September 20122
GW IRM
Implementation
Concentration (µg/L)
400
40
4
0
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Vinyl Chloride ND
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
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Date