February 2023 Data Summary Report
Tigard Cleaners
Tigard, Oregon
ECSI No. 6158

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

June 26, 2023
2326-01/Task 9

APEX

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1.0 Introduction

This Data Summary Report (Report) presents the results of the February 2023 media monitoring activities conducted at the Tigard Cleaners Site (the Site) located at 12519 SW Main Street in Tigard, Oregon (Figures 1 and 2). Tigard Cleaners is located between Kepler's Upholstery shop (Kepler's) at 12511 Main Street (hydraulically upgradient, to the east) and the Clear Payments, LLC space (Clear Payments; formerly Future State Consultants) 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).

This Report was prepared on behalf of the Oregon Department of Environmental Quality (DEQ) by Apex Companies, LLC (Apex) as part of the Groundwater Interim Remedial Measure (IRM) post-implementation monitoring program. This Report was prepared for the DEQ under Task 4 of Task Order No 71-18-2.

1.1 Background and Previous Work

The Site is listed in DEQ's Environmental Cleanup Site Information (ECSI) database as ECSI ID 6158 and is an active participant in the DEQ's Dry Cleaner Program. The active business operates in the main building that fronts SW Main Street and a small, detached building on the northwest side of the property, herein referred to as the main building and back building, respectively. Dry-cleaning operations that used tetrachloroethene (PCE) were reportedly conducted in the main building from the 1950s through the late 1970s when the operations moved to the back building.

Previous investigations conducted at the Site have identified concentrations of dry-cleaning chemicals, including PCE and trichloroethene (TCE), in groundwater, ambient air, and soil vapor below the facility at concentrations above occupational risk-based concentration (RBC) screening levels (Apex, 2017; AMEC Foster Wheeler [AMEC], 2017; 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.

2017 Interim Remedial Measures. 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 below ground surface [bgs]) with depth-discrete groundwater sampling; and installation of four additional sub-slab vapor monitoring points in the Site buildings (Apex, 2017). Results from the August 2017 IRM implementation and associated sampling were reported in the 2017 *Interim Removal Measures Report* (IRM Report; Apex, 2017). Consistent with previous sampling events, PCE and associated degradation by-products (TCE, cis-1,2-dichloroethene [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 (with relatively higher concentrations coincident with each of the two conductive zones), which suggests that the plume has infiltrated to the deeper transmissive layers beneath the Site. The dissolved-phase contaminant plume was also observed to extend laterally downgradient toward the Saxony-Pacific Property. The report concluded that enhanced bioremediation would be 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.

2018 Bioremediation Injections. In May 2018, Apex, on behalf of the DEQ, completed a groundwater IRM which included: injection of an *in situ* bioremediation substrate and active cultures; installation of two intermediate-zone monitoring wells; installation of two additional sub-slab vapor pins in Kepler's tenant space; tracing of 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 media monitoring event (June 2018) were presented in the *Groundwater Interim Removal Measures Completion Report*, submitted to DEQ on August 21, 2018 (Apex, 2018b). 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 exceeded the 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 a reduced concentration 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 2018 *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 represented 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 is 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 events were presented in the *Fall 2018 Data Summary Report* (Apex, 2018c) 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, but 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. Further investigations were conducted during the February 2019 event and 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.

Semi-Annual Monitoring. Additional media monitoring events have been conducted on a semi-annual basis from May 2019 to present. Monitoring events involved collecting groundwater, ambient air, sub-slab vapor, and VCS effluent samples. 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 stated that the injection substrate is beyond the midpoint of its expected effectiveness lifespan, and reduced rates of reductive dechlorination in source-area wells were

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

2022 Bioremediation Injections. A bioremediation injection was completed in August 2022. A total of 8,105 gallons of EOS Pro (emulsified oil), BAC-9 (microorganisms), and Clean-ER (zero valent iron) solution were injected into the subsurface during the expanded groundwater IRM activities. During the monitoring event conducted directly after the injections (October 2022), PCE and associated degradation byproducts were present in Site groundwater and ambient air at concentrations that exceed applicable DEQ RBCs.

1.2 Scope of Work

The scope of work for the February 2023 monitoring event was completed in general accordance with the *Groundwater IRM Work Plan* (Work Plan; Apex, 2018a) with amendments described in the Budget and Assumptions Proposal dated February 24, 2022.

The purpose of the February 2023 semi-annual media monitoring event at the Site was to evaluate the performance of the IRMs on the quality of groundwater and ambient air. In general, the work consisted of the following tasks:

- Complete one groundwater monitoring event to observe and document the effectiveness of the bioremediation application;
- Complete one ambient air monitoring event to assess outdoor air quality and air quality inside the Clear Payments (former Future State) office and Kepler's store;
- Collect one VCS exhaust monitoring sample to confirm that vapor concentrations from the stack continue to be acceptable for release to the ambient air; and
- Prepare this Report.

The activities from the February 2023 media monitoring event are discussed in Section 2.0 below.

1.3 Deviations from Scope of Work

A groundwater sample could not be collected from MW-6 due to heavy rain at the time of the sampling. The monument for MW-6 is in a local depression, and rainwater was filling the monument faster than it could be pumped out, so to prevent rain water from infiltrating the well, a sample could not be collected.

2.0 Investigation Activities

2.1 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 field activities.

Property Access. The DEQ and Apex coordinated with the property owners of the Tigard Cleaners building (Tigard Cleaners and Kepler's), Clear Payments (former Future State), and the Saxony Property to obtain access. Apex provided notification to the tenants of Tigard Cleaners and Clear Payments at least one week prior to investigation activities.

Subcontractor Solicitation. Analytical laboratory services were provided by ESC (dba Pace Analytical National) under their existing Price Agreement with the State of Oregon.

2.2 February 2023 Media Monitoring Event

The media monitoring event was performed at the Site on February 2023 to evaluate the performance of IRM measures that were implemented in 2022. The monitoring included the collection and analysis of groundwater samples, ambient air samples, and the VCS exhaust for VOCs.

2.2.1 Groundwater Monitoring

The February 2023 groundwater monitoring event was conducted on February 21, 2023, approximately six months after completing the most recent groundwater IRM (which was completed in August 2022). The depth to groundwater was measured in each well to the nearest 0.01 foot using an electronic water level probe. The measured depths to groundwater and resultant groundwater elevations are included in Table 1 and are presented on Figure 3. During this event, groundwater at the Site was encountered at depths between 3.70 feet and 8.62 feet bgs in the upper conductive zone and between 3.81 feet and 7.03 feet bgs in the lower conductive zone. The groundwater flow gradient at the Site varies and includes local flow gradients towards an apparent sink in the vicinity of MW-6 with localized gradients toward the north-northwest, south-southeast, and west-southwest (with magnitudes ranging from 0.08 feet/foot [ft/ft] to 0.31 ft/ft), converging on an apparent groundwater channel that results in an overall groundwater flow direction that is predominantly in the west-southwesterly direction towards Fanno Creek, which is consistent with previous observations.

During the monitoring event, groundwater samples were collected from monitoring wells MW-1 through MW-5, MW-7, and MW-2i using a peristaltic pump. Samples were collected by inserting clean polyethylene tubing down the ¾-inch or 2-inch diameter well casing to the middle interval of the wetted well screen. Samples

were collected using low flow techniques. Prior to sample collection, wells were purged by pumping at a low flow rate (less than 0.5 liters per minute [L/min]) while periodically monitoring the water quality parameters (i.e. pH, temperature, specific conductivity, dissolved oxygen [DO], and oxygen reduction potential [ORP]). Samples were collected after water quality parameters stabilized to within 10 percent for three consecutive three-minute intervals. Sampling field sheets are available in Appendix A.

2.2.2 Air/Vapor Monitoring

Ambient air samples were collected from inside Kepler's Upholstery on February 21, 2023 to evaluate the indoor air quality. Prior monitoring events in the Kepler's Upholstery building have consistently identified concentrations of TCE above the applicable DEQ RBCs. In addition, an outdoor air sample was collected on February 21, 2023 to evaluate if a correlation exists between outdoor air concentrations and indoor ambient air concentrations. The outdoor ambient air sample was set up and sampling began on February 21, 2023 with the other ambient air samples. The outdoor ambient air sample was located approximately 10 feet northwest of the main building of Tigard Cleaners (Figure 2). Each of the samples was collected in 6-liter Summa canisters with eight-hour flow controllers and was collected from typical breathing air spaces, set at an approximate height of 3 to 5 feet above ground surface.

An air sample from the system effluent (sample EX) was collected from the vent stack of the VCS to assess system effectiveness and the potential need for vapor treatment. The system effluent sample was collected in a 1-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.

2.3 Handling of Investigation-Derived Waste

IDW accumulated during the February 2023 media monitoring event consisted of monitoring well purge water and personal protective equipment (PPE). Water IDW was placed in a properly labeled drum and temporarily stored at a pre-approved location at the Site. Sampling materials and PPE were disposed of as solid waste.

3.0 Chemical Analysis and Results

The following section describes the results of the February 2023 media monitoring event.

3.1 Analyses Performed

Based on the use of the facility for current and historical dry-cleaning uses, PCE is the source contaminant of concern. However, PCE can naturally degrade through a stepwise process of reductive dechlorination to breakdown products TCE, DCE, vinyl chloride, and ethene. Therefore, these analytes are included in the evaluation of Site conditions.

Groundwater samples collected from MW-1 through MW-5, MW-7, MW-2i, and MW-6i were analyzed for VOCs by Environmental Protection Agency (EPA) Method 8260C. Groundwater samples collected from monitoring wells MW-1, MW-2, MW-4, and MW-5 were also analyzed for total organic carbon (TOC) by EPA Method SW9060A.

Ambient air and system effluent samples were analyzed for VOCs by EPA Method TO-15.

3.2 Media Monitoring Analytical Results

The sections below summarize the analytical results for each of the sampled media from the February 2023 media monitoring event. Groundwater results are presented in Tables 2 and 3 and are shown on Figure 4. Ambient air sample results are presented in Table 4 and are shown on Figure 5. The system effluent sample results are presented in Table 5 and are also shown on Figure 5. Laboratory analytical reports and the associated data quality review are included in Appendix B. Historical measurements are provided in Appendix C.

3.2.1 Groundwater Samples

PCE was detected above laboratory reporting limits (RLs) in two of the eight groundwater samples collected during the sampling event (monitoring wells MW-3 and MW-4). The detected concentrations of PCE were 36.5 micrograms per liter (µg/L) in well MW-3 (located north of the back building of Tigard Cleaners) to 7,410 µg/L in MW-4 (located in the main building of Tigard Cleaners). Monitoring well MW-3 did not have a detectable concentration of PCE during the October 2022 monitoring event (with an RL of 100 µg/L), so the detected concentration of 36.5 µg/L during this event cannot be compared to the prior event. However, the concentrations during the last two monitoring events in MW-3 are two orders of magnitude lower than observed during both 2021 monitoring events. The PCE concentration in MW-4 during February 2023 is an order of magnitude lower than the previous event in October 2022.

The concentration of PCE in well MW-3 observed during this monitoring event (36.5 µg/L) has decreased by 99 percent since the February 2019 event (which was 7,160 µg/L, the highest concentration of PCE that had been historically observed in this well). The concentration of PCE in well MW-4 decreased by 90 percent since the October 2022 event (which had the historical maximum concentration in this well of 78,000 µg/L).

TCE was detected in three of the eight groundwater samples (MW-2, MW-3, and MW-4). Detected TCE concentrations ranged from 0.299 µg/L in MW-2 to 1,990 µg/L in MW-4. TCE concentrations in MW-3 increased relative to the prior event in October 2022 (TCE was not detected during the October 2022 event at an RL of 100 µg/L) but have decreased by 82 percent compared to the October 2021 results, and by 89 percent compared to historical maximum concentrations. The TCE concentration in MW-4 decreased by 83 percent compared to the October 2022 event, and by 95 percent compared to historical maximums. The TCE concentration of 0.299 µg/L in MW-2 was the first time TCE has been detected in this well since June 2018,

though the concentration is below the laboratory detection limit and is an estimate (and is an order of magnitude less than the historical maximum concentration observed in this well).

DCE was detected in all eight groundwater samples collected during the monitoring event. DCE concentrations ranged from 0.257 µg/L in well MW-7 to 468,000 µg/L in source-area well MW-1. Compared to the October 2022 event, the concentration of DCE increased in wells MW-1, MW-2, and MW-3 and decreased in MW-4, MW-6, MW-2i, and MW-6i.

Vinyl chloride was detected in seven of the eight groundwater samples collected during the February 2023 monitoring event (not detected in monitoring well MW-6i). Detected concentrations of vinyl chloride ranged from 0.420 µg/L in MW-7 to 30,100 µg/L in MW-1. Vinyl chloride concentrations in wells MW-2, MW-3, and MW-4 increased compared to the October 2022 event, while wells MW-1, MW-2i, and MW-7 decreased.

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.

Through reductive dechlorination, it is expected that each successive stage would be characterized by a reduction in the concentration of the more saturated chloroethene and a corresponding increase in the less saturated chloroethene (e.g., PCE concentrations would decrease while TCE concentrations increase, then in sequence the TCE concentrations would decrease while DCE concentrations would increase, and the pattern would continue until the final reduction of vinyl chloride to ethene). Since the groundwater IRM in August 2022, the site wells in the source area have shown a significant decrease in PCE and TCE concentrations correlated with an increase in DCE and vinyl chloride concentrations (as expected), although the relative changes in concentration vary by well. These trends can be seen in the concentration trend plots in Appendix D for source area wells MW-1, MW-3, and MW-4.

PCE and TCE have continued to be non-detect, or only slightly above the detection limit, in the intermediate wells (MW-2i and MW 6i) and in MW-2 and MW-7. The intermediate wells have a decreasing trend of DCE and vinyl chloride consistent with advanced stages of the reductive dechlorination process (see trend plots in Appendix D). Downgradient wells (MW 2 and MW-7) show similar advanced stage trends, and MW-2 contains apparent seasonal fluctuations in DCE and vinyl chloride.

Source well MW-4 continues to show relatively higher detections of PCE and TCE, while source area wells MW-1 and MW-3 have low or no detections. The persistence of PCE and TCE concentrations in MW-4 indicates that source materials are likely still present in the vicinity, and the magnitude of the concentrations (historically in excess of 10 percent of the solubility of the compound) suggests that the source areas likely include non-aqueous-phase liquids (NAPLs); although no liquid NAPLs have been encountered at the Site in

source-area borings, it may be present as a separate-phase liquid adsorbed to the soil grains. The injection of the zero-valent iron in this area is expected to reduce the mass of NAPL that may be present in this area.

Total Molar Ethenes. Assessment of total molar ethene concentrations can be used to evaluate changes in the total population of the chloroethene molecules as the degradation continues from the chloride-saturated PCE (the heaviest molecular weight of the chloroethenes) through the relatively chloride-poor VC, without biasing the evaluation of the concentration data based on the different molecular weights of each compound. A summary of concentrations of the chloroethene VOC compounds observed in the February 2023 monitoring event are presented in Table 2 and Figure 4. Total molar ethene concentrations observed in MW-4, MW-2i, MW-6i, and MW-7 decreased in February 2023 as compared to the October 2022 event. Concentrations in MW-1, MW-2, and MW-3 increased as compared to the October 2022 event. Monitoring wells MW-2i, MW-6, MW-6i, and MW-7 showed the relatively lowest total molar concentrations that have been observed in these wells.

Natural Attenuation Chemistry. Monitoring wells MW-1, MW-2, MW-4, and MW-5 were analyzed for TOC, which is representative of the bioremediation substrate that was injected in 2022 (which is in turn representative of the bioavailable hydrocarbon supply required for facilitating the reductive dechlorination process). Analytical results of natural attenuation analyses are summarized in Table 3.

TOC was detected in all analyzed samples at concentrations between 5,180 µg/L (MW-5) and 44,000 µg/L (MW-2). Concentrations of TOC decreased in wells MW-1 and MW-4 since the October 2022 event by 85 percent and 60 percent respectively. Concentrations of TOC increased in wells MW-5 and MW-2 (neither of which had detectable concentrations during the October 2022 event).

Well MW-5 is located upgradient of the treatment injection area and is indicative of the naturally occurring organic carbon entering the system. The TOC concentrations in this well have varied significantly (from <1,000 µg/L to 18,900 µg/L), with the relatively higher concentrations occurring during the fall monitoring events, suggesting that the flux of organic carbon entering the system may be seasonally influenced.

TOC concentrations observed in source-area wells MW-1 and MW-4 decreased in comparison to the October 2022 event. However, those levels were significantly higher than normally encountered in these wells. That was to be expected as MW-1 and MW-4 were in the area of closely spaced injections. The concentration in downgradient well MW-2 increased compared to the October 2022 event. This was also expected as the influence of the tightly spaced injections in the source area spread downgradient.

A TOC concentration above 20,000 µg/L is recommended to sufficiently support microbial growth. The TOC concentrations in the sampled wells are near or above that threshold with the exception of MW-5. As MW-5 is upgradient and injections were not conducted in that area, this is to be expected.

3.2.2 Air/Vapor Monitoring Samples

This section summarizes the analytical results from the air and vapor samples collected during the February 2023 media monitoring event (including two ambient air samples and one system effluent vapor sample). Analytical results are included in Table 4 and Table 5 and are shown on Figure 5. Laboratory analytical reports are included in Appendix B.

Ambient Air. An ambient air sample was collected from one indoor location, Kepler's Upholstery (AMB-5), and one outside location (AMB-OUT; located approximately 10 feet northwest of Tigard Cleaner's main building). TCE was not detected above laboratory RLs in the outdoor ambient sample. TCE was detected in the sample from Kepler's Upholstery with a concentration of 1,600 µg/m^3. This concentration is the second highest concentration recorded for this space but is significantly less than the concentration of 7,980 µg/m^3 from the October 2022 event. DCE and vinyl chloride were not detected in either sample during this monitoring event.

System Effluent. A sample of the system effluent was collected from the vent stack of the VCS. PCE, TCE, and DCE were detected above laboratory RLs at concentrations of 139 µg/m^3, 117 µg/m^3, and 26.3 µg/m^3, respectively. These concentrations increased slightly as compared to the October 2022 event, but are well below historic highs and do not predict an unacceptable exposure concentration in ambient air (as discussed in Section 4.3). Vinyl chloride was not detected above RLs in the sample.

4.0 Risk-Based Screening

The following sections describe the analytical results (from groundwater, ambient air, system effluent vapor, and outfall grab water samples) as they compare to DEQ RBC screening levels.

4.1 Groundwater Risk-Based Screening

Analytical results of the groundwater samples were compared to the applicable DEQ RBCs (DEQ, 2018), which include:

- Groundwater volatilization to outdoor air for urban residential and occupational exposure scenarios;
- Groundwater vapor intrusion into buildings for urban residential (potential future use) 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 2. Analytical results exceeding one or more of the aforementioned screening levels are shaded in the tables.

The samples collected from upgradient well MW-5 and downgradient wells MW-2, MW-6i, and MW-7 did not contain any analytes with concentrations that exceeded applicable RBCs. Each of the other wells had one or more RBC exceedances, as discussed below. It is anticipated, however, that the forthcoming 2023 revision to DEQ's vapor intrusion guidance may result in changes to the conclusions for vapor intrusion risk, and it is recommended that the concentrations be re-evaluated following the finalization of the new guidance.

Groundwater Volatilization to Outdoor Air – Urban Residential. PCE and TCE were not detected in the February 2023 groundwater samples at concentrations that exceed the urban residential RBC for groundwater volatilization to outdoor air. Vinyl chloride was detected at concentrations that exceed the urban residential RBC in monitoring wells MW-1, MW-3, and MW-4 by factors of between 2.1 (MW-3) and 70 (MW-1). The RBC for DCE exceeds the solubility limit of the analyte and therefore cannot be exceeded.

Groundwater Volatilization to Outdoor Air – Occupational. The PCE and DCE RBCs for groundwater volatilization to outdoor air for occupational scenarios are above the solubility limit of the analytes and therefore cannot be exceeded. TCE was not detected in the February 2023 groundwater samples at concentrations that exceed the RBC. Vinyl chloride was detected in monitoring wells MW-1 and MW-4 at concentrations that exceed the RBC by factors of 5.1 and 3.0 respectively.

Groundwater Vapor Intrusion into Buildings – Urban Residential. PCE was not detected in the February 2023 groundwater samples at concentrations that exceed the urban residential RBC for vapor intrusion into buildings. TCE was detected in MW-4 at a concentration that exceeded the RBC by a factor of 4.4, though the laboratory detection limit for TCE in sample MW-1 was elevated and was greater than the RBC. Vinyl chloride was detected in four monitoring wells (MW-1, MW-2i, MW-3, and MW-4) at concentrations that exceeded the RBC by factors of between 11 (MW-2i) and approximately 1,400 (MW-1). The RBC for DCE is above the solubility limit of the chemical and therefore cannot be exceeded.

Groundwater Vapor Intrusion into Buildings – Occupational. PCE and TCE were not detected in any of the collected samples at concentrations that exceed the RBCs for occupational groundwater vapor intrusion into buildings. Vinyl chloride was detected at concentrations that exceed the RBC in monitoring well samples MW-1, MW-3, and MW-4, with exceedance factors that ranged between 1.1 (MW-3) and 34 (MW-1). The RBC for DCE is above the solubility limit of the analyte and therefore cannot be exceeded.

Groundwater in Excavation – Construction and Excavation. PCE was detected in monitoring well MW-4 at a concentration that exceeds the construction and excavation worker RBC for groundwater in excavations by a factor of 1.3. TCE was detected in monitoring well MW-4 at a concentration that exceeded the RBC by a factor of 4.6, though the detection limit for TCE was above the RBC in the MW-1 sample. DCE was detected at concentrations that exceed the RBC in wells MW-1 and MW-4 by factors of 26 and 3.8, respectively. Vinyl chloride was detected at concentrations that exceed the RBC in monitoring well samples MW-1 and MW-4 by factors of 31 and 19, respectively.

4.2 Ambient Air Risk-Based Screening

Analytical results of the ambient air sampling events 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 direct contact by air inhalation in occupational (current) and urban residential (potential future) scenarios. The RBCs are listed with the data in Table 4. Analytical results exceeding the associated screening level are shaded in the table.

Air Inhalation – Urban Residential. PCE, DCE, and vinyl chloride were detected in ambient air samples from the February 2023 monitoring event at concentrations that are below the air inhalation RBC for an occupational use setting. TCE was detected in the ambient air sample from Kepler's (AMB-5) at a concentration that exceeds the RBC by a factor of approximately 1,600. TCE concentrations in the Kepler's building (AMB-5) have consistently been elevated, and based on the results of the additional investigation and historical data, these TCE concentrations are unrelated to activities at Tigard Cleaners and are associated with a separate (but undefined) source.

Air Inhalation – Occupational. PCE, DCE, and vinyl chloride were detected in ambient air samples from the February 2023 monitoring event at concentrations that are below the air inhalation RBC for an occupational use setting. TCE was detected in the ambient air sample from Kepler's (AMB-5) at a concentration that exceeds the RBC by a factor of approximately 550. TCE concentrations in the Kepler's building (AMB-5) have consistently been elevated, and based on the results of the additional investigation and historical data, these TCE concentrations are unrelated to activities at Tigard Cleaners and are associated with a separate (but undefined) source.

4.3 Vapor Collection System Effluent Discharge and Compliance

VOC concentrations from the vapor collection system effluent sample were compared to RBC equivalents previously calculated using the EPA SCREEN3 vapor distribution model (EPA, 1995) for modified urban residential inhalation from a stack (Apex, 2017), as shown on Table 5. No analytes were detected in the system effluent at concentrations that exceed the acceptable discharge concentrations (the nearest analyte to its calculated limit is TCE, which is at approximately one percent of the allowable discharge). Therefore, it is concluded that no emission controls are needed for the discharge to be protective of surrounding receptors (concentrations in the discharge are also expected to continue to decrease with sustained operation).

The observed concentration trends in the system effluent also do not appear to influence the indoor air concentrations or the outdoor ambient air concentrations, as no similar trends in the ambient air sampling were observed.

5.0 Conclusions and Recommendations

Consistent with prior sampling events, PCE and/or associated degradation byproducts are present at the Site in groundwater and ambient air. Concentrations of PCE, TCE, DCE, and vinyl chloride that exceed applicable DEQ RBCs were observed in groundwater and/or ambient air during this event.

The groundwater sample collected from the upgradient well MW-5 has consistently exhibited VOC concentrations that are below applicable RBCs (and non-detect for PCE and TCE during this event).

The three wells located in or near the source areas include MW-3 (located north of the back building; hydraulically cross gradient), MW-1 (immediately southwest of the back building; hydraulically downgradient), and MW-4 (at the source area of the main building). PCE and TCE exceeded at least one applicable RBC in MW-4. DCE exceeded at least one applicable RBC in MW-1 and MW-4. Vinyl chloride concentrations in samples collected from wells MW-1, MW-3, and MW-4 exceeded at least one applicable RBC. The sample collected from MW-3 also exceeded at least one applicable RBC for TCE and vinyl chloride.

Groundwater collected from downgradient upper-zone wells MW-2 and MW-7 did not exceed applicable RBCs. Groundwater collected from downgradient intermediate-zone well MW-2i contained higher concentrations of chloroethenes than observed in the adjacent MW-2 and exceeded at least one RBC for vinyl chloride. These results indicate the groundwater contaminant plume continues to be present in the lower conductive layer downgradient from the main building and back building source area. Groundwater collected from downgradient intermediate-zone well MW-6i had concentrations below the RL for PCE, TCE, and vinyl chloride, and DCE was detected at an estimated concentration lower than the RL.

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 is the second highest concentration recorded for this space but is significantly lower than the historical high concentration collected during the October 2022 event. 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. The groundwater monitoring wells nearest the Kepler's sample, MW-4 and MW-5, do not 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 sometimes 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 2022 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.

Since the groundwater IRM in August 2022, the site wells in the source area have shown a significant decrease in PCE and TCE concentrations correlated with an increase in DCE and vinyl chloride concentrations (as expected), although the relative changes in concentration vary by well. The intermediate wells have a decreasing trend of DCE and vinyl chloride consistent with advanced stages of the reductive dechlorination process. Downgradient wells MW-2 and MW-7 show similar advanced stage trends, and MW-2 contains apparent seasonal fluctuations in DCE and vinyl chloride.

While each of the groundwater samples collected in the source area and the downgradient wells (excepting MW-6i) was impacted by chloroethene concentrations that exceeded at least one of the vapor intrusion and volatilization RBCs, this is not itself indicative of an unacceptable risk exposure, as the ambient air sample results in the Clear Payments (former Future State) space are consistently below the RBCs for occupational use settings for all chloroethenes, and the sample results from Kepler's space exceed RBCs for TCE for occupational use settings and PCE for urban residential use settings (which has been demonstrated to be unassociated with the dry cleaners operation). This is further supported by each of the ambient air samples being non-detect for DCE and vinyl chloride even as those compounds are present at increased concentrations in the groundwater samples due to the ongoing reductive dechlorination process.

Reductive dechlorination as a result of the 2022 expanded groundwater IRM continues to be observed in most monitoring wells (at varying stages). Preliminary evidence of increased reductive dechlorination in the source area is observed in monitoring wells MW-1 and MW-3, which showed an increase in DCE concentrations, and MW-4 showed a decrease in both PCE and TCE concentrations. 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.

Based on these conclusions, we recommend the following:

- Continuation of the semi-annual media monitoring to evaluate concentration trends in groundwater and ambient air. We recommend the following routine media monitoring (consistent with the October 2021 monitoring event):
    - Groundwater gauging and monitoring of all wells (MW-1 through MW-7) for VOC analysis;
    - Sampling wells MW-1, MW-4, MW-5, and MW-6 for TOC;

- Ambient air monitoring for VOCs to include AMB-4 (Future State), AMB-5 (Kepler's), and an outdoor air sample;
- Collecting a vapor effluent sample for VOCs; and
- Measuring sub-slab VOCs (using a photoionization detector) and vacuum pressure (using magnehelic gauges) for sub-slab vapor monitoring points VP-3 and VP-11 through VP-14.

6.0 References

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Table 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							
	6/7/2021	7-17	154.054	7.41	--	--	146.64
	10/20/2021			5.03	--	--	149.02
	10/19/2022			4.90	--	--	149.15
	2/21/2023			3.70	--	--	150.35
MW-2							
	6/7/2021	7-17	154.85	4.24	--	--	150.61
	10/20/2021			3.11	--	--	151.74
	10/19/2022			7.26	--	--	147.59
	2/21/2023			8.62	--	--	146.23
MW-3							
	10/20/2021	7-17	155.293	5.87	--	--	149.42
	5/26/2022			--	--	--	--
	10/19/2022			6.27	--	--	149.02
	2/21/2023			5.17	--	--	150.12
MW-4							
	6/7/2021	7-17	155.54	5.61	--	--	149.93
	10/20/2021			5.48	--	--	150.06
	10/19/2022			5.70	--	--	149.84
	2/21/2023			5.19	--	--	150.35
MW-5							
	6/7/2021	7-17	154.688	4.48	--	--	150.21
	10/20/2021			4.40	--	--	150.29
	10/19/2022			4.80	--	--	149.89
	2/21/2023			4.28	--	--	150.41
MW-6							
	6/7/2021	10-20	153.319	9.33	--	--	143.99
	10/20/2021			9.42	--	--	143.90
	10/19/2022			4.82	--	--	148.50
	2/21/2023			7.02	--	--	146.30
MW-7							
	6/7/2021	10-20	153.992	6.16	--	--	147.83
	10/20/2021			4.94	--	--	149.05
	10/19/2022			4.85	--	--	149.14
	2/21/2023			5.00	--	--	148.99
Intermediate Wells							
MW-2i							
	6/7/2021	33.25-43.25	154.21	4.27	--	--	149.94
	10/20/2021			6.20	--	--	148.01
	10/19/2022			4.29	--	--	149.92
	2/21/2023			7.03	--	--	147.18
MW-6i							
	6/7/2021	24.58-34.58	153.17	6.21	--	--	146.96
	10/20/2021			7.90	--	--	145.27
	10/19/2022			8.23	--	--	144.94
	2/21/2023			3.81	--	--	149.36

Notes:

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

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

Sample ID	Sample Date	Analyte Concentration in µg/L				Total Molar VOCs in µmol/L
		PCE	TCE	cis-1,2-DCE	Vinyl Chloride	
Upgradient						
MW-5						
	6/7/2021	<1.00	<1.00	**0.188 J**	**0.561 J**	0.023
	10/20/2021	<1.00	**0.261 J**	**9.06**	**0.433 J+**	0.111
	10/18/2022	<1.00	<1.00	<1.00	<1.00	<1.00
	2/21/2023	<1.00	<1.00	**0.466 J**	**0.439 J**	0.024
Source Area						
MW-1						
	6/7/2021	<20000	<20000	**452,000**	**90,000 J+**	6,342
	10/20/2021	**9,940 J**	**21,200**	**279,000**	**18,700 J+**	3,502
	10/19/2022	<500	<500	**217,000**	**37,200**	2,847
	2/21/2023	<500	<500	**468,000**	**30,100**	5,360
MW-3						
	6/7/2021	**2,620**	**1,350**	**5,630**	**1020 J+**	101
	10/20/2021	**1,560**	**821**	**3,150**	**467 J+**	56.1
	10/19/2022	<100	<100	**2,520**	**92.2 J**	28.7
	2/21/2023	**36.5 J**	**150**	**7,510**	**938**	94.1
MW-4						
	6/7/2021	**13,300**	**5,890**	**74,200**	**28000 J+**	1,349
	10/20/2021	**27,400**	**9,890**	**64,900**	**21,700**	1,267
	10/19/2022	**78,000**	**11,500**	**76,400**	**13,000**	1,564
	2/21/2023	**7,410**	**1,990**	**68,100**	**17,800**	1,057
Downgradient						
MW-2						
	6/7/2021	<1.00	<1.00	**62.8**	**79.0 J+**	1.92
	10/20/2021	<1.00	<1.00	**32.2**	**34.2 J+**	0.888
	10/18/2022	<1.00	<1.00	**8.55**	**2.88**	0.144
	2/21/2023	<1.00	**0.229 J**	**57.1**	**12.0**	0.788
MW-2i						
	6/7/2021	<500	<500	**31,100**	**13500 J+**	543
	10/20/2021	<500	<500	**19,600**	**4820 J+**	285
	10/19/2022	<500	<500	**34,000**	**8,700**	496
	2/21/2023	<100	<100	**12,600**	**230**	135

Please see notes at end of table.

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

Sample ID	Sample Date	Analyte Concentration in µg/L				Total Molar VOCs in µmol/L
		PCE	TCE	cis-1,2-DCE	Vinyl Chloride	
MW-6						
	6/7/2021	<250	<250	**921**	**1060 J+**	**29.5**
	10/20/2021	<25.0	**9.65 J**	**1,970**	**879**	**34.6**
	10/18/2022	<25.0	<25.0	**1,320**	**906**	**28.3**
	2/21/2023	Stormwater flowing into well monument, no sample collected				
MW-6i						
	6/7/2021	<1.00	<1.00	**0.818 J**	<1.00	**0.027**
	10/20/2021	<1.00	<1.00	**0.779 J**	<1.00	**0.025**
	10/18/2022	<1.00	<1.00	**0.950 J**	<1.00	**0.027**
	2/21/2023	<1.00	<1.00	**0.257 J**	<1.00	**0.023**
MW-7						
	6/7/2021	<5.00	<5.00	**229**	**336 J+**	**7.79**
	10/20/2021	<5.00	<5.00	**101**	**259 J+**	**5.23**
	10/18/2022	<5.00	<5.00	**45.9**	**46.0**	**1.27**
	2/21/2023	<1.00	<1.00	**11.2**	**11.4 J**	**0.309**
GW Volatilization to Outdoor Air	Urban Residential	150,000	6,900	>S	430	--
	Occupational	>S	20,000	>S	5,900	--
GW Vapor Intrusion into Buildings	Urban Residential	8,700	430	>S	21	--
	Occupational	48,000	3,700	>S	880	--
GW in Excavations	Construction and Excavation Worker	5,600	430	18,000	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 3
Groundwater Analytical Results for Total Organic Carbon
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Total Organic Carbon (µg/L)
Upgradient		
MW-5		
	6/7/2021	**6,620**
	10/20/2021	**5,310**
	10/18/2022	<1,000
	2/21/2023	**5,180**
Source Area		
MW-4		
	6/7/2021	**25,300**
	10/21/2021	**19,500**
	10/19/2022	**111,000 J**
	2/21/2023	**43,900**
Downgradient		
MW-1		
	6/7/2021	**32,400**
	10/20/2021	**11,700**
	10/19/2022	**129,000 J**
	2/21/2023	**18,800**
MW-2		
	6/7/2021	--
	10/20/2021	--
	10/19/2022	<1,000
	2/21/2023	**44,000**
MW-6		
	6/7/2021	**4,310**
	10/20/2021	**4,620**
	10/18/2022	<1,000
	2/21/2023	--

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 4
Ambient Air Analytical Results
Tigard Cleaners
Tigard, Oregon

Sample ID	Sample Date	Analyte Concentration in µg/m3			
		PCE	TCE	cis-1,2-DCE	Vinyl Chloride
AMB-4 / FC-1 (Former Clear Payments)					
	6/17/2021	**3.02**	<1.07	<0.793	<0.511
	10/20/2021	**3.15**	**2.40**	<0.793	<0.511
	11/3/2022	Could not access space			
	2/21/2023	Could not access space			
AMB-5 / KU-1 (Kepler's Upholstery)					
	6/17/2021	**5.68**	**151**	<0.793	<0.511
	10/20/2021	**27.0**	**863**	<15.9	<10.2
	11/3/2022	**18.5**	**7,980**	<0.793	<0.511
	2/21/2023	<27.2	**1,600**	<15.9	<10.2
AMB-OUT (Background Ambient)					
	6/17/2021	**36.2**	**1.52**	<0.793	<0.511
	10/21/2021	**1.72**	<1.07	<0.793	<0.511
	11/3/2022	**5.78**	**1.19**	<0.793	<0.511
	2/21/2023	<1.36	<1.07	<0.793	<0.511
Air Inhalation	Urban Residential	26	1.0	>Pv	0.20
	Occupational	47	2.9	>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 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	Vinyl Chloride
EX					
	6/17/2021	**213**	**86.8**	**28.9**	**0.726**
	10/20/2021	**188**	**71.3**	**21.3**	<0.511
	11/3/2022	**126**	**108**	**31.4**	**7.62**
	2/21/2023	**139**	**117**	**26.3**	**8.31**
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.

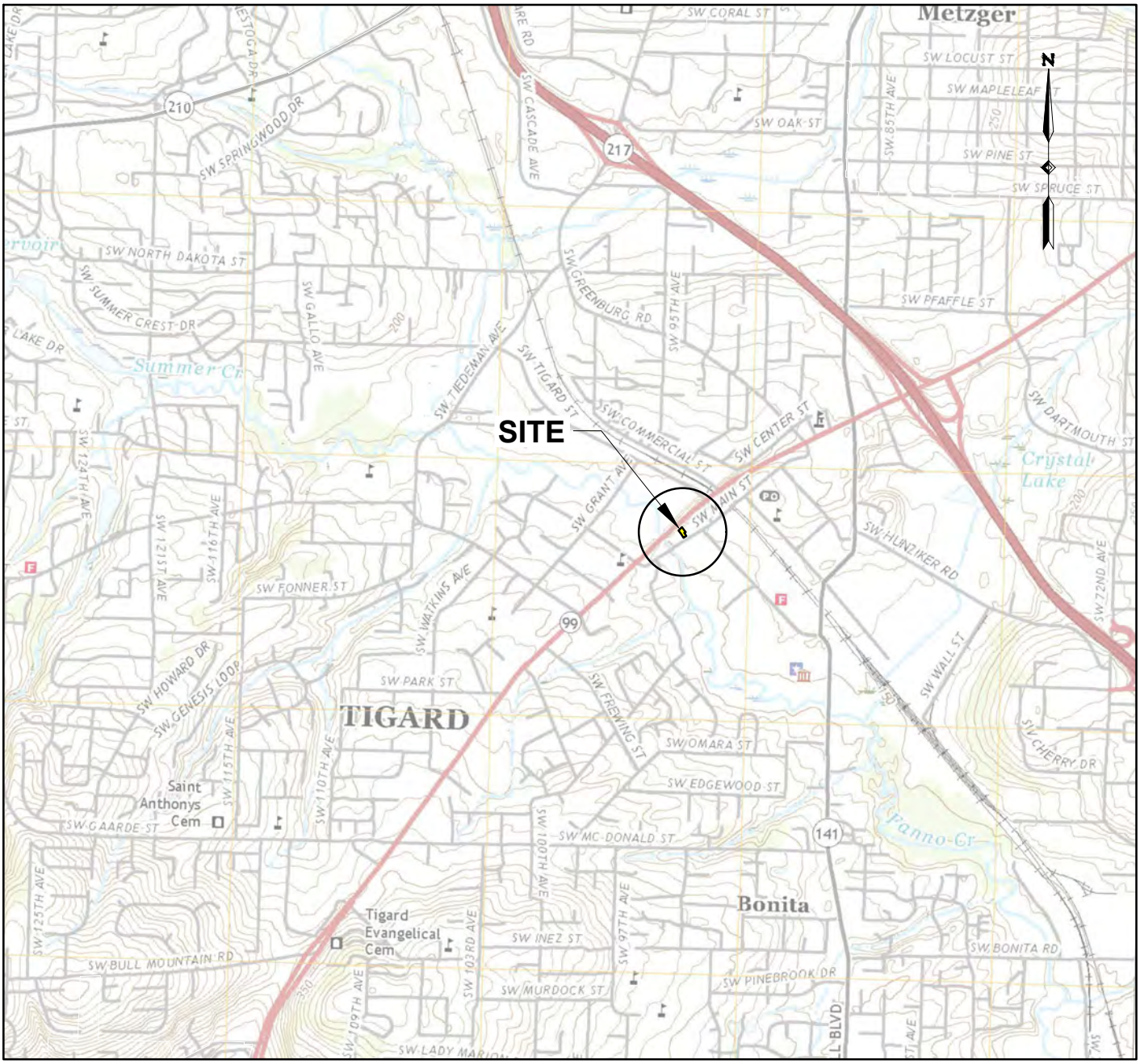
DEQ RBCs = Oregon Department of Environmental Quality's Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised May 2018.

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

February 2023 Data 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
	June 2023			

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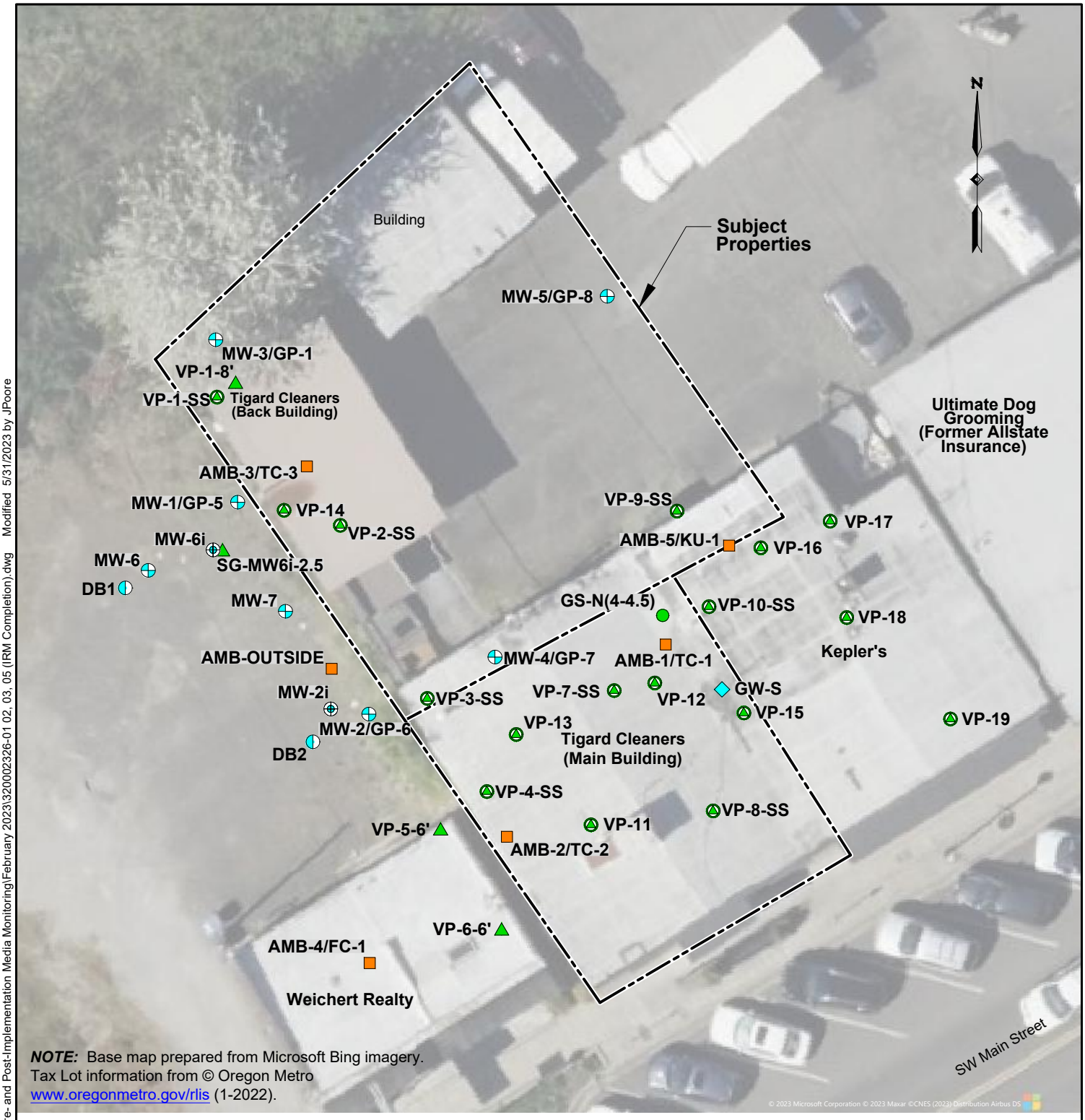


Legend:

- **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

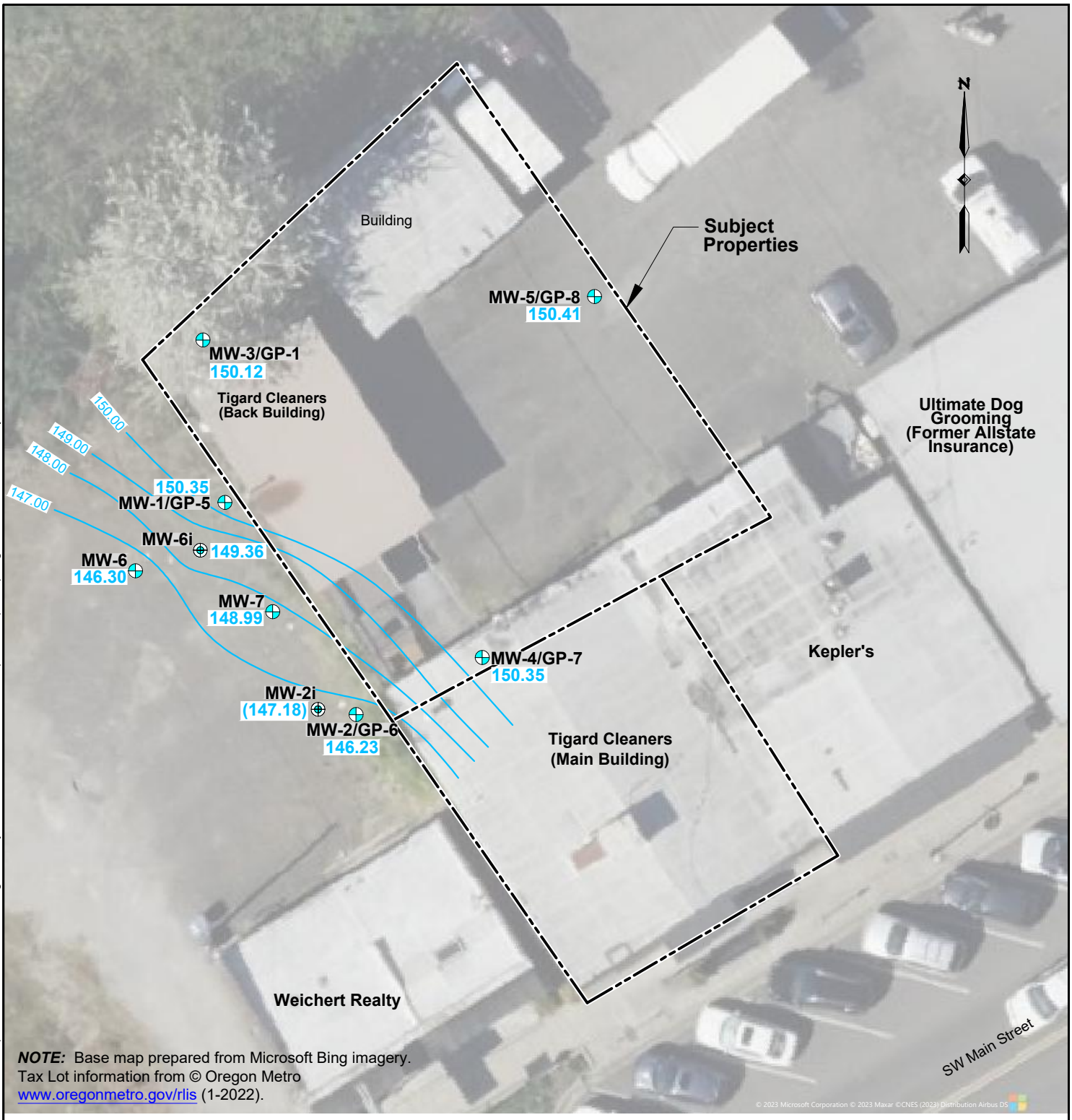
Scale in Feet

Site Plan

February 2023 Data Report
12519 SW Main Street
Tigard, Oregon

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

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Pre- and Post-Implementation Media Monitoring\February 2023\320002326-01 02, 03, 05 (IRM Completion).dwg Modified 5/31/2023 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
- **150.35** Groundwater Elevation in Feet Above MSL
- **(147.18)** Elevation Not Used for Contouring
- 147.00 ——— Groundwater Elevation Contour in Feet Above MSL

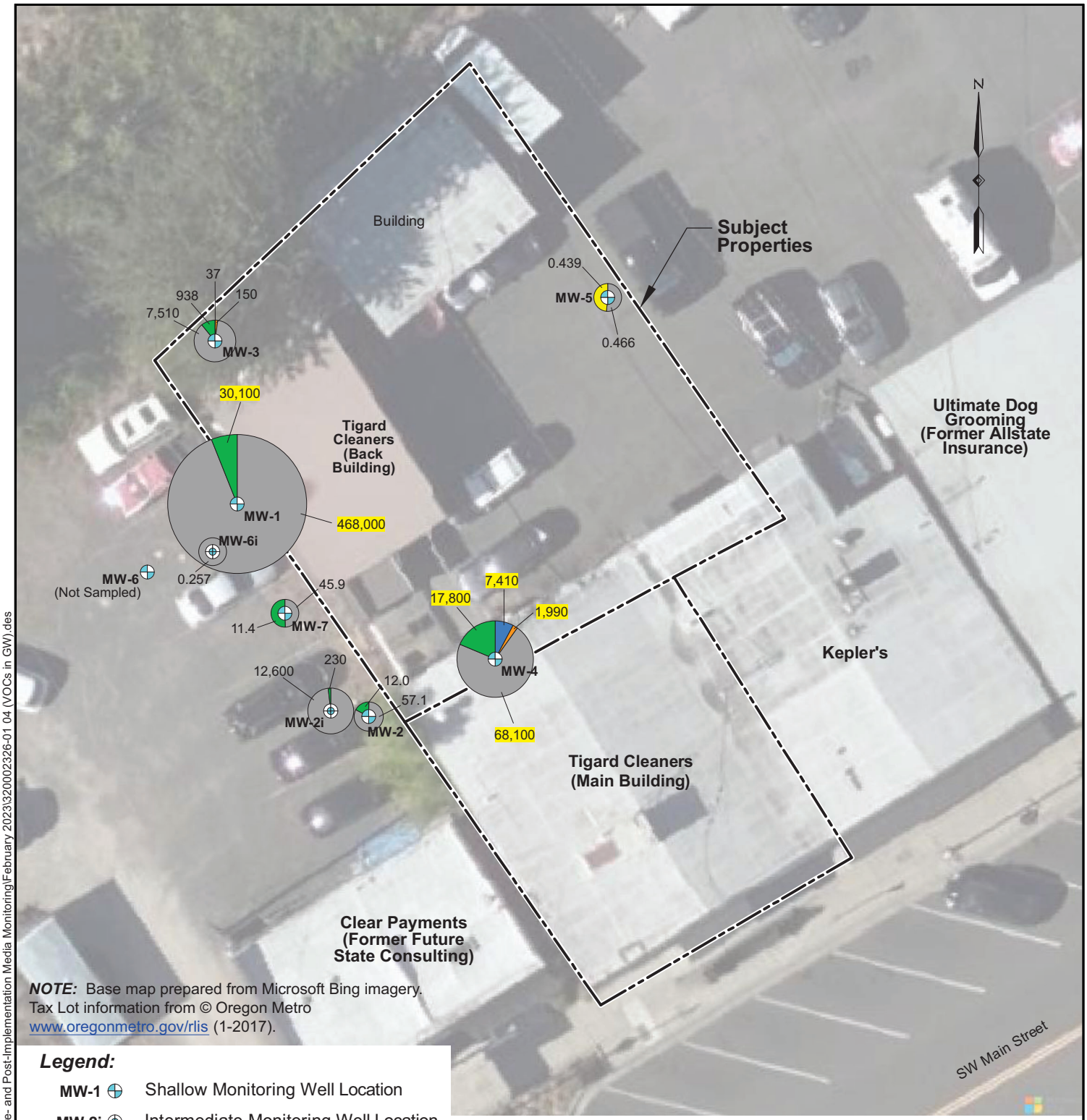
0 20 40
Scale in Feet

Shallow Groundwater Elevations - February 21, 2023

February 2023 Data 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**
	June 2023			

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Pre- and Post-Implementation Media Monitoring\February 2023\320002326-01 02, 03, 05 (IRM Completion).dwg Modified 5/31/2023 by JPoore



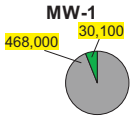
NOTE: Base map prepared from Microsoft Bing imagery.
Tax Lot information from © Oregon Metro
www.oregonmetro.gov/rlis (1-2017).

Legend:

MW-1 Shallow Monitoring Well Location

MW-2i Intermediate Monitoring Well Location

Detected Chloroethenes:



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 - February 21, 2023

February 2023 Data Report
12519 SW Main Street
Tigard, Oregon

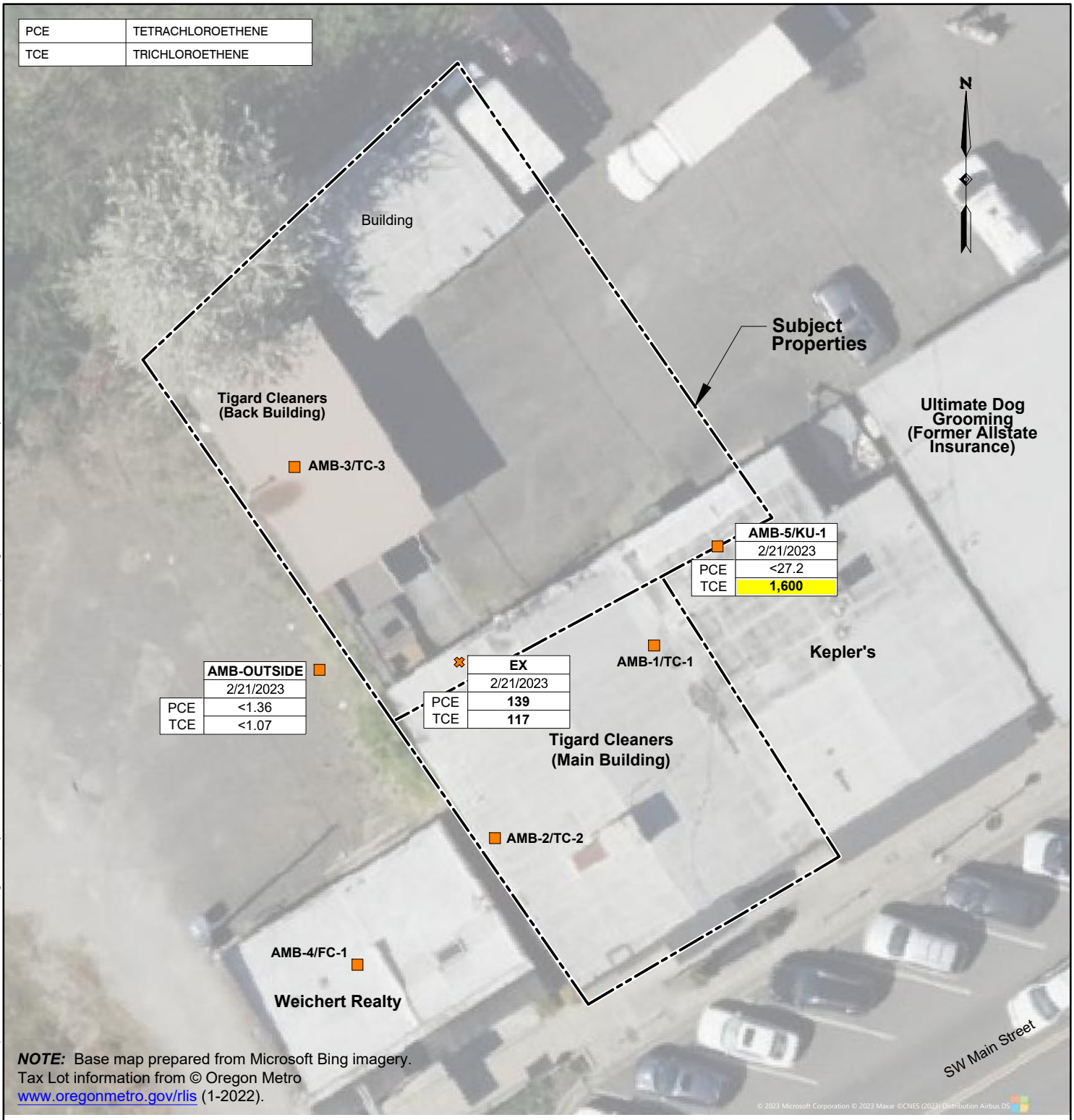
Apex Companies, LLC
15618 SW 72nd Avenue
Tigard, Oregon 97224

Project Number:	Drawn:	Approved:	Figure
320002326-01	JP	CO	4

June 2023

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Pre- and Post-Implementation Media Monitoring\February 2023\320002326-01 04 (VOCs in GW).des

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE



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

Legend:

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

EX ✖ Soil Vapor Extraction System Exhaust Sample Location (Summa)

AMB-5/KU-1	
	2/21/2023
PCE	<27.2
TCE	1,600

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 - February 21, 2023

February 2023 Data Report
12519 SW Main Street
Tigard, Oregon

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

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

June 2023

Figure **5**

I:\Client\DEQ\Oregon\320002326-01 Tigard Cleaners\09 Pre- and Post-Implementation Media Monitoring\February 2023\320002326-01 02, 03, 05 (IRM Completion).dwg Modified 5/31/2023 by JPoore

Appendix A

Sampling Sheets

WELL GAGING DATA SHEET

APEX

		Job Number:	32000236-01
Client:	DEQ	Date:	4/21/23
Project:	Figaro Cleaners	Sampler:	K. Schettler
Weather:	Raining	Time In/Out:	

WATER LEVEL DATA

	Well I.D.	Time	Depth to Free Product (feet)	Depth to Water (feet)	Depth to Well Bottom (feet)	Product Thickness (feet)	Water Column Height (feet)	Notes/Other Remarks
⑧	MW-1	1003	—	3.70	17ft			
⑥	MW-2	1015	—	8.62	17ft			
⑦	MW-2i	0959	—	8.03	43.25ft			
⑩	MW-3	1012	—	5.19	17ft			
⑨	MW-4	1014	—	5.19	17ft			
④	MW-5	1007	—	4.28	17ft			
⑤	MW-6	0954	—	7.02	20ft			
①	MW-6i	0953	—	3.81	34.58ft			
③	MW-7	0957	—	5.00	20ft			

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-1	Job Number:	320009362-01
Client:	DEQ	Date:	2/21/23
Project:	Tigard Cleaners	Sampler:	RS
Weather:	rain	Time In/Out:	1430

WELL DATA

Well Depth:	17ft	Well Diameter:	2	Water Height	
Depth to Water:	4.67	Screened Interval:	7 to 17	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		Pump Intake Depth:	
Sampling Method:		Tubing Type:	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1435			5.96	0.20	5.44	13.23	2638	0.0	-49.4		C
1438			6.37	0.20	5.44	13.27	2642	0.0	-54.1		C
1441			7.24	0.10	5.48	13.13	2635	0.02	-59.3		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-1	Sampling Flow Rate	0.20	Analytical Laboratory:	
Sample Time:	1445	Final Depth to Water:	8.36	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-2	Job Number:	320002326-01
Client:	DEQ	Date:	2/21/23
Project:	Tigard Cleaners	Sampler:	A.Evenden
Weather:	Cloudy	Time In/Out:	

WELL DATA

Well Depth:	17ft	Well Diameter:	2in	Water Height	
Depth to Water:	7.98	Screened Interval:	7 to 17	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:				Pump Intake Depth:						Comments		
Sampling Method:				Tubing Type:								
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks	
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria	
1151			11.53	0.20	5.80	14.37	1746	0	-68.1		Cloudy	
1154			11.53	"	5.91	14.40	1746	0	-79.7		"	
1157			11.53	"	5.96	14.08	1726	0	-89.5		"	
1200			11.53	✓	6.01	14.12	1721	0	-96.3		"	
1203			11.53		6.10	14.17	1716	0	-100.0			
1206			11.53		6.13	14.28	1717	0	-105.0			
1209			11.53		6.23	13.42	1544	16.5	-102.5			
1212			11.53		6.44	12.61	1546	34.7	-96.5			
1215			11.53		6.56	11.83	1382	93.4	-91.3			
1218			11.53		6.68	11.05	1312	149	-80.3			

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-2	Sampling Flow Rate	0.20	Analytical Laboratory:	
Sample Time:	1625	Final Depth to Water:	11.53	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-2i	Job Number:	320002326-01
Client:	DEQ	Date:	
Project:	Tigard Cleaners	Sampler:	
Weather:		Time In/Out:	

WELL DATA

Well Depth:	43.25ft	Well Diameter:	~~1ft~~ 2in	Water Height	
Depth to Water:	7.19ft	Screened Interval:	33.25 to 43.25	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		Pump Intake Depth:	
Sampling Method:		Tubing Type:	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
~~1520~~			10.15		6.98	14.13	726	5.38	-37.8		C
~~1526~~			11.51		6.80	14.22	7.25	5.65	-26.5		C
~~1530~~			12.41		6.76	14.09	724	5.63	-17.8		C
1529			13.74		6.72	14.26	722	5.52	-10.5		
1532			14.66		6.70	14.16	723	5.66	-5.3		

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-2i	Sampling Flow Rate		Analytical Laboratory:	
Sample Time:	1609	Final Depth to Water:		Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-3	Job Number:	320002326-01
Client:	DEQ	Date:	2/2/23
Project:	Tigard Cleaners	Sampler:	KS
Weather:	rain	Time In/Out:	1045

WELL DATA

Well Depth:	17ft	Well Diameter:	3/4	Water Height	
Depth to Water:	4.80	Screened Interval:	7 to 17	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	P. Pump	Pump Intake Depth:		Comments	
Sampling Method:	P. Pump	Tubing Type:			

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1054			7.01	0.20	6.04	13.16	1336	3.19	-59.4		C
1057			10.31	0.20	6.11	13.13	1343	1.69	-83.2		C
1100			dry	0.20	6.38	12.19	1340	5.46	-104.2		C
not enough water for a full set of parameters											

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-3	Sampling Flow Rate	0.20	Analytical Laboratory:	
Sample Time:	1615	Final Depth to Water:	16.82	Did Well Dewater?	Yes

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-4	Job Number:	320002326-01
Client:	DEQ	Date:	2/21/23
Project:	Tigard Cleaners	Sampler:	JCJ
Weather:		Time In/Out:	1130

WELL DATA

Well Depth:	17ft	Well Diameter:	3/4	Water Height	
Depth to Water:	5.01	Screened Interval:	7 to 17	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:	P. Pump	Pump Intake Depth:		Comments	
Sampling Method:	P. Pump	Tubing Type:			

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1138			5.61	0.20	5.59	14.68	2470	0.06	-10.1		C
1141			5.72	0.20	5.63	14.59	2107	0.06	-34.7		C
1144			5.84	0.20	5.76	14.62	1972	0.00	-53.5		C
1147			5.94	0.20	5.84	14.66	1862	0.00	-64.4		C
1150			5.94	0.20	5.90	14.67	1781	0.00	-72.9		C
1153			5.94	0.20	5.94	14.69	1715	0.00	-78.5		C
1156			5.94	0.20	5.96	14.68	1690	0.00	-82.6		C

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-4	Sampling Flow Rate	0.20	Analytical Laboratory:	
Sample Time:	1200	Final Depth to Water:	5.96	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

★ DUP-1

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-5	Job Number:	320002326-01
Client:	DEQ	Date:	2/21/23
Project:	Tigard Cleaners	Sampler:	A. Evernden
Weather:	Rainy	Time In/Out:	

WELL DATA

Well Depth:	17ft	Well Diameter:	2in	Water Height	
Depth to Water:	4.27ft	Screened Interval:	7 to 17	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:			Pump Intake Depth:							Comments	
Sampling Method:			Tubing Type:								
Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1054			4.31	0.20	6.65	13.42	507	14.1	86.1		floating solids
1057			4.31	↓	5.89	13.50	514	3.5	91.0		
1100			4.31		5.60	13.38	546	1.9	79.4		
1103			4.31		5.47	13.40	591	1.4	55.8		
1106			4.31		5.41	13.33	625	1.4	35.1		
1109			4.31		5.46	13.24	654	0.8	21.2		
1112			4.31		5.51	13.21	667	0.3	11.8		
1115			4.31		5.52	13.16	671	0.6	4.8		
1118			4.31		5.55	13.26	691	0.4	-6.4		
1121			4.31		5.56	13.28	699	0.1	-11.3		

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-5	Sampling Flow Rate	0.20	Analytical Laboratory:	
Sample Time:	1124	Final Depth to Water:	4.31	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-6	Job Number:	3200023226-01
Client:	DEQ	Date:	
Project:	Tigard Cleaners	Sampler:	
Weather:		Time In/Out:	

WELL DATA

Well Depth:	20ft	Well Diameter:		Water Height	
Depth to Water:		Screened Interval:	10 to 20	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		Pump Intake Depth:	Comments
Sampling Method:		Tubing Type:	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:		Sampling Flow Rate		Analytical Laboratory:	
Sample Time:		Final Depth to Water:		Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

MW-6 is located in a depression. After letting the wells equilibrate, there was a period of heavy rain. The water collected and pooled over MW-6, filling the monument and casing. MW-6 will not be sampled due to surface water filling in the well.

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-6i	Job Number:	320002326-01
Client:	DEQ	Date:	02/21/23
Project:	Tigard Cleaners	Sampler:	RS
Weather:	rain	Time In/Out:	1330

WELL DATA

Well Depth:	34.58ft	Well Diameter:	2	Water Height	
Depth to Water:	3.77	Screened Interval:	24.58 to 34.58	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		Pump Intake Depth:	
Sampling Method:		Tubing Type:	

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1346			~~4.81~~ 6.26	0.20	6.33	14.15	2373	0.00	-106.4		C
1349			6.06	0.20	6.34	14.17	2391	0.00	-116.8		C
1352			7.01	0.20	6.38	14.23	2407	0.00	-124.1		C
1355			7.70	0.20	6.44	14.31	2420	0.00	-131.3		C
			~~RS~~								

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-6i	Sampling Flow Rate	0.20	Analytical Laboratory:	
Sample Time:	1400	Final Depth to Water:	8.42	Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

WELL MONITORING DATA SHEET

APEX

Well I.D.	MW-7	Job Number:	320002326-01
Client:	DEQ	Date:	2/21/23
Project:	Tigard Cleaners	Sampler:	RS
Weather:	Rain	Time In/Out:	1500

WELL DATA

Well Depth:	20ft	Well Diameter:	2	Water Height	
Depth to Water:	4.57	Screened Interval:	10 to 20	x Multiplier	
Water Column Length:		Depth to Free Product:		x Casing Volumes	
Purge Volume:		Free Product Thickness:		= Purge Volume	
Water Height Multipliers (gal)	1-inch = 0.041	2-inch = 0.162	4-inch = 0.653	1 gallon = 3.785 liters	

PURGING DATA

Purge Method:		Pump Intake Depth:	
Sampling Method:		Tubing Type:	

Comments

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Turbidity (NTUs)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5° C	+/-5%	+/- 0.5 ppm	+/-20mV	+/-10%	<-- Stabilization Criteria
1549			9.58	0.10	6.97	12.95	2285	0	-72.1		C
1552			9.81	"	6.99	12.92	2281	0	-91.9		C
1555			10.34	"	6.90	13.46	2269	0	-100.7		C
1558			10.34	✓	6.90	14.01	2273	0	-100.8		C
1601											

Clarity: VC = very cloudy, Cl = Cloudy, SC = slightly cloudy, AC = almost clear, C = clear

SAMPLING DATA

Sample ID:	MW-7	Sampling Flow Rate		Analytical Laboratory:	
Sample Time:	1630	Final Depth to Water:		Did Well Dewater?	

# Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			
			yes no			

COMMENTS

Appendix B

Laboratory Reports and Quality Assurance Review

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 February 2023 media monitoring activities at Tigard Cleaners. Samples were analyzed by Pace National Analytical of Mount Juliet, Tennessee. Copies of the analytical laboratory reports are included in this appendix, referenced as follows:

Report	Report Date	Sampling Event
L1589672	March 3, 2023	Groundwater/Air Sampling

1.0 Analytical Methods

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

- Volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260D;
- Total organic carbon (TOC) by EPA Method 9060A; and

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 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 6ºC; 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 outside of quality control limits for multiple analytes in wells MW-1,MW-2, MW-2i, MW-3, MW-4, MW-5, MW-6, MW-6i, MW-7. 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.

3.5 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. All RPDs were within control limits.

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. RPDs were within quality control limits for the field duplicate sample.

4.0 Conclusion

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

ANALYTICAL REPORT

March 03, 2023

Revised Report

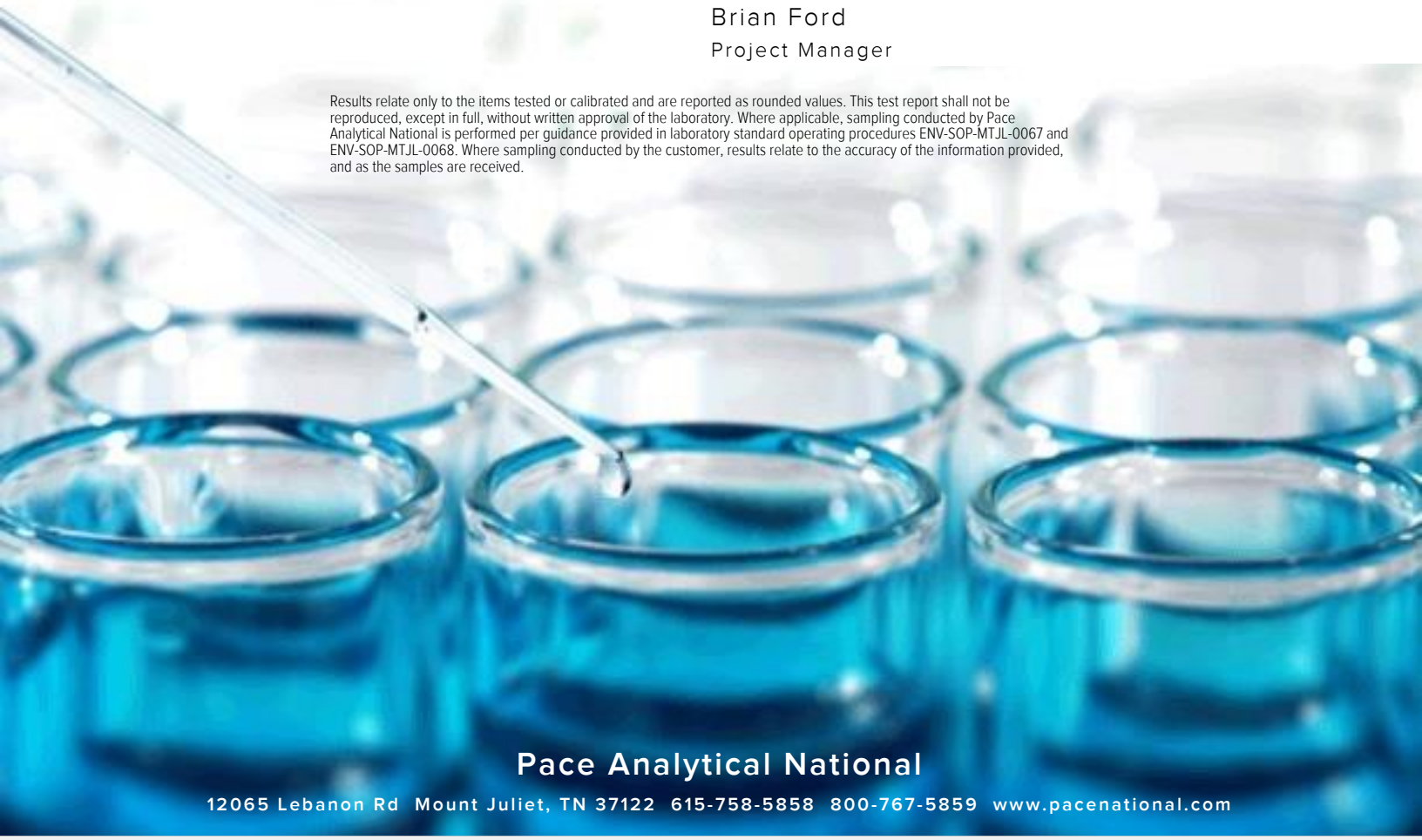
Oregon Dept. of Env. Quality - ODEQ

Sample Delivery Group:	L1589672
Samples Received:	02/27/2023
Project Number:	320002326-01
Description:	Tigard 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 L1589672-01 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 14:45 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG2014074	1	02/28/23 23:05	02/28/23 23:05	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	500	02/28/23 17:41	02/28/23 17:41	JAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2015084	10000	03/01/23 21:31	03/01/23 21:31	ADM	Mt. Juliet, TN

MW-2 L1589672-02 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 16:25 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG2014074	1	02/28/23 23:31	02/28/23 23:31	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	1	02/28/23 15:54	02/28/23 15:54	JAH	Mt. Juliet, TN

MW-2I L1589672-03 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 16:09 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2015084	100	03/01/23 21:10	03/01/23 21:10	ADM	Mt. Juliet, TN

MW-3 L1589672-04 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 16:15 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	100	02/28/23 18:25	02/28/23 18:25	JAH	Mt. Juliet, TN

MW-4 L1589672-05 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 12:00 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG2014074	1	03/01/23 00:48	03/01/23 00:48	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	2000	02/28/23 18:46	02/28/23 18:46	JAH	Mt. Juliet, TN

MW-5 L1589672-06 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 11:24 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG2014074	1	03/01/23 01:08	03/01/23 01:08	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	1	02/28/23 16:16	02/28/23 16:16	JAH	Mt. Juliet, TN

MW-6I L1589672-07 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 14:00 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	1	02/28/23 16:37	02/28/23 16:37	JAH	Mt. Juliet, TN

MW-7 L1589672-08 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 16:02 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2015084	1	03/01/23 20:48	03/01/23 20:48	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2015727	1	03/02/23 15:30	03/02/23 15:30	DWR	Mt. Juliet, TN

DUP-1 L1589672-09 GW

Collected by: Alex Evernden | Collected date/time: 02/21/23 12:00 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 9060A	WG2014074	1	03/01/23 02:15	03/01/23 02:15	LOH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260D	WG2014123	1000	02/28/23 19:29	02/28/23 19:29	JAH	Mt. Juliet, TN

AMB-5/KU-1 L1589672-10 Air

Collected by: Alex Evernden | Collected date/time: 02/21/23 16:59 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2013996	20	02/28/23 19:33	02/28/23 19:33	SDS	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2014887	400	03/02/23 00:43	03/02/23 00:43	DAH	Mt. Juliet, TN

AMB-OUTSIDE L1589672-11 Air

Collected by: Alex Evernden | Collected date/time: 02/21/23 16:57 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2013996	1	02/28/23 18:36	02/28/23 18:36	SDS	Mt. Juliet, TN

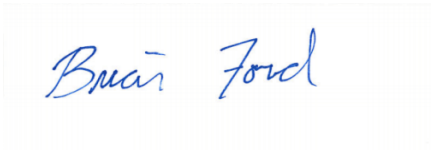
EX L1589672-12 Air

Collected by: Alex Evernden | Collected date/time: 02/21/23 10:04 | Received date/time: 02/27/23 09:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2013996	1	02/28/23 19:06	02/28/23 19:06	SDS	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2014887	10	03/01/23 22:41	03/01/23 22:41	DAH	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

Report Revision History

Level II Report - Version 1: 03/03/23 11:27

Project Narrative

revised report to per client request

Sample Delivery Group (SDG) Narrative

pH outside of method requirement.

Lab Sample ID	Project Sample ID	Method
L1589672-08	MW-7	8260D

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)	18800		102	1000	1	02/28/2023 23:05	WG2014074

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	02/28/2023 17:41	WG2014123
Acrolein	U		1270	25000	500	02/28/2023 17:41	WG2014123
Acrylonitrile	U		336	5000	500	02/28/2023 17:41	WG2014123
Benzene	U		47.1	500	500	02/28/2023 17:41	WG2014123
Bromobenzene	U		59.0	500	500	02/28/2023 17:41	WG2014123
Bromodichloromethane	U		68.0	500	500	02/28/2023 17:41	WG2014123
Bromoform	U	C3	64.5	500	500	02/28/2023 17:41	WG2014123
Bromomethane	U		303	2500	500	02/28/2023 17:41	WG2014123
n-Butylbenzene	U	C3	78.5	500	500	02/28/2023 17:41	WG2014123
sec-Butylbenzene	U	C3	62.5	500	500	02/28/2023 17:41	WG2014123
tert-Butylbenzene	U		63.5	500	500	02/28/2023 17:41	WG2014123
Carbon disulfide	48.6	J	48.1	500	500	02/28/2023 17:41	WG2014123
Carbon tetrachloride	U		64.0	500	500	02/28/2023 17:41	WG2014123
Chlorobenzene	U		58.0	500	500	02/28/2023 17:41	WG2014123
Chlorodibromomethane	U		70.0	500	500	02/28/2023 17:41	WG2014123
Chloroethane	U		96.0	2500	500	02/28/2023 17:41	WG2014123
Chloroform	U		55.5	2500	500	02/28/2023 17:41	WG2014123
Chloromethane	U	J4	480	1250	500	02/28/2023 17:41	WG2014123
2-Chlorotoluene	U		53.0	500	500	02/28/2023 17:41	WG2014123
4-Chlorotoluene	U		57.0	500	500	02/28/2023 17:41	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	138	2500	500	02/28/2023 17:41	WG2014123
1,2-Dibromoethane	U		63.0	500	500	02/28/2023 17:41	WG2014123
Dibromomethane	U		61.0	500	500	02/28/2023 17:41	WG2014123
1,2-Dichlorobenzene	U		53.5	500	500	02/28/2023 17:41	WG2014123
1,3-Dichlorobenzene	U		55.0	500	500	02/28/2023 17:41	WG2014123
1,4-Dichlorobenzene	U		60.0	500	500	02/28/2023 17:41	WG2014123
Dichlorodifluoromethane	U		187	2500	500	02/28/2023 17:41	WG2014123
1,1-Dichloroethane	U		50.0	500	500	02/28/2023 17:41	WG2014123
1,2-Dichloroethane	U		40.9	500	500	02/28/2023 17:41	WG2014123
1,1-Dichloroethene	U		94.0	500	500	02/28/2023 17:41	WG2014123
cis-1,2-Dichloroethene	468000		1260	10000	10000	03/01/2023 21:31	WG2015084
trans-1,2-Dichloroethene	4590		74.5	500	500	02/28/2023 17:41	WG2014123
1,2-Dichloropropane	U		74.5	500	500	02/28/2023 17:41	WG2014123
1,1-Dichloropropene	U		71.0	500	500	02/28/2023 17:41	WG2014123
1,3-Dichloropropane	U		55.0	500	500	02/28/2023 17:41	WG2014123
cis-1,3-Dichloropropene	U		55.5	500	500	02/28/2023 17:41	WG2014123
trans-1,3-Dichloropropene	U		59.0	500	500	02/28/2023 17:41	WG2014123
2,2-Dichloropropane	U		80.5	500	500	02/28/2023 17:41	WG2014123
Di-isopropyl ether	U		52.5	500	500	02/28/2023 17:41	WG2014123
Ethylbenzene	U		68.5	500	500	02/28/2023 17:41	WG2014123
Hexachloro-1,3-butadiene	U	C3	169	500	500	02/28/2023 17:41	WG2014123
Isopropylbenzene	U	C3	52.5	500	500	02/28/2023 17:41	WG2014123
p-Isopropyltoluene	U		60.0	500	500	02/28/2023 17:41	WG2014123
2-Butanone (MEK)	U		595	5000	500	02/28/2023 17:41	WG2014123
Methylene Chloride	U		215	2500	500	02/28/2023 17:41	WG2014123
4-Methyl-2-pentanone (MIBK)	U		239	5000	500	02/28/2023 17:41	WG2014123
Methyl tert-butyl ether	U		50.5	500	500	02/28/2023 17:41	WG2014123
Naphthalene	U	C3 J4	500	2500	500	02/28/2023 17:41	WG2014123
n-Propylbenzene	U		49.7	500	500	02/28/2023 17:41	WG2014123
Styrene	U	C3	59.0	500	500	02/28/2023 17:41	WG2014123

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	02/28/2023 17:41	WG2014123
1,1,2,2-Tetrachloroethane	U		66.5	500	500	02/28/2023 17:41	WG2014123
1,1,2-Trichlorotrifluoroethane	U		90.0	500	500	02/28/2023 17:41	WG2014123
Tetrachloroethene	U		150	500	500	02/28/2023 17:41	WG2014123
Toluene	U		139	500	500	02/28/2023 17:41	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	115	500	500	02/28/2023 17:41	WG2014123
1,2,4-Trichlorobenzene	U	C3	241	500	500	02/28/2023 17:41	WG2014123
1,1,1-Trichloroethane	U		74.5	500	500	02/28/2023 17:41	WG2014123
1,1,2-Trichloroethane	U		79.0	500	500	02/28/2023 17:41	WG2014123
Trichloroethene	U		95.0	500	500	02/28/2023 17:41	WG2014123
Trichlorofluoromethane	U		80.0	2500	500	02/28/2023 17:41	WG2014123
1,2,3-Trichloropropane	U		119	1250	500	02/28/2023 17:41	WG2014123
1,2,4-Trimethylbenzene	U		161	500	500	02/28/2023 17:41	WG2014123
1,2,3-Trimethylbenzene	U		52.0	500	500	02/28/2023 17:41	WG2014123
1,3,5-Trimethylbenzene	U		52.0	500	500	02/28/2023 17:41	WG2014123
Vinyl chloride	30100	C5	117	500	500	02/28/2023 17:41	WG2014123
Xylenes, Total	U		87.0	1500	500	02/28/2023 17:41	WG2014123
(S) Toluene-d8	*103*			*80.0-120*		*02/28/2023 17:41*	WG2014123
(S) Toluene-d8	*97.7*			*80.0-120*		*03/01/2023 21:31*	WG2015084
(S) 4-Bromofluorobenzene	*90.2*			*77.0-126*		*02/28/2023 17:41*	WG2014123
(S) 4-Bromofluorobenzene	*101*			*77.0-126*		*03/01/2023 21:31*	WG2015084
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*02/28/2023 17:41*	WG2014123
(S) 1,2-Dichloroethane-d4	*99.2*			*70.0-130*		*03/01/2023 21:31*	WG2015084

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)	44000		102	1000	1	02/28/2023 23:31	WG2014074

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	74.6		11.3	50.0	1	02/28/2023 15:54	WG2014123
Acrolein	2.64	J	2.54	50.0	1	02/28/2023 15:54	WG2014123
Acrylonitrile	U		0.671	10.0	1	02/28/2023 15:54	WG2014123
Benzene	0.187	J	0.0941	1.00	1	02/28/2023 15:54	WG2014123
Bromobenzene	U		0.118	1.00	1	02/28/2023 15:54	WG2014123
Bromodichloromethane	U		0.136	1.00	1	02/28/2023 15:54	WG2014123
Bromoform	U	C3	0.129	1.00	1	02/28/2023 15:54	WG2014123
Bromomethane	U		0.605	5.00	1	02/28/2023 15:54	WG2014123
n-Butylbenzene	U	C3	0.157	1.00	1	02/28/2023 15:54	WG2014123
sec-Butylbenzene	0.289	C3 J	0.125	1.00	1	02/28/2023 15:54	WG2014123
tert-Butylbenzene	U		0.127	1.00	1	02/28/2023 15:54	WG2014123
Carbon disulfide	0.479	J	0.0962	1.00	1	02/28/2023 15:54	WG2014123
Carbon tetrachloride	U		0.128	1.00	1	02/28/2023 15:54	WG2014123
Chlorobenzene	U		0.116	1.00	1	02/28/2023 15:54	WG2014123
Chlorodibromomethane	U		0.140	1.00	1	02/28/2023 15:54	WG2014123
Chloroethane	U		0.192	5.00	1	02/28/2023 15:54	WG2014123
Chloroform	U		0.111	5.00	1	02/28/2023 15:54	WG2014123
Chloromethane	U	J4	0.960	2.50	1	02/28/2023 15:54	WG2014123
2-Chlorotoluene	U		0.106	1.00	1	02/28/2023 15:54	WG2014123
4-Chlorotoluene	U		0.114	1.00	1	02/28/2023 15:54	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	0.276	5.00	1	02/28/2023 15:54	WG2014123
1,2-Dibromoethane	U		0.126	1.00	1	02/28/2023 15:54	WG2014123
Dibromomethane	U		0.122	1.00	1	02/28/2023 15:54	WG2014123
1,2-Dichlorobenzene	U		0.107	1.00	1	02/28/2023 15:54	WG2014123
1,3-Dichlorobenzene	U		0.110	1.00	1	02/28/2023 15:54	WG2014123
1,4-Dichlorobenzene	U		0.120	1.00	1	02/28/2023 15:54	WG2014123
Dichlorodifluoromethane	U		0.374	5.00	1	02/28/2023 15:54	WG2014123
1,1-Dichloroethane	U		0.100	1.00	1	02/28/2023 15:54	WG2014123
1,2-Dichloroethane	U		0.0819	1.00	1	02/28/2023 15:54	WG2014123
1,1-Dichloroethene	U		0.188	1.00	1	02/28/2023 15:54	WG2014123
cis-1,2-Dichloroethene	57.1		0.126	1.00	1	02/28/2023 15:54	WG2014123
trans-1,2-Dichloroethene	0.183	J	0.149	1.00	1	02/28/2023 15:54	WG2014123
1,2-Dichloropropane	U		0.149	1.00	1	02/28/2023 15:54	WG2014123
1,1-Dichloropropene	U		0.142	1.00	1	02/28/2023 15:54	WG2014123
1,3-Dichloropropane	U		0.110	1.00	1	02/28/2023 15:54	WG2014123
cis-1,3-Dichloropropene	U		0.111	1.00	1	02/28/2023 15:54	WG2014123
trans-1,3-Dichloropropene	U		0.118	1.00	1	02/28/2023 15:54	WG2014123
2,2-Dichloropropane	U		0.161	1.00	1	02/28/2023 15:54	WG2014123
Di-isopropyl ether	U		0.105	1.00	1	02/28/2023 15:54	WG2014123
Ethylbenzene	0.304	J	0.137	1.00	1	02/28/2023 15:54	WG2014123
Hexachloro-1,3-butadiene	U	C3	0.337	1.00	1	02/28/2023 15:54	WG2014123
Isopropylbenzene	0.454	C3 J	0.105	1.00	1	02/28/2023 15:54	WG2014123
p-Isopropyltoluene	U		0.120	1.00	1	02/28/2023 15:54	WG2014123
2-Butanone (MEK)	32.2		1.19	10.0	1	02/28/2023 15:54	WG2014123
Methylene Chloride	U		0.430	5.00	1	02/28/2023 15:54	WG2014123
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0	1	02/28/2023 15:54	WG2014123
Methyl tert-butyl ether	U		0.101	1.00	1	02/28/2023 15:54	WG2014123
Naphthalene	U	C3 J4	1.00	5.00	1	02/28/2023 15:54	WG2014123
n-Propylbenzene	0.577	J	0.0993	1.00	1	02/28/2023 15:54	WG2014123
Styrene	U	C3	0.118	1.00	1	02/28/2023 15:54	WG2014123

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	02/28/2023 15:54	WG2014123
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	02/28/2023 15:54	WG2014123
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	02/28/2023 15:54	WG2014123
Tetrachloroethene	U		0.300	1.00	1	02/28/2023 15:54	WG2014123
Toluene	0.740	J	0.278	1.00	1	02/28/2023 15:54	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	0.230	1.00	1	02/28/2023 15:54	WG2014123
1,2,4-Trichlorobenzene	U	C3	0.481	1.00	1	02/28/2023 15:54	WG2014123
1,1,1-Trichloroethane	U		0.149	1.00	1	02/28/2023 15:54	WG2014123
1,1,2-Trichloroethane	U		0.158	1.00	1	02/28/2023 15:54	WG2014123
Trichloroethene	0.229	J	0.190	1.00	1	02/28/2023 15:54	WG2014123
Trichlorofluoromethane	U		0.160	5.00	1	02/28/2023 15:54	WG2014123
1,2,3-Trichloropropane	U		0.237	2.50	1	02/28/2023 15:54	WG2014123
1,2,4-Trimethylbenzene	0.724	J	0.322	1.00	1	02/28/2023 15:54	WG2014123
1,2,3-Trimethylbenzene	0.742	J	0.104	1.00	1	02/28/2023 15:54	WG2014123
1,3,5-Trimethylbenzene	0.519	J	0.104	1.00	1	02/28/2023 15:54	WG2014123
Vinyl chloride	12.0	C5	0.234	1.00	1	02/28/2023 15:54	WG2014123
Xylenes, Total	0.583	J	0.174	3.00	1	02/28/2023 15:54	WG2014123
(S) Toluene-d8	*104*			*80.0-120*		*02/28/2023 15:54*	WG2014123
(S) 4-Bromofluorobenzene	*93.9*			*77.0-126*		*02/28/2023 15:54*	WG2014123
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*02/28/2023 15:54*	WG2014123

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	J4	1130	5000	100	03/01/2023 21:10	WG2015084
Acrolein	U	C3	254	5000	100	03/01/2023 21:10	WG2015084
Acrylonitrile	U		67.1	1000	100	03/01/2023 21:10	WG2015084
Benzene	U		9.41	100	100	03/01/2023 21:10	WG2015084
Bromobenzene	U		11.8	100	100	03/01/2023 21:10	WG2015084
Bromodichloromethane	U		13.6	100	100	03/01/2023 21:10	WG2015084
Bromoform	U		12.9	100	100	03/01/2023 21:10	WG2015084
Bromomethane	U		60.5	500	100	03/01/2023 21:10	WG2015084
n-Butylbenzene	U	J4	15.7	100	100	03/01/2023 21:10	WG2015084
sec-Butylbenzene	U		12.5	100	100	03/01/2023 21:10	WG2015084
tert-Butylbenzene	U		12.7	100	100	03/01/2023 21:10	WG2015084
Carbon disulfide	U		9.62	100	100	03/01/2023 21:10	WG2015084
Carbon tetrachloride	U		12.8	100	100	03/01/2023 21:10	WG2015084
Chlorobenzene	U		11.6	100	100	03/01/2023 21:10	WG2015084
Chlorodibromomethane	U		14.0	100	100	03/01/2023 21:10	WG2015084
Chloroethane	U		19.2	500	100	03/01/2023 21:10	WG2015084
Chloroform	U		11.1	500	100	03/01/2023 21:10	WG2015084
Chloromethane	U		96.0	250	100	03/01/2023 21:10	WG2015084
2-Chlorotoluene	U		10.6	100	100	03/01/2023 21:10	WG2015084
4-Chlorotoluene	U		11.4	100	100	03/01/2023 21:10	WG2015084
1,2-Dibromo-3-Chloropropane	U		27.6	500	100	03/01/2023 21:10	WG2015084
1,2-Dibromoethane	U		12.6	100	100	03/01/2023 21:10	WG2015084
Dibromomethane	U		12.2	100	100	03/01/2023 21:10	WG2015084
1,2-Dichlorobenzene	U		10.7	100	100	03/01/2023 21:10	WG2015084
1,3-Dichlorobenzene	U		11.0	100	100	03/01/2023 21:10	WG2015084
1,4-Dichlorobenzene	U		12.0	100	100	03/01/2023 21:10	WG2015084
Dichlorodifluoromethane	U		37.4	500	100	03/01/2023 21:10	WG2015084
1,1-Dichloroethane	U		10.0	100	100	03/01/2023 21:10	WG2015084
1,2-Dichloroethane	U		8.19	100	100	03/01/2023 21:10	WG2015084
1,1-Dichloroethene	29.0	J	18.8	100	100	03/01/2023 21:10	WG2015084
cis-1,2-Dichloroethene	12600		12.6	100	100	03/01/2023 21:10	WG2015084
trans-1,2-Dichloroethene	U		14.9	100	100	03/01/2023 21:10	WG2015084
1,2-Dichloropropane	U		14.9	100	100	03/01/2023 21:10	WG2015084
1,1-Dichloropropene	U		14.2	100	100	03/01/2023 21:10	WG2015084
1,3-Dichloropropane	U		11.0	100	100	03/01/2023 21:10	WG2015084
cis-1,3-Dichloropropene	U		11.1	100	100	03/01/2023 21:10	WG2015084
trans-1,3-Dichloropropene	U		11.8	100	100	03/01/2023 21:10	WG2015084
2,2-Dichloropropane	U		16.1	100	100	03/01/2023 21:10	WG2015084
Di-isopropyl ether	U		10.5	100	100	03/01/2023 21:10	WG2015084
Ethylbenzene	U		13.7	100	100	03/01/2023 21:10	WG2015084
Hexachloro-1,3-butadiene	U		33.7	100	100	03/01/2023 21:10	WG2015084
Isopropylbenzene	U		10.5	100	100	03/01/2023 21:10	WG2015084
p-Isopropyltoluene	U		12.0	100	100	03/01/2023 21:10	WG2015084
2-Butanone (MEK)	U		119	1000	100	03/01/2023 21:10	WG2015084
Methylene Chloride	U		43.0	500	100	03/01/2023 21:10	WG2015084
4-Methyl-2-pentanone (MIBK)	U		47.8	1000	100	03/01/2023 21:10	WG2015084
Methyl tert-butyl ether	U		10.1	100	100	03/01/2023 21:10	WG2015084
Naphthalene	U		100	500	100	03/01/2023 21:10	WG2015084
n-Propylbenzene	U		9.93	100	100	03/01/2023 21:10	WG2015084
Styrene	U		11.8	100	100	03/01/2023 21:10	WG2015084
1,1,1,2-Tetrachloroethane	U		14.7	100	100	03/01/2023 21:10	WG2015084
1,1,2,2-Tetrachloroethane	U		13.3	100	100	03/01/2023 21:10	WG2015084
1,1,2-Trichlorotrifluoroethane	U		18.0	100	100	03/01/2023 21:10	WG2015084
Tetrachloroethene	U		30.0	100	100	03/01/2023 21:10	WG2015084
Toluene	U		27.8	100	100	03/01/2023 21:10	WG2015084
1,2,3-Trichlorobenzene	U		23.0	100	100	03/01/2023 21:10	WG2015084

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	03/01/2023 21:10	WG2015084
1,1,1-Trichloroethane	U		14.9	100	100	03/01/2023 21:10	WG2015084
1,1,2-Trichloroethane	U		15.8	100	100	03/01/2023 21:10	WG2015084
Trichloroethene	U		19.0	100	100	03/01/2023 21:10	WG2015084
Trichlorofluoromethane	U		16.0	500	100	03/01/2023 21:10	WG2015084
1,2,3-Trichloropropane	U		23.7	250	100	03/01/2023 21:10	WG2015084
1,2,4-Trimethylbenzene	U		32.2	100	100	03/01/2023 21:10	WG2015084
1,2,3-Trimethylbenzene	U		10.4	100	100	03/01/2023 21:10	WG2015084
1,3,5-Trimethylbenzene	U		10.4	100	100	03/01/2023 21:10	WG2015084
Vinyl chloride	230	C5 J4	23.4	100	100	03/01/2023 21:10	WG2015084
Xylenes, Total	U		17.4	300	100	03/01/2023 21:10	WG2015084
(S) Toluene-d8	*101*			*80.0-120*		*03/01/2023 21:10*	WG2015084
(S) 4-Bromofluorobenzene	*102*			*77.0-126*		*03/01/2023 21:10*	WG2015084
(S) 1,2-Dichloroethane-d4	*92.6*			*70.0-130*		*03/01/2023 21:10*	WG2015084

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	02/28/2023 18:25	WG2014123
Acrolein	U		254	5000	100	02/28/2023 18:25	WG2014123
Acrylonitrile	U		67.1	1000	100	02/28/2023 18:25	WG2014123
Benzene	U		9.41	100	100	02/28/2023 18:25	WG2014123
Bromobenzene	U		11.8	100	100	02/28/2023 18:25	WG2014123
Bromodichloromethane	U		13.6	100	100	02/28/2023 18:25	WG2014123
Bromoform	U	C3	12.9	100	100	02/28/2023 18:25	WG2014123
Bromomethane	U		60.5	500	100	02/28/2023 18:25	WG2014123
n-Butylbenzene	U	C3	15.7	100	100	02/28/2023 18:25	WG2014123
sec-Butylbenzene	U	C3	12.5	100	100	02/28/2023 18:25	WG2014123
tert-Butylbenzene	U		12.7	100	100	02/28/2023 18:25	WG2014123
Carbon disulfide	U		9.62	100	100	02/28/2023 18:25	WG2014123
Carbon tetrachloride	U		12.8	100	100	02/28/2023 18:25	WG2014123
Chlorobenzene	U		11.6	100	100	02/28/2023 18:25	WG2014123
Chlorodibromomethane	U		14.0	100	100	02/28/2023 18:25	WG2014123
Chloroethane	U		19.2	500	100	02/28/2023 18:25	WG2014123
Chloroform	U		11.1	500	100	02/28/2023 18:25	WG2014123
Chloromethane	U	J4	96.0	250	100	02/28/2023 18:25	WG2014123
2-Chlorotoluene	U		10.6	100	100	02/28/2023 18:25	WG2014123
4-Chlorotoluene	U		11.4	100	100	02/28/2023 18:25	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	27.6	500	100	02/28/2023 18:25	WG2014123
1,2-Dibromoethane	U		12.6	100	100	02/28/2023 18:25	WG2014123
Dibromomethane	U		12.2	100	100	02/28/2023 18:25	WG2014123
1,2-Dichlorobenzene	U		10.7	100	100	02/28/2023 18:25	WG2014123
1,3-Dichlorobenzene	U		11.0	100	100	02/28/2023 18:25	WG2014123
1,4-Dichlorobenzene	U		12.0	100	100	02/28/2023 18:25	WG2014123
Dichlorodifluoromethane	U		37.4	500	100	02/28/2023 18:25	WG2014123
1,1-Dichloroethane	U		10.0	100	100	02/28/2023 18:25	WG2014123
1,2-Dichloroethane	U		8.19	100	100	02/28/2023 18:25	WG2014123
1,1-Dichloroethene	U		18.8	100	100	02/28/2023 18:25	WG2014123
cis-1,2-Dichloroethene	7510		12.6	100	100	02/28/2023 18:25	WG2014123
trans-1,2-Dichloroethene	25.6	J	14.9	100	100	02/28/2023 18:25	WG2014123
1,2-Dichloropropane	U		14.9	100	100	02/28/2023 18:25	WG2014123
1,1-Dichloropropene	U		14.2	100	100	02/28/2023 18:25	WG2014123
1,3-Dichloropropane	U		11.0	100	100	02/28/2023 18:25	WG2014123
cis-1,3-Dichloropropene	U		11.1	100	100	02/28/2023 18:25	WG2014123
trans-1,3-Dichloropropene	U		11.8	100	100	02/28/2023 18:25	WG2014123
2,2-Dichloropropane	U		16.1	100	100	02/28/2023 18:25	WG2014123
Di-isopropyl ether	U		10.5	100	100	02/28/2023 18:25	WG2014123
Ethylbenzene	U		13.7	100	100	02/28/2023 18:25	WG2014123
Hexachloro-1,3-butadiene	U	C3	33.7	100	100	02/28/2023 18:25	WG2014123
Isopropylbenzene	U	C3	10.5	100	100	02/28/2023 18:25	WG2014123
p-Isopropyltoluene	U		12.0	100	100	02/28/2023 18:25	WG2014123
2-Butanone (MEK)	U		119	1000	100	02/28/2023 18:25	WG2014123
Methylene Chloride	U		43.0	500	100	02/28/2023 18:25	WG2014123
4-Methyl-2-pentanone (MIBK)	U		47.8	1000	100	02/28/2023 18:25	WG2014123
Methyl tert-butyl ether	83.9	J	10.1	100	100	02/28/2023 18:25	WG2014123
Naphthalene	U	C3 J4	100	500	100	02/28/2023 18:25	WG2014123
n-Propylbenzene	U		9.93	100	100	02/28/2023 18:25	WG2014123
Styrene	U	C3	11.8	100	100	02/28/2023 18:25	WG2014123
1,1,1,2-Tetrachloroethane	U		14.7	100	100	02/28/2023 18:25	WG2014123
1,1,2,2-Tetrachloroethane	U		13.3	100	100	02/28/2023 18:25	WG2014123
1,1,2-Trichlorotrifluoroethane	U		18.0	100	100	02/28/2023 18:25	WG2014123
Tetrachloroethene	36.5	J	30.0	100	100	02/28/2023 18:25	WG2014123
Toluene	U		27.8	100	100	02/28/2023 18:25	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	23.0	100	100	02/28/2023 18:25	WG2014123

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	C3	48.1	100	100	02/28/2023 18:25	WG2014123
1,1,1-Trichloroethane	U		14.9	100	100	02/28/2023 18:25	WG2014123
1,1,2-Trichloroethane	U		15.8	100	100	02/28/2023 18:25	WG2014123
Trichloroethene	150		19.0	100	100	02/28/2023 18:25	WG2014123
Trichlorofluoromethane	U		16.0	500	100	02/28/2023 18:25	WG2014123
1,2,3-Trichloropropane	U		23.7	250	100	02/28/2023 18:25	WG2014123
1,2,4-Trimethylbenzene	U		32.2	100	100	02/28/2023 18:25	WG2014123
1,2,3-Trimethylbenzene	U		10.4	100	100	02/28/2023 18:25	WG2014123
1,3,5-Trimethylbenzene	U		10.4	100	100	02/28/2023 18:25	WG2014123
Vinyl chloride	938	C5	23.4	100	100	02/28/2023 18:25	WG2014123
Xylenes, Total	U		17.4	300	100	02/28/2023 18:25	WG2014123
(S) Toluene-d8	*105*			*80.0-120*		*02/28/2023 18:25*	WG2014123
(S) 4-Bromofluorobenzene	*90.4*			*77.0-126*		*02/28/2023 18:25*	WG2014123
(S) 1,2-Dichloroethane-d4	*103*			*70.0-130*		*02/28/2023 18:25*	WG2014123

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)	43900		102	1000	1	03/01/2023 00:48	WG2014074

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	02/28/2023 18:46	WG2014123
Acrolein	U		5080	100000	2000	02/28/2023 18:46	WG2014123
Acrylonitrile	U		1340	20000	2000	02/28/2023 18:46	WG2014123
Benzene	U		188	2000	2000	02/28/2023 18:46	WG2014123
Bromobenzene	U		236	2000	2000	02/28/2023 18:46	WG2014123
Bromodichloromethane	U		272	2000	2000	02/28/2023 18:46	WG2014123
Bromoform	U	C3	258	2000	2000	02/28/2023 18:46	WG2014123
Bromomethane	U		1210	10000	2000	02/28/2023 18:46	WG2014123
n-Butylbenzene	U	C3	314	2000	2000	02/28/2023 18:46	WG2014123
sec-Butylbenzene	U	C3	250	2000	2000	02/28/2023 18:46	WG2014123
tert-Butylbenzene	U		254	2000	2000	02/28/2023 18:46	WG2014123
Carbon disulfide	U		192	2000	2000	02/28/2023 18:46	WG2014123
Carbon tetrachloride	U		256	2000	2000	02/28/2023 18:46	WG2014123
Chlorobenzene	U		232	2000	2000	02/28/2023 18:46	WG2014123
Chlorodibromomethane	U		280	2000	2000	02/28/2023 18:46	WG2014123
Chloroethane	U		384	10000	2000	02/28/2023 18:46	WG2014123
Chloroform	U		222	10000	2000	02/28/2023 18:46	WG2014123
Chloromethane	U	J4	1920	5000	2000	02/28/2023 18:46	WG2014123
2-Chlorotoluene	U		212	2000	2000	02/28/2023 18:46	WG2014123
4-Chlorotoluene	U		228	2000	2000	02/28/2023 18:46	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	552	10000	2000	02/28/2023 18:46	WG2014123
1,2-Dibromoethane	U		252	2000	2000	02/28/2023 18:46	WG2014123
Dibromomethane	U		244	2000	2000	02/28/2023 18:46	WG2014123
1,2-Dichlorobenzene	U		214	2000	2000	02/28/2023 18:46	WG2014123
1,3-Dichlorobenzene	U		220	2000	2000	02/28/2023 18:46	WG2014123
1,4-Dichlorobenzene	U		240	2000	2000	02/28/2023 18:46	WG2014123
Dichlorodifluoromethane	U		748	10000	2000	02/28/2023 18:46	WG2014123
1,1-Dichloroethane	U		200	2000	2000	02/28/2023 18:46	WG2014123
1,2-Dichloroethane	U		164	2000	2000	02/28/2023 18:46	WG2014123
1,1-Dichloroethene	U		376	2000	2000	02/28/2023 18:46	WG2014123
cis-1,2-Dichloroethene	68100		252	2000	2000	02/28/2023 18:46	WG2014123
trans-1,2-Dichloroethene	U		298	2000	2000	02/28/2023 18:46	WG2014123
1,2-Dichloropropane	U		298	2000	2000	02/28/2023 18:46	WG2014123
1,1-Dichloropropene	U		284	2000	2000	02/28/2023 18:46	WG2014123
1,3-Dichloropropane	U		220	2000	2000	02/28/2023 18:46	WG2014123
cis-1,3-Dichloropropene	U		222	2000	2000	02/28/2023 18:46	WG2014123
trans-1,3-Dichloropropene	U		236	2000	2000	02/28/2023 18:46	WG2014123
2,2-Dichloropropane	U		322	2000	2000	02/28/2023 18:46	WG2014123
Di-isopropyl ether	U		210	2000	2000	02/28/2023 18:46	WG2014123
Ethylbenzene	U		274	2000	2000	02/28/2023 18:46	WG2014123
Hexachloro-1,3-butadiene	U	C3	674	2000	2000	02/28/2023 18:46	WG2014123
Isopropylbenzene	U	C3	210	2000	2000	02/28/2023 18:46	WG2014123
p-Isopropyltoluene	U		240	2000	2000	02/28/2023 18:46	WG2014123
2-Butanone (MEK)	U		2380	20000	2000	02/28/2023 18:46	WG2014123
Methylene Chloride	U		860	10000	2000	02/28/2023 18:46	WG2014123
4-Methyl-2-pentanone (MIBK)	U		956	20000	2000	02/28/2023 18:46	WG2014123
Methyl tert-butyl ether	U		202	2000	2000	02/28/2023 18:46	WG2014123
Naphthalene	U	C3 J4	2000	10000	2000	02/28/2023 18:46	WG2014123
n-Propylbenzene	U		199	2000	2000	02/28/2023 18:46	WG2014123
Styrene	U	C3	236	2000	2000	02/28/2023 18:46	WG2014123

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		294	2000	2000	02/28/2023 18:46	WG2014123
1,1,2,2-Tetrachloroethane	U		266	2000	2000	02/28/2023 18:46	WG2014123
1,1,2-Trichlorotrifluoroethane	U		360	2000	2000	02/28/2023 18:46	WG2014123
Tetrachloroethene	7410		600	2000	2000	02/28/2023 18:46	WG2014123
Toluene	U		556	2000	2000	02/28/2023 18:46	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	460	2000	2000	02/28/2023 18:46	WG2014123
1,2,4-Trichlorobenzene	U	C3	962	2000	2000	02/28/2023 18:46	WG2014123
1,1,1-Trichloroethane	U		298	2000	2000	02/28/2023 18:46	WG2014123
1,1,2-Trichloroethane	U		316	2000	2000	02/28/2023 18:46	WG2014123
Trichloroethene	1990	J	380	2000	2000	02/28/2023 18:46	WG2014123
Trichlorofluoromethane	U		320	10000	2000	02/28/2023 18:46	WG2014123
1,2,3-Trichloropropane	U		474	5000	2000	02/28/2023 18:46	WG2014123
1,2,4-Trimethylbenzene	U		644	2000	2000	02/28/2023 18:46	WG2014123
1,2,3-Trimethylbenzene	U		208	2000	2000	02/28/2023 18:46	WG2014123
1,3,5-Trimethylbenzene	U		208	2000	2000	02/28/2023 18:46	WG2014123
Vinyl chloride	17800	C5	468	2000	2000	02/28/2023 18:46	WG2014123
Xylenes, Total	U		348	6000	2000	02/28/2023 18:46	WG2014123
(S) Toluene-d8	*103*			*80.0-120*		*02/28/2023 18:46*	WG2014123
(S) 4-Bromofluorobenzene	*90.1*			*77.0-126*		*02/28/2023 18:46*	WG2014123
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*		*02/28/2023 18:46*	WG2014123

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)	5180		102	1000	1	03/01/2023 01:08	WG2014074

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		11.3	50.0	1	02/28/2023 16:16	WG2014123
Acrolein	U		2.54	50.0	1	02/28/2023 16:16	WG2014123
Acrylonitrile	U		0.671	10.0	1	02/28/2023 16:16	WG2014123
Benzene	0.155	J	0.0941	1.00	1	02/28/2023 16:16	WG2014123
Bromobenzene	U		0.118	1.00	1	02/28/2023 16:16	WG2014123
Bromodichloromethane	U		0.136	1.00	1	02/28/2023 16:16	WG2014123
Bromoform	U	C3	0.129	1.00	1	02/28/2023 16:16	WG2014123
Bromomethane	U		0.605	5.00	1	02/28/2023 16:16	WG2014123
n-Butylbenzene	U	C3	0.157	1.00	1	02/28/2023 16:16	WG2014123
sec-Butylbenzene	0.196	C3 J	0.125	1.00	1	02/28/2023 16:16	WG2014123
tert-Butylbenzene	U		0.127	1.00	1	02/28/2023 16:16	WG2014123
Carbon disulfide	U		0.0962	1.00	1	02/28/2023 16:16	WG2014123
Carbon tetrachloride	U		0.128	1.00	1	02/28/2023 16:16	WG2014123
Chlorobenzene	U		0.116	1.00	1	02/28/2023 16:16	WG2014123
Chlorodibromomethane	U		0.140	1.00	1	02/28/2023 16:16	WG2014123
Chloroethane	U		0.192	5.00	1	02/28/2023 16:16	WG2014123
Chloroform	U		0.111	5.00	1	02/28/2023 16:16	WG2014123
Chloromethane	U	J4	0.960	2.50	1	02/28/2023 16:16	WG2014123
2-Chlorotoluene	U		0.106	1.00	1	02/28/2023 16:16	WG2014123
4-Chlorotoluene	U		0.114	1.00	1	02/28/2023 16:16	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	0.276	5.00	1	02/28/2023 16:16	WG2014123
1,2-Dibromoethane	U		0.126	1.00	1	02/28/2023 16:16	WG2014123
Dibromomethane	U		0.122	1.00	1	02/28/2023 16:16	WG2014123
1,2-Dichlorobenzene	U		0.107	1.00	1	02/28/2023 16:16	WG2014123
1,3-Dichlorobenzene	U		0.110	1.00	1	02/28/2023 16:16	WG2014123
1,4-Dichlorobenzene	U		0.120	1.00	1	02/28/2023 16:16	WG2014123
Dichlorodifluoromethane	U		0.374	5.00	1	02/28/2023 16:16	WG2014123
1,1-Dichloroethane	U		0.100	1.00	1	02/28/2023 16:16	WG2014123
1,2-Dichloroethane	U		0.0819	1.00	1	02/28/2023 16:16	WG2014123
1,1-Dichloroethene	U		0.188	1.00	1	02/28/2023 16:16	WG2014123
cis-1,2-Dichloroethene	0.466	J	0.126	1.00	1	02/28/2023 16:16	WG2014123
trans-1,2-Dichloroethene	U		0.149	1.00	1	02/28/2023 16:16	WG2014123
1,2-Dichloropropane	U		0.149	1.00	1	02/28/2023 16:16	WG2014123
1,1-Dichloropropene	U		0.142	1.00	1	02/28/2023 16:16	WG2014123
1,3-Dichloropropane	U		0.110	1.00	1	02/28/2023 16:16	WG2014123
cis-1,3-Dichloropropene	U		0.111	1.00	1	02/28/2023 16:16	WG2014123
trans-1,3-Dichloropropene	U		0.118	1.00	1	02/28/2023 16:16	WG2014123
2,2-Dichloropropane	U		0.161	1.00	1	02/28/2023 16:16	WG2014123
Di-isopropyl ether	U		0.105	1.00	1	02/28/2023 16:16	WG2014123
Ethylbenzene	U		0.137	1.00	1	02/28/2023 16:16	WG2014123
Hexachloro-1,3-butadiene	U	C3	0.337	1.00	1	02/28/2023 16:16	WG2014123
Isopropylbenzene	0.711	C3 J	0.105	1.00	1	02/28/2023 16:16	WG2014123
p-Isopropyltoluene	U		0.120	1.00	1	02/28/2023 16:16	WG2014123
2-Butanone (MEK)	U		1.19	10.0	1	02/28/2023 16:16	WG2014123
Methylene Chloride	U		0.430	5.00	1	02/28/2023 16:16	WG2014123
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0	1	02/28/2023 16:16	WG2014123
Methyl tert-butyl ether	1.19		0.101	1.00	1	02/28/2023 16:16	WG2014123
Naphthalene	U	C3 J4	1.00	5.00	1	02/28/2023 16:16	WG2014123
n-Propylbenzene	0.201	J	0.0993	1.00	1	02/28/2023 16:16	WG2014123
Styrene	U	C3	0.118	1.00	1	02/28/2023 16:16	WG2014123

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	02/28/2023 16:16	WG2014123
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	02/28/2023 16:16	WG2014123
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	02/28/2023 16:16	WG2014123
Tetrachloroethene	U		0.300	1.00	1	02/28/2023 16:16	WG2014123
Toluene	U		0.278	1.00	1	02/28/2023 16:16	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	0.230	1.00	1	02/28/2023 16:16	WG2014123
1,2,4-Trichlorobenzene	U	C3	0.481	1.00	1	02/28/2023 16:16	WG2014123
1,1,1-Trichloroethane	U		0.149	1.00	1	02/28/2023 16:16	WG2014123
1,1,2-Trichloroethane	U		0.158	1.00	1	02/28/2023 16:16	WG2014123
Trichloroethene	U		0.190	1.00	1	02/28/2023 16:16	WG2014123
Trichlorofluoromethane	U		0.160	5.00	1	02/28/2023 16:16	WG2014123
1,2,3-Trichloropropane	U		0.237	2.50	1	02/28/2023 16:16	WG2014123
1,2,4-Trimethylbenzene	U		0.322	1.00	1	02/28/2023 16:16	WG2014123
1,2,3-Trimethylbenzene	U		0.104	1.00	1	02/28/2023 16:16	WG2014123
1,3,5-Trimethylbenzene	U		0.104	1.00	1	02/28/2023 16:16	WG2014123
Vinyl chloride	0.439	J	0.234	1.00	1	02/28/2023 16:16	WG2014123
Xylenes, Total	U		0.174	3.00	1	02/28/2023 16:16	WG2014123
(S) Toluene-d8	*106*			*80.0-120*		*02/28/2023 16:16*	WG2014123
(S) 4-Bromofluorobenzene	*92.4*			*77.0-126*		*02/28/2023 16:16*	WG2014123
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*		*02/28/2023 16:16*	WG2014123

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	46.4	J	11.3	50.0	1	02/28/2023 16:37	WG2014123
Acrolein	U		2.54	50.0	1	02/28/2023 16:37	WG2014123
Acrylonitrile	U		0.671	10.0	1	02/28/2023 16:37	WG2014123
Benzene	U		0.0941	1.00	1	02/28/2023 16:37	WG2014123
Bromobenzene	U		0.118	1.00	1	02/28/2023 16:37	WG2014123
Bromodichloromethane	U		0.136	1.00	1	02/28/2023 16:37	WG2014123
Bromoform	U	C3	0.129	1.00	1	02/28/2023 16:37	WG2014123
Bromomethane	U		0.605	5.00	1	02/28/2023 16:37	WG2014123
n-Butylbenzene	U	C3	0.157	1.00	1	02/28/2023 16:37	WG2014123
sec-Butylbenzene	U	C3	0.125	1.00	1	02/28/2023 16:37	WG2014123
tert-Butylbenzene	U		0.127	1.00	1	02/28/2023 16:37	WG2014123
Carbon disulfide	U		0.0962	1.00	1	02/28/2023 16:37	WG2014123
Carbon tetrachloride	U		0.128	1.00	1	02/28/2023 16:37	WG2014123
Chlorobenzene	U		0.116	1.00	1	02/28/2023 16:37	WG2014123
Chlorodibromomethane	U		0.140	1.00	1	02/28/2023 16:37	WG2014123
Chloroethane	U		0.192	5.00	1	02/28/2023 16:37	WG2014123
Chloroform	U		0.111	5.00	1	02/28/2023 16:37	WG2014123
Chloromethane	U	J4	0.960	2.50	1	02/28/2023 16:37	WG2014123
2-Chlorotoluene	U		0.106	1.00	1	02/28/2023 16:37	WG2014123
4-Chlorotoluene	U		0.114	1.00	1	02/28/2023 16:37	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	0.276	5.00	1	02/28/2023 16:37	WG2014123
1,2-Dibromoethane	U		0.126	1.00	1	02/28/2023 16:37	WG2014123
Dibromomethane	U		0.122	1.00	1	02/28/2023 16:37	WG2014123
1,2-Dichlorobenzene	U		0.107	1.00	1	02/28/2023 16:37	WG2014123
1,3-Dichlorobenzene	U		0.110	1.00	1	02/28/2023 16:37	WG2014123
1,4-Dichlorobenzene	U		0.120	1.00	1	02/28/2023 16:37	WG2014123
Dichlorodifluoromethane	U		0.374	5.00	1	02/28/2023 16:37	WG2014123
1,1-Dichloroethane	U		0.100	1.00	1	02/28/2023 16:37	WG2014123
1,2-Dichloroethane	U		0.0819	1.00	1	02/28/2023 16:37	WG2014123
1,1-Dichloroethene	U		0.188	1.00	1	02/28/2023 16:37	WG2014123
cis-1,2-Dichloroethene	0.257	J	0.126	1.00	1	02/28/2023 16:37	WG2014123
trans-1,2-Dichloroethene	U		0.149	1.00	1	02/28/2023 16:37	WG2014123
1,2-Dichloropropane	U		0.149	1.00	1	02/28/2023 16:37	WG2014123
1,1-Dichloropropene	U		0.142	1.00	1	02/28/2023 16:37	WG2014123
1,3-Dichloropropane	U		0.110	1.00	1	02/28/2023 16:37	WG2014123
cis-1,3-Dichloropropene	U		0.111	1.00	1	02/28/2023 16:37	WG2014123
trans-1,3-Dichloropropene	U		0.118	1.00	1	02/28/2023 16:37	WG2014123
2,2-Dichloropropane	U		0.161	1.00	1	02/28/2023 16:37	WG2014123
Di-isopropyl ether	U		0.105	1.00	1	02/28/2023 16:37	WG2014123
Ethylbenzene	U		0.137	1.00	1	02/28/2023 16:37	WG2014123
Hexachloro-1,3-butadiene	U	C3	0.337	1.00	1	02/28/2023 16:37	WG2014123
Isopropylbenzene	U	C3	0.105	1.00	1	02/28/2023 16:37	WG2014123
p-Isopropyltoluene	U		0.120	1.00	1	02/28/2023 16:37	WG2014123
2-Butanone (MEK)	12.9		1.19	10.0	1	02/28/2023 16:37	WG2014123
Methylene Chloride	U		0.430	5.00	1	02/28/2023 16:37	WG2014123
4-Methyl-2-pentanone (MIBK)	0.547	J	0.478	10.0	1	02/28/2023 16:37	WG2014123
Methyl tert-butyl ether	0.468	J	0.101	1.00	1	02/28/2023 16:37	WG2014123
Naphthalene	U	C3 J4	1.00	5.00	1	02/28/2023 16:37	WG2014123
n-Propylbenzene	U		0.0993	1.00	1	02/28/2023 16:37	WG2014123
Styrene	U	C3	0.118	1.00	1	02/28/2023 16:37	WG2014123
1,1,1,2-Tetrachloroethane	U		0.147	1.00	1	02/28/2023 16:37	WG2014123
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	02/28/2023 16:37	WG2014123
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	02/28/2023 16:37	WG2014123
Tetrachloroethene	U		0.300	1.00	1	02/28/2023 16:37	WG2014123
Toluene	U		0.278	1.00	1	02/28/2023 16:37	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	0.230	1.00	1	02/28/2023 16:37	WG2014123

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	C3	0.481	1.00	1	02/28/2023 16:37	WG2014123
1,1,1-Trichloroethane	U		0.149	1.00	1	02/28/2023 16:37	WG2014123
1,1,2-Trichloroethane	U		0.158	1.00	1	02/28/2023 16:37	WG2014123
Trichloroethene	U		0.190	1.00	1	02/28/2023 16:37	WG2014123
Trichlorofluoromethane	U		0.160	5.00	1	02/28/2023 16:37	WG2014123
1,2,3-Trichloropropane	U		0.237	2.50	1	02/28/2023 16:37	WG2014123
1,2,4-Trimethylbenzene	U		0.322	1.00	1	02/28/2023 16:37	WG2014123
1,2,3-Trimethylbenzene	0.135	J	0.104	1.00	1	02/28/2023 16:37	WG2014123
1,3,5-Trimethylbenzene	U		0.104	1.00	1	02/28/2023 16:37	WG2014123
Vinyl chloride	U		0.234	1.00	1	02/28/2023 16:37	WG2014123
Xylenes, Total	0.298	J	0.174	3.00	1	02/28/2023 16:37	WG2014123
(S) Toluene-d8	*104*			*80.0-120*		*02/28/2023 16:37*	WG2014123
(S) 4-Bromofluorobenzene	*93.1*			*77.0-126*		*02/28/2023 16:37*	WG2014123
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*02/28/2023 16:37*	WG2014123

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	J4	11.3	50.0	1	03/01/2023 20:48	WG2015084
Acrolein	U	C3	2.54	50.0	1	03/01/2023 20:48	WG2015084
Acrylonitrile	U		0.671	10.0	1	03/01/2023 20:48	WG2015084
Benzene	2.55		0.0941	1.00	1	03/01/2023 20:48	WG2015084
Bromobenzene	U		0.118	1.00	1	03/01/2023 20:48	WG2015084
Bromodichloromethane	U		0.136	1.00	1	03/01/2023 20:48	WG2015084
Bromoform	U		0.129	1.00	1	03/01/2023 20:48	WG2015084
Bromomethane	U		0.605	5.00	1	03/01/2023 20:48	WG2015084
n-Butylbenzene	U		0.157	1.00	1	03/02/2023 15:30	WG2015727
sec-Butylbenzene	0.340	J	0.125	1.00	1	03/01/2023 20:48	WG2015084
tert-Butylbenzene	U		0.127	1.00	1	03/01/2023 20:48	WG2015084
Carbon disulfide	U		0.0962	1.00	1	03/01/2023 20:48	WG2015084
Carbon tetrachloride	U		0.128	1.00	1	03/01/2023 20:48	WG2015084
Chlorobenzene	U		0.116	1.00	1	03/01/2023 20:48	WG2015084
Chlorodibromomethane	U		0.140	1.00	1	03/01/2023 20:48	WG2015084
Chloroethane	0.714	J	0.192	5.00	1	03/01/2023 20:48	WG2015084
Chloroform	U		0.111	5.00	1	03/01/2023 20:48	WG2015084
Chloromethane	U		0.960	2.50	1	03/01/2023 20:48	WG2015084
2-Chlorotoluene	U		0.106	1.00	1	03/01/2023 20:48	WG2015084
4-Chlorotoluene	U		0.114	1.00	1	03/01/2023 20:48	WG2015084
1,2-Dibromo-3-Chloropropane	U		0.276	5.00	1	03/01/2023 20:48	WG2015084
1,2-Dibromoethane	U		0.126	1.00	1	03/01/2023 20:48	WG2015084
Dibromomethane	U		0.122	1.00	1	03/01/2023 20:48	WG2015084
1,2-Dichlorobenzene	U		0.107	1.00	1	03/01/2023 20:48	WG2015084
1,3-Dichlorobenzene	U		0.110	1.00	1	03/01/2023 20:48	WG2015084
1,4-Dichlorobenzene	U		0.120	1.00	1	03/01/2023 20:48	WG2015084
Dichlorodifluoromethane	U		0.374	5.00	1	03/01/2023 20:48	WG2015084
1,1-Dichloroethane	U		0.100	1.00	1	03/01/2023 20:48	WG2015084
1,2-Dichloroethane	U		0.0819	1.00	1	03/01/2023 20:48	WG2015084
1,1-Dichloroethene	U		0.188	1.00	1	03/01/2023 20:48	WG2015084
cis-1,2-Dichloroethene	11.2		0.126	1.00	1	03/01/2023 20:48	WG2015084
trans-1,2-Dichloroethene	0.420	J	0.149	1.00	1	03/01/2023 20:48	WG2015084
1,2-Dichloropropane	U		0.149	1.00	1	03/01/2023 20:48	WG2015084
1,1-Dichloropropene	U		0.142	1.00	1	03/01/2023 20:48	WG2015084
1,3-Dichloropropane	U		0.110	1.00	1	03/01/2023 20:48	WG2015084
cis-1,3-Dichloropropene	U		0.111	1.00	1	03/01/2023 20:48	WG2015084
trans-1,3-Dichloropropene	U		0.118	1.00	1	03/01/2023 20:48	WG2015084
2,2-Dichloropropane	U		0.161	1.00	1	03/01/2023 20:48	WG2015084
Di-isopropyl ether	U		0.105	1.00	1	03/01/2023 20:48	WG2015084
Ethylbenzene	0.768	J	0.137	1.00	1	03/01/2023 20:48	WG2015084
Hexachloro-1,3-butadiene	U		0.337	1.00	1	03/01/2023 20:48	WG2015084
Isopropylbenzene	4.14		0.105	1.00	1	03/01/2023 20:48	WG2015084
p-Isopropyltoluene	U		0.120	1.00	1	03/01/2023 20:48	WG2015084
2-Butanone (MEK)	U		1.19	10.0	1	03/01/2023 20:48	WG2015084
Methylene Chloride	U		0.430	5.00	1	03/01/2023 20:48	WG2015084
4-Methyl-2-pentanone (MIBK)	U		0.478	10.0	1	03/01/2023 20:48	WG2015084
Methyl tert-butyl ether	U		0.101	1.00	1	03/01/2023 20:48	WG2015084
Naphthalene	U		1.00	5.00	1	03/01/2023 20:48	WG2015084
n-Propylbenzene	0.508	J	0.0993	1.00	1	03/01/2023 20:48	WG2015084
Styrene	U		0.118	1.00	1	03/01/2023 20:48	WG2015084
1,1,1,2-Tetrachloroethane	U		0.147	1.00	1	03/01/2023 20:48	WG2015084
1,1,2,2-Tetrachloroethane	U		0.133	1.00	1	03/01/2023 20:48	WG2015084
1,1,2-Trichlorotrifluoroethane	U		0.180	1.00	1	03/01/2023 20:48	WG2015084
Tetrachloroethene	U		0.300	1.00	1	03/01/2023 20:48	WG2015084
Toluene	1.86		0.278	1.00	1	03/01/2023 20:48	WG2015084
1,2,3-Trichlorobenzene	U		0.230	1.00	1	03/01/2023 20:48	WG2015084

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	03/01/2023 20:48	WG2015084
1,1,1-Trichloroethane	U		0.149	1.00	1	03/01/2023 20:48	WG2015084
1,1,2-Trichloroethane	U		0.158	1.00	1	03/01/2023 20:48	WG2015084
Trichloroethene	U		0.190	1.00	1	03/01/2023 20:48	WG2015084
Trichlorofluoromethane	U		0.160	5.00	1	03/01/2023 20:48	WG2015084
1,2,3-Trichloropropane	U		0.237	2.50	1	03/01/2023 20:48	WG2015084
1,2,4-Trimethylbenzene	1.88		0.322	1.00	1	03/01/2023 20:48	WG2015084
1,2,3-Trimethylbenzene	1.69		0.104	1.00	1	03/01/2023 20:48	WG2015084
1,3,5-Trimethylbenzene	0.328	J	0.104	1.00	1	03/01/2023 20:48	WG2015084
Vinyl chloride	11.4	C5 J4	0.234	1.00	1	03/01/2023 20:48	WG2015084
Xylenes, Total	2.94	J	0.174	3.00	1	03/01/2023 20:48	WG2015084
(S) Toluene-d8	*98.4*			*80.0-120*		*03/01/2023 20:48*	WG2015084
(S) Toluene-d8	*109*			*80.0-120*		*03/02/2023 15:30*	WG2015727
(S) 4-Bromofluorobenzene	*106*			*77.0-126*		*03/01/2023 20:48*	WG2015084
(S) 4-Bromofluorobenzene	*107*			*77.0-126*		*03/02/2023 15:30*	WG2015727
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*03/01/2023 20:48*	WG2015084
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*03/02/2023 15:30*	WG2015727

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)	42400		102	1000	1	03/01/2023 02:15	WG2014074

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		11300	50000	1000	02/28/2023 19:29	WG2014123
Acrolein	U		2540	50000	1000	02/28/2023 19:29	WG2014123
Acrylonitrile	U		671	10000	1000	02/28/2023 19:29	WG2014123
Benzene	U		94.1	1000	1000	02/28/2023 19:29	WG2014123
Bromobenzene	U		118	1000	1000	02/28/2023 19:29	WG2014123
Bromodichloromethane	U		136	1000	1000	02/28/2023 19:29	WG2014123
Bromoform	U	C3	129	1000	1000	02/28/2023 19:29	WG2014123
Bromomethane	U		605	5000	1000	02/28/2023 19:29	WG2014123
n-Butylbenzene	U	C3	157	1000	1000	02/28/2023 19:29	WG2014123
sec-Butylbenzene	U	C3	125	1000	1000	02/28/2023 19:29	WG2014123
tert-Butylbenzene	U		127	1000	1000	02/28/2023 19:29	WG2014123
Carbon disulfide	U		96.2	1000	1000	02/28/2023 19:29	WG2014123
Carbon tetrachloride	U		128	1000	1000	02/28/2023 19:29	WG2014123
Chlorobenzene	U		116	1000	1000	02/28/2023 19:29	WG2014123
Chlorodibromomethane	U		140	1000	1000	02/28/2023 19:29	WG2014123
Chloroethane	U		192	5000	1000	02/28/2023 19:29	WG2014123
Chloroform	U		111	5000	1000	02/28/2023 19:29	WG2014123
Chloromethane	U	J4	960	2500	1000	02/28/2023 19:29	WG2014123
2-Chlorotoluene	U		106	1000	1000	02/28/2023 19:29	WG2014123
4-Chlorotoluene	U		114	1000	1000	02/28/2023 19:29	WG2014123
1,2-Dibromo-3-Chloropropane	U	C3	276	5000	1000	02/28/2023 19:29	WG2014123
1,2-Dibromoethane	U		126	1000	1000	02/28/2023 19:29	WG2014123
Dibromomethane	U		122	1000	1000	02/28/2023 19:29	WG2014123
1,2-Dichlorobenzene	U		107	1000	1000	02/28/2023 19:29	WG2014123
1,3-Dichlorobenzene	U		110	1000	1000	02/28/2023 19:29	WG2014123
1,4-Dichlorobenzene	U		120	1000	1000	02/28/2023 19:29	WG2014123
Dichlorodifluoromethane	U		374	5000	1000	02/28/2023 19:29	WG2014123
1,1-Dichloroethane	U		100	1000	1000	02/28/2023 19:29	WG2014123
1,2-Dichloroethane	U		81.9	1000	1000	02/28/2023 19:29	WG2014123
1,1-Dichloroethene	U		188	1000	1000	02/28/2023 19:29	WG2014123
cis-1,2-Dichloroethene	74800		126	1000	1000	02/28/2023 19:29	WG2014123
trans-1,2-Dichloroethene	246	J	149	1000	1000	02/28/2023 19:29	WG2014123
1,2-Dichloropropane	U		149	1000	1000	02/28/2023 19:29	WG2014123
1,1-Dichloropropene	U		142	1000	1000	02/28/2023 19:29	WG2014123
1,3-Dichloropropane	U		110	1000	1000	02/28/2023 19:29	WG2014123
cis-1,3-Dichloropropene	U		111	1000	1000	02/28/2023 19:29	WG2014123
trans-1,3-Dichloropropene	U		118	1000	1000	02/28/2023 19:29	WG2014123
2,2-Dichloropropane	U		161	1000	1000	02/28/2023 19:29	WG2014123
Di-isopropyl ether	U		105	1000	1000	02/28/2023 19:29	WG2014123
Ethylbenzene	U		137	1000	1000	02/28/2023 19:29	WG2014123
Hexachloro-1,3-butadiene	U	C3	337	1000	1000	02/28/2023 19:29	WG2014123
Isopropylbenzene	U	C3	105	1000	1000	02/28/2023 19:29	WG2014123
p-Isopropyltoluene	U		120	1000	1000	02/28/2023 19:29	WG2014123
2-Butanone (MEK)	U		1190	10000	1000	02/28/2023 19:29	WG2014123
Methylene Chloride	U		430	5000	1000	02/28/2023 19:29	WG2014123
4-Methyl-2-pentanone (MIBK)	U		478	10000	1000	02/28/2023 19:29	WG2014123
Methyl tert-butyl ether	U		101	1000	1000	02/28/2023 19:29	WG2014123
Naphthalene	U	C3 J4	1000	5000	1000	02/28/2023 19:29	WG2014123
n-Propylbenzene	U		99.3	1000	1000	02/28/2023 19:29	WG2014123
Styrene	U	C3	118	1000	1000	02/28/2023 19:29	WG2014123

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		147	1000	1000	02/28/2023 19:29	WG2014123
1,1,2,2-Tetrachloroethane	U		133	1000	1000	02/28/2023 19:29	WG2014123
1,1,2-Trichlorotrifluoroethane	U		180	1000	1000	02/28/2023 19:29	WG2014123
Tetrachloroethene	10600		300	1000	1000	02/28/2023 19:29	WG2014123
Toluene	U		278	1000	1000	02/28/2023 19:29	WG2014123
1,2,3-Trichlorobenzene	U	C3 J4	230	1000	1000	02/28/2023 19:29	WG2014123
1,2,4-Trichlorobenzene	U	C3	481	1000	1000	02/28/2023 19:29	WG2014123
1,1,1-Trichloroethane	U		149	1000	1000	02/28/2023 19:29	WG2014123
1,1,2-Trichloroethane	U		158	1000	1000	02/28/2023 19:29	WG2014123
Trichloroethene	2370		190	1000	1000	02/28/2023 19:29	WG2014123
Trichlorofluoromethane	U		160	5000	1000	02/28/2023 19:29	WG2014123
1,2,3-Trichloropropane	U		237	2500	1000	02/28/2023 19:29	WG2014123
1,2,4-Trimethylbenzene	U		322	1000	1000	02/28/2023 19:29	WG2014123
1,2,3-Trimethylbenzene	U		104	1000	1000	02/28/2023 19:29	WG2014123
1,3,5-Trimethylbenzene	U		104	1000	1000	02/28/2023 19:29	WG2014123
Vinyl chloride	19100	C5	234	1000	1000	02/28/2023 19:29	WG2014123
Xylenes, Total	U		174	3000	1000	02/28/2023 19:29	WG2014123
(S) Toluene-d8	*106*			*80.0-120*		*02/28/2023 19:29*	WG2014123
(S) 4-Bromofluorobenzene	*92.8*			*77.0-126*		*02/28/2023 19:29*	WG2014123
(S) 1,2-Dichloroethane-d4	*103*			*70.0-130*		*02/28/2023 19:29*	WG2014123

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	25.0	59.4	ND	ND		20	WG2013996
Allyl chloride	107-05-1	76.53	4.00	12.5	ND	ND		20	WG2013996
Benzene	71-43-2	78.10	4.00	12.8	ND	ND		20	WG2013996
Benzyl Chloride	100-44-7	127	4.00	20.8	ND	ND		20	WG2013996
Bromodichloromethane	75-27-4	164	4.00	26.8	ND	ND		20	WG2013996
Bromoform	75-25-2	253	12.0	124	ND	ND		20	WG2013996
Bromomethane	74-83-9	94.90	4.00	15.5	ND	ND		20	WG2013996
1,3-Butadiene	106-99-0	54.10	40.0	88.5	ND	ND		20	WG2013996
Carbon disulfide	75-15-0	76.10	4.00	12.4	ND	ND		20	WG2013996
Carbon tetrachloride	56-23-5	154	4.00	25.2	ND	ND		20	WG2013996
Chlorobenzene	108-90-7	113	4.00	18.5	ND	ND		20	WG2013996
Chloroethane	75-00-3	64.50	4.00	10.6	ND	ND		20	WG2013996
Chloroform	67-66-3	119	4.00	19.5	ND	ND		20	WG2013996
Chloromethane	74-87-3	50.50	4.00	8.26	ND	ND		20	WG2013996
2-Chlorotoluene	95-49-8	126	4.00	20.6	ND	ND		20	WG2013996
Cyclohexane	110-82-7	84.20	4.00	13.8	44.7	154		20	WG2013996
Dibromochloromethane	124-48-1	208	4.00	34.0	ND	ND		20	WG2013996
1,2-Dibromoethane	106-93-4	188	4.00	30.8	ND	ND		20	WG2013996
1,2-Dichlorobenzene	95-50-1	147	4.00	24.0	ND	ND		20	WG2013996
1,3-Dichlorobenzene	541-73-1	147	4.00	24.0	ND	ND		20	WG2013996
1,4-Dichlorobenzene	106-46-7	147	4.00	24.0	ND	ND		20	WG2013996
1,2-Dichloroethane	107-06-2	99	4.00	16.2	ND	ND		20	WG2013996
1,1-Dichloroethane	75-34-3	98	4.00	16.0	ND	ND		20	WG2013996
1,1-Dichloroethene	75-35-4	96.90	4.00	15.9	ND	ND		20	WG2013996
cis-1,2-Dichloroethene	156-59-2	96.90	4.00	15.9	ND	ND		20	WG2013996
trans-1,2-Dichloroethene	156-60-5	96.90	4.00	15.9	ND	ND		20	WG2013996
1,2-Dichloropropane	78-87-5	113	4.00	18.5	ND	ND		20	WG2013996
cis-1,3-Dichloropropene	10061-01-5	111	4.00	18.2	ND	ND		20	WG2013996
trans-1,3-Dichloropropene	10061-02-6	111	4.00	18.2	ND	ND		20	WG2013996
1,4-Dioxane	123-91-1	88.10	4.00	14.4	ND	ND		20	WG2013996
Ethanol	64-17-5	46.10	25.0	47.1	119	224		20	WG2013996
Ethylbenzene	100-41-4	106	4.00	17.3	ND	ND		20	WG2013996
4-Ethyltoluene	622-96-8	120	4.00	19.6	ND	ND		20	WG2013996
Trichlorofluoromethane	75-69-4	137.40	4.00	22.5	ND	ND		20	WG2013996
Dichlorodifluoromethane	75-71-8	120.92	4.00	19.8	ND	ND		20	WG2013996
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	4.00	30.7	ND	ND		20	WG2013996
1,2-Dichlorotetrafluoroethane	76-14-2	171	4.00	28.0	ND	ND		20	WG2013996
Heptane	142-82-5	100	4.00	16.4	844	3450		20	WG2013996
Hexachloro-1,3-butadiene	87-68-3	261	12.6	135	ND	ND		20	WG2013996
n-Hexane	110-54-3	86.20	252	888	11900	42000		400	WG2014887
Isopropylbenzene	98-82-8	120.20	4.00	19.7	ND	ND		20	WG2013996
Methylene Chloride	75-09-2	84.90	4.00	13.9	ND	ND		20	WG2013996
Methyl Butyl Ketone	591-78-6	100	25.0	102	ND	ND		20	WG2013996
2-Butanone (MEK)	78-93-3	72.10	25.0	73.7	103	304		20	WG2013996
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	25.0	102	ND	ND		20	WG2013996
Methyl methacrylate	80-62-6	100.12	4.00	16.4	ND	ND		20	WG2013996
MTBE	1634-04-4	88.10	4.00	14.4	ND	ND		20	WG2013996
Naphthalene	91-20-3	128	12.6	66.0	ND	ND		20	WG2013996
2-Propanol	67-63-0	60.10	25.0	61.5	187	460		20	WG2013996
Propene	115-07-1	42.10	25.0	43.0	ND	ND		20	WG2013996
n-Propylbenzene	103-65-1	120	4.00	19.6	ND	ND		20	WG2013996
Styrene	100-42-5	104	4.00	17.0	ND	ND		20	WG2013996
1,1,2,2-Tetrachloroethane	79-34-5	168	4.00	27.5	ND	ND		20	WG2013996
Tetrachloroethylene	127-18-4	166	4.00	27.2	ND	ND		20	WG2013996
Tetrahydrofuran	109-99-9	72.10	4.00	11.8	ND	ND		20	WG2013996
Toluene	108-88-3	92.10	10.0	37.7	19.6	73.8		20	WG2013996

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	12.6	93.3	ND	ND		20	WG2013996
1,1,1-Trichloroethane	71-55-6	133	4.00	21.8	ND	ND		20	WG2013996
1,1,2-Trichloroethane	79-00-5	133	4.00	21.8	ND	ND		20	WG2013996
Trichloroethylene	79-01-6	131	4.00	21.4	298	1600		20	WG2013996
1,2,4-Trimethylbenzene	95-63-6	120	4.00	19.6	ND	ND		20	WG2013996
1,3,5-Trimethylbenzene	108-67-8	120	4.00	19.6	ND	ND		20	WG2013996
2,2,4-Trimethylpentane	540-84-1	114.22	4.00	18.7	ND	ND		20	WG2013996
Vinyl chloride	75-01-4	62.50	4.00	10.2	ND	ND		20	WG2013996
Vinyl Bromide	593-60-2	106.95	4.00	17.5	ND	ND		20	WG2013996
Vinyl acetate	108-05-4	86.10	4.00	14.1	ND	ND		20	WG2013996
m&p-Xylene	1330-20-7	106	8.00	34.7	9.06	39.3		20	WG2013996
o-Xylene	95-47-6	106	4.00	17.3	ND	ND		20	WG2013996
TPH (GC/MS) Low Fraction	8006-61-9	101	4000	16500	16100	66500		20	WG2013996
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*106*				WG2013996
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*107*				WG2014887

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	1.25	2.97	ND	ND		1	WG2013996
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2013996
Benzene	71-43-2	78.10	0.200	0.639	ND	ND		1	WG2013996
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2013996
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2013996
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2013996
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2013996
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2013996
Carbon disulfide	75-15-0	76.10	0.200	0.622	ND	ND		1	WG2013996
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2013996
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2013996
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2013996
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2013996
Chloromethane	74-87-3	50.50	0.200	0.413	0.609	1.26		1	WG2013996
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2013996
Cyclohexane	110-82-7	84.20	0.200	0.689	ND	ND		1	WG2013996
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2013996
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2013996
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2013996
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2013996
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2013996
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2013996
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2013996
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2013996
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2013996
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2013996
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2013996
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2013996
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2013996
1,4-Dioxane	123-91-1	88.10	0.200	0.721	ND	ND		1	WG2013996
Ethanol	64-17-5	46.10	1.25	2.36	43.2	81.5		1	WG2013996
Ethylbenzene	100-41-4	106	0.200	0.867	ND	ND		1	WG2013996
4-Ethyltoluene	622-96-8	120	0.200	0.982	ND	ND		1	WG2013996
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.218	1.23		1	WG2013996
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.508	2.51		1	WG2013996
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2013996
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2013996
Heptane	142-82-5	100	0.200	0.818	ND	ND		1	WG2013996
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2013996
n-Hexane	110-54-3	86.20	0.630	2.22	ND	ND		1	WG2013996
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2013996
Methylene Chloride	75-09-2	84.90	0.200	0.694	0.791	2.75		1	WG2013996
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2013996
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2013996
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2013996
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2013996
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2013996
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2013996
2-Propanol	67-63-0	60.10	1.25	3.07	3.10	7.62		1	WG2013996
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG2013996
n-Propylbenzene	103-65-1	120	0.200	0.982	ND	ND		1	WG2013996
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG2013996
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2013996
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2013996
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2013996
Toluene	108-88-3	92.10	0.500	1.88	1.01	3.80		1	WG2013996

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	WG2013996
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2013996
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2013996
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2013996
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	ND	ND		1	WG2013996
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	ND	ND		1	WG2013996
2,2,4-Trimethylpentane	540-84-1	114.22	0.200	0.934	ND	ND		1	WG2013996
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2013996
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2013996
Vinyl acetate	108-05-4	86.10	0.200	0.704	ND	ND		1	WG2013996
m&p-Xylene	1330-20-7	106	0.400	1.73	ND	ND		1	WG2013996
o-Xylene	95-47-6	106	0.200	0.867	ND	ND		1	WG2013996
TPH (GC/MS) Low Fraction	8006-61-9	101	200	826	ND	ND		1	WG2013996
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*99.7*				WG2013996

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	1.25	2.97	14.2	33.7		1	WG2013996
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2013996
Benzene	71-43-2	78.10	0.200	0.639	0.741	2.37		1	WG2013996
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2013996
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2013996
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2013996
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2013996
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2013996
Carbon disulfide	75-15-0	76.10	0.200	0.622	ND	ND		1	WG2013996
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2013996
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2013996
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2013996
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2013996
Chloromethane	74-87-3	50.50	0.200	0.413	ND	ND		1	WG2013996
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2013996
Cyclohexane	110-82-7	84.20	0.200	0.689	1.86	6.41		1	WG2013996
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2013996
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2013996
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2013996
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2013996
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2013996
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2013996
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2013996
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2013996
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	6.64	26.3		1	WG2013996
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2013996
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2013996
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2013996
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2013996
1,4-Dioxane	123-91-1	88.10	0.200	0.721	ND	ND		1	WG2013996
Ethanol	64-17-5	46.10	1.25	2.36	ND	ND		1	WG2013996
Ethylbenzene	100-41-4	106	0.200	0.867	ND	ND		1	WG2013996
4-Ethyltoluene	622-96-8	120	0.200	0.982	ND	ND		1	WG2013996
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.220	1.24		1	WG2013996
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.537	2.66		1	WG2013996
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2013996
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2013996
Heptane	142-82-5	100	0.200	0.818	3.56	14.6		1	WG2013996
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2013996
n-Hexane	110-54-3	86.20	6.30	22.2	131	462		10	WG2014887
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2013996
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2013996
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2013996
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2013996
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2013996
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2013996
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2013996
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2013996
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG2013996
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG2013996
n-Propylbenzene	103-65-1	120	0.200	0.982	ND	ND		1	WG2013996
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG2013996
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2013996
Tetrachloroethylene	127-18-4	166	0.200	1.36	20.4	139		1	WG2013996
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2013996
Toluene	108-88-3	92.10	0.500	1.88	0.783	2.95		1	WG2013996

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	WG2013996
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2013996
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2013996
Trichloroethylene	79-01-6	131	0.200	1.07	21.9	117		1	WG2013996
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	ND	ND		1	WG2013996
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	ND	ND		1	WG2013996
2,2,4-Trimethylpentane	540-84-1	114.22	0.200	0.934	ND	ND		1	WG2013996
Vinyl chloride	75-01-4	62.50	0.200	0.511	3.25	8.31		1	WG2013996
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2013996
Vinyl acetate	108-05-4	86.10	0.200	0.704	ND	ND		1	WG2013996
m&p-Xylene	1330-20-7	106	0.400	1.73	ND	ND		1	WG2013996
o-Xylene	95-47-6	106	0.200	0.867	ND	ND		1	WG2013996
TPH (GC/MS) Low Fraction	8006-61-9	101	200	826	277	1140	B	1	WG2013996
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*101*				WG2013996
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*97.1*				WG2014887

Method Blank (MB)

(MB) R3895946-2 02/28/23 07:10

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
TOC (Total Organic Carbon)	271	J	102	1000

L1589714-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1589714-01 03/01/23 03:13 • (DUP) R3895946-7 03/01/23 03:32

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC (Total Organic Carbon)	3180	2600	1	20.2	P1	20

L1589850-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1589850-03 03/01/23 04:45 • (DUP) R3895946-8 03/01/23 05:05

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
TOC (Total Organic Carbon)	59300	59100	1	0.456		20

Laboratory Control Sample (LCS)

(LCS) R3895946-1 02/28/23 06:54

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TOC (Total Organic Carbon)	75000	74600	99.5	85.0-115	

L1589672-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1589672-02 02/28/23 23:31 • (MS) R3895946-3 02/28/23 23:56 • (MSD) R3895946-4 03/01/23 00:26

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	44000	94300	96000	100	104	1	80.0-120			1.82	20

L1589672-06 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1589672-06 03/01/23 01:08 • (MS) R3895946-5 03/01/23 01:31 • (MSD) R3895946-6 03/01/23 01:54

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	5180	54600	55500	98.9	101	1	80.0-120			1.63	20

Method Blank (MB)

(MB) R3895678-3 02/28/23 10:35

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) R3895678-3 02/28/23 10:35

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	U		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	54.2	J	39.7	200
(S) 1,4-Bromofluorobenzene	*98.7*			*60.0-140*

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

(LCS) R3895678-1 02/28/23 09:11 • (LCSD) R3895678-2 02/28/23 09:42

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	3.32	3.25	88.5	86.7	70.0-130			2.13	25
Allyl Chloride	3.75	3.88	3.76	103	100	70.0-130			3.14	25
Benzene	3.75	3.67	3.74	97.9	99.7	70.0-130			1.89	25

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

(LCS) R3895678-1 02/28/23 09:11 • (LCSD) R3895678-2 02/28/23 09:42

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	4.22	4.12	113	110	70.0-152			2.40	25
Bromodichloromethane	3.75	3.70	3.71	98.7	98.9	70.0-130			0.270	25
Bromoform	3.75	3.47	3.60	92.5	96.0	70.0-130			3.68	25
Bromomethane	3.75	3.86	3.86	103	103	70.0-130			0.000	25
1,3-Butadiene	3.75	3.67	3.60	97.9	96.0	70.0-130			1.93	25
Carbon disulfide	3.75	3.92	3.87	105	103	70.0-130			1.28	25
Carbon tetrachloride	3.75	3.83	3.66	102	97.6	70.0-130			4.54	25
Chlorobenzene	3.75	3.30	3.52	88.0	93.9	70.0-130			6.45	25
Chloroethane	3.75	3.73	3.82	99.5	102	70.0-130			2.38	25
Chloroform	3.75	3.70	3.77	98.7	101	70.0-130			1.87	25
Chloromethane	3.75	3.89	3.84	104	102	70.0-130			1.29	25
2-Chlorotoluene	3.75	3.83	4.01	102	107	70.0-130			4.59	25
Cyclohexane	3.75	3.84	3.75	102	100	70.0-130			2.37	25
Dibromochloromethane	3.75	3.60	3.69	96.0	98.4	70.0-130			2.47	25
1,2-Dibromoethane	3.75	3.35	3.65	89.3	97.3	70.0-130			8.57	25
1,2-Dichlorobenzene	3.75	4.05	4.16	108	111	70.0-130			2.68	25
1,3-Dichlorobenzene	3.75	3.85	3.96	103	106	70.0-130			2.82	25
1,4-Dichlorobenzene	3.75	3.84	3.94	102	105	70.0-130			2.57	25
1,2-Dichloroethane	3.75	3.50	3.52	93.3	93.9	70.0-130			0.570	25
1,1-Dichloroethane	3.75	3.87	3.82	103	102	70.0-130			1.30	25
1,1-Dichloroethene	3.75	3.83	3.70	102	98.7	70.0-130			3.45	25
cis-1,2-Dichloroethene	3.75	3.65	3.65	97.3	97.3	70.0-130			0.000	25
trans-1,2-Dichloroethene	3.75	3.85	3.85	103	103	70.0-130			0.000	25
1,2-Dichloropropane	3.75	3.52	3.62	93.9	96.5	70.0-130			2.80	25
cis-1,3-Dichloropropene	3.75	3.61	3.60	96.3	96.0	70.0-130			0.277	25
trans-1,3-Dichloropropene	3.75	3.52	3.62	93.9	96.5	70.0-130			2.80	25
1,4-Dioxane	3.75	3.97	4.14	106	110	70.0-140			4.19	25
Ethanol	3.75	2.90	3.05	77.3	81.3	55.0-148			5.04	25
Ethylbenzene	3.75	3.48	3.64	92.8	97.1	70.0-130			4.49	25
4-Ethyltoluene	3.75	4.12	4.21	110	112	70.0-130			2.16	25
Trichlorofluoromethane	3.75	4.08	3.99	109	106	70.0-130			2.23	25
Dichlorodifluoromethane	3.75	4.48	4.37	119	117	64.0-139			2.49	25
1,1,2-Trichlorotrifluoroethane	3.75	3.97	3.85	106	103	70.0-130			3.07	25
1,2-Dichlorotetrafluoroethane	3.75	3.97	3.99	106	106	70.0-130			0.503	25
Heptane	3.75	3.44	3.70	91.7	98.7	70.0-130			7.28	25
Hexachloro-1,3-butadiene	3.75	4.17	4.21	111	112	70.0-151			0.955	25
n-Hexane	3.75	3.80	3.79	101	101	70.0-130			0.264	25
Isopropylbenzene	3.75	3.96	3.92	106	105	70.0-130			1.02	25
Methylene Chloride	3.75	3.73	3.48	99.5	92.8	70.0-130			6.93	25
Methyl Butyl Ketone	3.75	3.84	3.94	102	105	70.0-149			2.57	25

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

(LCS) R3895678-1 02/28/23 09:11 • (LCSD) R3895678-2 02/28/23 09:42

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	3.28	3.59	87.5	95.7	70.0-130			9.02	25
4-Methyl-2-pentanone (MIBK)	3.75	3.45	3.66	92.0	97.6	70.0-139			5.91	25
Methyl Methacrylate	3.75	3.08	3.19	82.1	85.1	70.0-130			3.51	25
MTBE	3.75	4.20	3.75	112	100	70.0-130			11.3	25
Naphthalene	3.75	4.58	4.70	122	125	70.0-159			2.59	25
2-Propanol	3.75	3.50	3.49	93.3	93.1	70.0-139			0.286	25
Propene	3.75	3.62	3.66	96.5	97.6	64.0-144			1.10	25
n-Propylbenzene	3.75	4.11	4.16	110	111	70.0-130			1.21	25
Styrene	3.75	3.61	3.82	96.3	102	70.0-130			5.65	25
1,1,2,2-Tetrachloroethane	3.75	3.88	3.92	103	105	70.0-130			1.03	25
Tetrachloroethylene	3.75	3.52	3.62	93.9	96.5	70.0-130			2.80	25
Tetrahydrofuran	3.75	3.56	3.38	94.9	90.1	70.0-137			5.19	25
Toluene	3.75	3.48	3.57	92.8	95.2	70.0-130			2.55	25
1,2,4-Trichlorobenzene	3.75	4.38	4.36	117	116	70.0-160			0.458	25
1,1,1-Trichloroethane	3.75	3.73	3.66	99.5	97.6	70.0-130			1.89	25
1,1,2-Trichloroethane	3.75	3.44	3.46	91.7	92.3	70.0-130			0.580	25
Trichloroethylene	3.75	3.63	3.78	96.8	101	70.0-130			4.05	25
1,2,4-Trimethylbenzene	3.75	4.12	4.21	110	112	70.0-130			2.16	25
1,3,5-Trimethylbenzene	3.75	4.31	4.50	115	120	70.0-130			4.31	25
2,2,4-Trimethylpentane	3.75	3.63	3.60	96.8	96.0	70.0-130			0.830	25
Vinyl chloride	3.75	3.99	3.87	106	103	70.0-130			3.05	25
Vinyl Bromide	3.75	3.77	3.79	101	101	70.0-130			0.529	25
Vinyl acetate	3.75	2.77	2.73	73.9	72.8	70.0-130			1.45	25
m&p-Xylene	7.50	7.04	7.27	93.9	96.9	70.0-130			3.21	25
o-Xylene	3.75	3.63	3.71	96.8	98.9	70.0-130			2.18	25
TPH (GC/MS) Low Fraction	203	208	206	102	101	70.0-130			0.966	25
(S) 1,4-Bromofluorobenzene				*98.6*	*96.6*	*60.0-140*				

Method Blank (MB)

(MB) R3896434-3 03/01/23 10:19

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
n-Hexane	U		0.206	0.630
(S) 1,4-Bromofluorobenzene	*101*			*60.0-140*

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

(LCS) R3896434-1 03/01/23 08:53 • (LCSD) R3896434-2 03/01/23 09:37

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
n-Hexane	3.75	3.50	3.52	93.3	93.9	70.0-130			0.570	25
(S) 1,4-Bromofluorobenzene				*101*	*104*	*60.0-140*				

Method Blank (MB)

(MB) R3896212-2 02/28/23 10:18

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) R3896212-2 02/28/23 10:18

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	*108*			*80.0-120*
(S) 4-Bromofluorobenzene	*91.6*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3896212-1 02/28/23 08:53

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	25.0	29.0	116	19.0-160	
Acrolein	25.0	25.9	104	10.0-160	
Acrylonitrile	25.0	25.7	103	55.0-149	

Laboratory Control Sample (LCS)

(LCS) R3896212-1 02/28/23 08:53

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	5.00	4.43	88.6	70.0-123	
Bromobenzene	5.00	4.88	97.6	73.0-121	
Bromodichloromethane	5.00	4.93	98.6	75.0-120	
Bromoform	5.00	3.72	74.4	68.0-132	
Bromomethane	5.00	4.71	94.2	10.0-160	
n-Butylbenzene	5.00	3.72	74.4	73.0-125	
sec-Butylbenzene	5.00	3.99	79.8	75.0-125	
tert-Butylbenzene	5.00	4.35	87.0	76.0-124	
Carbon disulfide	5.00	4.72	94.4	61.0-128	
Carbon tetrachloride	5.00	4.59	91.8	68.0-126	
Chlorobenzene	5.00	4.60	92.0	80.0-121	
Chlorodibromomethane	5.00	4.75	95.0	77.0-125	
Chloroethane	5.00	5.56	111	47.0-150	
Chloroform	5.00	4.55	91.0	73.0-120	
Chloromethane	5.00	7.32	146	41.0-142	J4
2-Chlorotoluene	5.00	4.70	94.0	76.0-123	
4-Chlorotoluene	5.00	4.55	91.0	75.0-122	
1,2-Dibromo-3-Chloropropane	5.00	3.91	78.2	58.0-134	
1,2-Dibromoethane	5.00	4.69	93.8	80.0-122	
Dibromomethane	5.00	4.76	95.2	80.0-120	
1,2-Dichlorobenzene	5.00	4.49	89.8	79.0-121	
1,3-Dichlorobenzene	5.00	4.40	88.0	79.0-120	
1,4-Dichlorobenzene	5.00	4.41	88.2	79.0-120	
Dichlorodifluoromethane	5.00	5.65	113	51.0-149	
1,1-Dichloroethane	5.00	4.74	94.8	70.0-126	
1,2-Dichloroethane	5.00	4.90	98.0	70.0-128	
1,1-Dichloroethene	5.00	5.02	100	71.0-124	
cis-1,2-Dichloroethene	5.00	4.83	96.6	73.0-120	
trans-1,2-Dichloroethene	5.00	4.97	99.4	73.0-120	
1,2-Dichloropropane	5.00	4.71	94.2	77.0-125	
1,1-Dichloropropene	5.00	4.73	94.6	74.0-126	
1,3-Dichloropropane	5.00	4.71	94.2	80.0-120	
cis-1,3-Dichloropropene	5.00	4.47	89.4	80.0-123	
trans-1,3-Dichloropropene	5.00	4.62	92.4	78.0-124	
2,2-Dichloropropane	5.00	4.41	88.2	58.0-130	
Di-isopropyl ether	5.00	5.12	102	58.0-138	
Ethylbenzene	5.00	4.50	90.0	79.0-123	
Hexachloro-1,3-butadiene	5.00	3.09	61.8	54.0-138	
Isopropylbenzene	5.00	3.85	77.0	76.0-127	
p-Isopropyltoluene	5.00	4.17	83.4	76.0-125	

Laboratory Control Sample (LCS)

(LCS) R3896212-1 02/28/23 08:53

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Butanone (MEK)	25.0	28.3	113	44.0-160	
Methylene Chloride	5.00	4.73	94.6	67.0-120	
4-Methyl-2-pentanone (MIBK)	25.0	27.1	108	68.0-142	
Methyl tert-butyl ether	5.00	4.94	98.8	68.0-125	
Naphthalene	5.00	2.69	53.8	54.0-135	J4
n-Propylbenzene	5.00	4.57	91.4	77.0-124	
Styrene	5.00	4.06	81.2	73.0-130	
1,1,1,2-Tetrachloroethane	5.00	4.54	90.8	75.0-125	
1,1,2,2-Tetrachloroethane	5.00	5.36	107	65.0-130	
1,1,2-Trichlorotrifluoroethane	5.00	4.92	98.4	69.0-132	
Tetrachloroethene	5.00	4.27	85.4	72.0-132	
Toluene	5.00	4.33	86.6	79.0-120	
1,2,3-Trichlorobenzene	5.00	2.43	48.6	50.0-138	J4
1,2,4-Trichlorobenzene	5.00	3.07	61.4	57.0-137	
1,1,1-Trichloroethane	5.00	4.68	93.6	73.0-124	
1,1,2-Trichloroethane	5.00	4.68	93.6	80.0-120	
Trichloroethene	5.00	4.27	85.4	78.0-124	
Trichlorofluoromethane	5.00	5.20	104	59.0-147	
1,2,3-Trichloropropane	5.00	5.79	116	73.0-130	
1,2,4-Trimethylbenzene	5.00	4.44	88.8	76.0-121	
1,2,3-Trimethylbenzene	5.00	4.20	84.0	77.0-120	
1,3,5-Trimethylbenzene	5.00	4.57	91.4	76.0-122	
Vinyl chloride	5.00	6.15	123	67.0-131	
Xylenes, Total	15.0	12.6	84.0	79.0-123	
(S) Toluene-d8			*104*	*80.0-120*	
(S) 4-Bromofluorobenzene			*90.6*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*103*	*70.0-130*	

Method Blank (MB)

(MB) R3896508-3 03/01/23 17:04

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) R3896508-3 03/01/23 17:04

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	*101*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*95.9*			*70.0-130*

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

(LCS) R3896508-1 03/01/23 15:17 • (LCSD) R3896508-2 03/01/23 15:38

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	39.1	41.0	156	164	19.0-160		J4	4.74	27
Acrolein	25.0	13.4	13.0	53.6	52.0	10.0-160			3.03	26
Acrylonitrile	25.0	23.4	24.9	93.6	99.6	55.0-149			6.21	20

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

(LCS) R3896508-1 03/01/23 15:17 • (LCSD) R3896508-2 03/01/23 15:38

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	4.84	5.37	96.8	107	70.0-123			10.4	20
Bromobenzene	5.00	4.41	5.35	88.2	107	73.0-121			19.3	20
Bromodichloromethane	5.00	4.58	4.92	91.6	98.4	75.0-120			7.16	20
Bromoform	5.00	4.32	4.39	86.4	87.8	68.0-132			1.61	20
Bromomethane	5.00	5.37	5.48	107	110	10.0-160			2.03	25
n-Butylbenzene	5.00	6.51	7.03	130	141	73.0-125	J4	J4	7.68	20
sec-Butylbenzene	5.00	5.42	5.91	108	118	75.0-125			8.65	20
tert-Butylbenzene	5.00	5.31	5.97	106	119	76.0-124			11.7	20
Carbon disulfide	5.00	4.55	5.05	91.0	101	61.0-128			10.4	20
Carbon tetrachloride	5.00	4.73	5.39	94.6	108	68.0-126			13.0	20
Chlorobenzene	5.00	4.98	5.13	99.6	103	80.0-121			2.97	20
Chlorodibromomethane	5.00	4.52	4.62	90.4	92.4	77.0-125			2.19	20
Chloroethane	5.00	5.61	6.59	112	132	47.0-150			16.1	20
Chloroform	5.00	4.62	5.01	92.4	100	73.0-120			8.10	20
Chloromethane	5.00	5.77	6.50	115	130	41.0-142			11.9	20
2-Chlorotoluene	5.00	4.77	5.38	95.4	108	76.0-123			12.0	20
4-Chlorotoluene	5.00	4.63	5.22	92.6	104	75.0-122			12.0	20
1,2-Dibromo-3-Chloropropane	5.00	4.98	5.20	99.6	104	58.0-134			4.32	20
1,2-Dibromoethane	5.00	4.57	4.79	91.4	95.8	80.0-122			4.70	20
Dibromomethane	5.00	4.86	5.04	97.2	101	80.0-120			3.64	20
1,2-Dichlorobenzene	5.00	5.09	5.57	102	111	79.0-121			9.01	20
1,3-Dichlorobenzene	5.00	4.96	5.39	99.2	108	79.0-120			8.31	20
1,4-Dichlorobenzene	5.00	4.74	5.42	94.8	108	79.0-120			13.4	20
Dichlorodifluoromethane	5.00	6.02	6.42	120	128	51.0-149			6.43	20
1,1-Dichloroethane	5.00	4.46	5.24	89.2	105	70.0-126			16.1	20
1,2-Dichloroethane	5.00	4.86	5.04	97.2	101	70.0-128			3.64	20
1,1-Dichloroethene	5.00	4.94	5.29	98.8	106	71.0-124			6.84	20
cis-1,2-Dichloroethene	5.00	4.72	5.47	94.4	109	73.0-120			14.7	20
trans-1,2-Dichloroethene	5.00	4.52	5.13	90.4	103	73.0-120			12.6	20
1,2-Dichloropropane	5.00	5.09	5.82	102	116	77.0-125			13.4	20
1,1-Dichloropropene	5.00	4.75	5.54	95.0	111	74.0-126			15.4	20
1,3-Dichloropropane	5.00	4.52	4.78	90.4	95.6	80.0-120			5.59	20
cis-1,3-Dichloropropene	5.00	4.64	4.86	92.8	97.2	80.0-123			4.63	20
trans-1,3-Dichloropropene	5.00	4.11	4.39	82.2	87.8	78.0-124			6.59	20
2,2-Dichloropropane	5.00	4.84	5.51	96.8	110	58.0-130			12.9	20
Di-isopropyl ether	5.00	4.99	5.35	99.8	107	58.0-138			6.96	20
Ethylbenzene	5.00	5.04	5.91	101	118	79.0-123			15.9	20
Hexachloro-1,3-butadiene	5.00	5.54	6.54	111	131	54.0-138			16.6	20
Isopropylbenzene	5.00	5.28	5.65	106	113	76.0-127			6.77	20
p-Isopropyltoluene	5.00	5.33	6.13	107	123	76.0-125			14.0	20

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

(LCS) R3896508-1 03/01/23 15:17 • (LCSD) R3896508-2 03/01/23 15:38

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	28.8	29.1	115	116	44.0-160			1.04	20
Methylene Chloride	5.00	4.73	5.31	94.6	106	67.0-120			11.6	20
4-Methyl-2-pentanone (MIBK)	25.0	27.9	28.9	112	116	68.0-142			3.52	20
Methyl tert-butyl ether	5.00	4.69	4.88	93.8	97.6	68.0-125			3.97	20
Naphthalene	5.00	5.85	6.75	117	135	54.0-135			14.3	20
n-Propylbenzene	5.00	4.78	5.37	95.6	107	77.0-124			11.6	20
Styrene	5.00	5.03	5.49	101	110	73.0-130			8.75	20
1,1,1,2-Tetrachloroethane	5.00	4.51	5.49	90.2	110	75.0-125			19.6	20
1,1,2,2-Tetrachloroethane	5.00	4.82	5.00	96.4	100	65.0-130			3.67	20
1,1,2-Trichlorotrifluoroethane	5.00	4.73	5.66	94.6	113	69.0-132			17.9	20
Tetrachloroethene	5.00	4.75	5.00	95.0	100	72.0-132			5.13	20
Toluene	5.00	4.68	5.12	93.6	102	79.0-120			8.98	20
1,2,3-Trichlorobenzene	5.00	6.14	6.68	123	134	50.0-138			8.42	20
1,2,4-Trichlorobenzene	5.00	5.70	6.12	114	122	57.0-137			7.11	20
1,1,1-Trichloroethane	5.00	4.71	5.26	94.2	105	73.0-124			11.0	20
1,1,2-Trichloroethane	5.00	4.95	4.84	99.0	96.8	80.0-120			2.25	20
Trichloroethene	5.00	4.52	5.13	90.4	103	78.0-124			12.6	20
Trichlorofluoromethane	5.00	5.99	5.92	120	118	59.0-147			1.18	20
1,2,3-Trichloropropane	5.00	4.81	5.27	96.2	105	73.0-130			9.13	20
1,2,4-Trimethylbenzene	5.00	5.05	5.63	101	113	76.0-121			10.9	20
1,2,3-Trimethylbenzene	5.00	4.96	5.69	99.2	114	77.0-120			13.7	20
1,3,5-Trimethylbenzene	5.00	4.98	5.57	99.6	111	76.0-122			11.2	20
Vinyl chloride	5.00	6.19	6.59	124	132	67.0-131		J4	6.26	20
Xylenes, Total	15.0	15.4	16.6	103	111	79.0-123			7.50	20
(S) Toluene-d8				*101*	*98.1*	*80.0-120*				
(S) 4-Bromofluorobenzene				*107*	*101*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*95.9*	*96.8*	*70.0-130*				

Method Blank (MB)

(MB) R3896927-4 03/02/23 11:02

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
n-Butylbenzene	U		0.157	1.00
(S) Toluene-d8	*107*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*100*			*70.0-130*

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

(LCS) R3896927-1 03/02/23 08:51 • (LCSD) R3896927-2 03/02/23 09:13

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 %
n-Butylbenzene	5.00	4.57	4.78	91.4	95.6	73.0-125			4.49	20
(S) Toluene-d8				*106*	*104*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*103*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*105*	*101*	*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.
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.
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
B	The same analyte is found in the associated blank.
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.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

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.

State of Oregon Chain of Custody – Page 1 of 2

Agency, Authorized Purchaser or Agent: Apex Companies for DEQ (Kara Master)

Contract Laboratory Name: Pace National

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: Kara Master
Address: Department of Environmental Quality, 700 NE Multnomah St, Suite 600, Portland, OR 97232
Tel. #:
E-mail: Kara.E.MASTER@deq.oregon.gov

Invoice To: ODEQ Business Office
Address: 700 NE Multnomah Street, Suite 600, Portland, OR. 97232
Tel. #:

Project Name: Tigard Cleaners
Project #: 320002326-01
Sampler(s) Name(s): Alex Evernden

Sample Preservative

	≤2									

B207

Requested Analyses

Sample ID#	Collection Date/Time	Matrix	Number of Containers	VOCs by Method 8260D	TOC by Method 9060A	VOCs by Method TO-15									L1589672
MW-1	2/21/23 1445	Water	4	X	X										-01
MW-2	2/21/23 1625	Water	4	X	X										-02
MW-2i	2/21/23 1609	Water	3	X											-03
MW-3	2/21/23 1615	Water	3	X											-04
MW-4	2/21/23 1200	Water	4	X	X										-05
MW-5	2/21/23 1124	Water	4	X	X										-06
MW-6i	2/21/23 1400	Water	3	X											-07
MW-7	2/21/23 1602	Water	3	X											-08
DUP-1	2/21/23 1200	Water	4	X	X										-09
AMB-5/KU-1	2/21/23 1659	Air	1			X									
AMB-Outside	2/21/23 1657	Air	1			X									
EX	2/21/23 1004	Air	1			X									

Notes: Report Results to: MStevens@apexcos.com; COwens@apexcos.com; Kelsi.Evans@apexcos.com; Kara.E.MASTER@deq.oregon.gov

Relinquished By: Alex Evernden	Agency/Agent: Apex Companies	Received By:	Agency/Agent:
Signature:	Time & Date: 2/21/23 1801	Signature:	Time & Date:
Relinquished By:	Agency/Agent:	Received By:	Agency/Agent:
Signature:		Signature:	Time & Date: 2-22-23 0945

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		

THIS PURC… 02-1098-07 AND PRICE AGREEMENT # [8901]. THE PRICE AGREEMENT INCLUDING CONTRACT TERMS AN… S) CONTAINED IN THE PRICE AGREEMENT ARE HEREBY INCORPORATED BY REFERENCE AND SHALL APPLY TO… CTING T'S AND C'S, EXPRESS OR IMPLIED.

OK TO NCF

6193 3532 0843

4.0°C +0= 4.0°C

2/27-NCF-L1589672 OREGONDEQ TD

R5

Time estimate: oh **Time spent:** oh

Members

Troy Dunlap (responsible) Brian Ford

- [x] Login Clarification needed
- [ ] Chain of custody is incomplete
- [ ] Please specify Metals requested
- [ ] Please specify TCLP requested
- [ ] Received additional samples not listed on COC
- [ ] Sample IDs on containers do not match IDs on COC
- [ ] Client did not "X" analysis
- [ ] Chain of Custody is missing
- [ ] If no COC: Received by:_____
- [ ] If no COC: Date/Time:_____
- [ ] If no COC: Temp./Cont.Rec./pH:_____
- [ ] If no COC: Carrier:_____
- [ ] If no COC: Tracking #:_____
- [ ] Client informed by call
- [x] Client informed by Email
- [ ] Client informed by Voicemail
- [ ] Date/Time:_____
- [x] PM initials:_____bjf_____
- [ ] Client Contact:_____

Comments

Troy Dunlap *27 February 2023 1:21 PM*

Did not receive air samples.

Brian Ford *28 February 2023 9:12 AM*

client shipped out the summas yesterday Mon 02/27. fedex shows delivered today, Tues 02/28. fedex# 530042984125

Troy Dunlap *28 February 2023 2:35 PM*

Received and added.

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
	2/21/2023			3.70	--	--	150.35
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
	2/21/2023			8.62	--	--	146.23
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
	2/21/2023			5.17	--	--	150.12

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
	2/21/2023			5.19	--	--	150.35
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
	2/21/2023			4.28	--	--	150.41
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
	2/21/2023			7.02	--	--	146.30

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
	2/21/2023			5.00	--	--	148.99
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
	2/21/2023			7.03	--	--	147.18
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
	2/21/2023			3.81	--	--	149.36

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					Total Molar VOCs in µmol/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**	0.027
MW-5							
	8/31/2017	<1.00	<1.00	**1.37**	<1.00	**0.984 J**	0.042
	10/9/2017	<1.00	<1.00	**1.34**	<1.00	**0.509 J**	0.034
	6/18/2018	<1.00	<1.00	**1.19**	<1.00	**0.389 J**	0.030
	9/25/2018	<1.00	<1.00	**0.640 J**	<1.00	**0.265 J**	0.023
	2/5/2019	<1.00	<1.00	**1.21**	<1.00	**0.980 J**	0.040
	5/30/2019	<1.00	<1.00	**2.18**	<1.00	**0.501 J**	0.042
	9/24/2019	<1.00	<1.00	**0.777 J**	<1.00	<1.00	0.028
	5/27/2020	<1.00	<1.00	**0.614 J**	<1.00	**0.239 J**	0.022
	10/16/2020	<1.00	<1.00	**0.463 J**	<1.00	<1.00	0.025
	6/7/2021	<1.00	<1.00	**0.188 J**	<1.00	**0.561 J**	0.023
	10/20/2021	<1.00	**0.261 J**	**9.06**	<1.00	**0.433 J+**	0.111
	10/18/2022	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
	2/21/2023	<1.00	<1.00	**0.466 J**	<1.00	**0.439 J**	0.024
Source Area							
MW-1							
	8/31/2017	**58,000**	**71,700**	**89,300**	**574**	**1,720**	1,850
	10/9/2017	**53,300**	**61,500**	**72,200**	**536**	**1,750**	1,568
	6/18/2018	**64,100**	**68,700**	**61,500**	**455 J**	**1,130**	1,567
	9/25/2018	**42,800**	**95,900**	**122,000**	**781**	**2,160**	2,289
	2/7/2019	**2,540**	**23,200**	**308,000**	**1,290**	**7620 J**	3,504
	5/30/2019	**3,230**	**9,040**	**375,000**	**1930 J**	**12,800**	4,181
	9/24/2019	**10,500**	**25,400**	**439,000**	**2,190**	**36,000**	5,384
	5/27/2020	**10,000**	**12500 J**	**536,000**	<20000	**58,700**	6,727
	10/16/2020	**11000 J**	**34,200**	**384,000**	<20000	**15,800 J**	4,644
	6/7/2021	<20000	<20000	**452,000**	<20000	**90,000 J+**	6,342
	10/20/2021	**9940 J**	**21,200**	**279,000**	<20000	**18,700 J+**	3,502
	2/21/2023	<500	<500	**468,000**	**4,590**	**30,100**	5,360
	10/19/2022	<500	<500	**217,000**	967	**37,200**	2,847
	2/21/2023	<500	<500	**468,000**	**4,590**	**30,100**	5,360
MW-3							
	8/31/2017	**4,000**	**1,890**	**2,000**	**5.61**	**175**	62.0
	10/9/2017	**1,700**	**1,090**	**1,190**	**4.49**	**134**	33.0
	6/19/2018	**1,110**	**661**	**2,740**	**14.3**	**365**	46.0
	9/25/2018	**1,520**	**591**	**3,350**	**106**	**431**	56.2
	2/5/2019	**7,160**	**723**	**13,000**	**40.6**	**1,550**	208
	5/30/2019	**1,220**	**468**	**10,700**	**41.3 J**	**1,410**	144
	9/24/2019	**214**	**147**	**1,680**	**4.89 J**	**94.9**	21.3
	5/27/2020	**726**	**385**	**6,410**	**32.4**	**818**	86.9
	10/16/2020	**1,740**	**1,060**	**5,490**	<100	**703**	87.0
	6/7/2021	**2,620**	**1,350**	**5,630**	**24.1 J**	**1020 J+**	101
	10/20/2021	**1,560**	**821**	**3,150**	<100	**467 J+**	56.1
	10/19/2022	<100	<100	**2,520**	<100	**92.2 J**	28.7
	2/21/2023	**36.5 J**	**150**	**7,510**	**25.6**	**938**	94.1
MW-4							
	8/31/2017	**60,600**	**35,400**	**45,200**	**140**	**7,680**	1,225
	10/9/2017	**44,000**	**21,900**	**24,400**	**84.1**	**4,930**	763
	6/18/2018	**55,300**	**37,100**	**62,100**	**314**	**6,090**	1,357
	9/25/2018	**9,790**	**5,290**	**86400 J**	<1000	**3630 J**	1,054
	2/5/2019	**23,800**	**7,980**	**253,000**	**657**	**24,100**	3,206
	5/30/2019	**16,400**	**9,660**	**198,000**	<2000	**22,700**	2,588
	9/24/2019	**21,300**	**5,460**	**162,000**	<2000	**21,200**	2,191

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					Total Molar VOCs in µmol/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**	2,303
	10/16/2020	**14,800**	**5,200**	**117,000**	<2000	**26,500**	1,770
	6/7/2021	**13,300**	**5,890**	**74,200**	<2000	**28000 J+**	1,349
	10/20/2021	**27,400**	**9,890**	**64,900**	<2000	**21,700**	1,267
	10/19/2022	**78,000**	**11,500**	**76,400**	<2000	**13,000**	1,564
	2/21/2023	**7,410**	**1,990**	**68,100**	<2000	**17,800**	1,057
Downgradient							
MW-2							
	8/31/2017	<1.00	**1.14**	**19.7**	<1.00	**6.78**	0.329
	10/9/2017	**1.14**	**4.45**	**20.9**	<1.00	**4.05**	0.326
	6/19/2018	**0.613 J**	**0.605 J**	**17.7**	<1.00	**12.4**	0.394
	9/25/2018	<1.00	<1.00	**43.3**	<1.00	**28.2**	0.910
	2/7/2019	<1.00	<1.00	**74.9**	**0.438 J**	**49.6**	1.58
	5/30/2019	<1.00	<1.00	**84.1**	**0.608 J**	**52.0**	1.71
	9/24/2019	<1.00	<1.00	**7.90**	<1.00	**3.77**	0.154
	5/27/2020	<1.00	<1.00	**71.6**	**0.498 J**	**62.9**	1.76
	10/16/2020	<1.00	<1.00	**5.45**	<1.00	**3.21**	0.120
	6/7/2021	<1.00	<1.00	**62.8**	**0.367 J**	**79.0 J+**	1.92
	10/20/2021	<1.00	<1.00	**32.2**	**0.166 J**	**34.2 J+**	0.888
	10/18/2022	<1.00	<1.00	**8.55**	**0.287 J**	**2.88**	0.144
	2/21/2023	<1.00	**0.229 J**	**57.1**	**0.183 J**	**12.0**	0.788
MW-2i							
	6/19/2018	**365**	**5,800**	**40,300**	**369**	**64.9**	467
	9/25/2018	<100	<100	**48,300**	**395**	**4,130**	569
	2/7/2019	**0.507 J**	**1.12**	**51,800**	**40.9**	**7,200**	650
	5/30/2019	<500	<500	**42,300**	<500	**9,430**	593
	9/24/2019	<500	<500	**43,500**	<500	**10,300**	620
	5/27/2020	<500	<500	**20,000**	<500	**1,620**	238
	10/16/2020	<500	<500	**36,500**	<500	**9,610**	536
	6/7/2021	<500	<500	**31,100**	<500	**13500 J+**	543
	10/20/2021	<500	<500	**19,600**	<500	**4820 J+**	285
	10/19/2022	<500	<500	**34,000**	<500	**8,700**	496
	2/21/2023	<100	<100	**12,600**	<100	**230**	135
MW-6							
	8/31/2017	**4,740**	**31,000**	**25,800**	**126**	**2,170**	567
	10/9/2017	**3,690**	**28,700**	**22,800**	**141**	**2,490**	517
	6/18/2018	<200	**234**	**35,500**	**156 J**	**1,860**	400
	9/25/2018	<200	<200	**30,100**	**123 J**	**8,800**	454
	2/7/2019	<1.00	**4.76**	**43,600**	**152**	**7,660**	574
	5/30/2019	<250	<250	**28,900**	**138 J**	**5,120**	383
	9/24/2019	<250	<250	**26,300**	**117 J**	**8,800**	415
	5/27/2020	<250	<250	**8,070**	<250	**5840 J**	180
	10/16/2020	<250	<250	**5,550**	<250	**4,460**	132
	6/7/2021	<250	<250	**921**	<250	**1060 J+**	29.5
	10/20/2021	<25.0	**9.65 J**	**1,970**	**5.35 J**	**879**	34.6
	10/18/2022	<25.0	<25.0	**1,320**	**5.94 J**	**906**	28.3
	2/21/2023	Stormwater flowing into well monument during sampling, no sample collected					
MW-6i							
	6/18/2018	**1.26**	**1.44**	**2,020**	**10.9**	**91.4**	22.4
	9/25/2018	<1.00	<1.00	**0.538 J**	**3.15**	**1.24**	0.065
	2/7/2019	<1.00	<1.00	**1.07**	**1.69**	**1.51**	0.059
	5/30/2019	<1.00	<1.00	**0.696 J**	**2.35**	**1.73**	0.066
	9/24/2019	<1.00	<1.00	**115**	**1.77**	**148**	3.58
	5/27/2020	<1.00	0.5	**9.42**	**0.601 J**	**1.23 J**	0.130
	10/16/2020	<1.00	<1.00	**1.31**	**0.201 J**	**2.29**	0.059

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					Total Molar VOCs in µmol/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	0.027
	10/20/2021	<1.00	<1.00	**0.779 J**	**0.232 J**	<1.00	0.025
	10/18/2022	<1.00	<1.00	**0.950 J**	**0.236 J**	<1.00	0.027
	2/21/2023	<1.00	<1.00	**0.257 J**	<1.00	<1.00	0.023
MW-7							
	8/31/2017	**1.59**	**45.0**	**6,710**	**65.8**	**2,120**	104
	10/9/2017	<500	<500	**13,000**	**300 J+**	**5,580**	230
	6/19/2018	<1.00	**23.0**	**11,800**	**61.5**	**7,790**	247
	9/25/2018	<100	<100	**10,500**	**48.8 J**	**5,930**	204
	2/7/2019	<1.00	<1.00	**5,350**	<1.00	**4,990**	135
	5/30/2019	<25.0	<25.0	**661**	<25.0	**715**	18.558
	9/24/2019	<25.0	<25.0	**273**	<25.0	**325**	8.316
	5/27/2020	<25.0	<25.0	**882**	**4.89 J**	**863 J**	23.127
	10/16/2020	<25.0	<25.0	**2,290**	<25.0	**2,110**	57.682
	6/7/2021	<5.00	<5.00	**229**	**1.41 J**	**336 J+**	7.787
	10/20/2021	<5.00	<5.00	**101**	**1.15 J**	**259 J+**	5.232
	10/18/2022	<5.00	<5.00	**45.9**	<5.00	**46.0**	1.269
	2/21/2023	<1.00	<1.00	**11.2**	**0.420 J**	**11.4 J**	0.309
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.

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	2/21/2023
	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	**5,180**
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	2/21/2023
	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	**43,900**
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	2/21/2023	10/19/2022	2/21/2023
	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	**18,800**	<1000	**44,000**
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**	--	--	--	--	--	--	--

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
	11/3/2022	Could not access space				
	2/21/2023	Could not access space				

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
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
	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
	2/21/2023	<27.2	**1,600**	<15.9	<15.9	<10.2
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
	2/21/2023	<1.36	<1.07	<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**
	2/21/2023	**139**	**117**	**26.3**	<0.793	**8.31**
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.

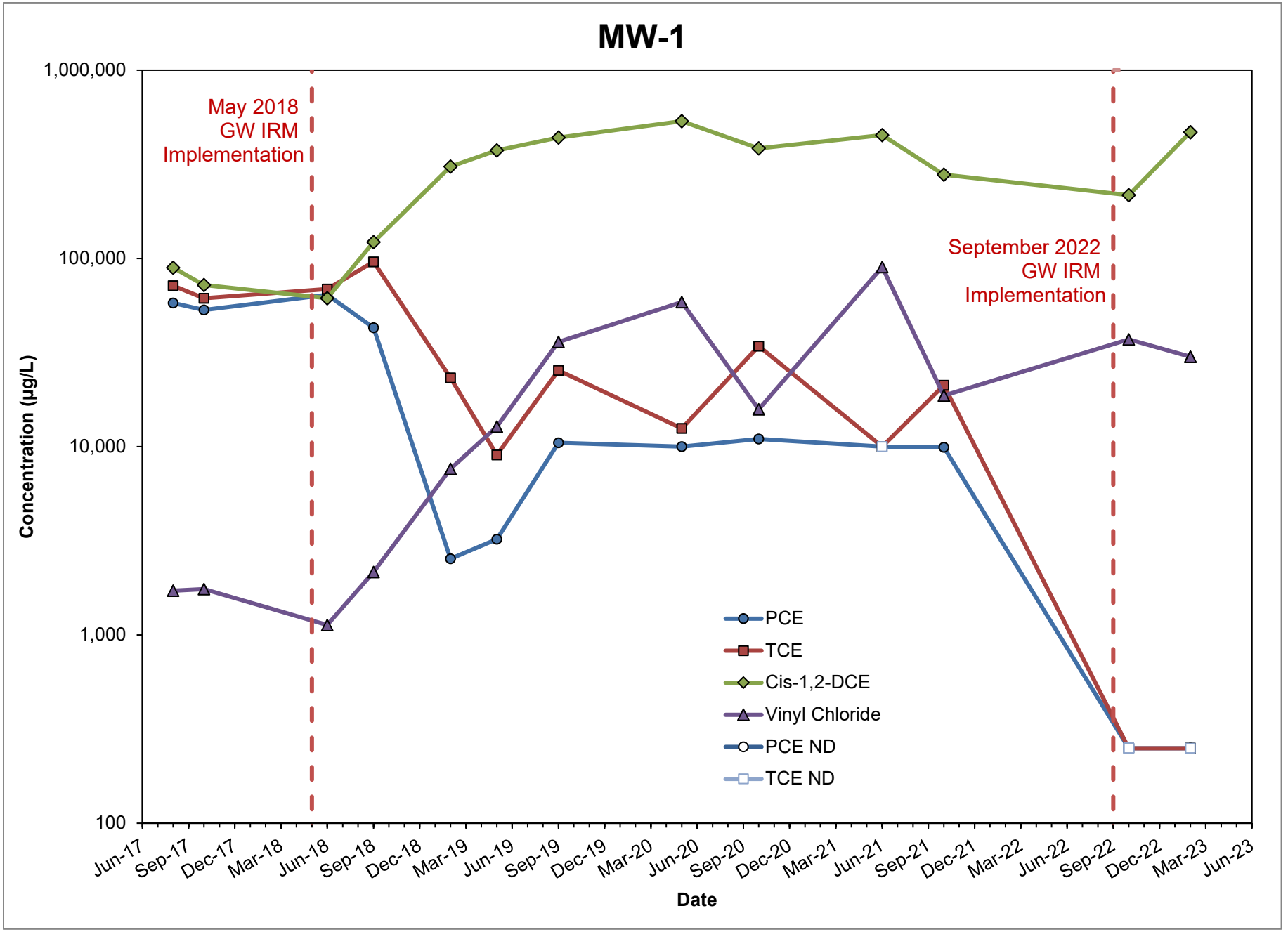
Shaded values indicate concentrations detected above one or more applicable RBCs.

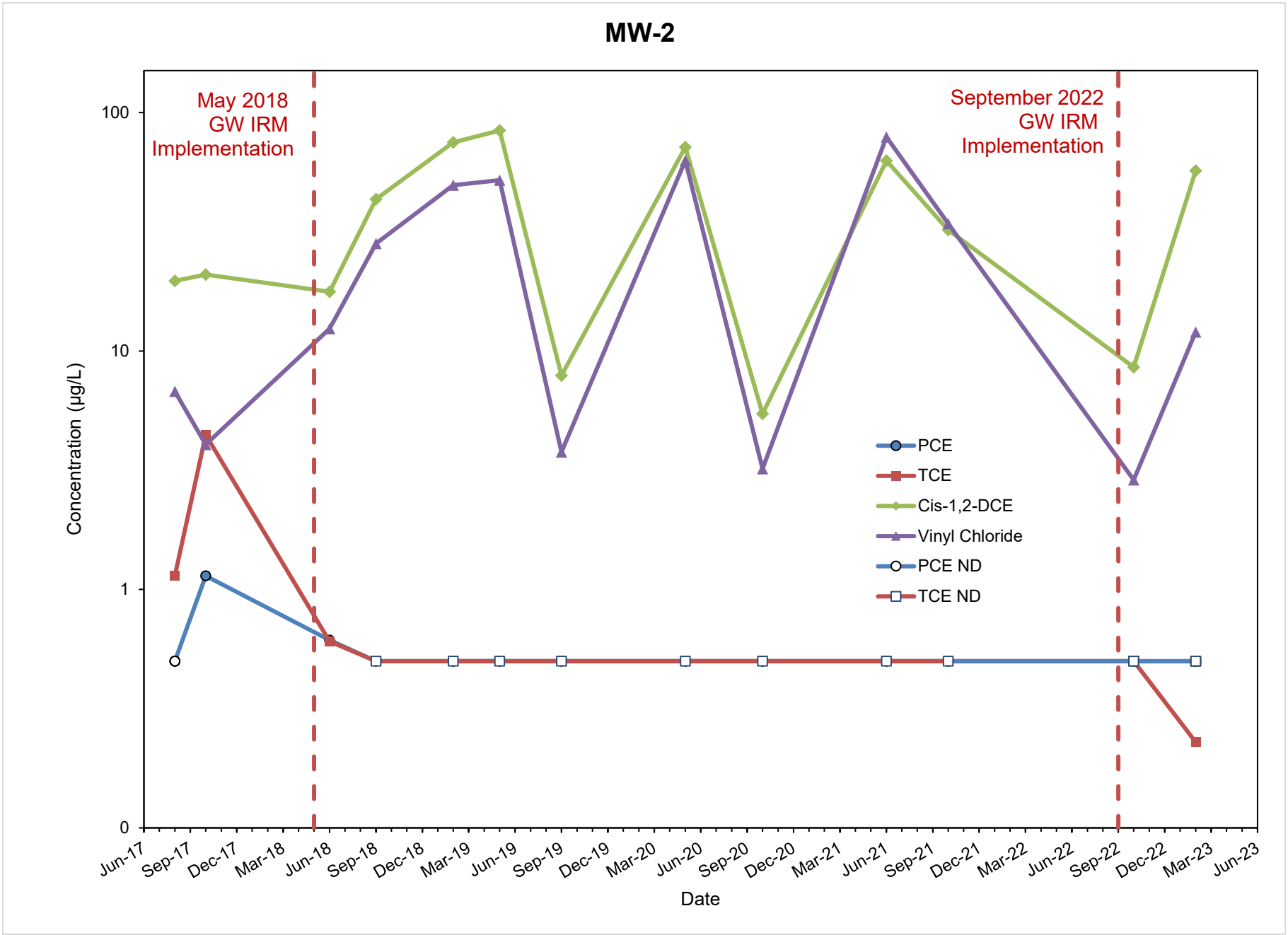
< = Concentration was not detected above the shown method reporting limit.

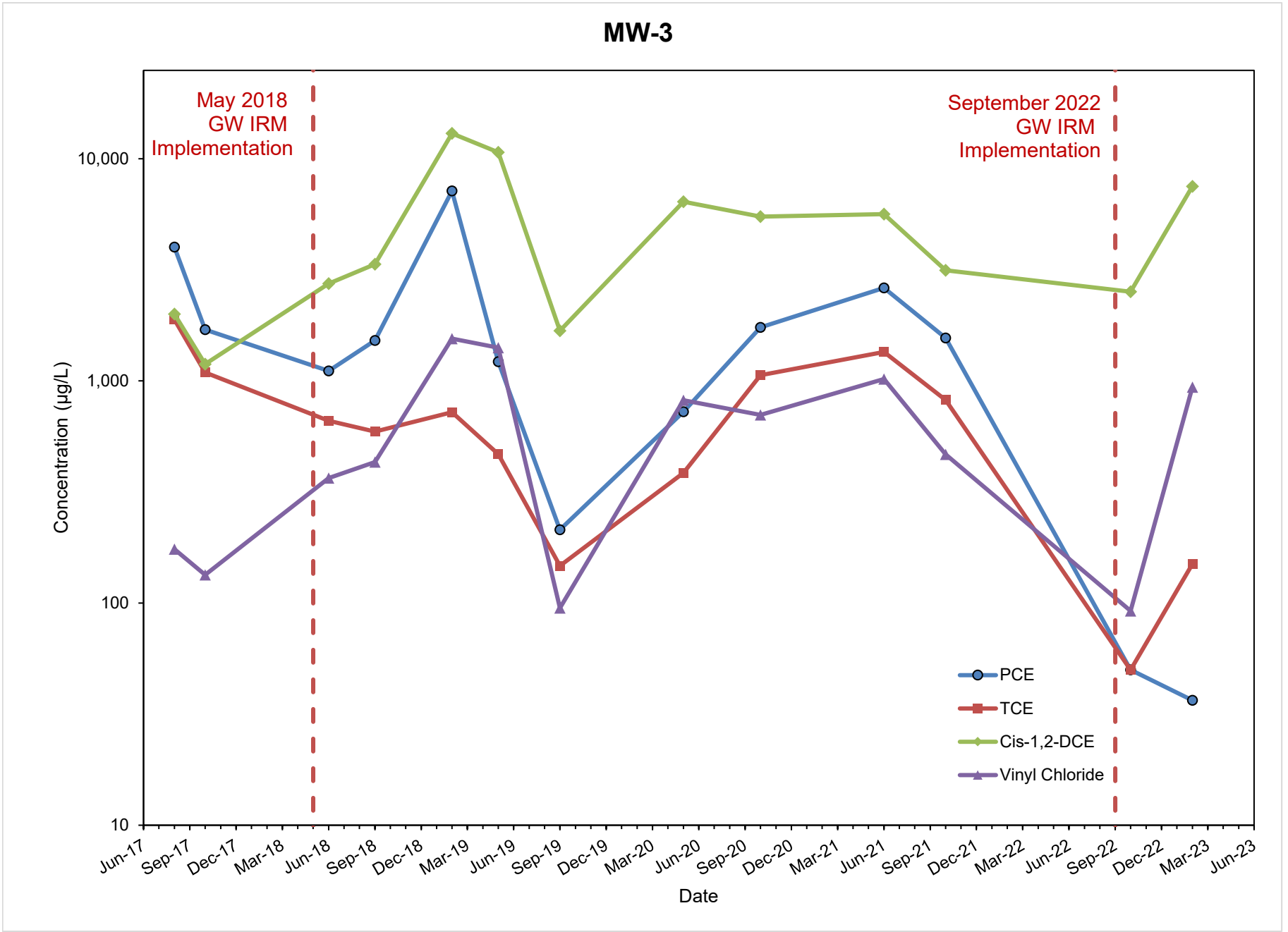
-- = Not analyzed or not available.

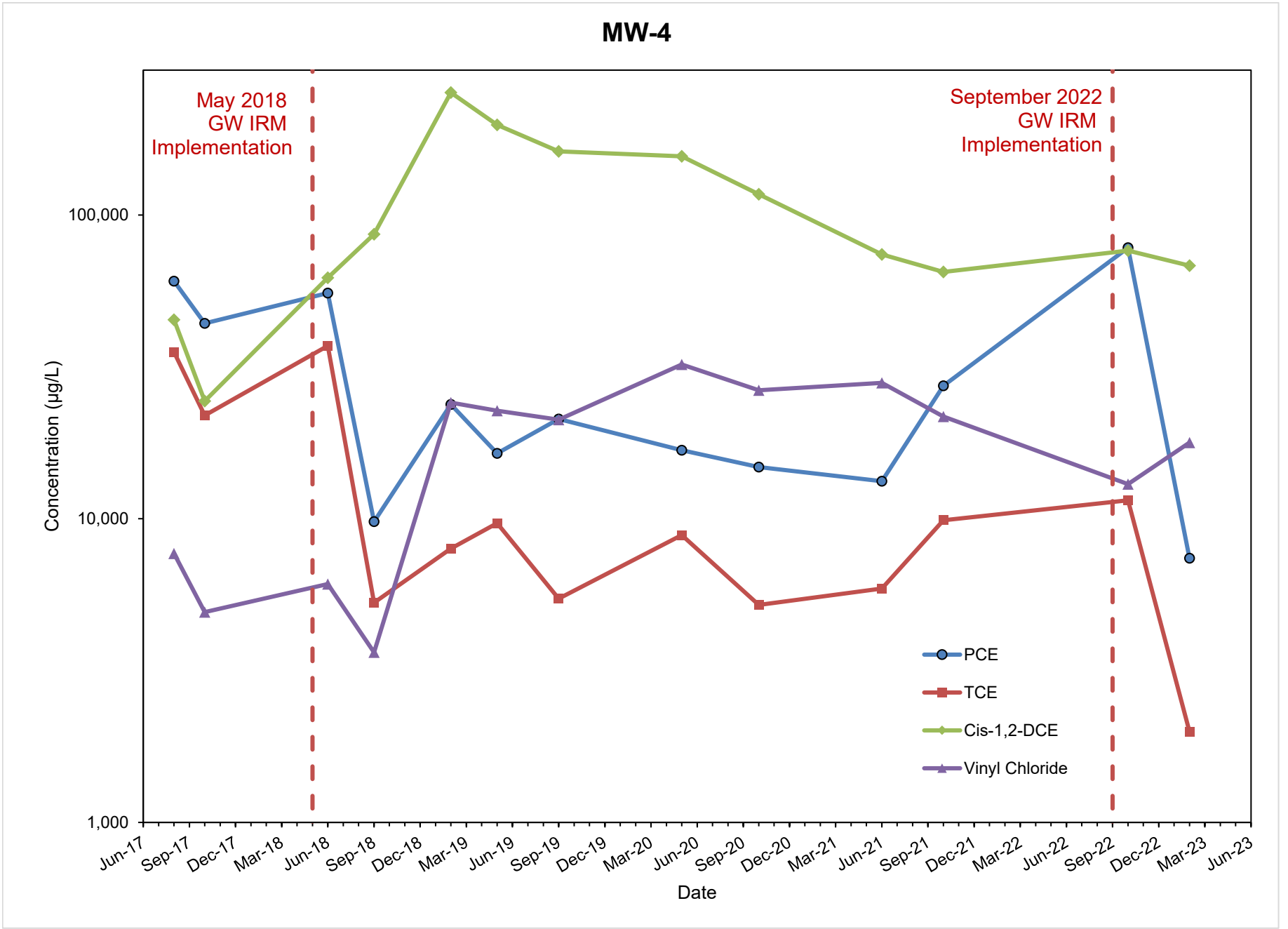
Appendix D

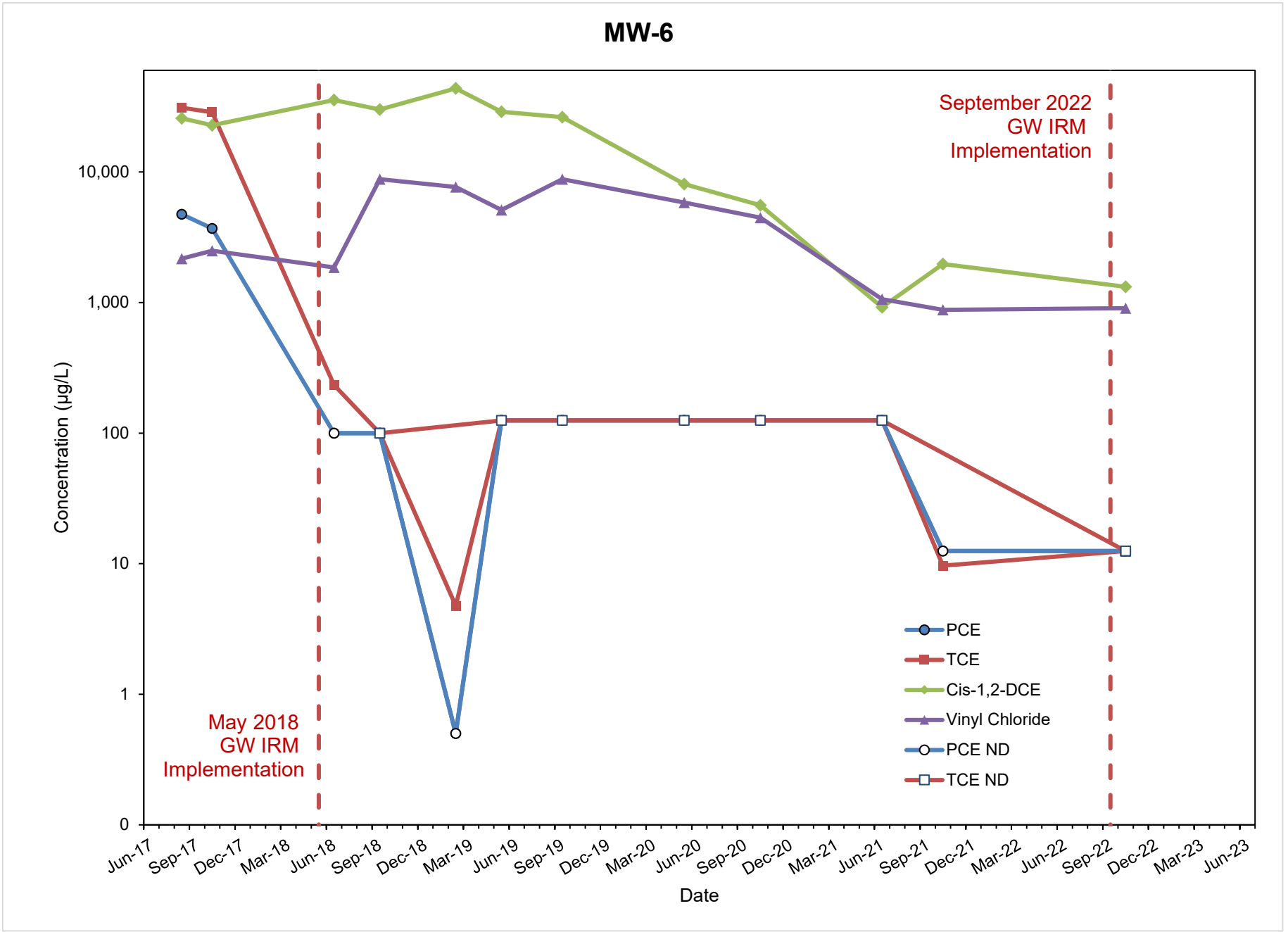
Monitoring Well Concentration Trend Plots

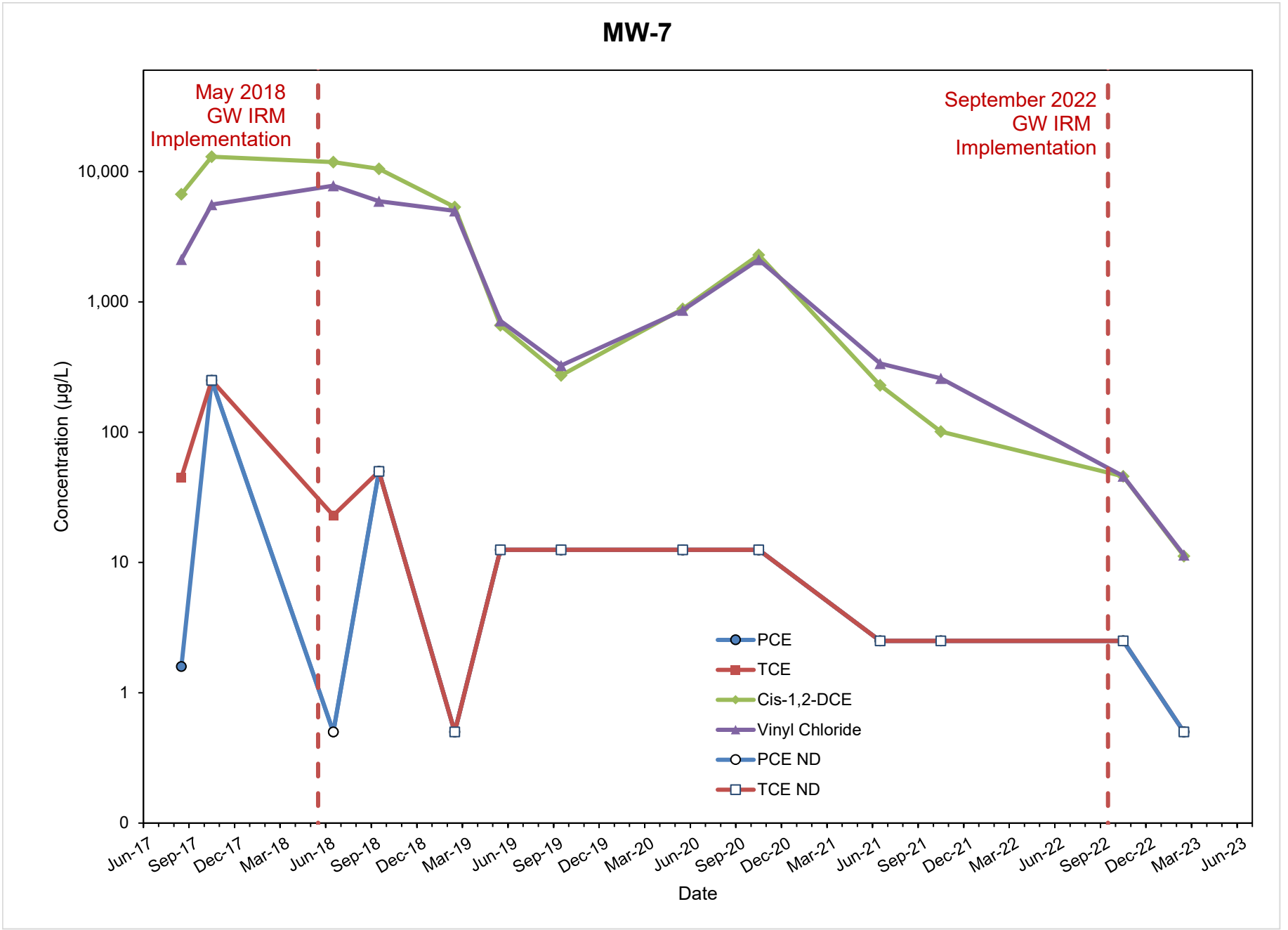

MW-1
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
1,000,000
100,000
10,000
1,000
100
Concentration (µg/L)
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND

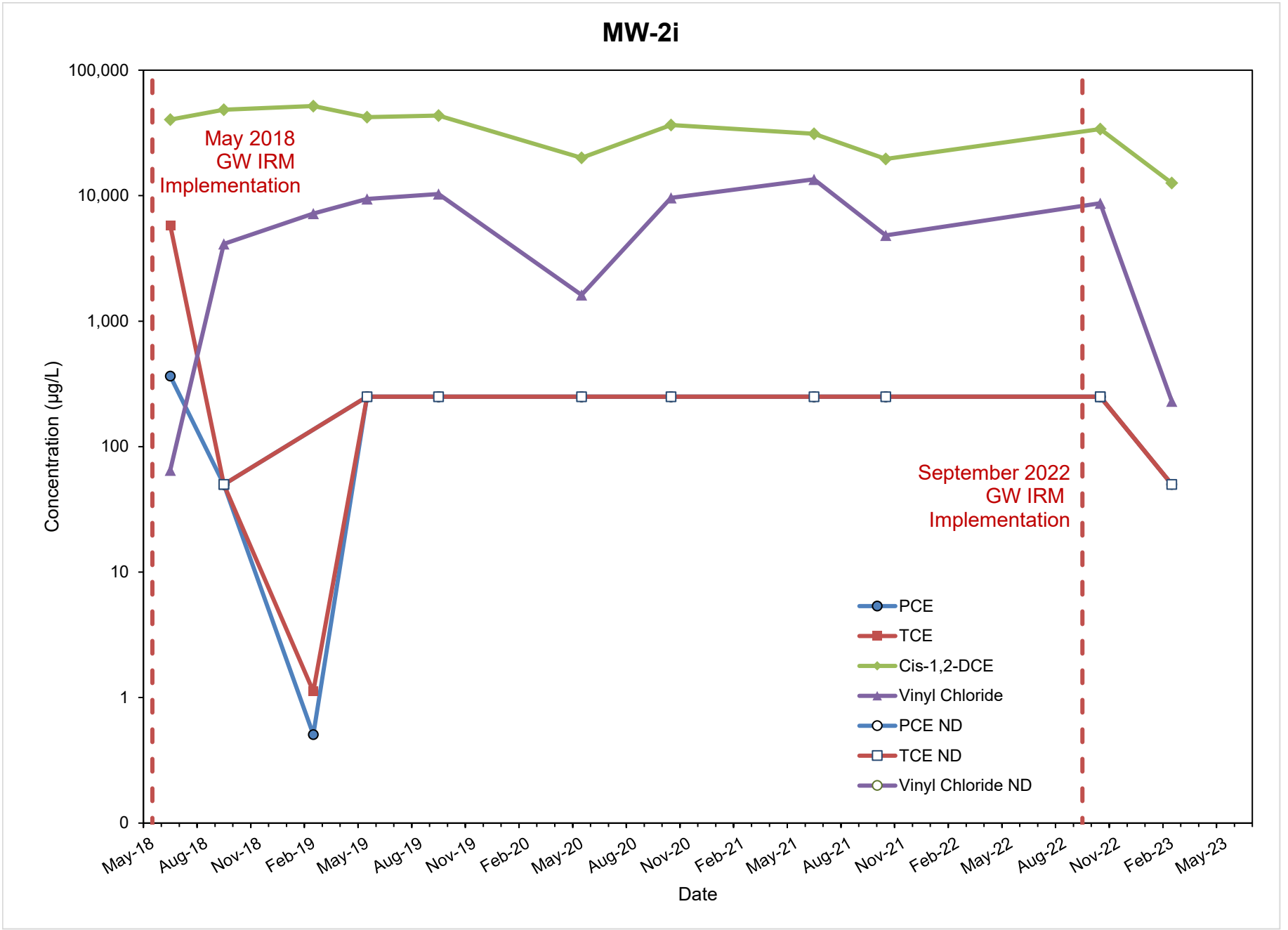

MW-2
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
100
10
1
0
Concentration (µg/L)
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date

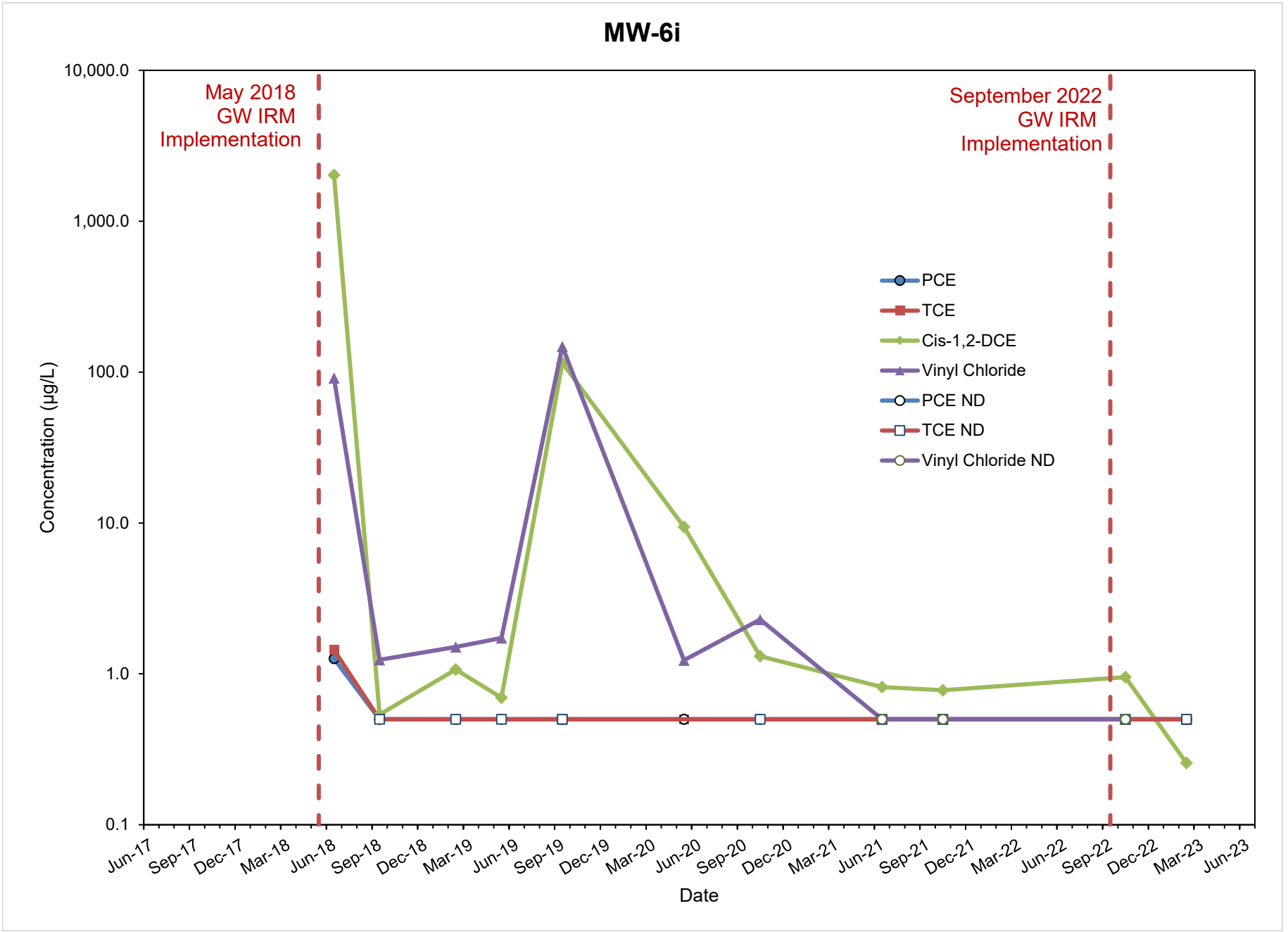

MW-3
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
10,000
1,000
100
10
Concentration (µg/L)
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride


MW-4
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
100,000
10,000
1,000
Concentration (µg/L)
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride


MW-6
September 2022
GW IRM
Implementation
May 2018
GW IRM
Implementation
Concentration (µg/L)
10,000
1,000
100
10
1
0
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND


MW-7
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
10,000
1,000
100
10
1
0
Concentration (µg/L)
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND


MW-2i
100,000
10,000
1,000
100
10
1
0
Concentration (µg/L)
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Vinyl Chloride ND
May-18
Aug-18
Nov-18
Feb-19
May-19
Aug-19
Nov-19
Feb-20
May-20
Aug-20
Nov-20
Feb-21
May-21
Aug-21
Nov-21
Feb-22
May-22
Aug-22
Nov-22
Feb-23
May-23
Date


MW-6i
May 2018
GW IRM
Implementation
September 2022
GW IRM
Implementation
PCE
TCE
Cis-1,2-DCE
Vinyl Chloride
PCE ND
TCE ND
Vinyl Chloride ND
Concentration (µg/L)
10,000.0
1,000.0
100.0
10.0
1.0
0.1
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Dec-18
Mar-19
Jun-19
Sep-19
Dec-19
Mar-20
Jun-20
Sep-20
Dec-20
Mar-21
Jun-21
Sep-21
Dec-21
Mar-22
Jun-22
Sep-22
Dec-22
Mar-23
Jun-23
Date