PACIFIC groundwater GROUP

ANNUAL COMPLIANCE MONITORING REPORT (NOVEMBER 2019 THROUGH AUGUST 2020) TERMINAL 91 TANK FARM AFFECTED AREA SEATTLE, WASHINGTON

October 2020

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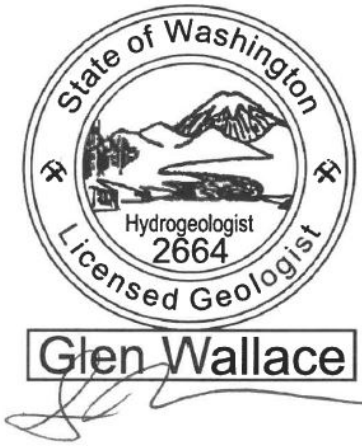
SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.



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1.0 SUMMARY

1.1 INTRODUCTION AND PURPOSE

Pacific Groundwater Group (PGG) has prepared this Annual Compliance Monitoring Report to describe the groundwater compliance monitoring at the Terminal 91 (T-91) Tank Farm Affected Area (TFAA) (Figure 1). The TFAA is situated within the Port's T-91 Facility in Seattle, Washington (Figure 1).

This report has been prepared pursuant to Agreed Order No. DE-8938 (AO) between the Port of Seattle (Port) and Washington Department of Ecology (Ecology) and in accordance with the Model Toxics Control Act (MTCA) under Chapter 70.105D of the Revised Code of Washington (RCW) and Chapter 173-340 of the Washington Administrative Code (WAC).

The work summarized in this annual report was conducted from November 2019 through August 2020 in accordance with the Compliance Monitoring Plan (CMP) and Ecology-approved revisions (PES Environmental, Inc. (PES 2013b; PGG 2019). This was year five of Performance Monitoring[1] as described in the CMP (PES 2013b). The scope of work for monitoring activities documented in this report is described in the following documents:

- Compliance Monitoring Plan, Terminal 91 Tank Farm Cleanup, Port of Seattle, Seattle, Washington. (CMP) (PES et al. 2013b) and
- Operations and Maintenance Plan, Terminal 91 Tank Farm Cleanup, Port of Seattle, Seattle, Washington. (O&M Plan) (PES et al. 2013c).

Compliance Monitoring currently includes groundwater monitoring and a water level snapshot annually in May, and quarterly light non-aqueous phase liquid (LNAPL) gauging quarterly. PES conducted groundwater monitoring at the TFAA through the construction phase and the first year of Performance Monitoring ending in August 2016. PGG continued the monitoring program beginning in November 2016. The CMP requirements for the annual report include:

- An overview of the current cleanup status identifying significant results and trends (Sections 1.2, 2.2, and 4.0);
- Water level contour maps using data from all groundwater monitoring wells sampled during each event (Section 3.2; Figure 2);
- Tabulated monitoring data and water table elevation data from the previous year; and
- A narrative discussion of data validation and a description of all data qualified or rejected (Section 4.4).

[1] Performance Monitoring began with the August 2015 sampling event but was reset to begin in November 2015 to accommodate laboratory analytical issues with the August 2015 sample batch. Therefore, the annual reporting period became November through August of the following year.

The CMP includes a review of data in the fifth monitoring year with the option to recommend adjustments to the monitoring program. This review and associated recommendations are included in Section 6.

1.2 KEY RESULTS

Key results from November 2019-August 2020 (project year five) Performance Monitoring include:

- Groundwater flow directions are consistent with previous flow directions, suggesting a relatively stable groundwater flow setting along previously-identified flow pathways.
- Indicator hazardous substance[2] (HIS) concentrations at Conditional Point of Compliance (CPOC) wells remain below cleanup levels.
- Groundwater concentrations at non-CPOC wells are generally consistent with previous concentrations and some values exceed applicable cleanup levels.
- A qualitative review of Monitored Natural Attenuation (MNA) data and comparison to previous data indicate continued MNA in groundwater.
- The fifth-year review of monitoring data supports reduction of selected wells and analytes from the monitoring program.

2.0 PROJECT BACKGROUND

2.1 BACKGROUND INFORMATION

Section 2 summarizes the general site history, subsurface conditions, and cleanup actions conducted between 2005 and 2014. The Construction Completion report and its references provide additional detail on the background and history of the TFAA (PES 2017).

2.1.1 Property Description and History

T-91 is located at 2001 West Garfield Street, Seattle, Washington and includes approximately 216 acres (Figure 1). The TFAA occupies approximately 17 acres in the central portion of T-91. The TFAA includes the Tank Farm Lease Parcel (TFLP) identified as "Tank Farm" within the TFAA on figures. The TFLP is a contiguous parcel approximately four acres in size located immediately north of the Magnolia Bridge. The TFAA is flat and paved or covered with buildings.

The TFLP is located at the north end of the TFAA. The environmental history of the TFLP includes the bulk petroleum tank farm present from the 1920s through 2005, and the dangerous waste treatment and storage operations conducted from 1980 through 1995. The aboveground portion of the tank farm, including the tanks, containment walls, and other aboveground piping and equipment, was demolished and removed in 2005 as

[2] IHS include: benzene, toluene, ethylbenzene, xylenes, total petroleum hydrocarbons (TPH)-gasoline, TPH-diesel, and TPH-heavy oil.

part of an interim remedial action (Roth Consulting 2005). The final cleanup was performed in 2013-2015 and is described further in the construction completion report (PES 2017).

2.1.2 Subsurface Conditions

The geology, hydrogeology, and nature and extent of contamination are informed by investigations conducted at T-91 since 1988. The results of these investigations are detailed in the Remedial Investigation Summary Report (Roth 2007) and Final Cleanup Action Plan (Ecology 2010). The geology and hydrostratigraphy of the site is briefly summarized below.

2.1.3 Geology

Four lithologic units have been identified beneath the TFLP and adjacent areas. These four units in order of increasing depth include:

- **The Shallow Sand Unit** consists of fill material placed over shallow marine and tidal marsh deposits of Smith Cove during the early 1900s. It consists primarily of moderately to poorly sorted, fine- to medium-grained unconsolidated sand with laminations of silty sand and gravel lenses occurring locally. The Shallow Sand Unit extends vertically from just below the paved ground surface to between 15 and 20 feet below ground surface (ft bgs).
- **The Silty Sand Unit** consists of gray or olive, moderately sorted, fine- to medium-grained silty sand with traces of coarse sand, shell debris, and wood debris. This unit is interpreted to be native marsh, intertidal, and shallow marine sediments that formed the pre-fill surface in the Smith Cove Waterway and the adjacent tidelands. Beneath the TFLP and adjacent upland areas, the Silty Sand Unit generally occurs at depths of 15 to 20 ft bgs, and varies from 20-ft thick beneath the BNSF rail yard east of the TFLP to 5-ft thick or less in the southwest corner of the TFLP. A gravel layer was found within the Silty Sand Unit in some locations and consists of moderately to poorly sorted, silty sandy gravel.
- **The Deep Sand Unit** directly underlies the Silty Sand Unit and consists primarily of poorly to moderately sorted, medium- to coarse-grained sand and gravelly sand, with only isolated occurrences of silt. However, beneath the northern portion of the TFLP, the Deep Sand Unit is composed of only 6 to 8 ft of sand, gravelly sand, and sandy gravel with the remaining deeper portions of the unit characterized by interbedded silty sand and sand. The depth to the top of the Deep Sand Unit varies from approximately 25 ft bgs at the center of the TFLP to as much as 45 ft beneath the north end of Pier 90.
- **The Silty Clayey Sand Unit** underlies the Deep Sand Unit and consists of soft to stiff fine-grained sediments, primarily silty clay and clayey silt, with lesser amounts of silt and silty clayey sand. The top of the Silty Clayey Sand Unit is shallowest beneath the eastern portion of the TFLP, where it occurs as shallow as 42 ft bgs.

2.1.4 Hydrostratigraphy

Shallow Aquifer. The Shallow Aquifer is generally present in the Shallow Sand Unit and is separated from the Deep Confined Aquifer by the Silty Sand Unit that acts as an upper

confining unit. Well water level data collected during routine monitoring show that the dominant unconfined groundwater flow direction is generally towards the south beneath the TFLP, TFAA, and piers, with flow locally to the southwest beneath Area of Concern (AOC) 11, located in the western portion of the TFAA. Water levels in the monitoring wells typically range between 3 and 10 ft bgs and generally correspond to seasonal variations in precipitation rates with the highest water levels observed during the wet season. The typical horizontal gradient beneath the TFLP is approximately 0.001 feet per foot (ft/ft).

Downward vertical gradients between the Shallow Aquifer and Deep Confined Aquifer are noted throughout the TFAA. Vertical gradients typically range from approximately 0.018 to 0.040 ft/ft, with vertical gradients decreasing to the south. Despite the presence of downward vertical gradients, significant downward movement of Shallow Aquifer groundwater under most of the TFAA is considered unlikely due to the low measured vertical permeability in the upper confining unit (Silty Sand Unit).

Tidal influence on Shallow Aquifer groundwater levels under the piers (reflected in higher tidal efficiency and lower time lag) is generally highest near the southern ends of the piers, decreasing progressively inland towards the bulkheads, that run east to west parallel to the shoreline.. Tidal efficiencies are notably higher on Pier 91 than Pier 90 and in areas without bulkheads or significant silt locally within the Shallow Aquifer. Little tidal influence is evident in Shallow Aquifer wells at the south end of the TFLP.

Deep Confined Aquifer. The deep confined aquifer is present in the Deep Sand Unit. The tidally-averaged groundwater flow direction in the Deep Confined Aquifer beneath and shoreward (i.e., south) of the TFLP is toward the south. As in the Shallow Aquifer, water levels in the Deep Confined Aquifer respond to seasonal variations in precipitation rates with the highest water levels observed during the wet season. The typical Deep Confined Aquifer horizontal gradient is relatively constant at approximately 0.003 ft/ft beneath the TFAA.

Tidal influence on Deep Aquifer groundwater levels under the piers is similar to the Shallow Aquifer, with a higher influence near the southern ends of the piers. Time lags are generally shorter in the Deep Aquifer under the piers than in the Shallow Aquifer. Tidal influence is evident in Deep Aquifer wells in most of the TFLP; the shortest time lags are along the southern boundary of the TFLP and the longest time lags are in the north.

2.2 CLEANUP ACTION SUMMARY

The TFAA cleanup actions between 2005 and 2014 consisted of the cleanup action for the TFLP, cleanup actions addressing secondary source areas and other potential future exposures, and start of compliance monitoring (PES 2017).

2.2.1 Cleanup Action for the Tank Farm Lease Parcel

The primary objectives for the TFLP cleanup action are to prevent migration of Light Non-Aqueous Phase Liquid (LNAPL) from the TFLP source area and to prevent future surface product seeps from occurring (PES 2013). Specific actions include:

- Removing existing above-ground structures and the existing asphalt paving; removing the remaining subsurface utilities, structures, and tank bases that appear to be the source of the historic surface seeps; and removing highly contaminated soil encountered during the tank base removal process;
- Constructing a subsurface cutoff wall around the perimeter of the former tank farm;
- Installing an enhanced passive LNAPL recovery system; and
- Backfilling and grading the area, constructing a new asphalt cover over the area, and constructing new stormwater drainage improvements.

2.2.2 Actions for Secondary Source Areas and Potential Future Exposures

Actions taken to address secondary source areas and potential future exposures include:

- Institutional controls, such as health and safety requirements for site workers and addressing potential exposures when future land use changes are made, including a restrictive environmental covenant filed in 2017;
- Excavating LNAPL source areas at Solid Waste Management Unit (SWMU) 30;
- Cleaning and decommissioning underground fuel pipelines remaining in the TFAA;
- Implementing an MNA groundwater sampling program to confirm that natural attenuation processes continue to degrade chemicals in groundwater (see Section 2.2.3).

3.0 COMPLIANCE GROUNDWATER MONITORING ACTIVITIES

This section describes compliance monitoring from November 2019 through August 2020 including four LNAPL gauging events and one groundwater monitoring event. The results are described in Section 4.0. Field logs are included in Appendix A.

The compliance monitoring program is designed to assess how the cleanup action is affecting groundwater quality and to evaluate if cleanup levels continue to be achieved at the CPOC wells. The CPOC wells are located at the downgradient end of three groundwater flow paths (Figure 1). Shallow aquifer CPOC wells include:

- CP-GP08 is located at the downgradient end of the Pier 90 flow path
- CP-GP09R and CP-GP10 are located at the downgradient end of the Pier 91 flow path
- CP-GP14 is the CPOC for the AOC 11 flow path

Deep aquifer CPOC wells include:

- PNO-MW-06B is located on the Pier 91 flow path
- CP-GP01B is located on the Pier 90 flow path

The groundwater performance monitoring program follows the schedule specified in the CMP. Consistent with the CMP, groundwater sampling shifted to a semi-annual schedule in 2018, and an annual schedule in 2019, with LNAPL gauging continuing on a quarterly basis. (PGG 2019; Ecology 2019).

3.1 LNAPL MONITORING

PGG collected LNAPL measurements at the east and west end of three LNAPL recovery trenches and at three monitoring wells (CP-107, CP-110, and PNO-MW104) on November 19, 2019; February 26, 2020; May 27, 2020; and August 7, 2020 (Figure 1, Table 1). The presence of LNAPL and the depth to water were measured from the surveyed top of casing (TOC) to the nearest 0.01 foot using an electronic oil-water interface probe. As specified by the CMP and Operation and Maintenance Plan (OMP) (PES et al. 2013b, c), LNAPL recovery was not performed during this annual monitoring period due to LNAPL thicknesses less than 0.25 feet. Observed LNAPL thickness ranged from sheen to 0.11 feet.

3.2 GROUNDWATER LEVEL MONITORING

PGG conducted performance groundwater level monitoring in 45 of 46 active CMP monitoring wells[3] on May 26, 2020 (Table 2a, Figure 2). Monitoring well CP-122B did not have groundwater level measured because heavy equipment was parked on top of the access point. Water level elevations from 2016 to 2020 are summarized in Table 2b.

3.2.1 Groundwater Monitoring Well Redevelopment

No wells required redevelopment during this annual reporting period.

3.3 GROUNDWATER SAMPLING AND ANALYSIS

CMP groundwater sampling was conducted on May 26 through 28, 2020 (Table 3). PGG monitored the wells for temperature, pH, specific conductance, visual turbidity, dissolved oxygen (DO), oxidation-reduction potential (ORP) and collected measurements of alkalinity and ferrous iron with field test kits.

PGG collected groundwater samples using low-flow sampling methods. A peristaltic pump and dedicated tubing were used for purging and sample collection. The groundwater was purged until parameters stabilized prior to sample collection. Samples were collected directly into laboratory-provided containers. Sample containers were placed in coolers with ice and chain of custody was maintained through delivery to OnSite Environmental.

Samples were submitted to Onsite Environmental Laboratory in Redmond, Washington (an Ecology-accredited laboratory) for analysis. Samples were analyzed for gasoline-range, diesel-range, and oil-range hydrocarbons using Northwest Total Petroleum Hydrocarbons-Gasoline (NWTPH-Gx), Northwest Total Petroleum Hydrocarbons-diesel extended (NWTPH-Dx), and benzene, toluene, ethylbenzene, and xylenes (BTEX) using United States Environmental Protection Agency (U.S. EPA) Method 8260. Additional MNA parameters included total manganese by U.S. EPA Method 200.8, nitrate and sulfate by USEPA Method 300.0, and methane by U.S. EPA Method RSK-175.

[3] UT-MW39-3 was previously decommissioned.

4.0 COMPLIANCE MONITORING RESULTS

This section describes the results of the annual compliance groundwater monitoring event and four quarterly LNAPL gauging events.

4.1 LNAPL MEASUREMENTS

Table 1a summarizes LNAPL measurements. As thicknesses were less than 0.25 feet, LNAPL recovery was not performed, consistent with the CMP and OMP (PES et al. 2013b, c). Key LNAPL observations include:

- LNAPL was consistently detected in Trench 5W (thickness ranged from 0.02 to 0.03 ft) and Trench 3E (thickness ranged detectable sheen to 0.05 ft).
- LNAPL was detected intermittently in other trench monitoring points.
- LNAPL was consistently detected in PNO-MW104 (thickness ranged from 0.08 to 0.11 ft).
- LNAPL was detected in CP-110 in August 2020 (0.01 ft); this was the first observation of measurable thickness post-construction, though sheen at less than the measurable thickness has been observed.
- CP-107 had measurable LNAPL thickness in August 2020 (0.09 ft); this appears to follow a seasonal trend with previous measurable thickness noted in August 2019.

4.2 GROUNDWATER ELEVATIONS AND FLOW DIRECTION

PGG conducted performance groundwater level monitoring on May 26, 2020, in all available and active CMP monitoring wells; UT-MW39-3 was previously decommissioned and CP-122B was unavailable at the snapshot date. Field water level forms are included in Appendix A.

Depth to water measurements are summarized in Table 2a. Table 2a also includes the calculated groundwater elevations, referenced to mean low-low water vertical datum (MLLW). The top-of-casing elevations in Table 2a include updated survey values from supplemental survey measurements in 2015 and 2016 at selected wells.

Shallow aquifer groundwater elevations were used to generate groundwater contours and evaluate the shallow aquifer flow direction (Figure 2 shows May 2020 contours). The shallow aquifer flow direction is to the south and is consistent with previous groundwater flow directions. No adjustments to the CMP are necessary due to changes in flow direction.

4.3 GROUNDWATER QUALITY MONITORING

4.3.1 Field Parameters

PGG monitored groundwater for temperature, pH, specific conductance, visual turbidity, dissolved oxygen, and oxidation-reduction potential and May 2020 results are shown in Table 3. Alkalinity and ferrous iron were measured using field chemistry kits in the May 2020 event. The field kits were exhausted in the course of the event and could not be replenished, so some wells are missing alkalinity and/or ferrous iron measurements.

4.3.2 Petroleum Hydrocarbons

The analytical results for total petroleum hydrocarbons and BTEX analyses are summarized in Table 3. The May 2020 laboratory analytical reports are included in Appendix A. Data trends for petroleum hydrocarbons are shown in Figures 3a through 6a.

In May 2020, cleanup levels were met at CPOC wells. The CPOC wells include shallow aquifer wells CP-GP08, CP-GP09R, CP-GP10, and CP-GP14 and deep aquifer wells PNO-MW06B and CP-GP01B. The groundwater data confirms that cleanup levels were met for total petroleum hydrocarbons at four of four shallow wells and both the deep wells during the May 2020 sampling event (Table 3).

Total petroleum hydrocarbons results exceeded cleanup levels at five non-CPOC wells in the former tank farm affected area (Figure 1). These results were generally consistent with expected site conditions. Exceedances included:

- CP-103A, located on the southwest corner of the former tank farm, exceeded cleanup levels for diesel range organics.
- CP-104A, located on the northwest corner of the former tank farm, exceeded cleanup levels for diesel range organics.
- CP-106A, located at the northeast corner of the former tank farm, exceeded cleanup levels for diesel range organics and gasoline range organics, with the qualifier that heavier fuels are present and may have impacted the gasoline result.
- CP-108A, located at the southeast corner of the former tank farm, exceeded the cleanup level for diesel range organics.
- CP-GP02, located between Pier 90 and the former tank farm, exceeded cleanup levels for diesel range organics.
- PNO-MW103, located on Pier 91, exceeded cleanup levels for gasoline- and diesel-range organics.

Benzene, toluene, and xylenes were not detected above reporting limits in most samples and did not exceed cleanup levels (Table 3). May 2020 detections included:

- CP-106A, located at the northeast corner of the former tank farm, had benzene and o-xylenes greater than the reporting limits but less than the cleanup levels.

- PNO-MW103, located on Pier 91, had o-xylenes greater than the reporting limit but less than the cleanup level.

Petroleum concentrations were generally consistent with previous monitoring events with concentrations qualitatively similar or decreasing within the range of data variability. These data do not indicate actions or changes to the CMP based on the current results.

4.3.3 Monitored Natural Attenuation

Monitored natural attenuation parameters are summarized in Tables 3 and 4b. Please see the 2016 Annual report for a detailed geochemical and statistical analysis of MNA at the site (PES 2016). MNA parameter trend plots are shown in Figures 3b through 6b.The 2019-2020 groundwater results indicate continued geochemical conditions conducive to natural attenuation in groundwater.

4.3.4 Data Trends

Figures 3a through 6a show data trends for gasoline-, diesel-, and oil-range hydrocarbons for each of the three groundwater flow path alignments (AOC 11, Pier 90, and Pier 91) and for CPOC wells. Tables 4a and 4b provide summary tabulations of the data from 2015 to May 2020. Data trends show generally decreasing concentrations or lack of detections at CPOC wells. None of the plotted trends showed an increasing trend in detected concentrations, though the data from some wells are noisy enough that the beginning of a trend may be hard to detect. Additional statistical analysis for trend is presented in Section 6.2.

The data trends do not indicate action or changes to the CMP based on the current results.

4.4 DATA VALIDATION AND MANAGEMENT

Data were reviewed using Stage 2 data validation consistent with *EPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Data Review* (U.S. EPA 2016a, b). Data completeness, holding times, laboratory instrument calibrations, surrogate recoveries, matrix spike and matrix spike duplicates, laboratory control samples, quantitation limits, method blanks, field QC samples, and trip blanks were reviewed. No additional data qualifiers were added to data presented in this report and in the data package for Port database use. Data quality assurance review key points include:

- Samples were analyzed within applicable holding times.
- Laboratory instrument calibrations, surrogate recoveries, matrix spike and matrix spike duplicates, and laboratory control samples were within the applicable quality assurance ranges with the exception of nitrate and sulfate in the May 2020 event. Nitrate and sulfate lab duplicates had relative percent differences of 22 and 33%, which is outside of the 20% criteria; these analyses were subcontracted to AmTest.
- The relative percent differences for the field duplicates were within the recommended criteria of 20%.
- Laboratory control samples and matrix spike duplicates were within acceptable ranges.

The reviewed data are considered generally acceptable for the intended use.

5.0 COMPLIANCE MONITORING PLAN DEVIATIONS

In the last year, there were deviations from the CMP. Water levels were not measured at well CP-122B due to equipment placed over the well. Field measurements of alkalinity and ferrous iron were not completed for eleven and four wells, respectively, due to a lack of available test kits. There were no other deviations from the CMP during the May 2020 monitoring event.

6.0 IHS MONITORING REVIEW

The CMP includes a process to review monitoring data and consider revisions to the groundwater monitoring plan. According to the CMP (PES 2013b):

> *The FS assumed that MNA monitoring would continue for 30 years, but if after 4 years the cleanup levels continue to be met at the CPOC wells, the plume concentrations are stable or decreasing, and LNAPL monitoring shows stable to decreasing LNAPL levels, the Port may make a request to Ecology to reduce the monitoring frequency, reduce the number of parameters monitored, reduce the number of wells within the network, or request a modification to the CPOCs.*

This section reviews data to assess if IHS compounds can be removed from the program, or if the number of wells included in sampling can be revised, while still achieving the goals of the monitoring program. The analysis supports revision to the monitoring program based on the findings that:

- Cleanup levels continue to be met at the CPOC wells
- Plume concentrations are stable
- LNAPL monitoring shows stable to decreasing LNAPL levels.

The evaluation is organized in the order of criteria listed in the CMP (see above). Groundwater monitoring data are compiled in Table 4, trends are analyzed in table 5, and results are summarized by constituent in in Table 6.

6.1 CONCENTRATIONS AT CPOC WELLS

IHS petroleum results at CPOC wells are summarized in Table 4a. Cleanup levels have been met in every CPOC sample collected since 2017.

6.2 MANN-KENDALL ANALYSIS FOR TREND

The Mann-Kendall trend test was performed on all constituents for which there were sufficient data. The test was performed on data from 2017 forward to remove trend influences due to systematic differences in data collected before 2017 (PGG 2019). Figures 3a

through 6b present time series plots of the constituents. Consistent with Ecology guidance for use of the Mann Kendall test for trend, wells with low detection rates were excluded.

The Mann-Kendall non-parametric trend test was applied to all wells individually to evaluate whether local groundwater concentrations are increasing over time. The Mann-Kendall statistic was computed in R by examining all possible pairs of measurements in the data set and scoring each pair as follows. An earlier measurement lower in magnitude than a later one is assigned a value of +1. If an earlier value is greater in magnitude than a later sample, it is scored as –1; two identical measurement values are assigned a value of 0. After scoring each pair in this way and adding up the total to get the Mann-Kendall statistic (tau), a positive value of tau implies that a majority of the differences between earlier and later measurements are positive, suggestive of an upward trend over time.

For this analysis the null hypothesis that no increasing trend exists was applied with a 0.05 level of significance (p-level) on each of the comparisons. The hypothesis was rejected when the p-level was less than 0.05 indicating that a trend is present in the data. The p-values are then corrected using the Bonferroni correction to reduce the chances of obtaining false-positive results (type I errors) when multiple-pair wise tests are performed on a single set of data. The Bonferroni corrected p values are interpreted the same way as uncorrected, values less than 0.05 signify a rejected null hypothesis.

Using the Bonferroni corrected p-values, the null hypothesis was not rejected for any of the comparisons (Table 5). These results indicate there are no statistically significant increasing or decreasing concentration trends in the dataset. Trends were indicated in uncorrected data for the following well/constituent pairs: CP-104A (diesel), CP-GP02 (diesel), and PNO-MW06A (diesel, gasoline). None of these wells are CPOC wells, and exceedances are primarily present in diesel values with one in gasoline.

The data indicate a stable plume configuration across the monitoring network.

6.3 LNAPL TRENDS

LNAPL thicknesses are summarized in Table 1b and Figure 7. LNAPL thickness has not exceeded the 0.25-foot recovery threshold since installation of the LNAPL enhanced recovery trenches with the exception of a single measurement at Trench 5W in 2015. LNAPL thicknesses are variable and appear to show a seasonal high in the August or November event across the majority of years and monitoring stations. This peak in LNAPL thickness occurs concurrent with the seasonal low water level. This correlation between water level and LNAPL thickness is consistent with typical LNAPL behavior in an unconfined aquifer with variable water levels. LNAPL trends do not qualitatively show significant trends over the period of record, 2015 through 2020.

6.4 REVIEW BY CONSTITUENT

Results from the aggregate data set are summarized by the number of analyses, number of detections, and prevalence of exceedances of cleanup levels (Table 7). The purpose of this review is to provide the basis of recommendations regarding future monitoring.

6.4.1 Total Petroleum Hydrocarbons

Gasoline, diesel, and oil-range petroleum included exceedances for all compounds with the bulk of detections occurring in the diesel range (Table 4a). The prevalence of detections and presence of exceedances indicates that these constituents should be continued in the monitoring program.

6.4.2 Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)

BTEX compounds are infrequently detected and have had no exceedances in the compliance monitoring program (2015 to 2020) (Table 4a). The majority of benzene, toluene and ethylbenzene detections have been at well CP-106A, and concentrations at that well appear to be stable to decreasing. Xylene detections occur at wells throughout the network, but at low concentrations. The maximum xylene detection (1 ug/L) is less than 0.1% of the CUL (1160 ug/l).

The low detection rate and lack of exceedances indicate that these constituents can be removed from the monitoring program.

6.4.3 Natural Attenuation Indicators

Methane, sulfate, nitrate, alkalinity, ferrous iron and manganese are monitored as indicators of natural attenuation processes. The MNA parameters indicate either the redox conditions conducive to biodegradation or the presence/absence of limiting nutrients for specific metabolic pathways. Decreasing redox conditions are, in order, indicated by: nitrate reduction, manganese reduction, iron reduction, sulfate reduction, and methanogenesis. Nitrate and sulfate reduction result in decreases in concentration as they are metabolically processed, while iron and manganese reduction result in increases in concentration as they are converted into more soluble valence states. Methanogenesis also results in increases in methane concentrations with methane as the final metabolic product.

Nitrate concentrations are generally near or below 1 mg/L indicating that nitrate reduction is not a significant component of natural attenuation at the site. Upgradient wells CP-114 and CP-205A/B have nitrate concentrations less than 1 mg/L. Nitrate concentrations near 7 mg/L at well CP-GP03AR are likely a local geochemical feature.

Manganese concentrations increase from 17 ug/L in upgradient well CP-114 to values between 300 and 500 ug/L in wells downgradient of the TFAA at CP-106A (500 ug/L), CP-103A (310 ug/L), PNO-MW-02 (310 ug/L), and PNO-MW-06A (330 ug/L). Downgradient CPOC wells have lower concentrations, including CP-GP09R (40 ug/L), CP-GP10 (11 U ug/L), CP-GP-14 (26 ug/L), and CP-GP08 (100 ug/L). The elevated manganese concentrations in areas with high petroleum concentrations are consistent with manganese reduction and likely indicate active bacterial degradation of petroleum.

Ferrous iron concentrations show generally similar trends to total manganese, but with lower analytical resolution due to the use of field test kits that are less precise.

Sulfate concentrations are highest in nearshore wells CP-GP05 and CP-GP-03AR, consistent with localized interaction with saline waters which are enriched in sulfate relative to groundwater.

6.5 RECOMMENDATIONS FOR REVISED MONITORING

Consistent with the criteria outlined in the CMP, the monitoring data concentrations, lack of exceedances, and trends support a request to adjust the monitoring program.

The Port recommends the adjustments to the monitoring program described below beginning with the 2021 calendar monitoring year. Current and recommended groundwater monitoring and LNAPL gauging are summarized in Table 7.

6.5.1 Changes to Analytes

The Port recommends:

- Remove analysis of BTEX compounds from the sampling program. These analytes are rarely detected and do not exceed applicable cleanup levels. Existing data are sufficient to demonstrate that these compounds do not exceed cleanup levels under post-construction conditions.
- Remove analysis of MNA parameters: alkalinity, nitrate, sulfate, methane, ferrous iron, and manganese. The available data indicate persistent conditions favorable to anaerobic degradation of petroleum along the groundwater flow paths. These constituents are not IHS parameters, do not have cleanup levels, and have sufficiently demonstrated favorable conditions for natural attenuation.
- Specific analytes discussed above may be reinstated on a temporary or ongoing basis, should future petroleum results indicate a change in site conditions.

6.5.2 Changes to Monitoring Wells

A number of wells have not had recent exceedances, and many have not had recent detections of petroleum compounds. The occurrence of recent exceedances and detections is summarized by well in the header of Table 4a. The Port recommends removing wells with no recent detections or exceedances from groundwater sampling, including: CP-108B, CP-114, CP-205B, CP-GP01A, CP-GP01B, CP-GP03AR, CP-GP05, and PNO-MW101A (Tables 4a, 8).

The Port does not recommend any changes to the annual synoptic water level snapshot well list or changes to the locations of CPOC wells. Future annual reports may recommend changes in locations of CPOC wells based on monitoring results.

6.5.3 Changes to LNAPL Monitoring

The Port does not currently recommend changes to the LNAPL monitoring frequency. However, the Port does recommend continued evaluation of LNAPL thickness seasonality. LNAPL levels show seasonal variation with a peak in LNAPL thicknesses at the end of the dry season when water levels are low. Peak observed LNAPL thicknesses occur in August and November in most wells. However, there is variability and some LNAPL thickness peaks occur outside of the August and November timeframe. If a more consistent trend of seasonal LNAPL thickness peaks below recovery thresholds is observed, the Port may recommend a reduction to measurement in only peak months.

7.0 REFERENCES

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Table 1a. 2020 LNAPL Monitoring Summary

Terminal 91

Well or Riser	Date	Easting	Northing	Top of Casing	LNAPL Top	LNAPL Bottom	LNAPL Thickness	*Groundwater Elevation (feet)
CP-107	11/19/2019	1258549.03	235217.377	17.7	6.14	6.14	0.00	11.56
CP-107	2/26/2020	1258549.03	235217.377	17.7	5.02	5.02	0.00	12.68
CP-107	5/27/2020	1258549.03	235217.377	17.7	NM	NM	NM	NM
CP-107	8/7/2020	1258549.03	235217.377	17.7	6.2	6.22	0.02	11.50
CP-110	11/19/2019	1258545.2	235064.79	17.46	6.9	6.9	0.00	10.56
CP-110	2/26/2020	1258545.2	235064.79	17.46	6.05	6.05	0.00	11.41
CP-110	5/27/2020	1258545.2	235064.79	17.46	NM	NM	NM	NM
CP-110	8/7/2020	1258545.2	235064.79	17.46	7.01	7.02	0.01	10.45
PNO-MW104	11/19/2019	1258507.67	234985.46	17.7	7.12	7.22	0.10	10.56
PNO-MW104	2/26/2020	1258507.67	234985.46	17.7	6.47	6.55	0.08	11.21
PNO-MW104	5/27/2020	1258507.67	234985.46	17.7	NM	NM	NM	NM
PNO-MW104	8/7/2020	1258507.67	234985.46	17.7	7.26	7.37	0.11	10.42
Trench 2E	11/19/2019	1258689.24	235172.27	21.43	10.85	10.86	0.01	10.58
Trench 2E	2/26/2020	1258689.24	235172.27	21.43	NM	NM	NM	NM
Trench 2E	5/27/2020	1258689.24	235172.27	21.43	NM	NM	NM	NM
Trench 2E	8/7/2020	1258689.24	235172.27	21.43	10.62	10.63	0.01	10.81
Trench 2W	11/19/2019	1258614.92	235174.809	18.37	7.79	7.81	0.02	10.58
Trench 2W	2/26/2020	1258614.92	235174.809	18.37	NMT	6.61	NMT	11.76
Trench 2W	5/27/2020	1258614.92	235174.809	18.37	NMT	7.2	NMT	11.17
Trench 2W	8/7/2020	1258614.92	235174.809	18.37	7.58	7.58	0.00	10.79
Trench 3E	11/19/2019	1258683.13	235311.857	19.29	8.69	8.74	0.05	10.59
Trench 3E	2/26/2020	1258683.13	235311.857	19.29	7.49	7.5	0.01	11.80
Trench 3E	5/27/2020	1258683.13	235311.857	19.29	8.08	8.08	0.00	11.21
Trench 3E	8/7/2020	1258683.13	235311.857	19.29	8.48	8.52	0.04	10.80
Trench 3W	11/19/2019	1258607.59	235312.566	18.1	7.49	7.54	0.05	10.60
Trench 3W	2/26/2020	1258607.59	235312.566	18.1	NMT	6.3	NMT	11.80
Trench 3W	5/27/2020	1258607.59	235312.566	18.1	6.89	6.89	0.00	11.21
Trench 3W	8/7/2020	1258607.59	235312.566	18.1	7.29	7.31	0.02	10.81
Trench 5E	11/19/2019	1258571.45	235310.842	16.51	6.29	6.31	0.02	10.22
Trench 5E	2/26/2020	1258571.45	235310.842	16.51	NMT	3.97	NMT	12.54
Trench 5E	5/27/2020	1258571.45	235310.842	16.51	NMT	4.86	NMT	11.65
Trench 5E	8/7/2020	1258571.45	235310.842	16.51	5.3	5.31	0.01	11.21
Trench 5W	11/19/2019	1258516.23	235312.104	16.56	5.26	5.28	0.02	11.30
Trench 5W	2/26/2020	1258516.23	235312.104	16.56	3.95	3.98	0.03	12.60
Trench 5W	5/27/2020	1258516.23	235312.104	16.56	4.85	4.88	0.03	11.70
Trench 5W	8/7/2020	1258516.23	235312.104	16.56	5.3	5.33	0.03	11.25

Notes:

NMT: no measurable thickness.

LNAPL top and bottom measured as distance below top of riser pipe.

LNAPL thickness was measured twice in the field; reported values are the final measurement.

NM: not measured.

Table 2a. 2020 Water Level Snapshot

Port of Seattle Terminal 91

Location	Aquifer	Northing	Easting	Top of Casing Elevation (ft)	Depth to Water (ft.)	Groundwater Elevation (ft)
B1-93	Shallow	235056.49	1259053.02	17.24	6.57	10.67
CP-103A	Shallow	234972.53	1258577.49	17.21	6.36	10.85
CP-104A	Shallow	235419.92	1258578.53	17.49	5.03	12.46
CP-104B	Deep	235426.99	1258578.29	17.39	5.48	11.91
CP-106A	Shallow	235301.93	1258919.04	18.11	6.32	11.79
CP-106B	Deep	235311.62	1258908.04	18.06	6.51	11.55
CP-107	Shallow	235217.38	1258549.03	17.70	5.77	11.93
CP-108A	Shallow	234962.68	1258931.98	17.19	6.25	10.94
CP-108B	Deep	234962.46	1258927.28	17.22	9.52	7.70
CP-110	Shallow	235064.79	1258545.20	17.46	6.68	10.78
CP-111	Shallow	234994.01	1258361.25	17.74	7.25	10.49
CP-112	Shallow	235347.29	1258424.51	17.40	5.40	12.00
CP-113	Shallow	235538.49	1258574.60	17.36	4.98	12.38
CP-114	Shallow	235478.73	1258827.05	17.17	5.48	11.69
CP-115A	Shallow	235411.43	1258723.96	17.74	5.26	12.48
CP-115B	Deep	235417.48	1258737.17	17.87	5.92	11.95
CP-121	Shallow	235478.45	1258668.95	17.91	5.21	12.70
CP-122B	Deep	235241.13	1258967.84	17.07	NA	NA
CP-203B	Deep	234972.13	1258599.96	17.56	8.58	8.98
CP-205A	Shallow	235677.44	1258726.80	17.69	5.12	12.57
CP-205B	Deep	235682.02	1258725.15	17.72	5.55	12.17
CP-GP01A	Shallow	234783.17	1259137.77	17.79	8.16	9.63
CP-GP01B	Deep	234780.16	1259127.74	17.58	10.04	7.54
CP-GP02	Shallow	234870.33	1259056.83	17.52	7.38	10.14
CP-GP03AR	Shallow	234511.00	1258309.84	18.00	8.97	9.03
CP-GP03BR	Deep	234481.72	1258309.70	17.91	13.64	4.27
CP-GP04R	Shallow	234734.04	1258317.31	18.14	8.51	9.63
CP-GP05	Shallow	234925.88	1258075.23	17.75	8.13	9.62
CP-GP06	Shallow	234926.51	1257941.21	17.85	8.02	9.83
CP-GP07R	Shallow	234873.77	1258267.68	18.07	8.09	9.98
CP-GP08	Shallow	234457.14	1259008.14	17.27	8.19	9.08
CP-GP09R	Shallow	234287.95	1258417.29	17.67	8.95	8.72
CP-GP10	Shallow	234293.61	1258302.87	17.68	9.39	8.29
CP-GP11	Shallow	235153.12	1258319.95	16.98	6.25	10.73
CP-GP12	Shallow	235283.73	1258226.95	17.31	5.40	11.91
CP-GP13	Shallow	235085.87	1258020.07	16.45	7.01	9.44
CP-GP14	Shallow	234927.56	1257862.30	17.60	7.90	9.70
CP-PR-13	Shallow	235133.41	1258256.72	17.34	6.79	10.55
CP-W210	Shallow	234966.79	1258734.14	17.40	7.06	10.34
PNO-MW02	Shallow	234813.14	1258463.27	17.87	8.26	9.61
PNO-MW06A	Shallow	234773.72	1258421.89	18.21	8.57	9.64
PNO-MW06B	Deep	234764.07	1258421.79	18.17	11.89	6.28
PNO-MW101	Shallow	234996.10	1258273.01	17.72	7.47	10.25
PNO-MW103	Shallow	234472.89	1258453.46	17.53	8.79	8.74
PNO-MW104	Shallow	234985.46	1258507.67	17.70	7.10	10.60
UT-MW39-1	Shallow	235313.48	1258481.61	16.89	4.88	12.01

Notes:

NA - well not accessible at time of snap shot

Water level snapsont May 26, 2020

Table 2b. 2016-2020 Water Level Elevations

Port of Seattle Terminal 91

Date	B1-93	CP-103A	CP-104A	CP-104B	CP-106A	CP-106B	CP-107	CP-108A	CP-108B	CP-110	CP-111	CP-112	CP-113	CP-114	CP-115A	CP-115B
11/14/2016	11.85	11.71	13.80	12.77	13.16	12.52	12.85	11.97	11.03	11.63	11.12	12.68	13.55	13.09	13.70	12.91
2/13/2017	--	12.18	14.34	13.35	13.60	13.31	13.36	12.52	9.94	12.09	11.36	13.12	14.41	13.72	14.54	14.68
5/9/2017	12.05	11.73	13.70	12.97	12.91	12.88	13.13	11.97	7.29	11.69	10.96	12.83	13.71	13.01	13.82	12.85
8/15/2017	10.49	10.58	11.97	11.67	11.38	11.38	11.55	10.70	8.93	10.52	10.35	11.67	11.87	11.15	11.91	11.62
11/30/2017	11.60	11.56	13.34	12.54	12.82	12.47	12.61	11.72	10.82	11.49	11.34	12.54	13.30	12.69	13.42	12.72
5/9/2018	11.34	11.16	12.99	12.34	12.36	12.27	12.31	11.38	8.97	11.12	10.64	12.38	12.97	12.51	13.08	11.69
11/25/2018	10.37	10.58	11.80	11.45	11.63	11.16	11.45	10.74	9.27	10.50	10.60	11.58	11.69	11.02	11.24	11.90
5/29/2019	--	10.70	12.20	11.78	11.60	11.58	11.72	10.89	8.27	10.63	10.50	--	--	11.39	12.17	11.78
5/27/2020	10.67	10.85	12.46	11.91	11.79	11.55	11.93	10.94	7.70	10.78	10.49	12.00	12.38	11.69	12.48	11.95

Date	CP-121	CP-122B	CP-203B	CP-205A	CP-205B	CP-GP01A	CP-GP01B	CP-GP02	CP-GP03AR	CP-GP03BR	CP-GP04R	CP-GP05	CP-GP06	CP-GP07R	CP-GP08	CP-GP09R
11/14/2016	13.90	12.44	10.48	13.79	13.30	10.65	10.18	11.16	10.33	7.33	10.37	11.35	10.71	10.60	9.98	9.86
2/13/2017	14.76	13.10	10.82	14.75	14.53	10.82	9.68	11.56	10.22	9.47	10.59	10.87	10.93	10.79	10.34	9.74
5/9/2017	14.03	12.84	9.62	13.95	13.84	10.00	6.41	10.98	8.75	3.57	9.80	9.73	10.10	10.32	9.66	8.31
8/15/2017	12.14	11.28	9.29	11.99	11.87	9.72	8.65	9.93	9.42	7.86	9.70	9.95	10.03	9.97	8.72	8.98
11/30/2017	13.67	12.23	10.54	13.57	13.47	10.48	10.28	10.81	10.12	12.97	10.43	10.64	10.87	10.36	9.90	9.32
5/9/2018	13.28	12.18	9.65	13.17	12.79	9.80	8.43	10.47	8.99	8.37	9.70	9.61	9.92	10.10	9.20	8.54
11/25/2018	11.98	10.92	9.60	11.81	11.58	10.03	--	9.99	9.89	8.69	10.06	10.31	10.33	10.14	9.02	9.52
5/29/2019	12.40	11.39	9.05	12.25	12.03	9.31	6.98	10.05	8.63	6.50	9.51	9.50	9.65	9.94	8.90	8.27
5/27/2020	12.70	--	8.98	12.57	12.17	9.63	7.54	10.14	9.03	4.27	9.63	9.62	9.83	9.98	9.08	8.72

Date	CP-GP10	CP-GP11	CP-GP12	CP-GP13	CP-GP14	CP-PR-13	CP-W210	PNO-MW02	PNO-MW06A	PNO-MW06B	PNO-MW101	PNO-MW103	PNO-MW104	UT-MW39-1
11/14/2016	9.75	11.41	11.47	10.19	10.91	11.07	11.36	10.54	10.40	8.79	11.07	9.76	11.50	12.69
2/13/2017	9.45	11.56	11.54	7.44	10.67	11.25	13.71	10.63	10.73	9.94	11.11	9.84	11.80	13.16
5/9/2017	--	11.23	11.23	9.86	9.75	10.93	11.27	10.03	9.89	6.39	10.67	8.49	13.50	12.90
8/15/2017	8.68	10.60	10.52	9.55	9.88	10.43	10.11	9.47	9.59	8.33	10.18	8.90	10.40	11.65
11/30/2017	8.98	11.32	11.52	10.20	10.60	11.29	11.04	10.31	10.41	11.79	10.95	9.51	11.30	12.48
5/9/2018	8.04	10.92	10.90	9.56	9.61	9.64	10.66	9.67	9.73	9.03	10.40	8.64	10.89	12.36
11/25/2018	9.16	10.67	10.61	9.69	10.28	10.55	10.11	9.69	9.89	9.28	10.32	9.34	10.51	10.52
5/29/2019	7.72	10.68	10.67	9.38	9.41	10.48	10.24	9.54	9.53	7.93	10.22	8.46	10.54	11.83
5/27/2020	8.29	10.73	11.91	9.44	9.70	10.55	10.34	9.61	9.64	6.28	10.25	8.74	10.60	12.01

Notes:

All water level elevations in feet MLLW.

Table 3. 2020 Groundwater Results

Port of Seattle Terminal 91

Constituent	Date	Units	Cleanup Level	CP-103A	CP-104A	CP-106A	CP-108A	CP-108B	CP-114	CP-203B	CP-205B	CP-GP01A	CP-GP01B	CP-GP02	CP-GP03AR	CP-GP05	CP-GP08	CP-GP09R	CP-GP10	CP-GP11	CP-GP14	PNO-MW02	PNO-MW06A	PNO-MW06B	PNO-MW101	PNO-MW103
													CPOC				*CPOC*	*CPOC*	*CPOC*		*CPOC*			*CPOC*		
Field Parameters																										
Temperature	5/27/2020	deg C	--	14.3	14.5	16.6	14	15.1	14.6	14.7	15.2	15.7	16.2	15.1	13.2	12.6	14.5	15.9	13.8	16.2	13.6	15.6	15.8	15	15.1	16.1
Specific Conductance	5/27/2020	umhos/cm	--	473.8	494.4	735	379.8	6011	453.5	553.5	2865	1520	4809	1244	33300	18650	868	7550	20570	3816	1967	1012	1556	2675	3711	1571
pH	5/27/2020	pH	--	7.18	7.29	6.74	7.37	7.77	7.57	7.4	8.21	7.09	8.43	6.85	7.55	7.27	7.16	7.24	7.59	7.31	7.22	6.49	6.73	7.09	7.51	6.69
Oxidation-Reduction Potential	5/27/2020	mV	--	-57.4	26.8	-92.7	-219.6	-337.4	342	-43.7	-290.1	41.4	-92.8	28.5	-306	-239.2	41.1	212.1	247	-303.3	-37.1	76.3	-103.3	-146.2	-208	-95.7
Oxygen, Dissolved	5/27/2020	mg/L	--	0.1	0.2	0.18	0.6	0.1	0.6	0.2	0.5	0.3	0.5	0.1	0.2	0.54	0.1	0.87	6.33	0.83	0.81	0.27	0.29	0.31	0.91	2.48
Ferrous Iron	5/27/2020	mg/L	--	--	0.5	3	0	0	0	--	--	0	--	2	0	0.5	2	0	0	0.5	0	3	1.5	0	0.5	3.5
Alkalinity as CaCO3	5/27/2020	mg/L	--	--	--	280	--	--	--	--	--	--	--	--	160	420	--	420	280	260	320	460	420	400	360	440
Monitored Natural Attenuation																										
Manganese, Total	5/27/2020	ug/L	--	310	290	500	43	--	17	--	--	83	--	290	11U	94	100	40	11U	42	26	310	330	--	710	720
Methane	5/27/2020	ug/L	--	5500	5500	13000	4400	--	1100	--	--	12000	--	11000	8.8	1200	490	100	0.55U	2800	370	7600	5000	--	1200	7400
Nitrate as N	5/27/2020	mg/L	--	0.294	0.289	0.581	0.216	--	1.03	--	--	0.469	--	0.757	10.2	5.37	0.481	0.054	0.934	1.9	0.604	0.692	0.683	--	0.025U	0.025U
Sulfate	5/27/2020	mg/L	--	0.32	0.53	0.18	1.61	--	14.6	--	--	0.1	--	6.1	1840	806	21.9	290	993D	142	77.3	9.68	3.08	--	31.8	0.1
Total Petroleum Hydrocarbons																										
NWTPH-Gasoline	5/27/2020	ug/L	800	520O	400O	**900O**	480O	100U	100U	370O	100U	100U	100U	440O	100U	100U	100U	100U	100U	280	100U	190O	160O	200O	100U	640O
NWTPH-Diesel	5/27/2020	mg/L	0.5	**0.78**	**0.5**	**0.86**	**0.59**	0.22U	0.21U	0.3	0.22U	0.2U	0.21U	**0.97**	0.2U	0.2U	0.21U	0.2U	0.2U	0.2U	0.21U	0.4	0.34	0.24	0.2U	**0.86**
NWTPH-Oil	5/27/2020	mg/L	0.5	0.21U	0.21U	0.2U	0.21U	0.22U	0.21U	0.21U	0.22U	0.2U	0.21U	0.21U	0.2U	0.2U	0.21U	0.2U	0.2U	0.2U	0.21U	0.2U	0.2U	0.2U	0.2U	0.2U
Volatiles																										
Benzene	5/27/2020	ug/L	9.7	0.2U	0.2U	3.7	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
Toluene	5/27/2020	ug/L	8260	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U	1.0U
Ethylbenzene	5/27/2020	ug/L	2100	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U
m,p-Xylenes	5/27/2020	ug/L	1160	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U	0.4U
o-Xylene	5/27/2020	ug/L	1160	0.61	0.2U	0.49	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.2U	0.24

Notes:

Groundwater Cleanup Levels from (PES 2009)

Bold, outlined, shaded cells indicate exceedance of cleanup level

ug/L: micrograms per liter

mg/L: milligrams per liter

U: Constituent not detected at reporting limit shown; values are gray

D: Result was obtained from the analysis of a dilution

L: Relative percent difference with duplicate out of range

M: Hydrocarbons in the gasoline range are impacting the diesel range result

X: Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Z: analyzed out of hold time

CPOC flag in header indicates that the well is a conditional point of compliance well

Depth to water in this table is at the time of sampling and may vary from values reported in Table 2

NWTPH: Northwest Total Petroleum Hydrocarbon analysis, with distillate range indicated (diesel-, gasoline-, and oil-range)

SG: Sample had silica gel treatment as part of the NWTPH-Dx analysis sample preparation

O: Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

Table 4a. Data Summary: Petroleum Compounds

Port of Seattle Terminal 91

				CPOC Wells						Monitoring Wells																
				No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	Yes
				No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes
				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes
Constituent	Date	Units	CUL	CP-GP08	CP-GP09R	CP-GP10	CP-GP14	CP-GP01B	PNO-MW06B	CP-103A	CP-104A	CP-106A	CP-108A	CP-108B	CP-114	CP-203B	CP-205B	CP-GP01A	CP-GP02	CP-GP03AR	CP-GP05	CP-GP11	PNO-MW02	PNO-MW06A	PNO-MW101	PNO-MW103
NWTPH-D-SG	11/9/2015	mg/L	0.5	0.05 U	0.074	0.05 U	0.113	**0.526**	**2.98**	**1.9**	**0.63**	**2.83**	**6.98**	**1.12**	0.05 U	**2.35**	0.05 U	0.05 U	**6.75**	0.152	0.1	0.05 U	**4.92**	**5.62**	0.185	**5.01**
NWTPH-D-SG	2/8/2016	mg/L	0.5	0.05 U	0.05 U	0.05 U	0.05 U	**1.04**	**2.26**	**3.08**	**0.555**	**1.84**	**6.54**	**0.606**	0.05 U	**1.68**	0.05 U	0.182	**3.24**	0.434	0.05 U	0.05 U	**0.892**	**1.82**	0.05 U	**5.1**
NWTPH-D-SG	5/3/2016	mg/L	0.5	0.05 U	0.05 U	0.05 U	0.05 U	0.448	**1.98**	**0.999**	**0.806**	**6.96**	**5.33**	0.405	0.05 U	**1.52**	0.05 U	0.109	0.05 U	0.05 U	0.05 U	0.05 U	0.271	**0.997**	0.078	**6.08**
NWTPH-D-SG	8/15/2016	mg/L	0.5	0.05 U	0.157	0.05 U	0.05 U	0.414	**2.12**	**1.83**	0.404	**2.37**	**3.96**	0.166	0.05 U	**1.94**	0.05 U	0.05 U	**7.72**	0.137	0.05 U	0.05 U	**3.78**	**3.74**	0.05 U	**1.5**
NWTPH-D-SG	2/13/2017	mg/L	0.5	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	**0.58**	0.38	**0.7**	0.26	0.26 U	0.26 U	0.26 U	0.31 U	0.26 U	0.26 U	0.25 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	**0.6**
NWTPH-D-SG	5/10/2017	mg/L	0.5	0.26 U	0.25 U	0.26 U	0.26 U	0.26 U	0.26 U	**0.53**	0.41	**0.66**	0.42	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.25 U	0.26 U	0.26 U	0.26 U	0.26 U	0.25 U	**0.73**
NWTPH-D-SG	8/15/2017	mg/L	0.5	0.26 U	0.26 U	0.25 U	0.26 U	0.25 U	0.25 U	**0.76**	**0.52**	**0.83**	**0.53**	0.27 U	0.25 U	0.36	0.26 U	0.26 U	0.48	0.46	0.25 U	0.26 U	0.45	0.26 U	0.26 U	**0.73**
NWTPH-D-SG	11/30/2017	mg/L	0.5	0.26 U	0.25 U	0.25 U	0.25 U	0.26 U	0.26 U	0.47 J	0.39 M	0.65 M	0.47	0.26 U	0.26 U	0.26M	0.26 U	0.26 U	0.63M	0.25 U	0.25 U	0.25 U	0.26 U	0.35	0.26 U	**0.98**
NWTPH-D-SG	5/16/2018	mg/L	0.5	0.26 U	0.26 U	0.25 U	0.25 U	0.26 U	0.26 U	0.76 M	0.64 M	0.79 M	0.4 M	0.31 U	0.26 U	0.3M	0.3 U	0.25 U	0.26 U	0.25 U	0.26 U	0.26 U	0.26 U	**0.62**	0.26 U	0.9M
NWTPH-D-SG	11/15/2018	mg/L	0.5	0.25 U	0.25 U	--	0.26 U	0.26 U	0.25 U	**0.68**	0.43	**0.67**	0.33	0.26 U	0.25 U	0.37	0.26 U	0.26 U	0.43	0.25 U	0.25 U	0.26 U	0.47	0.41	0.25 U	**0.72**
NWTPH-D-SG	5/29/2019	mg/L	0.5	0.25 U	0.26 U	0.25 U	0.25 U	0.25 U	0.25 U	**0.69**	**0.63**	0.67M	0.32	0.26 U	0.25 U	0.44	0.25 U	0.25 U	0.4	0.25 U	0.25 U	0.25 U	0.35M	0.5M	0.25 U	**0.89**
NWTPH-D-SG	5/27/2020	mg/L	0.5	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U	0.24	**0.78**	**0.5**	**0.86**	**0.59**	0.22 U	0.21 U	0.3	0.22 U	0.2 U	**0.97**	0.2 U	0.2 U	0.2 U	0.4	0.34	0.2 U	**0.86**
NWTPH-LO	8/10/2015	mg/L	0.5	0.13	**0.858**	0.1 U	0.1 U	**0.65**	**0.659**	0.1 U	0.1 U	**2.66**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.151	**5.58**	**0.57**	0.1 U	0.1 U	**2.44**	**2.17**	0.196	0.1 U
NWTPH-LO	11/9/2015	mg/L	0.5	0.1 U	0.1 U	0.1 U	0.1 U	0.253	0.1 U	0.1 U	**0.76**	**3.83**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.104	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NWTPH-LO	2/8/2016	mg/L	0.5	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.16	**2.28**	0.104 U	0.1 U	0.146	0.1 U	0.114	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
NWTPH-LO	5/3/2016	mg/L	0.5	0.1 U	0.1 U	0.1 U	0.1 U	0.446	0.1 U	0.1 U	0.1 U	**6.3**	0.1 U	**0.524**	0.338	0.103 U	0.1 U	0.1 U	**4.21**	0.331	0.1 U	0.1 U	**1.72**	**2.32**	0.1 U	0.1 U
NWTPH-LO	8/15/2016	mg/L	0.5	0.1 U	0.314	0.1 U	0.1 U	**0.707**	0.1 U	0.1 U	0.24	**4.04**	0.1 U	**0.593**	0.118	0.1 U	0.1 U	0.15	0.1 U	0.19	0.1 U	0.1 U	0.1 U	0.1 U	0.144	**1.47**
NWTPH-LO	11/14/2016	mg/L	0.5	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	**0.93**	**0.52**	0.46	**2.3**	**2.8**	--	0.45	0.41 U	0.42 U	0.41 U	**2.9**	**0.5**	0.41 U	0.4 U	**1.5**	**1.9**	0.41 U	**1.3**
NWTPH-LO	2/13/2017	mg/L	0.5	0.41 U	0.41 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.49 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U
NWTPH-LO	5/10/2017	mg/L	0.5	0.42 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
NWTPH-LO	8/15/2017	mg/L	0.5	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
NWTPH-LO	11/30/2017	mg/L	0.5	0.41 U	0.4 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.4 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.47N
NWTPH-LO	5/16/2018	mg/L	0.5	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.49 U	0.41 U	0.41 U	0.49 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
NWTPH-LO	11/15/2018	mg/L	0.5	0.4 U	0.4 U	--	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.4 U	0.4 U	0.41 U	0.41 U	0.41 U	0.4 U	0.4 U
NWTPH-LO	5/29/2019	mg/L	0.5	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.4 U	0.41 U	0.41 U	0.41 U	0.4 U	0.4 U	0.4 U	0.4 U	0.41 U	0.41 U	0.41 U
NWTPH-LO	5/27/2020	mg/L	0.5	0.21 U	0.2 U	0.2 U	0.21 U	0.21 U	0.2 U	0.21 U	0.21 U	0.2 U	0.21 U	0.22 U	0.21 U	0.21 U	0.22 U	0.2 U	0.21 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NWTPH-G	8/10/2015	ug/L	800	50 U	50 U	50 U	50 U	50 U	50 U	235	554	703	336	50 U	50 U	171	50 U	50 U	248	50 U	50 U	255	50 U	50 U	84.1	50 U
NWTPH-G	11/9/2015	ug/L	800	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	51.8	50 U
NWTPH-G	2/8/2016	ug/L	800	50 U	50 U	50 U	50 U	50 U	50 U	334	50 U	50 U	79.2	50 U	616	290	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
NWTPH-G	5/3/2016	ug/L	800	50 U	50 U	50 U	50 U	50 U	164	290	712	**1730**	543	50 U	50 U	296	50 U	50 U	50 U	50 U	50 U	**1440**	50 U	50 U	58.7	50 U
NWTPH-G	8/15/2016	ug/L	800	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	93.4	50 U	50 U	50 U	50 U	50 U	50 U	148	50 U
NWTPH-G	11/14/2016	ug/L	800	100 U	100 U	100 U	100 U	100 U	400 U	380	300	400 U	400 U	--	100 U	100 U	400 U	100 U	400 U	400 U	100 U	400 U	160	400 U	100 U	400 U
NWTPH-G	2/13/2017	ug/L	800	100 U	100 U	100 U	100 U	100 U	200	430	390	**860**	270	100 U	100 U	320	100 U	100 U	100 U	100 U	100 U	230	100 U	100 U	100 U	450
NWTPH-G	5/10/2017	ug/L	800	100 U	100 U	100 U	100 U	100 U	130	500 U	470 O	**1200 O**	500 U	100 U	100 U	500 U	100 U	100 U	140	100 U	100 U	360	100 U	100 U	100 U	400 U
NWTPH-G	8/15/2017	ug/L	800	100 U	100 U	100 U	100 U	100 U	500 U	500 U	500 U	**1200 O**	500 U	100 U	100 U	500 U	100 U	100 U	500 U	100 U	100 U	500 U	500 U	100 U	100 U	500 U
NWTPH-G	11/30/2017	ug/L	800	100 U	100 U	100 U	100 U	100 U	380 O	540 O	450 O	**990 O**	490 O	400 U	100 U	380 O	400 U	100 U	690 O	100 U	100 U	350	380 O	100 U	100 U	**600 O**
NWTPH-G	5/16/2018	ug/L	800	100 U	100 U	400 U	100 U	100 U	230	630	370	**1100**	430	400 U	100 U	380	400 U	100 U	250	400 U	100 U	**730**	150	220	100 U	710
NWTPH-G	11/15/2018	ug/L	800	100 U	100 U	--	400 U	100 U	400 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	400 U	100 U	100 U	400 U	400 U	400 U	400 U	400 U	400 U	400 U
NWTPH-G	5/29/2019	ug/L	800	100 U	100 U	100 U	100 U	100 U	170 O	500 U	500 U	790 O	500 U	500 U	100 U	500 U	500 U	100 U	500 U	100 U	100 U	330	250 O	160 O	100 U	500 U
NWTPH-G	5/27/2020	ug/L	800	100 U	100 U	100 U	100 U	100 U	200 O	520 O	400 O	**900 O**	480 O	100 U	100 U	370 O	100 U	100 U	440 O	100 U	100 U	280	190 O	160 O	100 U	**640 O**
Benzene	8/10/2015	ug/L	9.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	6.18	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	11/9/2015	ug/L	9.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	7.07	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	2/8/2016	ug/L	9.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.09	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	5/3/2016	ug/L	9.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	6.17	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	8/15/2016	ug/L	9.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	7.27	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene	11/14/2016	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6.3	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	2/13/2017	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4.5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	5/10/2017	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4.7	0.23	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	8/15/2017	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	11/30/2017	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	5/16/2018	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6.4	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	11/15/2018	ug/L	9.7	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	5.5	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	5/29/2019	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	6.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Benzene	5/27/2020	ug/L	9.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	3.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	8/10/2015	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.63	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	11/9/2015	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.05	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	2/8/2016	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	5/3/2016	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	8/15/2016	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	11/14/2016	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	2/13/2017	ug/L	8260	2.7	2.0 U	2.0 U	2.0 U	2.8	2.0 U	2.0 U	2.0 U	2.0 U	2.3	0.2 U	2.1	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Toluene	5/10/2017	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	8/15/2017	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	45	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	11/30/2017	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Table 4a. Data Summary: Petroleum Compounds

Port of Seattle Terminal 91

				CPOC Wells						Monitoring Wells																
Exceedance Within Last 4 Events?				No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No	Yes
Recent Detection within 50% of CUL?				No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes
Continue Monitoring?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes
Constituent	**Date**	**Units**	**CUL**	**CP-GP08**	**CP-GP09R**	**CP-GP10**	**CP-GP14**	**CP-GP01B**	**PNO-MW06B**	**CP-103A**	**CP-104A**	**CP-106A**	**CP-108A**	**CP-108B**	**CP-114**	**CP-203B**	**CP-205B**	**CP-GP01A**	**CP-GP02**	**CP-GP03AR**	**CP-GP05**	**CP-GP11**	**PNO-MW02**	**PNO-MW06A**	**PNO-MW101**	**PNO-MW103**
Toluene	5/16/2018	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	11/15/2018	ug/L	8260	1.0 U	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	5/29/2019	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Toluene	5/27/2020	ug/L	8260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	8/10/2015	ug/L	2100	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	11/9/2015	ug/L	2100	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	2/8/2016	ug/L	2100	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	5/3/2016	ug/L	2100	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	8/15/2016	ug/L	2100	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	11/14/2016	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.25	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	2/13/2017	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	5/10/2017	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	8/15/2017	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.37	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	11/30/2017	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	5/16/2018	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	11/15/2018	ug/L	2100	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	5/29/2019	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene	5/27/2020	ug/L	2100	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
o-Xylene	8/10/2015	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	11/9/2015	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	2/8/2016	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	5/3/2016	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	8/15/2016	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.01	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
o-Xylene	11/14/2016	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.55	0.21	0.73	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.26	0.2 U	0.2 U
o-Xylene	2/13/2017	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.47	0.2 U	0.54	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
o-Xylene	5/10/2017	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.31	0.2 U	0.57	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
o-Xylene	8/15/2017	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.48	0.26	0.71	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.27	0.22	0.22	0.2 U	0.2
o-Xylene	11/30/2017	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.22	0.48	0.2 U	0.46	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24	0.2 U	0.2 U
o-Xylene	5/16/2018	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.61	0.23	0.58	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U	0.25
o-Xylene	11/15/2018	ug/L	1160	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.58	0.27	0.53	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.27	0.35	0.2 U	0.23
o-Xylene	5/29/2019	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.52	0.27	0.54	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.23	0.2 U	0.23
o-Xylene	5/27/2020	ug/L	1160	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.61	0.2 U	0.49	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24
m,p-Xylene	8/10/2015	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	11/9/2015	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	2/8/2016	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	5/3/2016	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	8/15/2016	ug/L	1160	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	4.63	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
m,p-Xylene	11/14/2016	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	6	0.4 U	--	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	2/13/2017	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	1.4	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	5/10/2017	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.47	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	8/15/2017	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.56	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.52	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	11/30/2017	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	1.5	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	5/16/2018	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.46	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	11/15/2018	ug/L	1160	0.4 U	0.4 U	--	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	5/29/2019	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
m,p-Xylene	5/27/2020	ug/L	1160	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U

Notes:

Bold, outlined, shaded cells indicate exceedance of cleanup level

U: non-detect at reporting limit shown.

J: Estimated value, result may be between reporting and method detection limits.

mg/L: milligrams per liter

ug/L: micrograms per liter

O: Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

CPOC: Conditional Point of Compliance

Table 4b. Data Summary: Natural Attenuation Indicators
Port of Seattle Terminal 91

			CPOC Wells						Monitoring Wells															
Constituent	Date	Units	CP-GP08	CP-GP09R	CP-GP10	CP-GP14	CP-GP01B	PNO-MW06B	CP-103A	CP-104A	CP-106A	CP-108A	CP-108B	CP-114	CP-203B	CP-205B	CP-GP01A	CP-GP02	CP-GP03AR	CP-GP05	CP-GP11	PNO-MW02	PNO-MW06A	PNO-MW101	PNO-MW103
Alkalinity (as CaCO3)	11/14/2016	mg/L	320	360	--	220	--	--	--	280	--	--	--	--	--	--	200	500	220	320	420	400	340	480	520
Alkalinity (as CaCO3)	5/10/2017	mg/L	--	225	220	220	170	420	320	200	320	160	--	140	320	560	380	460	160	180	340	360	360	115	520
Alkalinity (as CaCO3)	11/30/2017	mg/L	320	400	180	225	20	400	240	320	300	360	900	180	240	520	300	440	160	220	360	320	420	380	520
Alkalinity (as CaCO3)	5/16/2018	mg/L	300	260	280	300	40	360	220	140	360	220	400	180	--	540	260	280	180	300	300	340	260	360	240
Alkalinity (as CaCO3)	5/29/2019	mg/L	320	--	180	260	20	--	--	220	280	160	760	240	180	520	240	460	160	300	--	380	320	380	440
Alkalinity (as CaCO3)	5/27/2020	mg/L	--	420	280	320	--	400	--	--	280	--	--	--	--	--	--	--	160	420	260	460	420	360	440
Ferrous Iron	11/14/2016	mg/L	0.5U	0.5U	--	0.5U	0.5U	--	--	0.75	--	--	--	--	--	--	0.5U	3	0.5J	0.5U	0.5U	2	1.5	1.5	1.5
Ferrous Iron	5/10/2017	mg/L	--	0	0	0	0	0	0.25	0.75	1	0.25	--	0.25	0.25	0	0.5	0.5	0	0	0	0	1	0.5	2
Ferrous Iron	11/30/2017	mg/L	0.25	0	0	0	0.25	0	1.25	0.25J	1.25	0.75	0	0.75	0.5	0	0.75	3	0	0.5	0	1	2	0.5	1.5
Ferrous Iron	5/16/2018	mg/L	0	0.5	0	0	0.25	0	1	0.5	2	0.25	0	0.25	0.5	0	0	0	0	0	0	1	2	1	3
Ferrous Iron	5/29/2019	mg/L	1	0.5	0	0	0.5	--	2	0.5	1.5	0.5	0	0.5	0.5	0	0.5	1.5	0.5	0.5	--	1	2.5	0.5	1.5
Ferrous Iron	5/27/2020	mg/L	2	0	0	0	--	0	--	0.5	3	0	0	0	--	--	0	2	0	0.5	0.5	3	1.5	0.5	3.5
Manganese, Total	11/9/2015	ug/L	56.7	274	5.71J	281	12	26.1	381	298	834	156	2.0U	106	683	4.25	55.6	245	11.5	182	199	698	2060	1290	679
Manganese, Total	5/3/2016	ug/L	113	29.2	10UJ	102	--	--	297	289	465	85	--	11.2	--	--	69.5	106	10UJ	218	454	222	169	812	807
Manganese, Total	11/14/2016	ug/L	35	23	10U	15L	--	--	340	300L	410L	110	--	11L	--	--	61	10UL	10U	190L	1000	410	840	920	530
Manganese, Total	5/10/2017	ug/L	32	10U	10U	41	--	--	280	240	390	51	--	13	--	--	99	140	10U	250	240	270	93	360	530
Manganese, Total	11/30/2017	ug/L	11U	11U	11U	85	--	--	330	260	430	120	--	14	--	--	90	340	11U	260	260	290	1100	550	550
Manganese, Total	5/16/2018	ug/L	68	13	11U	26	--	--	350	280	570	51	--	11U	--	--	69	240	11U	110	210	340	500	490	610
Manganese, Total	5/29/2019	ug/L	99	27	11U	79	--	--	390	330	530	60	--	19	--	--	90	280	11U	140	100	420	340	1100	700
Manganese, Total	5/27/2020	ug/L	100	40	11U	26	--	--	310	290	500	43	--	17	--	--	83	290	11U	94	42	310	330	710	720
Methane	11/9/2015	ug/L	20.9	8.88	5.0U	20.5	3800	2450	2710	1440	1700	1270	3570	729	1880	2360	3210	2590	8.18	125	553	3020	5440	1560	1930
Methane	11/9/2015	ug/L	20.9	8.88	5.0U	20.5	3800	2450	2710	1440	1700	1270	3570	729	1880	2360	3210	2590	8.18	125	553	3020	5440	1560	1930
Methane	5/3/2016	ug/L	5.81	5.0U	5.0U	7.06	--	--	285	340	2170	238	--	39.8	--	--	1630	552	5.0U	35.4	1190	513	344	333	464
Methane	5/3/2016	ug/L	5.81	5.0U	5.0U	7.06	--	--	285	340	2170	238	--	39.8	--	--	1630	552	5.0U	35.4	1190	513	344	333	464
Methane	11/14/2016	ug/L	14	2.6	0.5U	15	--	--	5800	5200	7900	920	--	1100	--	--	12000	9000	5.6	310	2200	2900	2000Z	1000	4800Z
Methane	11/14/2016	ug/L	14	2.6	0.5U	15	--	--	5800	5200	7900	920	--	1100	--	--	12000	9000	5.6	310	2200	2900	2000Z	1000	4800Z
Methane	5/10/2017	ug/L	8.1	1.5	0.75	100	--	--	7500	2000	15000	4100	--	140	--	--	4100	2100	9	570	9900	260	750	1700	5400
Methane	5/10/2017	ug/L	8.1	1.5	0.75	100	--	--	7500	2000	15000	4100	--	140	--	--	4100	2100	9	570	9900	260	750	1700	5400
Methane	11/30/2017	ug/L	11	0.6	0.61	64	--	--	5000	5400	13000	2700	--	830	--	--	7700	8000	6.2	370	2400	1800	6200	7500	8900
Methane	11/30/2017	ug/L	11	0.6	0.61	64	--	--	5000	5400	13000	2700	--	830	--	--	7700	8000	6.2	370	2400	1800	6200	7500	8900
Methane	5/16/2018	ug/L	31	8.4	2.4	85	--	--	4200	2500	17000	3200	--	350	--	--	5200	1900	7.1	230	5800	6800	5800	1400	3300
Methane	5/16/2018	ug/L	31	8.4	2.4	85	--	--	4200	2500	17000	3200	--	350	--	--	5200	1900	7.1	230	5800	6800	5800	1400	3300
Methane	5/29/2019	ug/L	210	44	1.0U	120	--	--	6000	5200	15000	3800	--	920	--	--	13000	8300	6.6	460	800	12000	6700	610	6300
Methane	5/29/2019	ug/L	210	44	1.0U	120	--	--	6000	5200	15000	3800	--	920	--	--	13000	8300	6.6	460	800	12000	6700	610	6300
Methane	5/27/2020	ug/L	490	100	0.55U	370	--	--	5500	5500	13000	4400	--	1100	--	--	12000	11000	8.8	1200	2800	7600	5000	1200	7400
Methane	5/27/2020	ug/L	490	100	0.55U	370	--	--	5500	5500	13000	4400	--	1100	--	--	12000	11000	8.8	1200	2800	7600	5000	1200	7400
Nitrate as N	11/9/2015	mg/L as N	0.722	10U	2.62J	5.0U	0.67J	0.256J	1.06	0.1U	0.2U	0.124J	2.0U	0.151	0.048	1.0U	0.2U	0.5U	20U	5.0U	2.0U	0.418J	2.0U	2.0U	0.506J
Nitrate as N	5/3/2016	mg/L as N	5.0UJ	5.0UJ	10U	5.0U	--	--	0.2U	0.2U	0.5U	0.2U	--	0.645	--	--	0.5U	0.732	20U	10U	5.0U	0.5U	0.5U	5.0U	5.0U
Nitrate as N	11/14/2016	mg/L as N	0.67	0.05U	0.72	0.77	--	--	0.05U	0.05U	0.05U	0.28	--	0.48	--	--	0.089	0.18	0.05U	0.13	0.05U	0.05U	0.05U	0.05U	0.05U
Nitrate as N	5/10/2017	mg/L as N	0.516J	0.025U	1.1J	0.025U	--	--	0.21J	0.025U	0.025U	0.025U	--	0.124J	--	--	0.122J	0.532J	7.8J	1.9J	0.025U	0.025U	0.025U	0.025U	0.025U
Nitate as N	11/30/2017	mg/L as N	0.628	0.025U	1.03	0.204	--	--	0.025U	0.025U	0.025U	0.184	--	1.05	--	--	0.099	0.027	0.025U	0.578	0.301	0.025U	0.044	0.025U	0.025U
Nitrate as N	5/16/2018	mg/L as N	0.166	--	--	0.389	--	--	0.025U	0.025U	0.025U	0.025U	--	0.392	--	--	0.025U	1.1	7.88	1.1	0.025U	0.025U	0.025U	0.025U	0.025U
Nitrate as N	5/29/2019	mg/L as N	0.025U	0.897	0.598	0.365	--	--	0.17	0.206	0.55	0.179	--	0.164	--	--	0.025U	0.441	1.3	0.025U	0.791	0.763	0.114	0.592	0.099
Nitrate as N	5/27/2020	mg/L as N	0.481	0.054	0.934	0.604	--	--	0.294	0.289	0.581	0.216	--	1.03	--	--	0.469	0.757	10.2	5.37	1.9	0.692	0.683	0.025U	0.025U
Sulfate	11/9/2015	mg/L	53.2	1300	2010	1280	4.47J	2.6J	0.382J	3.63	6.58	51.9	7.91	14.1	0.034J	2.39J	0.592J	4.96	2210	863	432	2.09J	3.96J	50.8	3.32J
Sulfate	5/3/2016	mg/L	46.3	508	980	377	--	--	5.06	0.6U	1.5U	0.93	--	20.5	--	--	1.5U	38.4	1640	793	183	28.3	1.75	28.8	15U
Sulfate	11/14/2016	mg/L	51.7	1480	1320	529	--	--	0.29	2.02	4.31	19.8	--	21	--	--	14.3	67.8	1720	31.9	92.8	7.08	21.8	35.4	0.72
Sulfate	5/10/2017	mg/L	53.5	430	747	190	--	--	5.72	0.52	0.25	0.71	--	16.4	--	--	10.3	35.2	1410	910	44.4	33.5	9.12	2.51	0.4
Sulfate	11/30/2017	mg/L	57.9	882	1780	402	--	--	0.26	0.64	1.08	53.3	--	25.7	--	--	6.4	61.4	2300	1800	466	27.8	41.9	24.3	1.48
Sulfate	5/16/2018	mg/L	4.1	--	--	144	--	--	0.17	0.61	0.3	3.4	--	14	--	--	0.74	19	1740	1120	90.9	13.7	0.66	0.72	1.2
Sulfate	5/29/2019	mg/L	39.7	446	1730	354	--	--	0.25	5.87	0.89	3.57	--	3.46	--	--	0.84	64.6	2190	928	203	9.18	0.1U	129	0.43
Sulfate	5/27/2020	mg/L	21.9	290	993	77.3	--	--	0.32	0.53	0.18	1.61	--	14.6	--	--	0.1	6.1	1840	806	142	9.68	3.08	31.8	0.1

Notes:
Alkalinity and ferrous iron measured in field with test kits.
U: non-detect at reporting limit shown.
J: Estimated value, result may be between reporting and method detection limits.
mg/L: milligrams per liter
ug/L: micrograms per liter

Table 5. Mann Kendall Test for Trend

Terminal 91

Well	Constituent	n	tau	p	Bonferroni-Adjusted p	Trend
CP-103A	Diesel	9	0.42	0.14	1.00	No
CP-103A	Gasoline	9	0.13	0.73	1.00	No
CP-103A	Oil	9	1.00	1.00	1.00	No
CP-104A	Diesel	8	0.41	**0.03**	0.76	No
CP-104A	Gasoline	8	-0.26	0.21	1.00	No
CP-104A	Oil	8	1.00	1.00	1.00	No
CP-106A	Diesel	8	0.17	0.38	1.00	No
CP-106A	Gasoline	8	-0.33	0.07	1.00	No
CP-108A	Diesel	8	0.07	0.75	1.00	No
CP-108A	Gasoline	8	0.08	0.73	1.00	No
CP-108A	Oil	8	1.00	1.00	1.00	No
CP-203B	Diesel	8	0.59	0.06	1.00	No
CP-203B	Gasoline	8	0.04	1.00	1.00	No
CP-GP02	Diesel	8	0.40	**0.04**	1.00	No
CP-GP02	Gasoline	8	0.16	0.47	1.00	No
CP-GP11	Gasoline	8	-0.04	1.00	1.00	No
PNO-MW02	Diesel	8	0.40	0.23	1.00	No
PNO-MW02	Gasoline	8	0.40	0.23	1.00	No
PNO-MW06A	Diesel	8	0.47	**0.02**	0.40	No
PNO-MW06A	Gasoline	8	0.49	**0.02**	0.53	No
PNO-MW06B *	Diesel	8	0.50	0.19	1.00	No
PNO-MW103	Diesel	8	0.25	0.22	1.00	No
PNO-MW103	Gasoline	8	0.16	0.47	1.00	No

Notes:

n: number of observations; data restricted to 2017 and later (PGG 2019).

tau: Mann Kendall statistic; positive indicates upward trend.

p: significance level, applied at 0.05; $p < 0.05$ (**bolded**) indicates a trend.

Bonferroni-adjusted p: see discussion in text.

Trend: qualitiative evaluation of p value with $p < 0.05$ indicating a trend.

* Conditional point of compliance well.

Wells/consituents not shown did not have adequate detections for analysis.

Table 6. Groundwater Summary by Constituent

Port of Seattle Terminal 91

Constituent	Units	Results	Detections	Minimum	Average	Maximum	CUL	Exceedances	Continue?	Basis
Total Petroleum Hydrocarbons (NWTPH)										
NWTPH-G	mg/L	345	81	0.05	0.4	1.73	0.8	Yes	Yes	
NWTPH-D-SG	mg/L	287	128	0.07	1.3	7.72	0.5	Yes	Yes	Exceedancees present in data set.
NWTPH-LO	mg/L	342	53	0.10	1.5	6.3	0.5	Yes	Yes	
BTEX Compounds (EPA 8260)										
Benzene	ug/L	348	19	0.2	5.2	7.5	9.7	No	No	
Toluene	ug/L	347	7	1.1	8.2	45.0	8260	No	No	
Ethylbenzene	ug/L	348	5	0.2	0.3	0.4	2100	No	No	Low detection rate, no exceedances.
Xylene Isomers, M+P	ug/L	348	11	0.4	1.6	6.0	1160	No	No	
o-Xylene	ug/L	347	44	0.2	0.4	1.0	1160	No	No	
LNAPL Monitoring										
LNAPL Thickness	feet	88	79	0	0.03	0.18	0.25*	--	Yes	LNAPL is present.
Natural Attenuation Indicators										
Alkalinity as CaCO3, Total	mg/L	112	111	20	313.1	900	--	--	No	
Ferrous Iron	mg/L	122	112	0	0.7	3.5	--	--	No	
Manganese, Total	ug/L	158	138	4.25	295.8	2060	--	--	No	Results document persistent geochemistry favorable to natural attenuation.
Sulfate	mg/L	149	144	0.034	314.9	2300	--	--	No	
Nitrate as N	mg/L	140	66	0.027	0.7	7.88	--	--	No	
Methane	ug/L	157	150	0.6	3309.6	17000	--	--	No	

Notes:

* 0.25 feet is the threshold for initiating LNAPL recovery.

LNAPL: light non-aqueous phase liquid.

CUL: cleanup level.

See Tables 4a,b for data summary.

See Tables 4a and 5 for well-specific evaluations.

Table 7. Recommended Monitoring Summary

Terminal 91

Location	Current	Recommended
CPOC Wells		
CP-GP08	TPH/BTEX/MNA	TPH
CP-GP09R	TPH/BTEX/MNA	TPH
CP-GP10	TPH/BTEX/MNA	TPH
CP-GP14	TPH/BTEX/MNA	TPH
PNO-MW06B	TPH/BTEX/MNA	TPH
Monitoring Wells		
CP-103A	TPH/BTEX/MNA	TPH
CP-104A	TPH/BTEX/MNA	TPH
CP-106A	TPH/BTEX/MNA	TPH
CP-108A	TPH/BTEX/MNA	TPH
CP-108B	TPH/BTEX/MNA	WL Only
CP-114	TPH/BTEX/MNA	WL Only
CP-203B	TPH/BTEX/MNA	TPH
CP-205B	TPH/BTEX/MNA	WL Only
CP-GP01A	TPH/BTEX/MNA	WL Only
CP-GP01B	TPH/BTEX/MNA	TPH
CP-GP02	TPH/BTEX/MNA	TPH
CP-GP03AR	TPH/BTEX/MNA	WL Only
CP-GP05	TPH/BTEX/MNA	WL Only
CP-GP11	TPH/BTEX/MNA	TPH
PNO-MW02	TPH/BTEX/MNA	TPH
PNO-MW06A	TPH/BTEX/MNA	TPH
PNO-MW101	TPH/BTEX/MNA	WL Only
PNO-MW103	TPH/BTEX/MNA	TPH
LNAPL Gauging		
CP-107	LNAPL	LNAPL*
CP-110	LNAPL	LNAPL*
PNO-MW104	LNAPL	LNAPL*
Trench 2E	LNAPL	LNAPL*
Trench 2W	LNAPL	LNAPL*
Trench 3E	LNAPL	LNAPL*
Trench 3W	LNAPL	LNAPL*
Trench 5E	LNAPL	LNAPL*
Trench 5W	LNAPL	LNAPL*

Notes:
TPH: NWTPH-G, NWTPH-Dx
BTEX: benzene, toluene, ethylbenzene, m,p- and o-xylenes.
MNA: methane, nitrate, sulfate, alkalinity, manganese, ferrous iron.
Water level snapshot full well list not shown; see CMP (PES 2013a).
Groundwater sampling is annual in May of each year.
LNAPL: measure product thickness, recover if greater than 0.25 feet.
LNAPL gauging is quarterly (February, May, August, November).
* Future gauging may shift to August and November only.

CP-205B
CP-205A
CP-113
CP-121
CP-114
CP-104B
CP-104A
CP-115A
CP-115B
CP-112
UT-MW39-1
CP-GP12
LNAPL Trench 5
LNAPL Trench 3
CP-106B
CP-106A
CP-122B
CP-107
Tank Farm (Demolished)
LNAPL Trench 2
CP-GP11
CP-PR-13
CP-GP13
AOC 11 Flowpath
CP-110
Pier 90 Flowpath
B1-93
PNO-MW101
CP-111
PNO-MW104
CP-103A
CP-203B
CP-W210
CP-108B
CP-108A
CP-GP14
CP-GP06
CP-GP05
CP-GP07R
CP-GP02
PNO-MW02
PNO-MW06A
PNO-MW06B
Short Fill Impoundment
CP-GP01B
CP-GP01A
CP-GP04R
Pier 91
Pier 91 Flowpath
Pier 90
Short Fill Area
CP-GP03AR
CP-GP03BR
PNO-MW103
CP-GP08
CP-GP10
CP-GP09R
Smith Cove Waterway
0 Feet 150
1 inch = 150 feet
Pictometry International Corp. 2015

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Monitoring Well Network
- Shallow Aquifer Well
- Deep Aquifer Well
- Shallow Groundwater Sampling Well
- Deep Groundwater Sampling Well
- Piezometer
- LNAPL Trench Riser Pipe
- Bulkhead
- Tank Farm
- Tank Farm Affected Area (TFAA) Boundary
- Bentonite Cutoff Wall
- AOC 11 (Old Tank Farm)
- Groundwater Flowpaths Used in MNA Evaluation
- LNAPL Trench

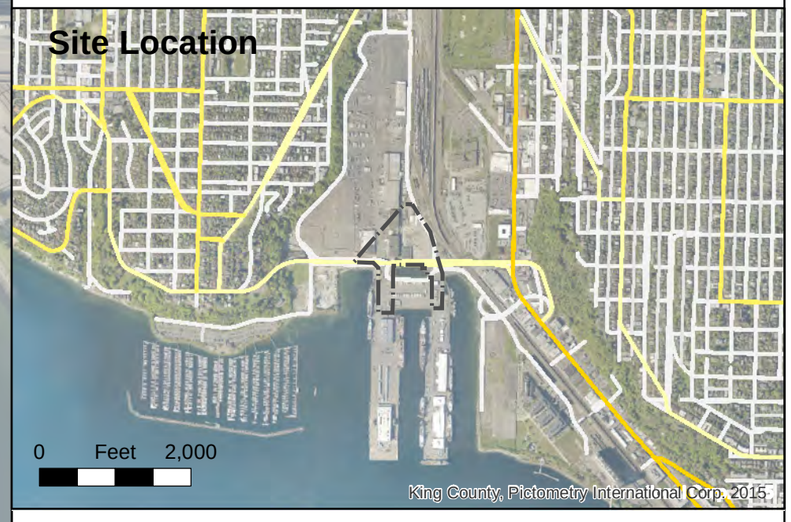

Figure 1.
Site Map

Terminal 91

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CP-205B 12.17
CP-205A 12.57
CP-113 12.38
CP-121 12.7
CP-114 11.69
CP-104B 11.91
CP-115A 12.48
CP-115B 11.95
CP-104A 12.46
CP-112 12.00
UT-MW39-1 12.01
CP-106B 11.55
CP-106A 11.79
CP-GP12 11.91
CP-107 11.93
CP-GP11 10.73
CP-PR-13 10.55
CP-GP13 9.44
CP-110 10.78
B1-93 10.67
PNO-MW101 10.25
CP-111 10.49
PNO-MW104 10.60
CP-103A 10.85
CP-203B 8.98
CP-W210 10.34
CP-108B 7.70
CP-108A 10.94
CP-GP14 9.70
CP-GP06 9.83
CP-GP05 9.62
CP-GP07R 9.98
CP-GP02 10.14
PNO-MW02 9.61
PNO-MW06A 9.64
PNO-MW06B 6.28
CP-GP01B 7.54
CP-GP01A 9.63
CP-GP04R 9.63
CP-GP03AR 9.03
CP-GP03BR 4.27
PNO-MW103 8.74
CP-GP08 9.08
CP-GP10 8.29
CP-GP09R 8.72
12
11
10
9
0 Feet 150
1 inch = 150 feet
EagleView Technologies, Inc.

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Monitoring Well Network

- Shallow Aquifer Well
- Deep Aquifer Well
- Shallow Groundwater Sampling Well
- Deep Groundwater Sampling Well
- Piezometer

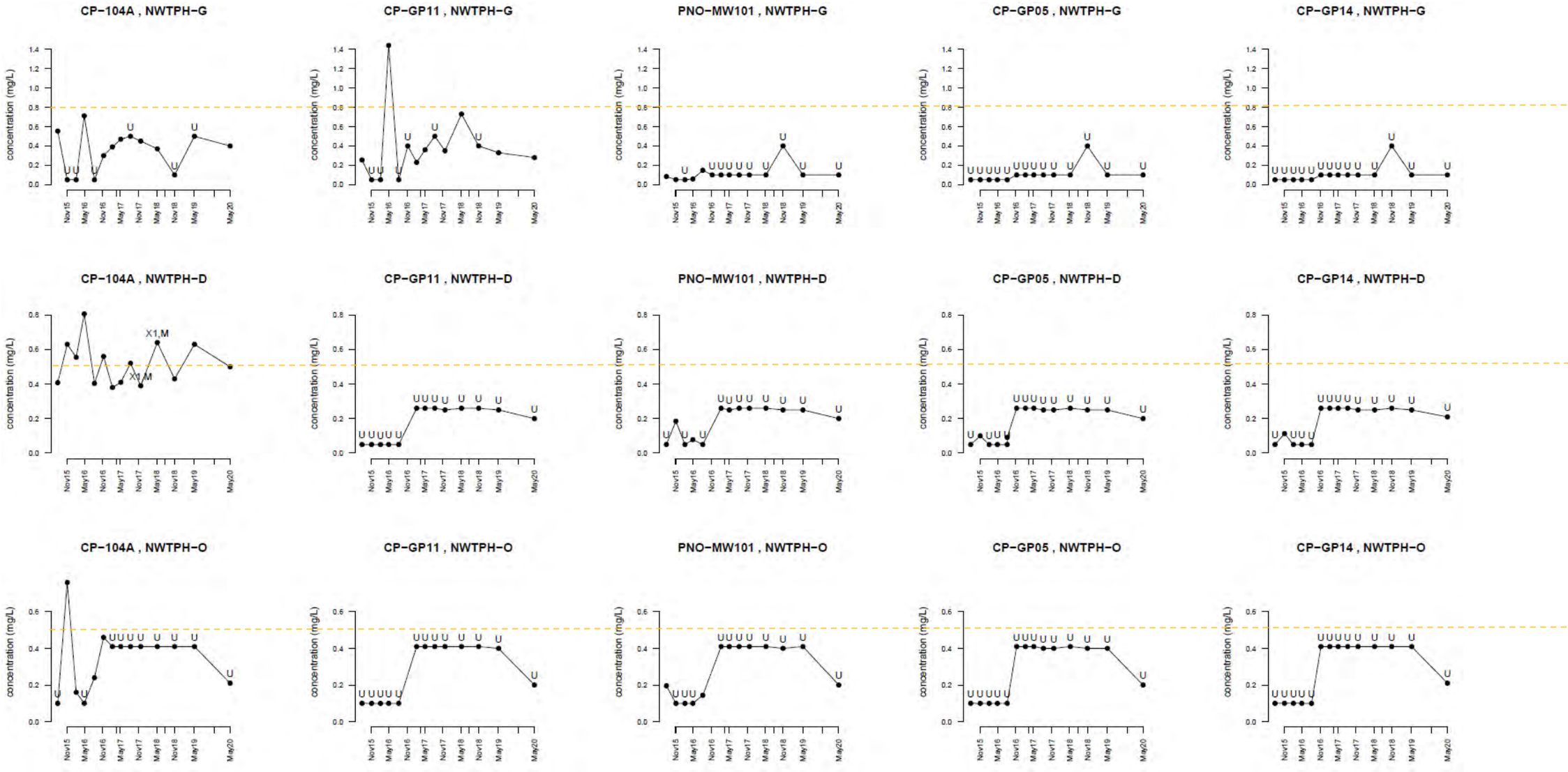
Shallow Aquifer (November 2018)

- Groundwater Elevation Contours
- Flow Directions
- Bulkhead
- Tank Farm
- Tank Farm Affected Area (TFAA) Boundary
- Bentonite Cutoff Wall
- AOC 11 (Old Tank Farm)

Figure 2.
Shallow Groundwater Elevations
May 2020

Terminal 91

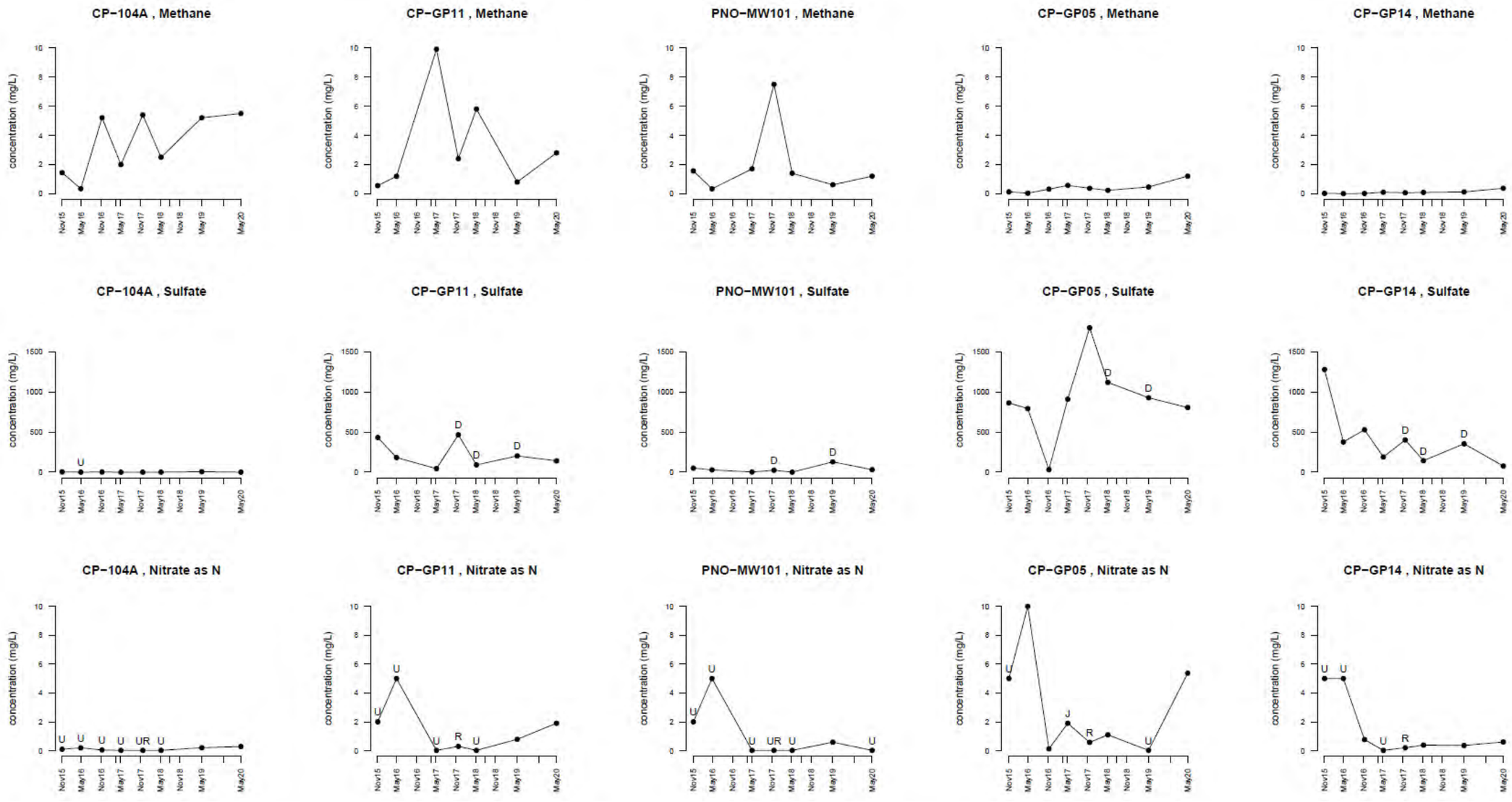
PgG



See Table 3 for data qualifiers.
Yellow dashed lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line above plot where cleanup levels are off-scale.
Plots arranged from Tank Farm (left) to end of flow path (right).

Figure 3a. AOC 11 Flowpath Time Series Plots: TPH
Terminal 91

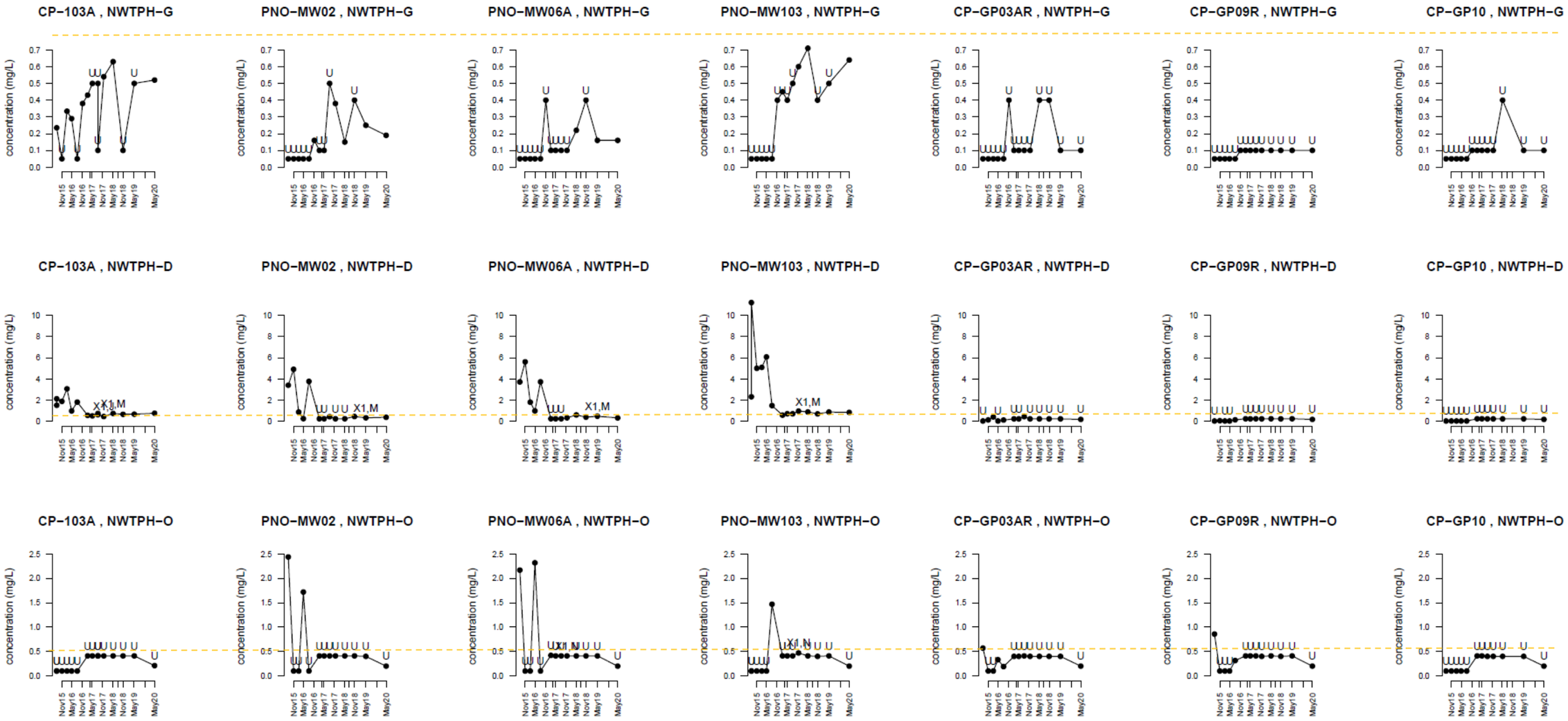
PgG



See Table 3 for data qualifiers.
Plots arranged from Tank Farm (left) to end of flow path (right).

Figure 3a. AOC 11 Flowpath Time Series Plots: MNA Parameters
Terminal 91

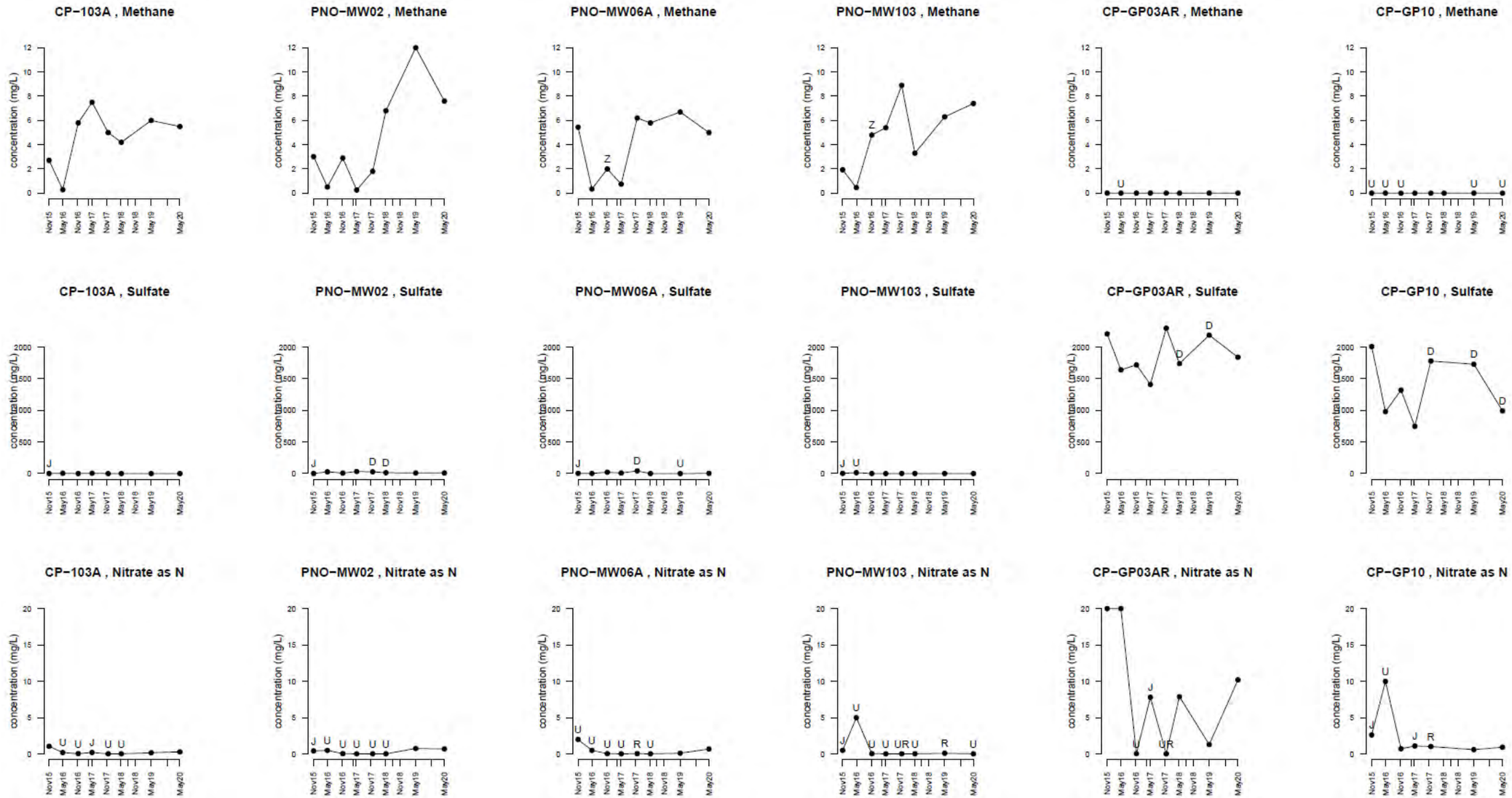
PgG



See Table 3 for data qualifiers.
Yellow dashed lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line above plot where cleanup levels are off-scale.
Plots arranged from Tank Farm (left) to end of flow path (right).

Figure 4a. Pier 91 Flowpath Time Series Plots: TPH
Terminal 91

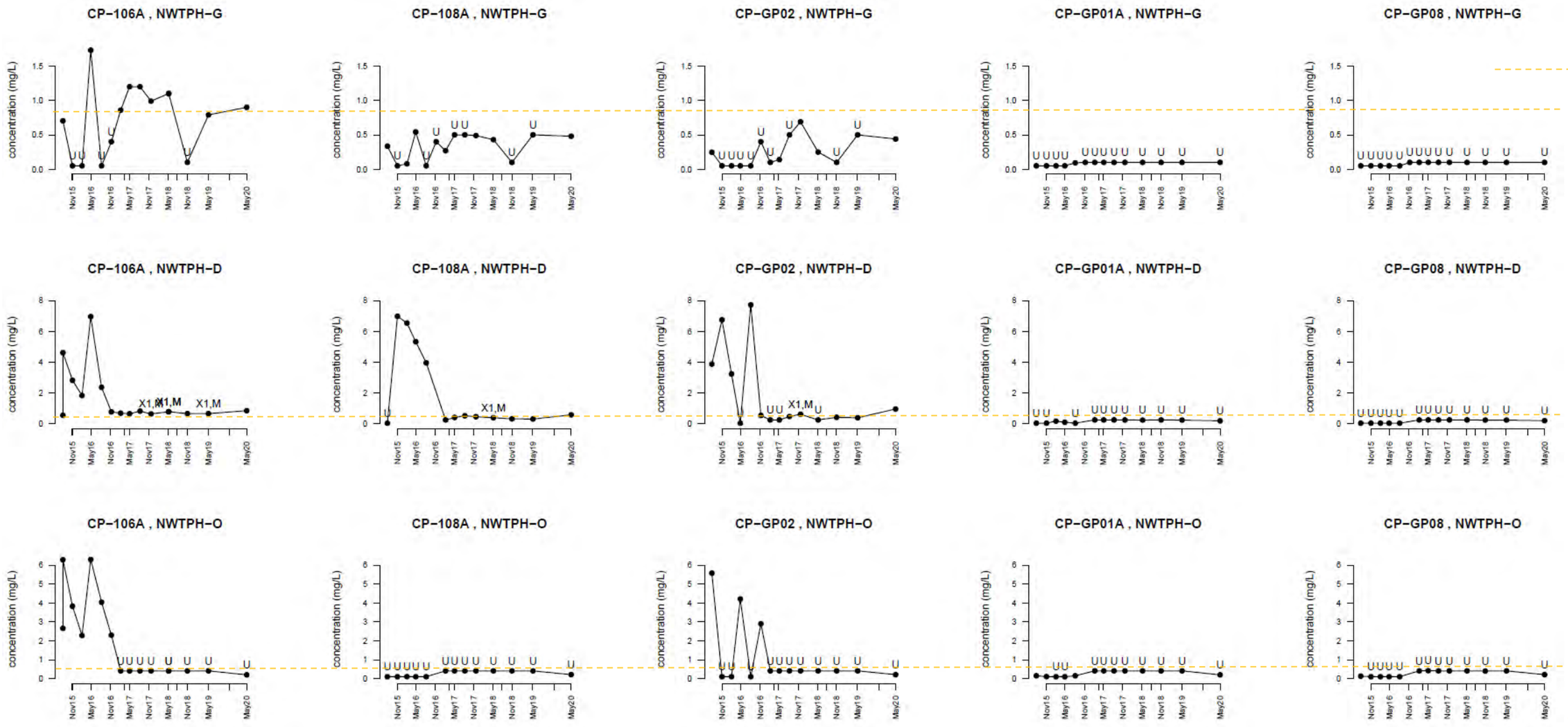
PgG



See Table 3 for data qualifiers.
Plots arranged from Tank Farm (left) to end of flow path (right).

Figure 4b. Pier 91 Flowpath Time Series Plots: MNA Parameters
Terminal 91

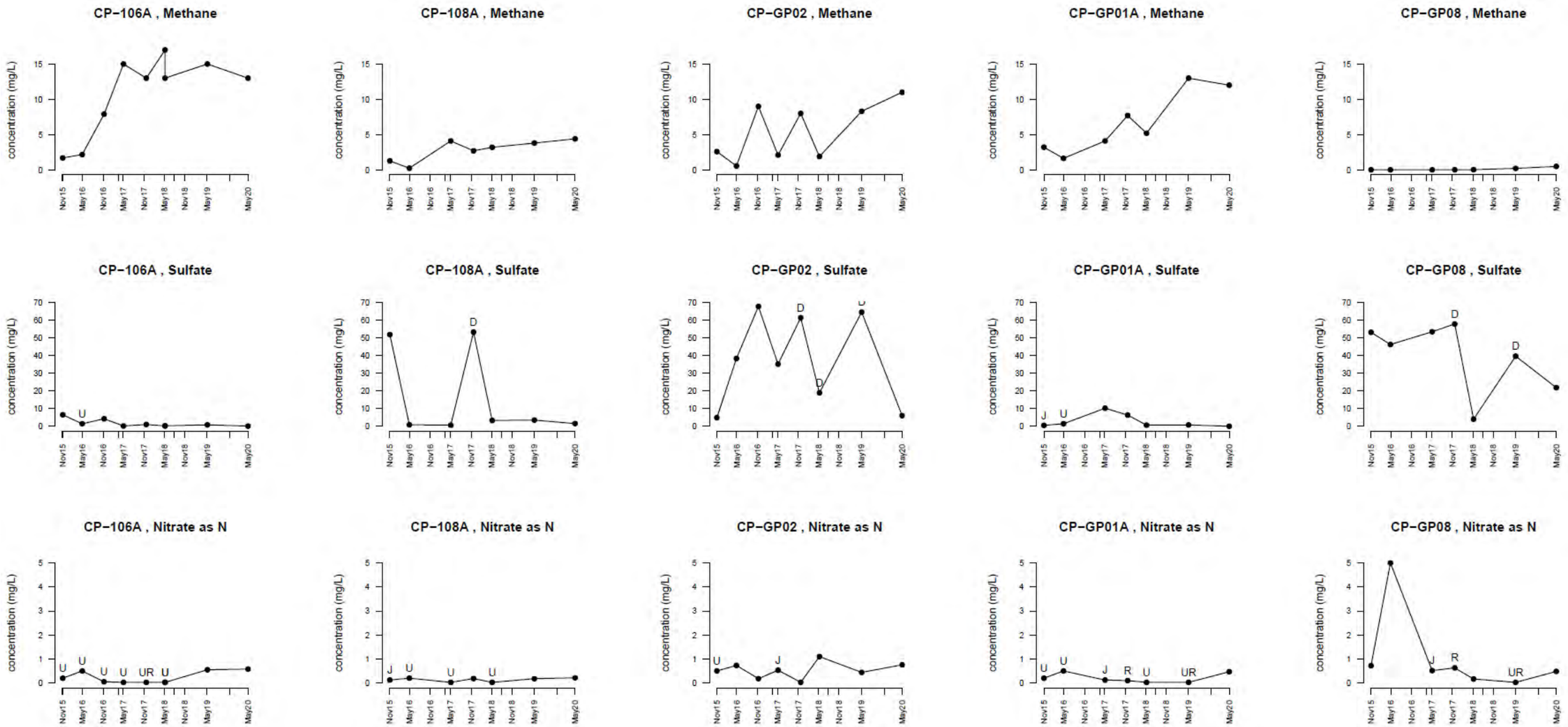
PgG



See Table 3 for data qualifiers.
Yellow dashed lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line above plot where cleanup levels are off-scale.
Plots arranged from Tank Farm (left) to end of flow path (right).

Figure 5a. Pier 90 Flowpath Time Series Plots: TPH
Terminal 91

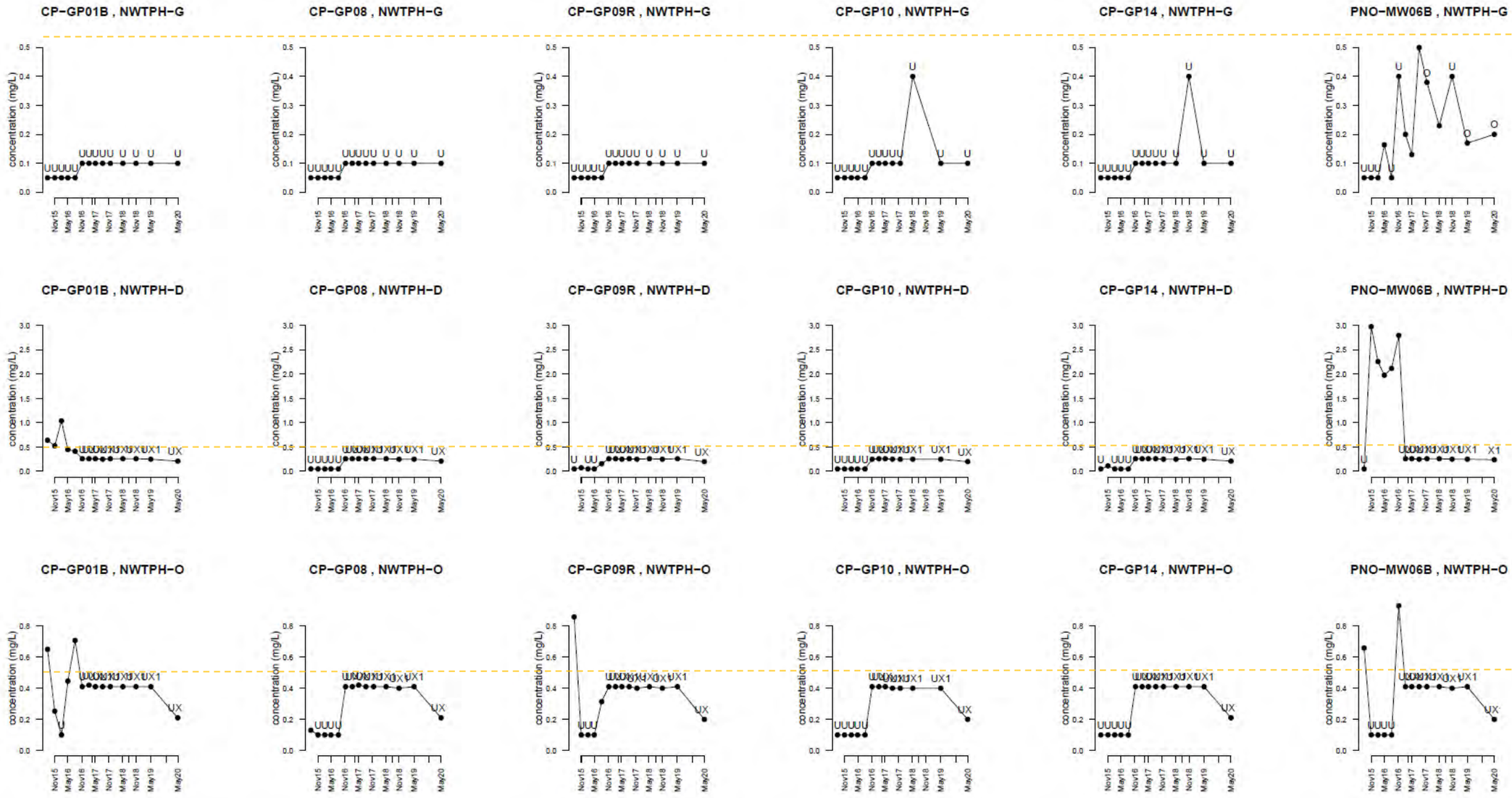
PgG



See Table 3 for data qualifiers.
Plots arranged from Tank Farm (left) to end of flow path (right).

Figure 5b. Pier 90 Flowpath Time Series Plots: MNA Parameters
Terminal 91

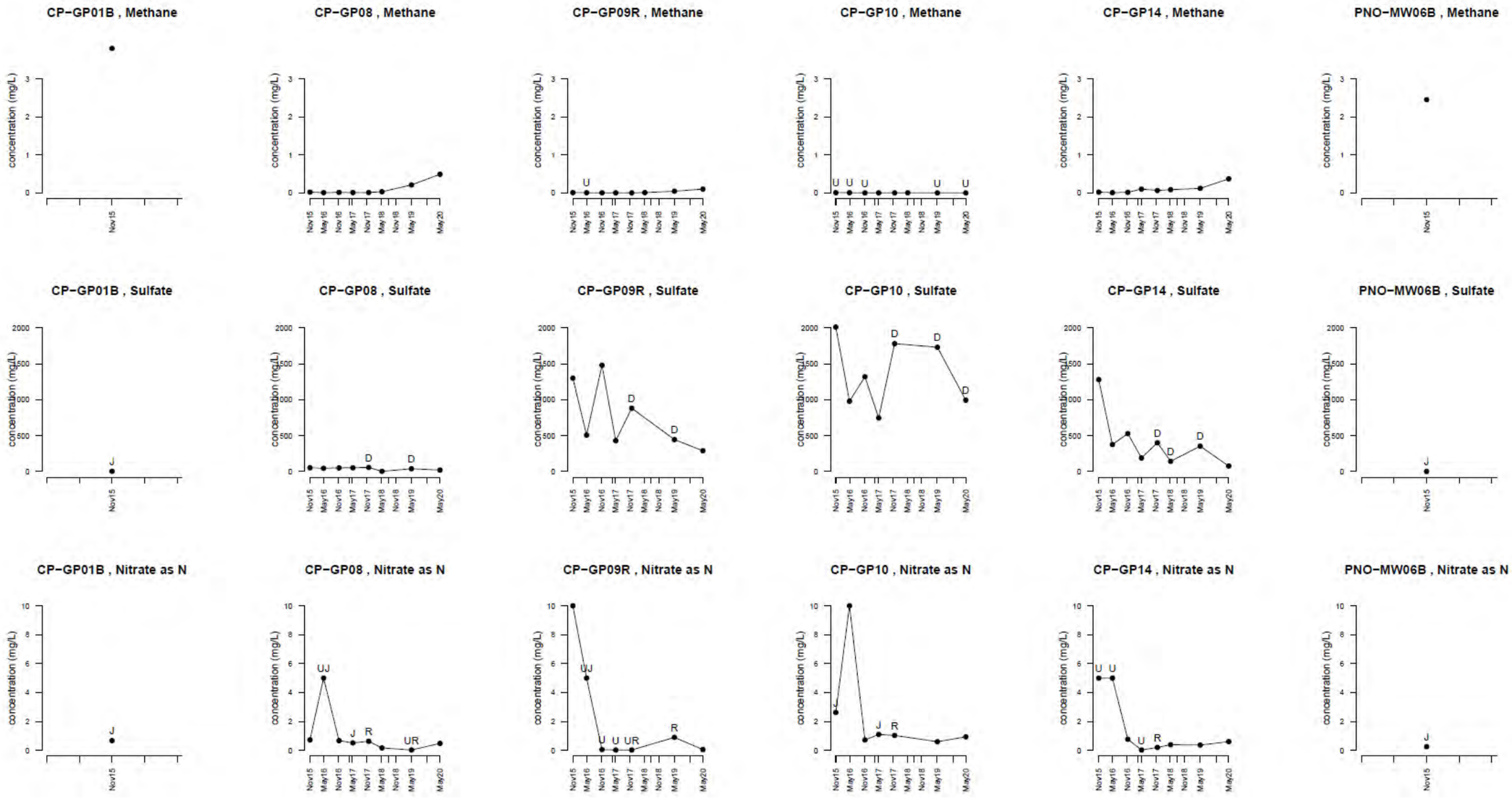
PgG



See Table 3 for data qualifiers.
Yellow dashed lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line above plot where cleanup levels are off-scale.

Figure 6a. CPOC Well Time Series Plots: TPH
Terminal 91

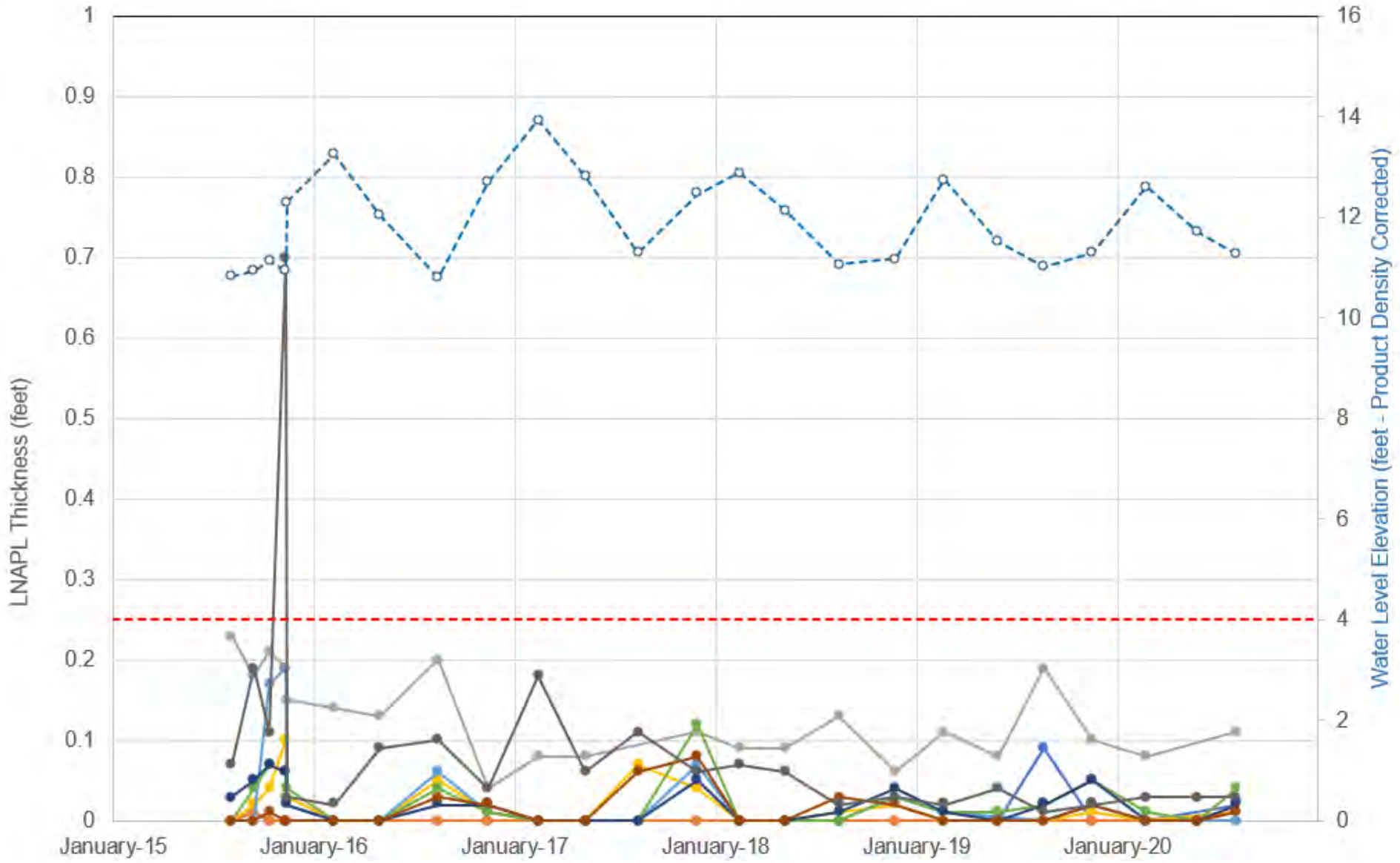
PgG



See Table 3 for data qualifiers.
Deep well completions with a "B" in the location name are not routinely sampled for these constituents under the Compliance Monitoring Plan (CMP).
CPOC: Conditional Point of Compliance.
MNA: Monitored Natural Attenuation.

Figure 6b. CPOC Well Time Series Plots: MNA Parameters
Terminal 91

PgG



The water level hydrograph for location Trench 5W is plotted to show seasonal high and low water levels relative to LNAPL thickness variations as discussed in text. LNAPL thickness is typically greatest during seasonal low water levels.

Figure 7
LNAPL Thickness Trends

Terminal 91

PgG

APPENDIX A
FIELD FORMS / LABORATORY ANALYTICAL REPORTS (ELECTRONIC ONLY)

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 24, 2020

Glen Wallace
Pacific Groundwater Group
2377 Eastlake Avenue E, Suite 200
Seattle, WA 98102

Re: Analytical Data for Project JG1601
Laboratory Reference No. 2005-222

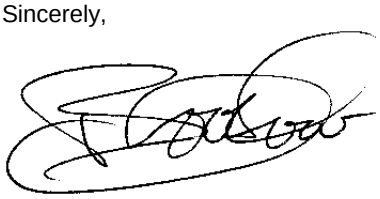
Dear Glen:

Enclosed are the analytical results and associated quality control data for samples submitted on May 29, 2020.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



Blair Goodrow
Project Manager

Enclosures

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
CP-203B	05-222-01	Water	5-28-20	5-29-20	
CP-205B	05-222-02	Water	5-28-20	5-29-20	
CP-108A	05-222-03	Water	5-28-20	5-29-20	
CP-108B	05-222-04	Water	5-28-20	5-29-20	
CP-114	05-222-05	Water	5-27-20	5-29-20	
CP-GP08	05-222-06	Water	5-27-20	5-29-20	
CP-103A	05-222-07	Water	5-28-20	5-29-20	

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

Case Narrative

Samples were collected on May 27 and 28, 2020 and received by the laboratory on May 29, 2020. They were maintained at the laboratory at a temperature of 2°C to 6°C. Please see Sample/Cooler Receipt form at the end of the report.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-203B**					
Laboratory ID:	05-222-01					
Gasoline	**370**	100	NWTPH-Gx	6-3-20	6-3-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*79*	*65-120*				
Client ID:	**CP-205B**					
Laboratory ID:	05-222-02					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*65-120*				
Client ID:	**CP-108A**					
Laboratory ID:	05-222-03					
Gasoline	**480**	100	NWTPH-Gx	6-3-20	6-3-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*74*	*65-120*				
Client ID:	**CP-108B**					
Laboratory ID:	05-222-04					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*74*	*65-120*				
Client ID:	**CP-114**					
Laboratory ID:	05-222-05					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*65-120*				
Client ID:	**CP-GP08**					
Laboratory ID:	05-222-06					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*76*	*65-120*				
Client ID:	**CP-103A**					
Laboratory ID:	05-222-07					
Gasoline	**520**	100	NWTPH-Gx	6-3-20	6-3-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*75*	*65-120*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0603W2					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*79*	*65-120*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-222-01										
	ORIG	DUP									
Gasoline	**365**	**354**	NA	NA		NA		NA	3	30	
Surrogate:											
Fluorobenzene						*79*	*80*	*65-120*			

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-203B**					
Laboratory ID:	05-222-01					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*87*	*75-127*				
Toluene-d8	*100*	*80-127*				
4-Bromofluorobenzene	*91*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-205B**					
Laboratory ID:	05-222-02					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*97*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-108A**					
Laboratory ID:	05-222-03					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*88*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*93*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-108B**					
Laboratory ID:	05-222-04					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*75-127*				
Toluene-d8	*106*	*80-127*				
4-Bromofluorobenzene	*97*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-114**					
Laboratory ID:	05-222-05					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*83*	*75-127*				
Toluene-d8	*101*	*80-127*				
4-Bromofluorobenzene	*92*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP08**					
Laboratory ID:	05-222-06					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*82*	*75-127*				
Toluene-d8	*100*	*80-127*				
4-Bromofluorobenzene	*90*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-103A**					
Laboratory ID:	05-222-07					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	0.61	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*77*	*75-127*				
Toluene-d8	*98*	*80-127*				
4-Bromofluorobenzene	*87*	*78-125*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

BTEX by EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0530W2					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*75-127*				
Toluene-d8	*106*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	05-221-02										
	MS	MSD	MS	MSD		MS	MSD				
1,1-Dichloroethene	**9.72**	**9.99**	10.0	10.0	ND	97	100	68-122	3	15	
Benzene	**9.39**	**9.69**	10.0	10.0	ND	94	97	70-121	3	16	
Trichloroethene	**10.9**	**10.9**	10.0	10.0	ND	109	109	80-121	0	17	
Toluene	**10.7**	**11.1**	10.0	10.0	ND	107	111	78-117	4	19	
Chlorobenzene	**9.64**	**10.3**	10.0	10.0	ND	96	103	80-120	7	16	
Surrogate:											
Dibromofluoromethane						*86*	*80*	*75-127*			
Toluene-d8						*103*	*99*	*80-127*			
4-Bromofluorobenzene						*106*	*107*	*78-125*			

SPIKE BLANK					
Laboratory ID:	SB0530W1				
1,1-Dichloroethene	**9.78**	10.0		98	65-126
Benzene	**9.57**	10.0		96	71-119
Trichloroethene	**11.2**	10.0		112	82-123
Toluene	**11.5**	10.0		115	77-119
Chlorobenzene	**10.1**	10.0		101	80-120
Surrogate:					
Dibromofluoromethane				*81*	*75-127*
Toluene-d8				*100*	*80-127*
4-Bromofluorobenzene				*107*	*78-125*

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-203B**					
Laboratory ID:	05-222-01					
Diesel Range Organics	**0.30**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*113*	*50-150*				
Client ID:	**CP-205B**					
Laboratory ID:	05-222-02					
Diesel Range Organics	**ND**	0.22	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.22	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*97*	*50-150*				
Client ID:	**CP-108A**					
Laboratory ID:	05-222-03					
Diesel Range Organics	**0.59**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*135*	*50-150*				
Client ID:	**CP-108B**					
Laboratory ID:	05-222-04					
Diesel Range Organics	**ND**	0.22	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.22	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*119*	*50-150*				
Client ID:	**CP-114**					
Laboratory ID:	05-222-05					
Diesel Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*117*	*50-150*				
Client ID:	**CP-GP08**					
Laboratory ID:	05-222-06					
Diesel Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*117*	*50-150*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-103A**					
Laboratory ID:	05-222-07					
Diesel Range Organics	**0.78**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*116*	*50-150*				

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0603W1					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-3-20	6-3-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-3-20	6-3-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*120*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-222-01										
	ORIG	DUP									
Diesel Range Organics	**0.303**	**0.271**	NA	NA		NA		NA	11	NA	X1
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	X1
Surrogate:											
o-Terphenyl						*113*	*102*	*50-150*			
SPIKE BLANK											
Laboratory ID:	SB0603W1 ACU										
Diesel Fuel #2	**0.498**		0.500		NA	**100**		57-129	NA	NA	X1
Surrogate:											
o-Terphenyl						*131*		*50-150*			

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

DISSOLVED METHANE
RSK 175

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-108A**					
Laboratory ID:	05-222-03					
Methane	**4400**	28	RSK 175	6-4-20	6-4-20	
Client ID:	**CP-114**					
Laboratory ID:	05-222-05					
Methane	**1100**	8.3	RSK 175	6-4-20	6-4-20	
Client ID:	**CP-GP08**					
Laboratory ID:	05-222-06					
Methane	**490**	2.8	RSK 175	6-4-20	6-4-20	
Client ID:	**CP-103A**					
Laboratory ID:	05-222-07					
Methane	**5500**	42	RSK 175	6-4-20	6-4-20	

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

DISSOLVED METHANE
RSK 175
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0604W1					
Methane	**ND**	0.55	RSK 175	6-4-20	6-4-20	

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK										
Laboratory ID:	SB0604W1									
	SB	SBD	SB	SBD	SB	SBD				
Methane	**21.6**	**22.0**	22.1	22.1	98	100	75-125	2	25	

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

TOTAL MANGANESE
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-108A**					
Laboratory ID:	05-222-03					
Manganese	**43**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-114**					
Laboratory ID:	05-222-05					
Manganese	**17**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP08**					
Laboratory ID:	05-222-06					
Manganese	**100**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-103A**					
Laboratory ID:	05-222-07					
Manganese	**310**	11	EPA 6010D	6-4-20	6-4-20	

Date of Report: June 24, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-222
Project: JG1601

TOTAL MANGANESE
EPA 6010D
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0604WM1					
Manganese	**ND**	11	EPA 6010D	6-4-20	6-4-20	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-221-02										
	ORIG	DUP									
Manganese	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	05-221-02										
	MS	MSD	MS	MSD		MS	MSD				
Manganese	**492**	**503**	556	556	ND	**89**	**91**	75-125	2	20	
SPIKE BLANK											
Laboratory ID:	SB0604WM1										
Manganese	**586**		556		N/A	**105**		80-120			

OnSite Environmental Inc.

Data Qualifiers

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260D, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: PGG
Project Number: J61601
Project Name: T91
Project Manager: Glen Wallace
Sampled by: NBW/TK

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 05-222

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX by 8260	NWTPH-Gx	NWTPH-Dx (☒ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Nitrate and Sulfate	Total Manganese	Dissolved Methane		% Moisture
1	CP-203B	5/28	1628	W	7		X		X																		
2	CP-205B	5/28	1414	W	7		X		X																		
3	CP-108A	5/28	1202	W	11		X		X														X	X	X		
4	CP-108B	5/28	1029	W	7		X		X																		
5	CP-114	5/27	1629	W	11		X		X														X	X	X		
6	CP-GP08	5/27	1452	W	11		X		X														X	X	X		
7	CP-103A	5/28	1724	W	11		X		X														X	X	X		

	Signature	Company	Date	Time
Relinquished		PGG	5/29/22	9:50
Received		ACPHA	5/29/22	0950
Relinquished		ACPHA	5/29/22	1030
Received		OSE	5/29/22	1030
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Sample/Cooler Receipt and Acceptance Checklist

Client: PGG

Client Project Name/Number: JG1601

OnSite Project Number: 05-222

Initiated by: KL

Date Initiated: 5/29/20

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	(No)	N/A	1 2 3 4	
1.2 Were the custody seals intact?	Yes	No	(N/A)	1 2 3 4	
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	(N/A)	1 2 3 4	
1.4 Were the samples delivered on ice or blue ice?	(Yes)	No		1 2 3 4	
1.5 Were samples received between 0-6 degrees Celsius?	(Yes)	No	Temperature: 5/4.3		
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	(N/A)			
1.7 How were the samples delivered?	Client	(Courier)	UPS/FedEx	OSE Pickup	Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	(Yes)	No	1 2 3 4	
2.2 Was the COC legible and written in permanent ink?	(Yes)	No	1 2 3 4	
2.3 Have samples been relinquished and accepted by each custodian?	(Yes)	No	1 2 3 4	
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	(Yes)	No	1 2 3 4	
2.5 Were all of the samples listed on the COC submitted?	(Yes)	No	1 2 3 4	
2.6 Were any of the samples submitted omitted from the COC?	Yes	(No)	1 2 3 4	

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	(No)		1 2 3 4	
3.2 Were any sample labels missing or illegible?	Yes	(No)		1 2 3 4	
3.3 Have the correct containers been used for each analysis requested?	(Yes)	No		1 2 3 4	
3.4 Have the samples been correctly preserved?	(Yes)	No	N/A	1 2 3 4	
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	(Yes)	No	N/A	1 2 3 4	
3.6 Is there sufficient sample submitted to perform requested analyses?	(Yes)	No		1 2 3 4	
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	(No)		1 2 3 4	
3.8 Was method 5035A used?	Yes	No	(N/A)	1 2 3 4	
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		(N/A)	1 2 3 4	

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 10, 2020

Glen Wallace
Pacific Groundwater Group
2377 Eastlake Avenue E, Suite 200
Seattle, WA 98102

Re: Analytical Data for Project JG1601
Laboratory Reference No. 2005-221

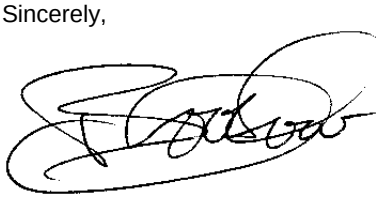
Dear Glen:

Enclosed are the analytical results and associated quality control data for samples submitted on May 29, 2020.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



Blair Goodrow
Project Manager

Enclosures

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
PN0-MW103	05-221-01	Water	5-28-20	5-29-20	
CP-GP03AR	05-221-02	Water	5-28-20	5-29-20	
PN0-MW101	05-221-03	Water	5-28-20	5-29-20	
CP-GP11	05-221-04	Water	5-28-20	5-29-20	
CP-GP05	05-221-05	Water	5-27-20	5-29-20	
CP-GP14	05-221-06	Water	5-27-20	5-29-20	
CP-106A	05-221-07	Water	5-28-20	5-29-20	

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

Case Narrative

Samples were collected on May 27 and 28, 2020 and received by the laboratory on May 29, 2020. They were maintained at the laboratory at a temperature of 2°C to 6°C. Please see Sample/Cooler Receipt form at the end of the report.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PN0-MW103**					
Laboratory ID:	05-221-01					
Gasoline	**640**	100	NWTPH-Gx	6-3-20	6-3-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*73*	*65-120*				
Client ID:	**CP-GP03AR**					
Laboratory ID:	05-221-02					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*65-120*				
Client ID:	**PN0-MW101**					
Laboratory ID:	05-221-03					
Gasoline	**ND**	100	NWTPH-Gx	6-5-20	6-5-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*65-120*				
Client ID:	**CP-GP11**					
Laboratory ID:	05-221-04					
Gasoline	**280**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*80*	*65-120*				
Client ID:	**CP-GP05**					
Laboratory ID:	05-221-05					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*65-120*				
Client ID:	**CP-GP14**					
Laboratory ID:	05-221-06					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*80*	*65-120*				
Client ID:	**CP-106A**					
Laboratory ID:	05-221-07					
Gasoline	**900**	100	NWTPH-Gx	6-3-20	6-3-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*75*	*65-120*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0603W1					
Gasoline	**ND**	100	NWTPH-Gx	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*65-120*				
Laboratory ID:	MB0605W1					
Gasoline	**ND**	100	NWTPH-Gx	6-5-20	6-5-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*104*	*65-120*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-221-02										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*77*	*75*	*65-120*			

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PN0-MW103**					
Laboratory ID:	05-221-01					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	0.24	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*96*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP03AR**					
Laboratory ID:	05-221-02					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*84*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*114*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PN0-MW101**					
Laboratory ID:	05-221-03					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*94*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*100*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP11**					
Laboratory ID:	05-221-04					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*105*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP05**					
Laboratory ID:	05-221-05					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP14**					
Laboratory ID:	05-221-06					
Benzene	ND	0.20	EPA 8260D	6-3-20	6-3-20	
Toluene	ND	1.0	EPA 8260D	6-3-20	6-3-20	
Ethylbenzene	ND	0.20	EPA 8260D	6-3-20	6-3-20	
m,p-Xylene	ND	0.40	EPA 8260D	6-3-20	6-3-20	
o-Xylene	ND	0.20	EPA 8260D	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*95*	*75-127*				
Toluene-d8	*102*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-106A**					
Laboratory ID:	05-221-07					
Benzene	3.7	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	0.49	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*82*	*75-127*				
Toluene-d8	*106*	*80-127*				
4-Bromofluorobenzene	*91*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0530W2					
Benzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Toluene	ND	1.0	EPA 8260D	5-30-20	5-30-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-30-20	5-30-20	
o-Xylene	ND	0.20	EPA 8260D	5-30-20	5-30-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*75-127*				
Toluene-d8	*106*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				
Laboratory ID:	MB0603W1					
Benzene	ND	0.20	EPA 8260D	6-3-20	6-3-20	
Toluene	ND	1.0	EPA 8260D	6-3-20	6-3-20	
Ethylbenzene	ND	0.20	EPA 8260D	6-3-20	6-3-20	
m,p-Xylene	ND	0.40	EPA 8260D	6-3-20	6-3-20	
o-Xylene	ND	0.20	EPA 8260D	6-3-20	6-3-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*75-127*				
Toluene-d8	*98*	*80-127*				
4-Bromofluorobenzene	*101*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

BTEX by EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	05-221-02										
	MS	MSD	MS	MSD		MS	MSD				
1,1-Dichloroethene	**9.72**	**9.99**	10.0	10.0	ND	97	100	68-122	3	15	
Benzene	**9.39**	**9.69**	10.0	10.0	ND	94	97	70-121	3	16	
Trichloroethene	**10.9**	**10.9**	10.0	10.0	ND	109	109	80-121	0	17	
Toluene	**10.7**	**11.1**	10.0	10.0	ND	107	111	78-117	4	19	
Chlorobenzene	**9.64**	**10.3**	10.0	10.0	ND	96	103	80-120	7	16	
Surrogate:											
Dibromofluoromethane						*86*	*80*	*75-127*			
Toluene-d8						*103*	*99*	*80-127*			
4-Bromofluorobenzene						*106*	*107*	*78-125*			
SPIKE BLANK											
Laboratory ID:	SB0530W1										
1,1-Dichloroethene	**9.78**		10.0			98		65-126			
Benzene	**9.57**		10.0			96		71-119			
Trichloroethene	**11.2**		10.0			112		82-123			
Toluene	**11.5**		10.0			115		77-119			
Chlorobenzene	**10.1**		10.0			101		80-120			
Surrogate:											
Dibromofluoromethane						*81*		*75-127*			
Toluene-d8						*100*		*80-127*			
4-Bromofluorobenzene						*107*		*78-125*			
SPIKE BLANKS											
Laboratory ID:	SB0603W1										
	SB	SBD	SB	SBD		SB	SBD				
1,1-Dichloroethene	**9.15**	**9.23**	10.0	10.0		92	92	65-126	1	19	
Benzene	**8.83**	**8.81**	10.0	10.0		88	88	71-119	0	16	
Trichloroethene	**10.3**	**9.94**	10.0	10.0		103	99	82-123	4	18	
Toluene	**9.44**	**9.10**	10.0	10.0		94	91	77-119	4	18	
Chlorobenzene	**9.79**	**9.50**	10.0	10.0		98	95	80-120	3	17	
Surrogate:											
Dibromofluoromethane						*94*	*95*	*75-127*			
Toluene-d8						*102*	*99*	*80-127*			
4-Bromofluorobenzene						*101*	*100*	*78-125*			

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PN0-MW103**					
Laboratory ID:	05-221-01					
Diesel Range Organics	**0.86**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*120*	*50-150*				
Client ID:	**CP-GP03AR**					
Laboratory ID:	05-221-02					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*122*	*50-150*				
Client ID:	**PN0-MW101**					
Laboratory ID:	05-221-03					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*120*	*50-150*				
Client ID:	**CP-GP11**					
Laboratory ID:	05-221-04					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*119*	*50-150*				
Client ID:	**CP-GP05**					
Laboratory ID:	05-221-05					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*127*	*50-150*				
Client ID:	**CP-GP14**					
Laboratory ID:	05-221-06					
Diesel Range Organics	**ND**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*115*	*50-150*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-106A**					
Laboratory ID:	05-221-07					
Diesel Range Organics	**0.86**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*123*	*50-150*				

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0601W1					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*115*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	05-221-02									
	ORIG	DUP								
Diesel Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	X1
Lube Oil Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	X1
Surrogate:										
o-Terphenyl						*122* *117*	*50-150*			
SPIKE BLANK										
Laboratory ID:	SB0601W1 ACU									
Diesel Fuel #2	**0.477**		0.500		NA	**95**	57-129	NA	NA	X1
Surrogate:										
o-Terphenyl						*109*	*50-150*			

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

DISSOLVED METHANE
RSK 175

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PN0-MW103**					
Laboratory ID:	05-221-01					
Methane	**7400**	42	RSK 175	6-5-20	6-5-20	
Client ID:	**CP-GP03AR**					
Laboratory ID:	05-221-02					
Methane	**8.8**	0.55	RSK 175	6-5-20	6-5-20	
Client ID:	**PN0-MW101**					
Laboratory ID:	05-221-03					
Methane	**1200**	8.3	RSK 175	6-5-20	6-5-20	
Client ID:	**CP-GP11**					
Laboratory ID:	05-221-04					
Methane	**2800**	17	RSK 175	6-5-20	6-5-20	
Client ID:	**CP-GP05**					
Laboratory ID:	05-221-05					
Methane	**1200**	8.3	RSK 175	6-5-20	6-5-20	
Client ID:	**CP-GP14**					
Laboratory ID:	05-221-06					
Methane	**370**	2.8	RSK 175	6-5-20	6-5-20	
Client ID:	**CP-106A**					
Laboratory ID:	05-221-07					
Methane	**13000**	83	RSK 175	6-5-20	6-5-20	

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

DISSOLVED METHANE
RSK 175
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0605W1					
Methane	**ND**	0.55	RSK 175	6-5-20	6-5-20	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	05-221-02										
	MS	MSD	MS	MSD		MS	MSD				
Methane	**26.7**	**25.6**	22.1	22.1	8.76	81	76	75-125	4	25	
SPIKE BLANK											
Laboratory ID:	SB0605W1										
	SB	SBD	SB	SBD		SB	SBD				
Methane	**22.5**	**21.3**	22.1	22.1		102	96	75-125	5	25	

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

TOTAL MANGANESE
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PN0-MW103**					
Laboratory ID:	05-221-01					
Manganese	**720**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP03AR**					
Laboratory ID:	05-221-02					
Manganese	**ND**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**PN0-MW101**					
Laboratory ID:	05-221-03					
Manganese	**710**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP11**					
Laboratory ID:	05-221-04					
Manganese	**42**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP05**					
Laboratory ID:	05-221-05					
Manganese	**94**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP14**					
Laboratory ID:	05-221-06					
Manganese	**26**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-106A**					
Laboratory ID:	05-221-07					
Manganese	**500**	11	EPA 6010D	6-4-20	6-4-20	

Date of Report: June 10, 2020
Samples Submitted: May 29, 2020
Laboratory Reference: 2005-221
Project: JG1601

TOTAL MANGANESE
EPA 6010D
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0604WM1					
Manganese	**ND**	11	EPA 6010D	6-4-20	6-4-20	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-221-02										
	ORIG	DUP									
Manganese	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	05-221-02										
	MS	MSD	MS	MSD		MS	MSD				
Manganese	**492**	**503**	556	556	ND	**89**	**91**	75-125	2	20	
SPIKE BLANK											
Laboratory ID:	SB0604WM1										
Manganese	**586**		556		N/A	**105**		80-120			

OnSite Environmental Inc.

Data Qualifiers

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260D, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional Analytical Services

Jun 9 2020
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
PNO-MW103	Water	20-A007316	NUT, MIN
CP-GP03AR	Water	20-A007317	NUT, MIN
PNO-MW101	Water	20-A007318	NUT, MIN
CP-GP11	Water	20-A007319	NUT, MIN
CP-GP05	Water	20-A007320	NUT, MIN
CP-GP14	Water	20-A007321	NUT, MIN
CP-106A	Water	20-A007322	NUT, MIN
CP-108A	Water	20-A007323	NUT, MIN
CP-114	Water	20-A007324	NUT, MIN
CP-GP08	Water	20-A007325	NUT, MIN
CP-103A	Water	20-A007326	NUT, MIN

Your samples were received on Friday, May 29, 2020. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Aaron W. Young
Laboratory Manager

PO Number: 05-221

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

Am Test Inc.
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Professional Analytical Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
PO Number: 05-221
All results reported on an as received basis.

Date Received: 05/29/20
Date Reported: 6/ 9/20

AMTEST Identification Number **20-A007316**
Client Identification **PNO-MW103**
Sampling Date **05/28/20, 10:00**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	0.10	mg/l		0.1	EPA 300.0	AW	05/29/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	< 0.025	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007317**
Client Identification **CP-GP03AR**
Sampling Date **05/28/20, 11:45**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	1840	mg/l		0.1	EPA 300.0	AY	06/02/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	10.2	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007318**
Client Identification **PNO-MW101**
Sampling Date **05/28/20, 13:10**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	31.8	mg/l		0.1	EPA 300.0	AY	06/04/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	< 0.025	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007319**
Client Identification **CP-GP11**
Sampling Date **05/28/20, 14:45**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	142.	mg/l		0.1	EPA 300.0	AY	06/02/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	1.90	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007320**
Client Identification **CP-GP05**
Sampling Date **05/28/20, 17:30**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	806.	mg/l		0.1	EPA 300.0	AY	06/02/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	5.37	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007321**
Client Identification **CP-GP14**
Sampling Date **05/28/20, 15:45**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	77.3	mg/l		0.1	EPA 300.0	AY	06/02/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.604	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007322**
Client Identification **CP-106A**
Sampling Date **05/28/20, 16:10**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	0.18	mg/l		0.1	EPA 300.0	AW	05/29/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.581	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007323**
Client Identification **CP-108A**
Sampling Date **05/28/20, 12:02**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	1.61	mg/l		0.1	EPA 300.0	AW	05/29/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.216	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007324**
Client Identification **CP-114**
Sampling Date **05/27/20, 16:29**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	14.6	mg/l		0.1	EPA 300.0	AY	06/02/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	1.03	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007325**
Client Identification **CP-GP08**
Sampling Date **05/27/20, 14:52**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	21.9	mg/l		0.1	EPA 300.0	AY	06/02/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.481	mg/l		0.025	EPA 300.0	AW	05/29/20

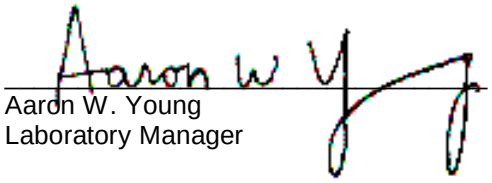
AMTEST Identification Number **20-A007326**
Client Identification **CP-103A**
Sampling Date **05/28/20, 17:24**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	0.32	mg/l		0.1	EPA 300.0	AW	05/29/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.294	mg/l		0.025	EPA 300.0	AW	05/29/20



Aaron W. Young
Laboratory Manager

Am Test Inc.
13600 NE 126th PL
Suite C
Kirkland, WA, 98034
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Professional Analytical Services

QC Summary for sample numbers: 20-A007316 to 20-A007326

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
20-A007308	Nitrate	mg/l	1.36	1.31	3.7
20-A007312	Nitrate	mg/l	0.296	0.283	4.5
20-A007360	Nitrate	mg/l	1.07	1.07	0.00
20-A007315	Sulfate	mg/l	< 0.1	< 0.1	
20-A007553	Sulfate	mg/l	0.97	0.99	2.0

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
20-A007308	Nitrate	mg/l	1.36	3.97	2.00	130.50 %
20-A007312	Nitrate	mg/l	0.296	2.36	2.00	103.20 %
20-A007360	Nitrate	mg/l	1.07	3.09	2.00	101.00 %
20-A007315	Sulfate	mg/l	< 0.1	2.07	2.00	103.50 %
20-A007553	Sulfate	mg/l	0.97	3.05	2.00	104.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Nitrate	mg/l	2.00	2.12	106. %
Nitrate	mg/l	2.00	2.14	107. %
Nitrate	mg/l	2.00	2.07	104. %
Sulfate	mg/l	2.00	2.00	100. %
Sulfate	mg/l	2.00	2.03	102. %
Sulfate	mg/l	2.00	2.05	102. %
Sulfate	mg/l	2.00	2.03	102. %
Sulfate	mg/l	2.00	2.04	102. %
Sulfate	mg/l	2.00	2.04	102. %

BLANKS

ANALYTE	UNITS	RESULT
Nitrate	mg/l	< 0.025
Nitrate	mg/l	< 0.025
Nitrate	mg/l	< 0.025
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1
Sulfate	mg/l	< 0.1

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 05-221

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

(Standard)

Other: _____

Project Manager: Blair Goodrow

email: bgoodrow@onsite-env.com

Project Number: JG1601

Project Name: Terminal 91

Lab ID	Sample Identification		Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
1	PNO-MW103	7316	5/28/20	10:00	Water	1	Nitrate, Sulfate EPA 300.0
2	CP-GP03AR	17	5/28/20	11:45	Water	1	Nitrate, Sulfate EPA 300.0 (QC THIS SAMPLE)
3	PNO-MW101	18	5/28/20	13:10	Water	1	Nitrate, Sulfate EPA 300.0
4	CP-GP11	19	5/28/20	14:45	Water	1	Nitrate, Sulfate EPA 300.0
5	CP-GP05	20	5/27/20	17:30	Water	1	Nitrate, Sulfate EPA 300.0
6	CP-GP14	21	5/27/20	15:45	Water	1	Nitrate, Sulfate EPA 300.0
7	CP-106A	22	5/28/20	16:10	Water	1	Nitrate, Sulfate EPA 300.0
10	CP-108A	23	5/28/20	12:02	Water	1	Nitrate, Sulfate EPA 300.0
12	CP-114	24	5/27/20	16:29	Water	1	Nitrate, Sulfate EPA 300.0
13	CP-GP08	25	5/27/20	14:52	Water	1	Nitrate, Sulfate EPA 300.0
14	CP-103A	26	5/28/20	17:24	Water	1	Nitrate, Sulfate EPA 300.0

Signature	Company	Date	Time	Comments/Special Instructions
Relinquished by:	OnSite Env	5/29/20	1110	
Received by:	Amtest	5/29/20	1110	Reporting Limits for both - 100 ppb
Relinquished by:				EDDs - excel and POS formats
Received by:				
Relinquished by:				
Received by:				

Client T=8.5

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Pacific Groundwater Group
Project Number: JG1601
Project Name: Terminal 91
Project Manager: Glen Wallace
Sampled by: NBW & TWK

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 05-221

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX by 8260	NWTPH-Gx	NWTPH-Dx (☒ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Total Manganese	Diss. Gasses	Nitrate Sulfate		% Moisture
1	PND-MW103	5/28	N 10:00	GW	11	~~X~~	X		X														X	X	X		
2	CP-GP03AR (MSMSD)	5/28	~~N~~ 11:45	GW	17		X		X														X	X	X		
3	PND-MW101	5/28	N 13:10	GW	11		X		X														X	X	X		
4	CP-GP11	5/28	N 14:45	GW	11		X		X														X	X	X		
5	CP-GP05	5/27	17:30	GW	11		X		X														X	X	X		
6	CP-GP14	5/27	15:45	GW	11		X		X														X	X	X		
7	CP-106A	5/28	16:10	GW	11		X		X														X	X	X		

	Signature	Company	Date	Time
Relinquished	[signature]	PGG	5/29/20	9:50
Received	[signature]	ALPHA	5/29/20	09:50
Relinquished	[signature]	ALPHA	5/29/20	1030
Received	[signature]	OSE	5/29/30	1030
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
collected MSMSD volume at sample location CP-GP03AR

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Sample/Cooler Receipt and Acceptance Checklist

Client: PGG

Client Project Name/Number: JG1601

Initiated by: KL

OnSite Project Number: 05-221

Date Initiated: 5/29/30

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	(No)	N/A	1 2 3 4	
1.2 Were the custody seals intact?	Yes	No	(N/A)	1 2 3 4	
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	(N/A)	1 2 3 4	
1.4 Were the samples delivered on ice or blue ice?	(Yes)	No		1 2 3 4	
1.5 Were samples received between 0-6 degrees Celsius?	(Yes)	No	Temperature: 3,5		
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	(N/A)			
1.7 How were the samples delivered?	Client	(Courier)	UPS/FedEx	OSE Pickup	Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	(Yes)	No		1 2 3 4
2.2 Was the COC legible and written in permanent ink?	(Yes)	No		1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	(Yes)	No		1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	(Yes)	No		1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	(Yes)	No		1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	(No)		1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	(No)		1 2 3 4	
3.2 Were any sample labels missing or illegible?	Yes	(No)		1 2 3 4	
3.3 Have the correct containers been used for each analysis requested?	(Yes)	No		1 2 3 4	
3.4 Have the samples been correctly preserved?	(Yes)	No	N/A	1 2 3 4	
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	(Yes)	No	N/A	1 2 3 4	
3.6 Is there sufficient sample submitted to perform requested analyses?	(Yes)	No		1 2 3 4	
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	(No)		1 2 3 4	
3.8 Was method 5035A used?	Yes	No	(N/A)	1 2 3 4	
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		(N/A)	1 2 3 4	

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 10, 2020

Glen Wallace
Pacific Groundwater Group
2377 Eastlake Avenue E, Suite 200
Seattle, WA 98102

Re: Analytical Data for Project JG1601
Laboratory Reference No. 2005-194

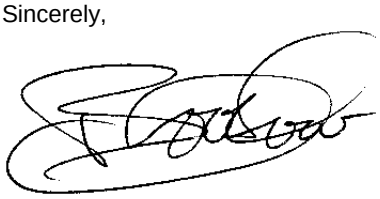
Dear Glen:

Enclosed are the analytical results and associated quality control data for samples submitted on May 27, 2020.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



Blair Goodrow
Project Manager

Enclosures

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
CP-GP10	05-194-01	Water	5-26-20	5-27-20	
CP-GP09R	05-194-02	Water	5-26-20	5-27-20	
PNO-MW02	05-194-03	Water	5-27-20	5-27-20	
PNO-MW06B	05-194-04	Water	5-27-20	5-27-20	
PNO-MW06A	05-194-05	Water	5-27-20	5-27-20	
CP-GP01B	05-194-07	Water	5-26-20	5-27-20	
CP-104A	05-194-08	Water	5-27-20	5-27-20	
CP-GP01A	05-194-09	Water	5-27-20	5-27-20	
CP-GP02	05-194-10	Water	5-27-20	5-27-20	

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

Case Narrative

Samples were collected on May 26 and 27, 2020 and received by the laboratory on May 27, 2020. They were maintained at the laboratory at a temperature of 2°C to 6°C. Please see Sample/Cooler Receipt form at the end of the report.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP10**					
Laboratory ID:	05-194-01					
Gasoline	**ND**	100	NWTPH-Gx	6-1-20	6-1-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*81*	*65-120*				
Client ID:	**CP-GP09R**					
Laboratory ID:	05-194-02					
Gasoline	**ND**	100	NWTPH-Gx	6-1-20	6-1-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*81*	*65-120*				
Client ID:	**PNO-MW02**					
Laboratory ID:	05-194-03					
Gasoline	**190**	100	NWTPH-Gx	6-1-20	6-1-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-120*				
Client ID:	**PNO-MW06B**					
Laboratory ID:	05-194-04					
Gasoline	**200**	100	NWTPH-Gx	6-1-20	6-1-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*65-120*				
Client ID:	**PNO-MW06A**					
Laboratory ID:	05-194-05					
Gasoline	**160**	100	NWTPH-Gx	6-1-20	6-1-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*70*	*65-120*				
Client ID:	**CP-GP01B**					
Laboratory ID:	05-194-07					
Gasoline	**ND**	100	NWTPH-Gx	6-1-20	6-1-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*79*	*65-120*				
Client ID:	**CP-104A**					
Laboratory ID:	05-194-08					
Gasoline	**400**	100	NWTPH-Gx	6-1-20	6-1-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*81*	*65-120*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP01A**					
Laboratory ID:	05-194-09					
Gasoline	**ND**	100	NWTPH-Gx	6-1-20	6-1-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*82*	*65-120*				
Client ID:	**CP-GP02**					
Laboratory ID:	05-194-10					
Gasoline	**440**	100	NWTPH-Gx	6-1-20	6-1-20	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*78*	*65-120*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0601W1					
Gasoline	**ND**	100	NWTPH-Gx	6-1-20	6-1-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-120*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-194-01										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*81*	*80*	*65-120*			

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP10**					
Laboratory ID:	05-194-01					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*99*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*100*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP09R**					
Laboratory ID:	05-194-02					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*95*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*96*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PNO-MW02**					
Laboratory ID:	05-194-03					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PNO-MW06B**					
Laboratory ID:	05-194-04					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*96*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PNO-MW06A**					
Laboratory ID:	05-194-05					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*75-127*				
Toluene-d8	*103*	*80-127*				
4-Bromofluorobenzene	*97*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP01B**					
Laboratory ID:	05-194-07					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*97*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-104A**					
Laboratory ID:	05-194-08					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*94*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*98*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP01A**					
Laboratory ID:	05-194-09					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*95*	*75-127*				
Toluene-d8	*104*	*80-127*				
4-Bromofluorobenzene	*95*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP02**					
Laboratory ID:	05-194-10					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*75-127*				
Toluene-d8	*105*	*80-127*				
4-Bromofluorobenzene	*99*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0529W1					
Benzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Toluene	ND	1.0	EPA 8260D	5-29-20	5-29-20	
Ethylbenzene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
m,p-Xylene	ND	0.40	EPA 8260D	5-29-20	5-29-20	
o-Xylene	ND	0.20	EPA 8260D	5-29-20	5-29-20	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*75-127*				
Toluene-d8	*107*	*80-127*				
4-Bromofluorobenzene	*100*	*78-125*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

BTEX by EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	05-194-10										
	MS	MSD	MS	MSD		MS	MSD				
1,1-Dichloroethene	**9.97**	**10.4**	10.0	10.0	ND	100	104	68-122	4	15	
Benzene	**9.79**	**10.1**	10.0	10.0	ND	98	101	70-121	3	16	
Trichloroethene	**11.3**	**11.7**	10.0	10.0	ND	113	117	80-121	3	17	
Toluene	**10.6**	**10.8**	10.0	10.0	ND	106	108	78-117	2	19	
Chlorobenzene	**10.6**	**10.8**	10.0	10.0	ND	106	108	80-120	2	16	
Surrogate:											
Dibromofluoromethane						*94*	*96*	*75-127*			
Toluene-d8						*106*	*106*	*80-127*			
4-Bromofluorobenzene						*100*	*99*	*78-125*			
SPIKE BLANK											
Laboratory ID:	SB0529W1										
1,1-Dichloroethene	**10.0**		10.0			100		65-126			
Benzene	**9.74**		10.0			97		71-119			
Trichloroethene	**11.4**		10.0			114		82-123			
Toluene	**10.6**		10.0			106		77-119			
Chlorobenzene	**10.7**		10.0			107		80-120			
Surrogate:											
Dibromofluoromethane						*99*		*75-127*			
Toluene-d8						*104*		*80-127*			
4-Bromofluorobenzene						*103*		*78-125*			

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP10**					
Laboratory ID:	05-194-01					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*111*	*50-150*				
Client ID:	**CP-GP09R**					
Laboratory ID:	05-194-02					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*124*	*50-150*				
Client ID:	**PNO-MW02**					
Laboratory ID:	05-194-03					
Diesel Range Organics	**0.40**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*127*	*50-150*				
Client ID:	**PNO-MW06B**					
Laboratory ID:	05-194-04					
Diesel Range Organics	**0.24**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*115*	*50-150*				
Client ID:	**PNO-MW06A**					
Laboratory ID:	05-194-05					
Diesel Range Organics	**0.34**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*109*	*50-150*				
Client ID:	**CP-GP01B**					
Laboratory ID:	05-194-07					
Diesel Range Organics	**ND**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*105*	*50-150*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-104A**					
Laboratory ID:	05-194-08					
Diesel Range Organics	**0.50**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*111*	*50-150*				
Client ID:	**CP-GP01A**					
Laboratory ID:	05-194-09					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*124*	*50-150*				
Client ID:	**CP-GP02**					
Laboratory ID:	05-194-10					
Diesel Range Organics	**0.97**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.21	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*135*	*50-150*				

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0601W1					
Diesel Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	6-1-20	6-1-20	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*115*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	SB0601W1									
	ORIG	DUP								
Diesel Fuel #2	**0.477**	**0.421**	NA	NA		NA	NA	12	NA	X1
Lube Oil Range	**ND**	**ND**	NA	NA		NA	NA	NA	NA	X1
Surrogate:										
o-Terphenyl						*109* *104*	*50-150*			
SPIKE BLANK										
Laboratory ID:	SB0601W1 ACU									
Diesel Fuel #2	**0.477**		0.500		NA	**95**	57-129	NA	NA	X1
Surrogate:										
o-Terphenyl						*109*	*50-150*			

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

DISSOLVED METHANE
RSK 175

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP10**					
Laboratory ID:	05-194-01					
Methane	**ND**	0.55	RSK 175	6-3-20	6-3-20	
Client ID:	**CP-GP09R**					
Laboratory ID:	05-194-02					
Methane	**100**	0.55	RSK 175	6-3-20	6-3-20	
Client ID:	**PNO-MW02**					
Laboratory ID:	05-194-03					
Methane	**7600**	55	RSK 175	6-3-20	6-3-20	
Client ID:	**PNO-MW06A**					
Laboratory ID:	05-194-05					
Methane	**5000**	28	RSK 175	6-3-20	6-3-20	
Client ID:	**CP-104A**					
Laboratory ID:	05-194-08					
Methane	**5500**	55	RSK 175	6-3-20	6-3-20	
Client ID:	**CP-GP01A**					
Laboratory ID:	05-194-09					
Methane	**12000**	83	RSK 175	6-3-20	6-3-20	
Client ID:	**CP-GP02**					
Laboratory ID:	05-194-10					
Methane	**11000**	83	RSK 175	6-3-20	6-3-20	

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

DISSOLVED METHANE
RSK 175
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0603W1					
Methane	**ND**	0.55	RSK 175	6-3-20	6-3-20	

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANK										
Laboratory ID:	SB0603W1									
	SB	SBD	SB	SBD	SB	SBD				
Methane	**23.6**	**23.3**	22.1	22.1	107	105	75-125	1	25	

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

TOTAL MANGANESE
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP10**					
Laboratory ID:	05-194-01					
Manganese	**ND**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP09R**					
Laboratory ID:	05-194-02					
Manganese	**40**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**PNO-MW02**					
Laboratory ID:	05-194-03					
Manganese	**310**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**PNO-MW06A**					
Laboratory ID:	05-194-05					
Manganese	**330**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-104A**					
Laboratory ID:	05-194-08					
Manganese	**290**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP01A**					
Laboratory ID:	05-194-09					
Manganese	**83**	11	EPA 6010D	6-4-20	6-4-20	
Client ID:	**CP-GP02**					
Laboratory ID:	05-194-10					
Manganese	**290**	11	EPA 6010D	6-4-20	6-4-20	

Date of Report: June 10, 2020
Samples Submitted: May 27, 2020
Laboratory Reference: 2005-194
Project: JG1601

TOTAL MANGANESE
EPA 6010D
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0604WM1					
Manganese	**ND**	11	EPA 6010D	6-4-20	6-4-20	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	05-221-02										
	ORIG	DUP									
Manganese	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	05-221-02										
	MS	MSD	MS	MSD		MS	MSD				
Manganese	**492**	**503**	556	556	ND	**89**	**91**	75-125	2	20	
SPIKE BLANK											
Laboratory ID:	SB0604WM1										
Manganese	**586**		556		N/A	**105**		80-120			

OnSite Environmental Inc.

Data Qualifiers

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260D, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional Analytical Services

Jun 9 2020
On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister

Dear David Baumeister:

Enclosed please find the analytical data for your JG1601 project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
CP-GP10	Water	20-A007235	NUT, MIN
CP-GP09R	Water	20-A007236	NUT, MIN
PN0-MW02	Water	20-A007237	NUT, MIN
PN0-MW06A	Water	20-A007238	NUT, MIN
CP-104A	Water	20-A007239	NUT, MIN
CP-GP01A	Water	20-A007240	NUT, MIN
CP-GP02	Water	20-A007241	NUT, MIN

Your samples were received on Thursday, May 28, 2020. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

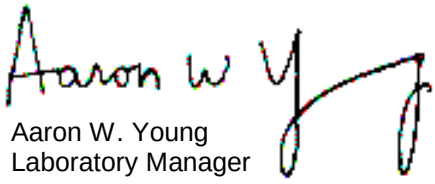
The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,



Aaron W. Young
Laboratory Manager

PO Number: 05-194

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
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Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com

Professional Analytical Services

ANALYSIS REPORT

On-Site Environmental
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: JG1601
PO Number: 05-194
All results reported on an as received basis.

Date Received: 05/28/20
Date Reported: 6/ 9/20

AMTEST Identification Number **20-A007235**
Client Identification **CP-GP10**
Sampling Date **05/26/20, 15:15**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	993.	mg/l	D	20	EPA 300.0	AY	06/01/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.934	mg/l		0.025	EPA 300.0	AY	05/28/20

AMTEST Identification Number **20-A007236**
Client Identification **CP-GP09R**
Sampling Date **05/26/20, 17:00**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	290.	mg/l		0.1	EPA 300.0	AY	06/01/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.054	mg/l		0.025	EPA 300.0	AW	05/29/20

AMTEST Identification Number **20-A007237**
Client Identification **PN0-MW02**
Sampling Date **05/27/20, 09:45**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	9.68	mg/l		0.1	EPA 300.0	AY	06/01/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.692	mg/l		0.025	EPA 300.0	AY	05/28/20

AMTEST Identification Number **20-A007238**
Client Identification **PN0-MW06A**
Sampling Date **05/27/20, 12:45**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	3.08	mg/l		0.1	EPA 300.0	AY	05/28/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.683	mg/l		0.025	EPA 300.0	AY	05/28/20

AMTEST Identification Number **20-A007239**
Client Identification **CP-104A**
Sampling Date **05/27/20, 13:39**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	0.53	mg/l		0.1	EPA 300.0	AY	05/28/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.289	mg/l		0.025	EPA 300.0	AY	05/28/20

AMTEST Identification Number **20-A007240**
Client Identification **CP-GP01A**
Sampling Date **05/27/20, 10:32**

Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	0.10	mg/l		0.1	EPA 300.0	AY	05/28/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.469	mg/l		0.025	EPA 300.0	AY	05/28/20

AMTEST Identification Number **20-A007241**
Client Identification **CP-GP02**
Sampling Date **05/27/20, 12:17**

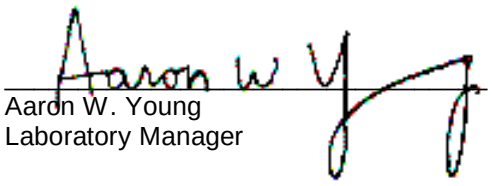
Minerals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfate	6.10	mg/l		0.1	EPA 300.0	AY	05/28/20

Nutrients

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Nitrate	0.757	mg/l		0.025	EPA 300.0	AY	05/28/20

D = The reported value is from a dilution.



Aaron W. Young
Laboratory Manager

Am Test Inc.
13600 NE 126th PL
Suite C
Kirkland, WA, 98034
(425) 885-1664
www.amtestlab.com

Professional Analytical Services

QC Summary for sample numbers: 20-A007235 to 20-A007241

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
20-A007241	Nitrate	mg/l	0.757	0.759	0.26
20-A007308	Nitrate	mg/l	1.36	1.31	3.7
20-A007312	Nitrate	mg/l	0.296	0.283	4.5
20-A007360	Nitrate	mg/l	1.07	1.07	0.00
20-A007241	Sulfate	mg/l	6.10	6.09	0.16
20-A007225	Sulfate	mg/l	27.7	27.5	0.72

MATRIX SPIKES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	SMPL+ SPK	SPK AMT	RECOVERY
20-A007241	Nitrate	mg/l	0.757	2.68	2.00	96.15 %
20-A007308	Nitrate	mg/l	1.36	3.97	2.00	130.50 %
20-A007312	Nitrate	mg/l	0.296	2.36	2.00	103.20 %
20-A007360	Nitrate	mg/l	1.07	3.09	2.00	101.00 %
20-A007241	Sulfate	mg/l	6.10	8.25	2.00	107.50 %
20-A007225	Sulfate	mg/l	27.7	47.3	20.0	98.00 %

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Nitrate	mg/l	2.00	2.34	117. %
Nitrate	mg/l	2.00	2.12	106. %
Nitrate	mg/l	2.00	2.14	107. %
Nitrate	mg/l	2.00	2.07	104. %
Sulfate	mg/l	2.00	2.06	103. %

BLANKS

ANALYTE	UNITS	RESULT
Nitrate	mg/l	< 0.025
Nitrate	mg/l	< 0.025
Nitrate	mg/l	< 0.025
Nitrate	mg/l	< 0.025
Sulfate	mg/l	< 0.1

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 05-194

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other: _____

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: JG1601

Project Name: _____

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
	CP-GP10 7235	5/26/20	15:15	GW	1	Nitrate, Sulfate EPA 300
	CP-GP09R 36	5/26/20	17:00	GW	1	Nitrate, Sulfate EPA 300
	PN0-MW02 37	5/27/20	9:45	GW	1	Nitrate, Sulfate EPA 300
	PN0-MW06A 38	5/27/20	12:45	GW	1	Nitrate, Sulfate EPA 300
	CP-104A 39	5/27/20	13:39	GW	1	Nitrate, Sulfate EPA 300
	CP-GP01A 40	5/27/20	10:32	GW	1	Nitrate, Sulfate EPA 300
	CP-GP02 41	5/27/20	12:17	GW	1	Nitrate, Sulfate EPA 300

	Company	Date	Time	Comments/Special Instructions
Relinquished by:		5/27/20	1700	
Received by:	AMTEST T=5.4	5/28/20	915	RL for both - 100 ppb
Relinquished by:				EDDs
Received by:				
Relinquished by:				
Received by:				

p.7

OVERNIGHT BOX

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Pacific Groundwater Group
Project Number: JG1601
Project Name: Terminal 91
Project Manager: Glen Wallace
Sampled by: NBW & TWK

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 05-194

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX 8260 D	NWTPH-Gx	NWTPH-Dx (☒ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Nitrate & Sulfate EPA 300	Total Manganese	Dissolved Gasses		% Moisture
1	CP-GP10	5/26/20	15:15	GW	11		X		X														X	X	X		
2	CP-GP09R	5/26/20	17:00	GW	11		X		X														X	X	X		
3	PNO-MW02	5/27/20	9:45	GW	11		X		X														X	X	X		
4	PNO-MW06B	5/27/20	11:10	GW	9		X		X																		
5	PNO-MW06A	5/27/20	12:45	GW	10		X		X														X	X	X		
6	Trip Blanks				4																						
7	CP-GP01B	5/26/20	16:42	GW	6		X		X																		
8	CP-104A	5/27/20	13:39	GW	11		X		X														X	X	X		
9	CP-GP01A	5/27/20	10:32	GW	11		X		X														X	X	X		
10	CP-GP02	5/27/20	12:17	GW	11		X		X														X	X	X		

	Signature	Company	Date	Time
Relinquished		PGG	5/27/20	14:45
Received	J. Isaacson	ALPHA	5/27/20	14:45
Relinquished	J. Isaacson	ALPHA	5/27/20	15:55
Received	[illegible]	OSE	5/27/20	1555
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Sample/Cooler Receipt and Acceptance Checklist

Client: PGG

Client Project Name/Number: JG1601

OnSite Project Number: 05-194

Initiated by: KL

Date Initiated: 5/27/20

1.0 Cooler Verification

1.1 Were there custody seals on the outside of the cooler?	Yes	(No)	N/A	1 2 3 4	
1.2 Were the custody seals intact?	Yes	No	(N/A)	1 2 3 4	
1.3 Were the custody seals signed and dated by last custodian?	Yes	No	(N/A)	1 2 3 4	
1.4 Were the samples delivered on ice or blue ice?	(Yes)	No	N/A	1 2 3 4	
1.5 Were samples received between 0-6 degrees Celsius?	(Yes)	No	N/A	Temperature: 4	
1.6 Have shipping bills (if any) been attached to the back of this form?	Yes	(N/A)			
1.7 How were the samples delivered?	(Client)	Courier	UPS/FedEx	OSE Pickup	Other

2.0 Chain of Custody Verification

2.1 Was a Chain of Custody submitted with the samples?	(Yes)	No	1 2 3 4
2.2 Was the COC legible and written in permanent ink?	(Yes)	No	1 2 3 4
2.3 Have samples been relinquished and accepted by each custodian?	(Yes)	No	1 2 3 4
2.4 Did the sample labels (ID, date, time, preservative) agree with COC?	(Yes)	No	1 2 3 4
2.5 Were all of the samples listed on the COC submitted?	(Yes)	No	1 2 3 4
2.6 Were any of the samples submitted omitted from the COC?	Yes	(No)	1 2 3 4

3.0 Sample Verification

3.1 Were any sample containers broken or compromised?	Yes	(No)		1 2 3 4
3.2 Were any sample labels missing or illegible?	Yes	(No)		1 2 3 4
3.3 Have the correct containers been used for each analysis requested?	(Yes)	No		1 2 3 4
3.4 Have the samples been correctly preserved?	(Yes)	No	(N/A)	1 2 3 4
3.5 Are volatiles samples free from headspace and bubbles greater than 6mm?	(Yes)	No	(N/A)	1 2 3 4
3.6 Is there sufficient sample submitted to perform requested analyses?	(Yes)	No		1 2 3 4
3.7 Have any holding times already expired or will expire in 24 hours?	Yes	(No)		1 2 3 4
3.8 Was method 5035A used?	Yes	No	(N/A)	1 2 3 4
3.9 If 5035A was used, which sampling option was used (#1, 2, or 3).	#		(N/A)	1 2 3 4

Explain any discrepancies:

1 - Discuss issue in Case Narrative

2 - Process Sample As-is

3 - Client contacted to discuss problem

4 - Sample cannot be analyzed or client does not wish to proceed

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: Nov 2019

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle

Date: 11/19/2019
Location: Tank Farm Demo Area
Measured By: TWL
Measuring Tool: Keck Interface Probe

Location	Time	MP	Depth Set 1 LNAPL	Depth Set 1 Water	Depth Set 1 Thickness	Depth Set 2 LNAPL	Depth Set 2 Water	Depth Set 2 Thickness
Trench 2E	12:01	TOC N	10.85	10.86	0.01	10.85	10.86	0.01
Trench 2W	12:04	TOC N	7.80	7.81	0.01	7.79	7.81	0.02
Trench 3E	12:10	TOC N	8.69	8.74	0.05	8.69	8.74	0.05
Trench 3W	12:15	TOC N	7.49	7.54	0.05	7.49	7.54	0.05
Trench 5E	12:23	TOC N	6.29	6.31	0.02	6.29	6.31	0.02
Trench 5W	12:28	TOC N	5.26	5.28	0.02	5.26	5.28	0.02
PNO-104	12:50	TOC N	7.12	7.22	0.10	7.12	7.22	0.10
CP-107	12:40	TOC N	6.13	6.14	0.01	6.14	6.14	0.00
CP-110	12:30	TOC N	6.90	6.90	0.00	6.90	6.90	0.00

LNAPL Recovery Notes

O&M Plan says recover if thickness > 0.25 ft. Use peristaltic to pump into safe container.

Location	Date	Start Time	End Time	Quantity	Notes:

Signature: TWL

PGG

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: Q1 2020

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle

Trench positions (North is up) E
X (5W) X (5E) X (3W) X (3E) X (2W) X (2E)

Date: 2/26/20
Location:
Measured By: NBW
Measuring Tool: Interface probe

Location	Time	MP	Depth Set 1 LNAPL	Depth Set 1 Water	Depth Set 1 Thickness	Depth Set 2 LNAPL	Depth Set 2 Water	Depth Set 2 Thickness
CP-107	1032		ND	5.03	0	ND	5.02	0
CP-110	1020		ND	6.06	0	ND	6.05	0
PNO-104	1026		6.47	6.54	0.07	6.47	6.55	0.08
Trench 2E	1045	Inaccessable: Trailer parked on				access	Panel.	
Trench 2W	1038		ND	6.61	0*	ND	6.61	0*
Trench 3E	~~1051~~	~~Inaccessable: Trailer parked on~~						wrote on wrong line
Trench 3W	1052		ND	6.31	0*	ND	6.30	0*
Trench 5E	1059		ND	3.98	0*	ND	3.97	0*
Trench 5W	1104		3.97	3.95	0.02	3.98	3.95	0.03
Trench 3E	1049		7.50	~~7.52~~ 7.51	0.02*	7.49	7.50	0.01*

LNAPL Recovery Notes

O&M Plan says recover if thickness > 0.25 ft. Use peristaltic to pump into safe container.

Location	Date	Start Time	End Time	Quantity	Notes:

* probe became covered in thick, sticky NAPL despite not detecting it.

Signature:

PGG

Date	Time	Site	DTP 1	DTP 2	DTP 3	DTW 1	DTW 2	DTW 3
5/27	1740	2E	Not	ac	cess	ible:	Trailer	parked here
5/27	1735	2W	ND	ND	ND	7.20	7.20	7.20
5/27	1705	3E	8.08*	8.08*	8.09*	8.08	8.07	8.08
5/27	1718	3W	ND	ND	6.89*	6.89	6.88	6.89
5/27	1723	5E	ND	ND	ND	4.86	4.87	4.86
5/27	1728	5W	4.85	4.84	4.85	4.88	4.89	4.88

* LNAPL detected, but very thin layer

Sampler:
Nick Waldo

Water Level Snapshot Sheet Staff: NBW

Date: 5/26/20 Sounder:

Well	Time	DTW 1	DTW 2	DTW 3	Area	LNAPL	Aquifer	Elev.	Depth	Comments
UT-MW39-3					?	X	Shallow	17.33	14.00	Decommissioned
CP-GP01 B	1101	9.86	9.89	9.98**	P-90		Shallow	17.68	19.20	Seems water from monument entered well*
CP-GP01 A	1130	8.15	8.16	8.16	P-90		Deep	17.60	64.50	
CP-GP02	1124	7.37	7.38	7.38	P-90		Shallow	17.39	20.10	
CP-GP08	5/26 1040	8.18	8.19	8.19	P-90		Shallow	17.37	18.00	
CP-GP03AR					P-91		Shallow	17.77	19.85	
CP-GP03BR					P-91		Deep	17.74	64.50	
CP-GP04R					P-91		Shallow	17.90	19.83	
CP-GP07R					P-91		Shallow	18.08	19.85	
CP-GP09R					P-91		Shallow	17.45	18.00	
CP-GP10					P-91		Shallow	17.92	17.85	
PNO-MW02					P-91		Shallow	17.71	17.00	
PNO-MW06A					P-91		Shallow	18.05	17.50	
PNO-MW06B					P-91		Deep	17.98	55.40	
PNO-MW103					P-91		Shallow	17.48	17.00	
B1-93	1208	6.56	6.57	6.57	TF-90		Shallow	17.24	30.00	
CP-103A					TF-90		Shallow	17.11	15.00	
CP-104A	1306	5.01	5.03	5.03	TF-90		Shallow	17.13	15.00	
CP-104B	1313	5.48	5.48	5.48	TF-90		Deep	16.86	50.00	
CP-106A	1229	6.31	6.33	6.32	TF-90		Shallow	18.00	15.00	J-plug needs replacement
CP-106B					TF-90		Deep	17.91	41.50	
CP-108A	1147	6.25	6.25	6.25	TF-90		Shallow	16.58	15.00	
CP-108B	1152	9.51	9.52	9.52	TF-90		Deep	16.77	60.00	
CP-113	1332	4.98	4.98	4.98	TF-90		Shallow	17.29	17.00	
CP-114	1241	5.48	5.49	5.48	TF-90		Shallow	17.94	14.00	
CP-115A	1249	5.25	5.26	5.26	TF-90		Shallow	17.74	21.00	
CP-115B	1259	5.91	5.92	5.92	TF-90		Shallow	17.64	42.50	J-Plug was left off, Picture Taken of when I arrived
CP-121	1321	5.20	5.21	5.21	TF-90		Shallow	17.61	21.00	
CP-122B	1235	—	—	—	TF-90		Deep	16.90	42.50	Need trowel, monument full of sediment
CP-203B					TF-90		Deep	16.99	59.95	
CP-205A	1348	56.14	5.12	5.12	TF-90		Shallow	17.74	14.00	
CP-205B	1351	5.62	5.58	5.55	TF-90		Deep	17.73	50.00	1356: 5.51
CP-W210					TF-90		Shallow	17.11	14.95	
CP-107	1426	5.77	5.77	5.77	TF-91	X	Shallow	17.15	20.00	DTP: None
CP-110	1419	6.68	6.68	6.68	TF-91	X	Shallow	17.42	16.50	DTP: None
CP-111					TF-91		Shallow	17.64	15.00	
CP-112					TF-91		Shallow	17.04	15.00	
CP-GP05					TF-91		Shallow	17.44	10.00	
CP-GP06					TF-91		Shallow	17.46	17.50	
CP-GP11					TF-91		Shallow	16.94	20.00	
CP-GP12					TF-91		Shallow	17.42	20.00	
CP-GP13					TF-91		Shallow	17.01	20.00	
CP-GP14					TF-91		Shallow	17.63	20.00	
CP-PR-13					TF-91		Shallow	17.31	12.90	
PNO-MW101					TF-91		Shallow	17.74	16.30	
PNO-MW104	1737	7.10	7.10	7.09	TF-91	X	Shallow	17.43	17.40	DTP: 7.01, 7.00, 7.00
UT-MW39-1					TF-91		Shallow	16.65	17.50	

Notes:
LNAPL = Light non-aqueous phase liquid, well with historic LNAPL presence
T-90 and TF-91 are arbitrary divisions that refer to portions of the TFAA on the Pier 90/91 side of the alley.

* GP01B – because grey stains down inside of PVC, matching color of monument water. Did not occur today.

** GP01B cont. 1110 – 10.01, 1115 – 10.04

PGG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-103A

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/28/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 6.37	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet): 15	Purge Date/Time: 5/28/2020 1652
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water 9 x CVC .16 x Casing Volumes 3 = [illegible] gallons 4.5

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
6.64	1655	1/2	7.28	498.7	14.9	1.6	-73.0	clear
6.66	1701	1 1/2	7.13	494.9	14.4	0.4	-64.2	clear
6.66	1704	2	7.19	494.4	14.3	0.4	-62.3	clear
6.66	1708	3	7.21	491.9	14.3	0.3	-58.8	clear
6.67	1714	4	7.18	485.1	14.3	0.2	-57.4	
6.67	1720	5	7.17	477.1	14.3	0.1	-58.1	
6.67	1722	5 1/2	7.18	473.8	14.3	0.1	-57.4	clear

Well Integrity:
No Alk test available

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result _____ mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/28/2020 1724

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: [signature]

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP104A

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/27/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/27/2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 5.03	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet): 15	Purge Date/Time: 5/27/2020 1301
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water 10 x CVC .16 x Casing Volumes 1/3 = 1.6/4.8 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
5.06	1304	0.5	7.42	506.2	14.9	0.6	14.6	Clear
5.08	1307	1.	7.35	495.1	14.7	0.4	18.4	clear
5.08	1312	2	7.33	491.6	14.7	0.3	22.3	clear
5.08	1322	4	7.29	495.5	14.6	0.2	25.6	Clear
5.07	1328	5	7.29	496.8	14.6	0.2	26.7	
5.07	1333	6	7.28	494.2	14.5	0.2	27.0	Clear
5.08	1338	7	7.29	494.4	14.5	0.2	26.8	clear

Well Integrity:

No Alk kit available

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 0.5 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/27/2020 1339

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-6P01A

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-108A

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/28/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (yes/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 6.24	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet): 15	Purge Date/Time: 5/28/2020 1104
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water 9 x CVC .16 x Casing Volumes 1/3 = 1.5/4.5 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
6.55*	1106	1/4	7.33	376.5	14.0	1.0	-195.2	clear
7.00*	1111	2/4	6.97	359.6	14.1	0.7	-195.7	
7.06*	1121	1 3/4	7.10	380.4	14.1	0.4	-209.3	clear
6.98	1129	2 1/2	7.22	385.8	14.1	0.3	-216.7	clear
6.98	1141	3 1/2	7.34	370.4	14.0	0.2	-223.1	cloudy
6.99	1156	4 1/2	7.37	375.0	14.1	0.7	-221.3	clear
	1203	5	7.37	379.8	14.0	0.6	-219.6	clear

Well Integrity:

* turned down pumping rate

No ALK kit available

Alkalinity Result: ___ drops x 20 ___ mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 0.0 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/28 /2020 1202

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-108B

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/28/2020
Project Name: Terminal 91 (T91)	Location: CP-108B
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 7.77

Depth of Well (feet): 60

Purge Volume Measurement Method: Graduated Bucket

Purge Date/Time: 5/28/2020 929

Reference Point: top of casing, N side if no notch

Sampling Equipment: YSI 556 (Field Env.)

Purging Equipment: Peristaltic Pump

Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water 52 x CVC .16 x Casing Volumes 1 = 8 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
7.80	930	0.2	8.05	3198	16.0	0.9	-82.8	Dark orange/brown
7.82	942	2	8.08	3198	15.3	0.2	-108.0	Reddish brown
7.86	955	4	7.79	5607	15.3	0.1	-189.4	Yellow/brown
7.88	1008	6	7.77	4942	15.2	0.1	-340.3	brown
7.94	1021	8	7.77	6032	15.1	0.1	-337.5	brown
7.94	1027	9	7.77	6011	15.1	0.1	-337.4	brown

Well Integrity:

no Alk kits available

Strong Sulfur smell from well & purge water

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 0.0 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/28/2020 1029

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
2	40mL VOA	HCl		Dissolved Gases (Methane)
1	500 mL Poly	Unpreserved		Nitrate and Sulfate
1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature:

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-114

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/27/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 5.49 — Purge Volume Measurement Method: Graduated Bucket

Depth of Well (feet): 14 — Purge Date/Time: 5/27/2020 1554

Reference Point: top of casing, N side if no notch — Purging Equipment: Peristaltic Pump

Sampling Equipment: YSI 556 (Field Env.) — Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water 9 x CVC .16 x Casing Volumes 1/3 = 1.5 / 4.5 gallons

DTW

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
— 1557	0.2	8.03	466.3	14.9	0.6	14.3	Grey flecks
5.54 1601	3/4	7.75	438.4	14.2	0.6	15.1	clear
5.55 1607	1 3/4	7.63	451.4	14.5	0.5	27.8	clear
5.55 1613	2 3/4	7.56	456.3	14.5	0.6	32.9	clear
5.55 1620	4 1/4	7.57	456.4	14.5	0.7	34.0	
5.55 1626	5	7.57	453.5	14.6	0.6	34.2	clear

Well Integrity:

No Alk test available

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 0.0 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/27/2020 1629

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature:

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-203B

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/28/2020
Project Name: Terminal 91 (T91)	Location: CP-203B
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 8.43

Depth of Well (feet): 59.95

Purge Volume Measurement Method: Graduated Bucket

Purge Date/Time: 5/28/2020 1447

Reference Point: top of casing, N side if no notch

Sampling Equipment: YSI 556 (Field Env.)

Purging Equipment: Peristaltic Pump

Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water 52 x CVC .16 x Casing Volumes 1/3 = 8/24 gallons

DTW

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
8.50 1449	1/4	7.49	591.1	14.5	0.8	-99.2	clear
8.53 1456	1 3/4	7.30	549.9	14.3	0.3	-83.7	clear
8.57 1508	4	7.35	551.7	14.5	0.8	-79.6	clear
8.62 1522	6	7.89	554.0	14.6	0.8	-78.8	clear
8.64 1530	7 1/2	7.37	556.7	14.6	0.5	-77.3	clear
8.65 1540	9	7.39	553.6	14.6	0.3	-64.0	clear
8.67 1548	10 1/2	7.38	552.9	14.7	0.3	-55.9	clear
8.68 1556	12	7.39	559.4	14.7	0.2	-50.7	clear
8.69 1611	14	7.40	553.5	14.7	0.2	-43.7	clear

Well Integrity: [redacted]

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Alk Kit not available

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result _____ mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/28 /2020 1628

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
2	40mL VOA	HCl		Dissolved Gases (Methane)
1	500 mL Poly	Unpreserved		Nitrate and Sulfate
1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-205B

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/28/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 5.40	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet): 50	Purge Date/Time: 5/28/2020 1253
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water 44 x CVC .16 x Casing Volumes 1/3 = 7.5/23 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
6.28*	1255	1/4	8.06	2775	14.8	0.5	-282.6	Brown
6.43	1303	1	8.06	2741	14.7	0.4	-291.9	brown
6.56	1326	3 1/2	8.17	2778	15.0	0.7	-290.5	brown
6.62	1340	5	8.15	2656	15.1	0.1	-292.3	
6.68	1407	8	8.21	2865	15.2	0.5	-290.1	brown

Well Integrity:
No Alk kit available
*Turned pump rate down

Alkalinity Result: — drops x 20 — mg/L as $CaCO_3$

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result _____ mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/28/2020 1414

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
2	40mL VOA	HCl		Dissolved Gases (Methane)
1	500 mL Poly	Unpreserved		Nitrate and Sulfate
1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP01A

Sampling Event: May 2020

Sample #:

Project Number:	JG1601	Date:	05/27/2020
Project Name:	Terminal 91 (T91)	Location:	
Project Address:	2001 W Garfield St.	Sampled By:	NBW/TK
Client Name:	Port of Seattle	Purged By:	NBW/TK
Laboratory:	OnSite Environmental, Redmond, WA	Date Sent to Lab:	05/28/2020
Chain-of-Custody (**yes**/no):	yes	Field CC Sample Number:	NA
Shipment Method:		Sample Split:	NA

Depth to Water (feet): 8.04

Depth of Well (feet): 19.2

Purge Volume Measurement Method: Graduated Bucket

Purge Date/Time: 5/27/2020 920

Reference Point: top of casing, N side if no notch

Sampling Equipment: YSI 556 (Field Env.)

Purging Equipment: Peristaltic Pump

Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water 11 x CVC .16 x Casing Volumes 3 = 5.1 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
—	921	0.125	—	—	—	—	—	clear w/ white filaments
8.49	924	0.5	—	—	—	—	—	clear
8.34	933	1	7.14	1544	15.7	1.2	20.2	clear w/ filaments
8.36	938	1½	7.12	1540	15.7	1.0	24.2	clear
8.39	946	2 ¼	7.10	1540	15.7	0.8	29.1	clear
8.40	9585	2 ¾	7.11	1537	15.7	0.7	32.4	clear
8.43	1003	3 ½	7.13	1536	15.8	0.5	34.9	clear
8.48	1011	4 ½	7.13	1534	15.7	0.3	38.6	clear
8.52	1020	5	7.10	1527	15.7	0.3	42.7	clear

DECREASE PUMP RATE.

Well Integrity:

Tide dropping, well is tidally influenced

Alkalinity Result: ___ drops x 20 _____ mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result _____ mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/___/2020

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PGG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-6P01A

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/27/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/ /2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 8.04	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet): 19.2	Purge Date/Time: 5/27/2020 920
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water _____ x CVC _____ x Casing Volumes _____ = _____ gallons

DTW 8.55

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
1028	6	7.09	1520	15.7	0.3	41.4	
1032	SAMPLE	TIME					

Well Integrity:

Ran out of Alk kits, could not get more.

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 0 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/27/2020 1032

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PGG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-6P01B

Sampling Event: May 2020

Sample #:

Project Number:	JG1601	Date:	05/26/2020
Project Name:	Terminal 91 (T91)	Location:	CP-6P01B
Project Address:	2001 W Garfield St.	Sampled By:	NBW/TK
Client Name:	Port of Seattle	Purged By:	NBW/TK
Laboratory:	OnSite Environmental, Redmond, WA	Date Sent to Lab:	05/27 /2020
Chain-of-Custody (yes/no):	yes	Field CC Sample Number:	NA
Shipment Method:		Sample Split:	NA

Depth to Water (feet): 12.38

Depth of Well (feet): 64.50

Purge Volume Measurement Method: Graduated Bucket

Purge Date/Time: 5/ /2020 1507

Reference Point: top of casing, N side if no notch

Sampling Equipment: YSI 556 (Field Env.)

Purging Equipment: Peristaltic Pump

Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water 52 x CVC .16 x Casing Volumes 3/1 = 25/8.3 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
	~~1509~~	0.125	—	—	—	—	—	black flecks
—	1514	0.5	6.26	221.6	16.3	0.5	28.0	clear
12.38	1519	1.0	6.21	208.1	16.0	0.4	23.1	clear
12.33	1540	3.0	7.79	303.8	16.0	0.2	-9.2	slight yellow
—	1549	4.0	8.03	385.2	16.0	0.2	-1.0	slight yellow
12.20	1601	5.0	8.03	3929	16.0	0.2	7.9	clear
12.08	1619	7	8.33	4807	15.9	0.1	6.5	clear
11.97	1630	8	8.35	4729	15.8	0.1	-9.9	clear
11.88	16~~36~~	~~8.5~~	8.37	4815	15.8	0.1	-34.5	clear
11.81	Well Integrity: 1644	9.5	8.37	4813	15.7	0.2	-57.0	clear

Alkalinity Result: ___ drops x 20 _____ mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result _____ mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/26 /2020

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
2	40mL VOA	HCl		Dissolved Gases (Methane)
1	500 mL Poly	Unpreserved		Nitrate and Sulfate
1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-6101B

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/26/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/27/2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet):	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet):	Purge Date/Time: 5/26/2020
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=($\pi r^2 h$) (7.48 gal/ft³)

Purge Volume = ft of water _____ x CVC _____ x Casing Volumes _____ = _____ gallons

DTW

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
11.73 1650	10	8.37	4719	15.6	0.2	-90.3	clear
11.55 1705	11	8.43	4809	16.2	0.5	-92.8	
1642	nominal	sample time					

Well Integrity:

only changed top part, tube wouldn't mix due to salt

Alkalinity Result: 11 drops x 20 _____ mg/L as $CaCO_3$

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result _____ mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/26/2020 1642

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
2	40mL VOA	HCl		Dissolved Gases (Methane)
1	500 mL Poly	Unpreserved		Nitrate and Sulfate
1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature: NBW

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-6 P02

Sampling Event: May 2020

Sample #:

Project Number: JG1601	Date: 05/27/2020
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: NBW/TK
Client Name: Port of Seattle	Purged By: NBW/TK
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 05/27/2020
Chain-of-Custody (**yes**/no): yes	Field CC Sample Number: NA
Shipment Method:	Sample Split: NA

Depth to Water (feet): 7.37	Purge Volume Measurement Method: Graduated Bucket
Depth of Well (feet): 20.10	Purge Date/Time: 5/27/2020 1116
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: YSI 556 (Field Env.)	Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water 13 x CVC .16 x Casing Volumes 3/1 = 6/2 gallons

DTW	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
7.78	1118	.25	6.96	1506	15.8	0.6	41.1	slightly cloudy
7.87	1121	1/2	6.99	1526	15.0	0.5	36.7	" "
Decrease Pump rate	1128	1	6.87	1466	15.0	0.3	26.9	" "
7.76	1133	1 1/2	6.87	1418	14.9	0.2	25.0	Clear
7.75	1140	2 1/2	6.86	1355	14.9	0.2	25.4	clear
7.75	1147	3 1/2	6.87	1316	14.9	0.2	26.1	Clear
7.76	1157	4 1/2	6.85	1287	15.1	0.1	26.2	Slight Yellow
7.78	1205	5 1/2	6.85	1259	15.1	0.1	27.0	
7.79	1215	6 1/2	6.85	1244	15.1	0.1	28.5	Slight Yellow
7.80								

Well Integrity:

No AIK kit available

Alkalinity Result: ✓ drops x 20 ✓ mg/L as $CaCO_3$

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 2.0 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/27/2020 1217

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature:

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-6P08

Sampling Event: May 2020

Sample #:

Project Number:	JG1601	Date:	05/27/2020
Project Name:	Terminal 91 (T91)	Location:	CP-6P08
Project Address:	2001 W Garfield St.	Sampled By:	NBW/TK
Client Name:	Port of Seattle	Purged By:	NBW/TK
Laboratory:	OnSite Environmental, Redmond, WA	Date Sent to Lab:	05/ /2020
Chain-of-Custody (**yes**/no):	yes	Field CC Sample Number:	NA
Shipment Method:		Sample Split:	NA

Depth to Water (feet): 8.30

Depth of Well (feet): 18

Purge Volume Measurement Method: Graduated Bucket

Purge Date/Time: 5/27/2020 1428

Reference Point: top of casing, N side if no notch

Sampling Equipment: YSI 556 (Field Env.)

Purging Equipment: Peristaltic Pump

Water Level Probe Used: Waterline

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water 10 x CVC .16 x Casing Volumes 1/3 = 1.6/48 gallons

DTW

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	
1429	0.1	7.25	896	15.9	0.6	35.7	opaque rust orange	8.75
1431	½	7.13	873	14.8	0.1	38.4	clear	8.75
1439	2	7.16	871	14.4	0.5	40.6	clear	8.75
1445	3	7.16	869	14.4	0.5	42.1		8.76
1451	4	7.18	870	14.5	0.4	39.7	clear	8.76
1457	5	7.16	868	14.5	0.1	41.1	clear	

Well Integrity:

No Alk tests available

Alkalinity Result: — drops x 20 — mg/L as CaCO3

Fill plastic tube, add to vial (Bromcresol- Green Methyl Red) , add dropwise SO4 Acid

Fe(II) Result 2.0 mg/L

HACH (Fe(II)) Test Kit , 25mL Sample, Fe Iron Reagant, Swirl, 3 min, Outdoor Color Wheel:

Bottle Inventory (check applicable rows) Day/Time Sampled: 5/27/2020 1452

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
✓ 2	500 mL AG	HCl		NWTPH-Dx
✓ 5	40mL VOA	HCl		NWTPH-G / BTEX (8260C)
Natural Attenuation Samples *(Shallow Wells Only)*				
✓ 2	40mL VOA	HCl		Dissolved Gases (Methane)
✓ 1	500 mL Poly	Unpreserved		Nitrate and Sulfate
✓ 1	250 mL Poly	Nitric Acid		Total Manganese
MS/MSD Samplles				
3	40mL VOA	HCl		NWTPH-G / BTEX
2	40mL VOA	HCl		Dissolved Gases (Methane)

Signature:

PgG

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: August 2020

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle

Trench positions (North is up)
X (5W) X (5E) X (3W) X (3W)
X (2W) X (2E)

Date: 8/7/2020
Location: TFAA
Measured By: Travis K.
Measuring Tool: Geotech interface probe

Location	Time	MP	Depth Set 1 LNAPL	Depth Set 1 Water	Depth Set 1 Thickness	Depth Set 2 LNAPL	Depth Set 2 Water	Depth Set 2 Thickness
CP-107	9:36	TOC	6.20	6.23	0.03	6.20	6.22	0.02
CP-110	10:20	TOC	7.01	7.02	0.01	7.01	7.02	0.01
PNO-104	10:26	TOC	7.26	7.37	0.11	7.26	7.37	0.11
Trench 2E	10:17	TOC	10.62	10.63	0.01	10.62	10.63	0.01
Trench 2W	10:06	TOC	7.58	7.58	0.00	—	7.58	0.00
Trench 3E	10:01	TOC	8.48	8.52	0.04	8.48	8.52	0.04
Trench 3W	9:54	TOC	7.29	7.31	0.02	7.29	7.31	0.02
Trench 5E	9:41	TOC	5.30	5.31	0.01	5.30	5.31	0.01
Trench 5W	9:46	TOC	5.30	5.33	0.03	5.30	5.33	0.03

LNAPL Recovery Notes

O&M Plan says recover if thickness > 0.25 ft. Use peristaltic to pump into safe container.

Location	Date	Start Time	End Time	Quantity	Notes:

Signature: 

PGG

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