MOTT MACDONALD

Annual Compliance Monitoring Report Terminal 91 Tank Farm Affected Area

November 2021 to August 2022

October 2022

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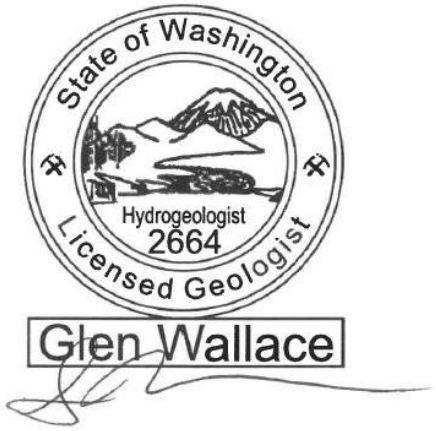
Signature

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 Summary

1.1 Introduction and Purpose

Mott MacDonald (MM; Pacific Groundwater Group has become a Division of MM) has prepared this *Annual Compliance Monitoring Report* to document 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 2021 through August 2022 in accordance with the *Compliance Monitoring Plan* (CMP) and Ecology-approved revisions (PES Environmental, Inc. (PES 2013b; PGG 2019). The scope of work for monitoring activities documented in this report is described in the following documents:

- CMP, Terminal 91 Tank Farm Cleanup, Port of Seattle, Seattle, Washington. (PES et al. 2013b) and
- *Operations and Maintenance Plan* (OMP), Terminal 91 Tank Farm Cleanup, Port of Seattle, Seattle, Washington. (PES et al. 2013c).

Compliance monitoring currently includes groundwater monitoring and a water level snapshot annually in August, and quarterly light non-aqueous phase liquid (LNAPL) gauging. PES conducted groundwater monitoring at the TFAA through the construction phase and the first year of performance monitoring ending in August 2016. MM 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 1);
- Tabulated monitoring data and water table elevation data from the previous year (Figures 2 and 3, Tables 1 through 4); and
- A narrative discussion of data validation and a description of all data qualified or rejected (Section 4.4).

1.2 Key Results

Key results from November 2021 - August 2022 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 (IHS) 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.

2 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 as shown on Figure 1. 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 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 are 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 that 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 horizontal gradient of the Deep Confined Aquifer 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 and the cleanup actions addressing secondary source areas, other potential future exposures, and the 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 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 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; and
- Implementing an MNA groundwater sampling program to confirm that natural attenuation processes continue to degrade chemicals in groundwater (see Section 2.2.3).

3 Compliance Groundwater Monitoring Activities

This section describes compliance monitoring from November 2021 through August 2022 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, the Pier 90, Pier 91, and AOC 11 flow paths. Figure 1 shows well locations. 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 quarterly LNAPL gauging (PGG 2019; Ecology 2019). The monitoring well network and analyte list was updated for the current monitoring period based on the recommendations in the *2020 Annual Monitoring Report* and as approved by Ecology (PGG 2020, Ecology 2021).

3.1 LNAPL Monitoring

MM personnel 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 17, 2022, February 25, 2022; May 10, 2022; and August 25, 2022 (Figures 1 and 3, 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. LNAPL recovery was not performed during this annual monitoring period due to LNAPL thicknesses less than 0.25 feet, as specified in the CMP and OMP (PES et al. 2013b, c). LNAPL thickness ranged from sheen or less than measurable (< 0.01 ft) to 0.13 feet.

3.2 Groundwater Level Monitoring

MM personnel conducted performance groundwater level monitoring in 45 of 46 active CMP monitoring wells[1] on August 25, 2022 (Table 2a, Figure 1). Water level elevations from 2016 to 2022 are summarized in Table 2b.

[1] The monument lid bolts at CP-GP03B were seized and the well could not be opened.

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 August 25, 2022 (Table 3). The groundwater quality was monitored during purging for field parameters such as temperature, pH, specific conductance, visual turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP) at each well.

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

Samples were submitted to OnSite located in Redmond, Washington (an Ecology-accredited laboratory) for analysis on August 26, 2022. Samples were analyzed for gasoline-range, diesel-range, and oil-range hydrocarbons using Northwest Total Petroleum Hydrocarbons-Gasoline (NWTPH-Gx), and Northwest Total Petroleum Hydrocarbons-Diesel extended (NWTPH-Dx). NWTPH-Dx analysis was conducted with silica gel cleanup.

4 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). LNAPL was not measured in trench 3E due to a seized vault latch at time of gauging events; the vault latch was repaired in October 2022. Key LNAPL observations include:

- LNAPL was intermittently detected in trench monitoring points with thicknesses from 0 to 0.06 ft.
- LNAPL was consistently detected in PNO-MW104 with thicknesses from 0.09 to 0.13 ft.
- CP-107 had no measurable LNAPL during the 2022 monitoring events (0 ft).

LNAPL thickness appears to have a seasonal variation in observed thickness related to rising and falling water levels. LNAPL thickness measurements are typically the greatest in summer-fall events when water levels are the lowest (Figure 3). This is consistent with the expected LNAPL behavior in unconfined aquifers (Newell 1995).

4.2 Groundwater Elevations and Flow Direction

The performance groundwater level monitoring was conducted on August 25, 2022, in all available and active CMP monitoring wells; UT-MW39-3 was previously decommissioned and CP-GP03BR had a damaged bolt that could not be opened; the bolt will be extracted and replaced in November 2022. Field water level forms are included in Appendix A.

Depth to water measurements are summarized in Table 2a. This table also includes the calculated groundwater elevations, referenced to mean low-low water (MLLW) vertical datum. 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 during August 2022 (Figure 1). 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

The groundwater quality was monitored for temperature, pH, specific conductance, visual turbidity, DO, and ORP. The August 2022 groundwater results are presented in Table 3.

4.3.2 Petroleum Hydrocarbons

The analytical results for total petroleum hydrocarbons are summarized in Table 3. The laboratory analytical report is included in Appendix B. Data trends for petroleum hydrocarbons are shown in Figures 2a through 2c.

In August 2022, cleanup levels were met at all CPOC wells for gasoline-, diesel-, and oil-range hydrocarbons. 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.

Key CPOC results included:

- No sampled wells had exceedances for gasoline-, diesel-, and oil-range hydrocarbons during the monitoring period.
- All analytical results were non-detect, except at CPOC well PNO-MW06B, where gasoline (170 ug/L) and diesel (0.22 mg/L) were detected below their respective cleanup levels (800 ug/L and 0.5 mg/L).

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

- One well, CP-106A, exceeded cleanup level for gasoline range organics.
- Wells CP-103A, CP-104A, CP-106A, CP-108A, PNO-MW06A, and PNO-MW103 exceeded cleanup level for diesel range organics, consistent with prior monitoring results.

The well locations are shown in Figure 1. The data generally indicate continued compliance with site cleanup objectives. Gasoline concentrations were generally consistent with previous monitoring events with compliance at all CPOC wells.

4.3.3 Data Trends

Figures 2a through 2c show data trends for gasoline-, diesel-, and oil-range hydrocarbons for site CPOC wells and wells generally north and south of the Magnolia Bridge. Table 4 provides a summary of the data from 2015 to 2022. 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[2], though the data from some wells are noisy enough that the beginning of a trend may be hard to detect.

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:

- NWTPH-Dx analysis was conducted with silica gel cleanup during the sample extraction and preparation phase. Silica gel cleanup is specified in the CMP[3]. One result for oil-range hydrocarbons at PNO-MW06A was flagged as N1 due to hydrocarbons in diesel range impacting lube oil range results.
- Samples were analyzed within applicable holding times.

[2] Z-flagged NWTPH-D and NWTPH-O results from 2021 were analyzed without silica gel cleanup and are biased high and not considered for evaluation of trend. The CMP specifies silica gel cleanup for NWTPH-Dx analyses.

[3] See footnote 2.

- Laboratory instrument calibrations, surrogate recoveries, matrix spike and matrix spike duplicates, and laboratory control samples were within the applicable quality assurance ranges.
- The relative percent differences for the field duplicates were within the recommended criteria of 20%.
- Laboratory control samples were within acceptable ranges.

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

5 Compliance Monitoring Plan Deviations

There were two deviations from the CMP in the November 2021- August 2022 monitoring year. Water levels were not measured at well CP-GP03BR due to a seized monument lid, and LNAPL thickness was intermittently not measured at Trench 3E due to a seized latch. There were no other deviations from the CMP during the monitoring period.

6 References

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Table 1a. 2022 LNAPL Monitoring Summary

Port of Seattle Terminal 91

Well or Riser	Date	Easting	Northing	Top of Casing	LNAPL Top	LNAPL Bottom	LNAPL Thickness	*Groundwater Elevation (feet)
CP-107	11/17/2021	1258549.03	235217.38	17.70	4.92	4.92	0.00	12.78
CP-107	2/25/2022	1258549.03	235217.38	17.70	5.32	5.32	0	12.38
CP-107	5/10/2022	1258549.03	235217.38	17.70	5.29	5.29	0	12.41
CP-107	8/25/2022	1258549.03	235217.38	17.70	6.12	6.12	0	11.58
CP-110	11/17/2021	1258545.20	235064.79	17.46	5.80	5.80	0.00	11.66
CP-110	2/25/2022	1258545.20	235064.79	17.46	6.29	6.3	0.01	11.17
CP-110	5/10/2022	1258545.20	235064.79	17.46	6.24	6.25	0.01	11.22
CP-110	8/25/2022	1258545.20	235064.79	17.46	6.96	6.96	0	10.50
PNO-MW104	11/17/2021	1258507.67	234985.46	17.70	6.10	6.26	0.16	11.57
PNO-MW104	2/25/2022	1258507.67	234985.46	17.70	6.71	6.82	0.11	10.97
PNO-MW104	5/10/2022	1258507.67	234985.46	17.70	6.62	6.75	0.13	11.05
PNO-MW104	8/25/2022	1258507.67	234985.46	17.70	7.25	7.34	0.09	10.43
Trench 2E	11/17/2021	1258689.24	235172.27	21.43	10.35	10.35	0.00	11.08
Trench 2E	2/25/2022	1258689.24	235172.27	21.43	9.72	9.72	0	11.71
Trench 2E	5/10/2022	1258689.24	235172.27	21.43	9.95	9.96	0.01	11.48
Trench 2E	8/25/2022	1258689.24	235172.27	21.43	5.25	5.25	0	16.18
Trench 2W	11/17/2021	1258614.92	235174.81	18.37	7.31	7.33	0.02	11.06
Trench 2W	2/25/2022	1258614.92	235174.81	18.37	6.67	6.67	0	11.70
Trench 2W	5/10/2022	1258614.92	235174.81	18.37	6.9	6.91	0.01	11.46
Trench 2W	8/25/2022	1258614.92	235174.81	18.37	5.28	5.28	0	13.09
Trench 3E	11/17/2021	1258683.13	235311.86	19.29	7.02	7.06	0.04	12.26
Trench 3E	2/25/2022	1258683.13	235311.86	19.29	NM	NM	NM	NM
Trench 3E	5/10/2022	1258683.13	235311.86	19.29	NM	NM	NM	NM
Trench 3E	8/25/2022	1258683.13	235311.86	19.29	NM	NM	NM	NM
Trench 3W	11/17/2021	1258607.59	235312.57	18.10	8.20	8.25	0.05	9.89
Trench 3W	2/25/2022	1258607.59	235312.57	18.10	6.35	6.36	0.01	11.75
Trench 3W	5/10/2022	1258607.59	235312.57	18.10	6.58	6.59	0.01	11.52
Trench 3W	8/25/2022	1258607.59	235312.57	18.10	7.1	7.1	0	11.00
Trench 5E	11/17/2021	1258571.45	235310.84	16.51	4.03	4.04	0.01	12.48
Trench 5E	2/25/2022	1258571.45	235310.84	16.51	4.35	4.36	0.01	12.16
Trench 5E	5/10/2022	1258571.45	235310.84	16.51	4.28	4.3	0.02	12.21
Trench 5E	8/25/2022	1258571.45	235310.84	16.51	10.49	10.49	0	6.02
Trench 5W	11/17/2021	1258516.23	235312.10	16.56	4.01	4.05	0.04	12.54
Trench 5W	2/25/2022	1258516.23	235312.10	16.56	4.38	4.4	0.02	12.18
Trench 5W	5/10/2022	1258516.23	235312.10	16.56	4.29	4.35	0.06	12.26
Trench 5W	8/25/2022	1258516.23	235312.10	16.56	7.43	7.43	0	9.13

Notes:

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 1b. LNAPL Thickness Summary 2015-2022

Port of Seattle Terminal 91

Date	CP-107	CP-110	PNO-MW104	Trench 2E	Trench 2W	Trench 3E	Trench 3W	Trench 5E	Trench 5W
8/6/2015	0.00	0.00	0.23	0.00	0.00	0.00	0.03	0.00	0.07
9/15/2015	0.01	0.01	0.18	0.02	0.00	0.04	0.05	0.00	0.19
10/14/2015	0.00	0.00	0.21	0.04	0.17	0.07	0.07	0.01	0.11
11/12/2015	0.00	0.00	0.19	0.10	0.19	0.06	0.06	0.00	**0.70**
11/16/2015	0.00	0.00	0.15	0.03	0.02	0.04	0.02	NA	0.03
2/8/2016	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.02
5/2/2016	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.09
8/15/2016	0.00	0.00	0.20	0.05	0.06	0.04	0.02	0.03	0.10
11/14/2016	0.00	0.00	0.04	0.01	0.01	0.01	0.02	0.02	0.04
2/13/2017	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.18
5/10/2017	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.06
8/15/2017	NA	NA	NA	0.07	0.00	0.00	0.00	0.06	0.11
11/30/2017	0.00	0.00	0.11	0.04	0.07	0.12	0.05	0.08	0.06
2/15/2018	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.07
5/9/2018	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.06
8/15/2018	0.00	0.00	0.13	0.01	0.00	0.00	0.01	0.03	0.02
11/25/2018	0.00	0.00	0.06	0.02	0.03	0.03	0.04	0.02	0.03
2/21/2019	0.00	0.00	0.11	0.00	0.01	0.01	0.01	0.00	0.02
5/30/2019	0.00	0.00	0.08	0.00	NA	0.01	0.00	0.00	0.04
8/22/2019	0.09	0.00	0.19	0.00	0.00	0.02	0.02	0.00	0.01
11/19/2019	0.00	0.00	0.10	0.01	0.02	0.05	0.05	0.02	0.02
2/26/2020	0.00	0.00	0.08	0.00	0.00	0.01	0.00	0.00	0.03
5/27/2020	NA	NA	NA	NA	0.00	0.00	0.00	0.00	0.03
8/7/2020	0.02	0.01	0.11	0.01	0.00	0.04	0.02	0.01	0.03
11/18/2020	0.00	0.00	0.11	0.00	0.02	0.02	0.05	0.00	0.02
2/9/2021	0.00	0.01	0.13	0.00	0.00	0.00	0.01	0.00	0.01
5/27/2021	0.00	0.01	0.14	0.00	0.01	0.01	0.00	0.00	0.06
8/26/2021	0.01	0.00	0.24	0.00	0.01	0.01	0.02	0.00	0.00
11/17/2021	0.00	0.00	0.16	0.00	0.02	0.04	0.05	0.01	0.04
2/25/2022	0.00	0.01	0.11	0.00	0.00	NA	0.01	0.01	0.02
5/10/2022	0.00	0.01	0.13	0.01	0.01	NA	0.01	0.02	0.06
8/25/2022	0.00	0.00	0.09	0.00	0.00	NA	0.00	0.00	0.00

Notes:

All measurements in feet.

Bold indicates thickness greater than the recovery threshold (0.25 feet).

NA - well not accessible at time of gauging event

Table 2a. 2022 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	235056.488	1259053.02	17.24	6.71	10.53
CP-103A	Shallow	234972.532	1258577.49	17.21	6.64	10.57
CP-104A	Shallow	235419.92	1258578.53	17.49	5.53	11.96
CP-104B	Deep	235426.99	1258578.29	17.39	5.8	11.59
CP-106A	Shallow	235301.93	1258919.04	18.11	6.76	11.35
CP-106B	Deep	235311.62	1258908.04	18.06	6.7	11.36
CP-107	Shallow	235217.377	1258549.03	17.7	6.12	11.58
CP-108A	Shallow	234962.68	1258931.98	17.19	6.5	10.69
CP-108B	Deep	234962.46	1258927.28	17.22	10.6	6.62
CP-110	Shallow	235064.79	1258545.2	17.46	6.96	10.50
CP-111	Shallow	234994.011	1258361.25	17.74	7.31	10.43
CP-112	Shallow	235347.293	1258424.51	17.4	5.7	11.70
CP-113	Shallow	235538.49	1258574.6	17.36	5.46	11.90
CP-114	Shallow	235478.726	1258827.05	17.17	6	11.17
CP-115A	Shallow	235411.433	1258723.96	17.74	5.82	11.92
CP-115B	Deep	235417.48	1258737.17	17.87	6.33	11.54
CP-121	Shallow	235478.449	1258668.95	17.91	5.75	12.16
CP-122B	Deep	235241.133	1258967.84	17.07	5.85	11.22
CP-203B	Deep	234972.13	1258599.96	17.56	8.22	9.34
CP-205A	Shallow	235677.44	1258726.8	17.69	5.7	11.99
CP-205B	Deep	235682.021	1258725.15	17.72	6	11.72
CP-GP01A	Shallow	234783.171	1259137.77	17.79	8.45	9.34
CP-GP01B	Deep	234780.155	1259127.74	17.58	11.61	5.97
CP-GP02	Shallow	234870.331	1259056.83	17.52	7.57	9.95
CP-GP03AR	Shallow	234510.996	1258309.84	18	9.35	8.65
CP-GP03BR	Deep	234481.72	1258309.70	17.91	NA	NA
CP-GP04R	Shallow	234734.039	1258317.31	18.14	8.65	9.49
CP-GP05	Shallow	234925.882	1258075.23	17.75	8.2	9.55
CP-GP06	Shallow	234926.509	1257941.21	17.85	8.1	9.75
CP-GP07R	Shallow	234873.769	1258267.68	18.07	8.2	9.87
CP-GP08	Shallow	234457.14	1259008.14	17.27	8.42	8.85
CP-GP09R	Shallow	234287.947	1258417.29	17.67	9.32	8.35
CP-GP10	Shallow	234293.606	1258302.87	17.68	9.9	7.78
CP-GP11	Shallow	235153.122	1258319.95	16.98	6.43	10.55
CP-GP12	Shallow	235283.731	1258226.95	17.31	6.7	10.61
CP-GP13	Shallow	235085.865	1258020.07	16.45	6.9	9.55
CP-GP14	Shallow	234927.563	1257862.3	17.6	8.2	9.40
CP-PR-13	Shallow	235133.41	1258256.72	17.34	6.85	10.49
CP-W210	Shallow	234966.79	1258734.14	17.4	7.25	10.15
PNO-MW02	Shallow	234813.143	1258463.27	17.87	8.54	9.33
PNO-MW06A	Shallow	234773.718	1258421.89	18.21	8.88	9.33
PNO-MW06B	Deep	234764.073	1258421.79	18.17	12.09	6.08
PNO-MW101	Shallow	234996.104	1258273.01	17.72	7.6	10.12
PNO-MW103	Shallow	234472.89	1258453.46	17.53	9.14	8.39
PNO-MW104	Shallow	234985.46	1258507.67	17.7	7.27	10.43
UT-MW39-1	Shallow	235313.48	1258481.61	16.89	5.2	11.69

Notes:

NA - well not accessible at time of snap shot.

Water level gauging performed on August 25, 2022.

Table 2b. 2016-2022 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	13.8	12.77	13.16	12.52	12.85	11.97	11.03	11.63	11.12	12.68	13.55	13.09	13.7	12.91
2/13/2017	--	12.18	14.34	13.35	13.6	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	13.7	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	10.7	8.93	10.52	10.35	11.67	11.87	11.15	11.91	11.62
11/30/2017	11.6	11.56	13.34	12.54	12.82	12.47	12.61	11.72	10.82	11.49	11.34	12.54	13.3	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	11.8	11.45	11.63	11.16	11.45	10.74	9.27	10.5	10.6	11.58	11.69	11.02	11.24	11.9
5/29/2019	--	10.7	12.2	11.78	11.6	11.58	11.72	10.89	8.27	10.63	10.5	--	--	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	7.7	10.78	10.49	12	12.38	11.69	12.48	11.95
8/26/2021	--	10.36	11.65	11.33	11.14	10.93	11.29	10.4	7.53	10.28	10.32	11.44	11.55	10.82	11.62	11.31
8/25/2022	10.53	10.57	11.96	11.59	11.35	11.36	11.58	10.69	6.62	10.5	10.43	11.7	11.9	11.17	11.92	11.54

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	13.9	12.44	10.48	13.79	13.3	10.65	10.18	11.16	10.33	7.33	10.37	11.35	10.71	10.6	9.98	9.86
2/13/2017	14.76	13.1	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	6.41	10.98	8.75	3.57	9.8	9.73	10.1	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	9.7	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	9.9	9.32
5/9/2018	13.28	12.18	9.65	13.17	12.79	9.8	8.43	10.47	8.99	8.37	9.7	9.61	9.92	10.1	9.2	8.54
11/25/2018	11.98	10.92	9.6	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	12.4	11.39	9.05	12.25	12.03	9.31	6.98	10.05	8.63	6.5	9.51	9.5	9.65	9.94	8.9	8.27
5/27/2020	12.7	--	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
8/26/2021	11.84	10.82	9.33	11.65	11.44	9.17	6.8	9.72	8.72	--	9.42	9.46	9.76	9.88	8.78	8.77
8/25/2022	12.16	11.22	9.34	11.99	11.72	9.34	5.97	9.95	8.65	--	9.49	9.55	9.75	9.87	8.85	8.35

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	10.4	8.79	11.07	9.76	11.5	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	11.8	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	13.5	12.9
8/15/2017	8.68	10.6	10.52	9.55	9.88	10.43	10.11	9.47	9.59	8.33	10.18	8.9	10.4	11.65
11/30/2017	8.98	11.32	11.52	10.2	10.6	11.29	11.04	10.31	10.41	11.79	10.95	9.51	11.3	12.48
5/9/2018	8.04	10.92	10.9	9.56	9.61	9.64	10.66	9.67	9.73	9.03	10.4	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	9.7	10.55	10.34	9.61	9.64	6.28	10.25	8.74	10.6	12.01
8/26/2021	8.22	9.56	10.4	9.45	9.56	10.37	9.89	9.45	9.42	7.56	10.04	8.77	10.29	11.4
8/25/2022	7.78	10.55	10.61	9.55	9.4	10.49	10.15	9.33	9.33	6.08	10.12	8.39	10.43	11.69

Notes:

All water level elevations in feet referenced to mean low-low water vertical datum (MLLW).

Table 3. August 2022 Groundwater Results

Port of Seattle Terminal 91

Constituent	Units	Cleanup Level	CP-103A	CP-104A	CP-106A	CP-108A	CP-203B	CP-GP01B	CP-GP02	CP-GP08	CP-GP09R	CP-GP10	CP-GP11	CP-GP14	PNO-MW02	PNO-MW06A	PNO-MW06B	PNO-MW103
								CPOC		*CPOC*	*CPOC*	*CPOC*		*CPOC*			*CPOC*	
Field Parameters																		
Temperature	deg C	--	17.46	18.9	21.3	18.2	15	16.6	17.4	17.1	19.16	19.26	20.1	15.15	19.72	20.95	16.58	20.72
Specific Conductance	umhos/cm	--	460	456	635	410	487	4649	1065	751	8750	18110	4336	2318	945	1371	3626	1368
pH	pH	--	7.36	7.12	6.68	6.83	6.91	8.08	6.44	6.75	6.74	7.43	7.25	7.25	6.5	6.99	7.51	6.89
Oxidation-Reduction Potential	mV	--	-127.5	-108	-96.9	-114.3	-108.3	-172.4	-99.2	-16.7	92.9	79.4	-228.8	-76.2	-75.1	-114.6	-240.3	-142.5
Oxygen, Dissolved	mg/L	--	0.25	0.18	0.32	0.14	0.21	0.14	0.39	0.31	0.61	5.66	0.16	0.56	0.48	0.4	0.27	0.33
Total Petroleum Hydrocarbons																		
NWTPH-Gasoline	ug/L	800	560	540	**950**	540	430	100U	360	100U	100U	100U	230	100U	100U	140	170	660
NWTPH-Diesel *	mg/L	0.5	**0.54X1**	**0.57X1**	**0.6X1**	**0.72X1**	0.36X1	0.15UX1	0.34X1	0.15UX1	0.15UX1	0.15UX1	0.15UX1	0.15UX1	0.24X1	**0.62X1**	0.22X1	**0.88X1**
NWTPH-Oil *	mg/L	0.5	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.27X1,N1	0.2UX1	0.2UX1

Notes:

* NWTPH-Diesel and NWTPH-Oil analyses were conducted with silica gel cleanup.

Groundwater Cleanup Levels from PES 2009.

Bold, gray shaded cells indicate exceedance of cleanup level

ug/L: micrograms per liter

mg/L: milligrams per liter

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

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

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

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

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

Groundwater samples were collected on August 25, 2022.

Table 4. Data Summary

Port of Seattle Terminal 91

			CPOC Wells																					
Constituent	**Units**	**Event Date**	**CP-GP08**	**CP-GP01B**	**CP-GP09R**	**CP-GP10**	**CP-GP14**	**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**
Field Parameters																									
Oxidation-Reduction Potential	mV	11/14/2016	-170.5	-180.9	84.3	161.8	-8.8	-133.2	-122.7	-154.9	-98.3	-51.1	-290	-60.9	70.5	-247.2	-197	16.6	-68.3	-95.2	-230	-93.2	-113.6	-94.4	-84.2
Oxidation-Reduction Potential	mV	2/13/2017	14.4	-68.2	-15.9	-28	-12.3	-212.2	-22.6	-82.9	-6.7	-185.1	-278	-6.9	42.4	-107.8	-27.4	-11.3	-146.9	21	-40.7	18.6	-7.6	-127.2	-89.3
Oxidation-Reduction Potential	mV	5/10/2017	186.4	-186.4	-148.3	-166.8	183.9	-198	-160.8	-205	108.2	54.8	-243	-196	-186.4	-245.8	-187.4	-181.3	-205.8	-202	-178.6	7.64	-192	-158.5	-186.8
Oxidation-Reduction Potential	mV	8/15/2017	-155.6	Error	--	115.4	11.2	181.21	-157.3	-199.1	-223.2	-205.1	-299.4	--	-182.6	-328.9	-162.5	-232.9	-297.3	-230.5	141.1	228.9	225.8	635.1J	-46.5
Oxidation-Reduction Potential	mV	11/30/2017	-124.7	67	-97	-16.4	-30.4	-143.4	-66.7	-191.5	26.9	75.2	-253.7	-94.4J	-121.9	-216.3	37.9	-94.1	-180	-104.1	-188.6	-101.8	-129.3	-102.6	-123.7
Oxidation-Reduction Potential	mV	5/16/2018	40.9	112.9	71.8	78.1	-14.1	-247.7	-163.3	-22.5	-59.1	-24.5	-241.1	-50.9	--	-157.9	-1.9	2.9	-304.2	-89.8	-296.2	-142.8	-52.1	-66.7	-40.5
Oxidation-Reduction Potential	mV	11/25/2018	-53.7	23.8	-11.5	--	-219.8	-179.1	18.6	-5.5	-9.9	-25.2	-167.6	-149.7	26.2	-324.7	-40	-25	-323.3	-263.8	-306.9	-42.6	-114.5	-252.4	-253.3
Oxidation-Reduction Potential	mV	5/29/2019	-102	-89.8	220.4	-37.6	-40.2	-190.4	-100.1	-138.7	-119.2	-178.3	-297.7	-147.1	-109.8	-247.6	-129.4	-126	-110.3	-93.8	-237.4	-78.2	-80.4	-117.8	-44.5
Oxidation-Reduction Potential	mV	5/27/2020	41.1	-92.8	212.1	247	-37.1	-146.2	-57.4	26.8	-92.7	-219.6	-337.4	342	-43.7	-290.1	41.4	28.5	-306	-239.2	-303.3	76.3	-103.3	-208	-95.7
Oxidation-Reduction Potential	mV	8/25/2021	-87.9	-244.5	21.8	44.6	-65.8	-100.9	-117.5	-124.9	-98.1	-244.7	--	--	-100.7	--	--	-142.3	--	--	-281.3	-61.5	-181.2	--	-94.4
Oxidation-Reduction Potential	mV	8/25/2022	-16.7	-172.4	92.9	79.4	-76.2	-240.3	-127.5	-108	-96.9	-114.3	--	--	-108.3	--	--	-99.2	--	--	-228.8	-75.1	-114.6	--	-142.5
Oxygen, Dissolved	mg/L	11/14/2016	1.56	0.37	0.97	5.01	5.36	0.08	0.13	1.23	0.18	0.11	0.32	1.59	2.8	0.14	0.38	0.53	0.41	1.51	0.34	0.33	0.08	0.33	0.58
Oxygen, Dissolved	mg/L	2/13/2017	2.54	0.51	1.66	7.27	4.57	0.01U	0.13	0.27	0.7	0.99	0.38	1.39	0.14	0.32	0.87	1.64	0.28	0.66	0.08	0.15	0.08	0.09	0.04
Oxygen, Dissolved	mg/L	5/10/2017	1.93	0.31	0.86	8.81	0.88	0.037	1.69	1.2	0.17	0.26	0.07	1.21	1.6	0.68	0.89	0.88	0.56	0.87	1.62	5.76	0.45	0.8	0.8
Oxygen, Dissolved	mg/L	8/15/2017	0.44	1.84	--	3.86	0.5	0.12	0.25	0.28	0.38	0.23	0.18		0.25	0.17	1.65	0.18	0.17	0.22	0.12	0.11	0.2	0.19	0.16
Oxygen, Dissolved	mg/L	11/30/2017	2.48	3.42	0.68	4.12	2.54	0.75	0.19	0.22	1	0.23	0.08	1.24	0.58	0.17J	0.48	0.37	0.32	0.93	0.61	0.63	0.39	0.64	0.68
Oxygen, Dissolved	mg/L	5/16/2018	1.22	0.16	2.07	7.97	4.4	1.27	0.12	0.29	0.14	0.4	0.28	0.99		0.19	0.17	0.3	1.04	2.54	0.54	1.1	0.82	2.66	0.67
Oxygen, Dissolved	mg/L	11/25/2018	0.3	2.69	0.23	--	0.22	0.63	0.23	0.18	0.28	0.79	0.56	0.4	0.28	1.12	0.38	0.32	0.27	0.23	0.8	0.25	0.31	1.77	0.41
Oxygen, Dissolved	mg/L	5/29/2019	0.24	0.7	0.68	7.46J	0.33	0.4	0.23	0.23	0.21	0.19	0.12	0.33	0.22	0.16	0.21	0.32	0.12	0.61	0.35	0.54	0.24	0.79	0.18
Oxygen, Dissolved	mg/L	5/27/2020	0.1	0.5	0.87	6.33	0.81	0.31	0.1	0.2	0.18	0.6	0.1	0.6	0.2	0.5	0.3	0.1	0.2	0.54	0.83	0.27	0.29	0.91	2.48
Oxygen, Dissolved	mg/L	8/25/2021	0.39	0.41	0.99	5.59	1.95	1.17	0.49	0.4	0.59	0.27	--	--	0.31	--	--	0.33	--	--	2.64	0.5	2.19	--	0.58
Oxygen, Dissolved	mg/L	8/25/2022	0.31	0.14	0.61	5.66	0.56	0.27	0.25	0.18	0.32	0.14	--	--	0.21	--	--	0.39	--	--	0.16	0.48	0.4	--	0.33
pH, Field	pH	11/14/2016	7.17	6.67	7.29	7.28	6.84	7.3	7.17	7.05	6.94	6.94	7.92	7.38	6.71	8.01	7.21	6.59	7.49	6.94	7.39	6.79	6.71	7.53	7.12
pH, Field	pH	2/13/2017	6.99	8.41	7.33	7.55	6.76	7.12	6.98	7.27	7.02	7.21	7.89	7.41	7.23	7.86	7.17	6.88	7.32	6.77	7.77	6.65	6.88	7.17	6.56
pH, Field	pH	5/10/2017	6.83	8.05	7.39	7.81	7.19	7.34	7.35	7.51	7.14	7.4	8.01	7.77	7.39	8.27	6.94	6.66	7.65	7.42	7.48	6.68	6.91	7.4	6.62
pH, Field	pH	8/15/2017	7.06	8.27	--	7.19	9.75	6.88	7.09	7.13	6.82	6.99	7.79		7.11	7.69	6.98	6.81	7.44	7.13	6.73	6.2J	6.94	5.01J	6.75
pH, Field	pH	11/30/2017	7.03	6.18	6.91	7.19	6.76	6.93	7.14	7.27	6.78	6.85	8.04	7.38	7.61	7.76	7.01	6.9	7.23	6.89	6.98	6.39	6.43	7.34	6.63
pH, Field	pH	5/16/2018	7.08	5.86	7.16	7.41	7.2	7.29	7.11	6.85	6.95	6.88	8.07	7.41		7.72	7.13	6.74	7.62	7.1	7.42	6.6	6.73	7.41	6.72
pH, Field	pH	11/25/2018	7.13	7.63	6.98	--	6.89	7.3	8.11	6.82	8.16	6.52	7.81	7.52	8.06	7.79	8.51	8.37	7.36	7.03	7.02	6.7	6.54	7.49	6.82
pH, Field	pH	5/29/2019	7.07	6.25	5.82	7.13	6.8	5.77	7.09	7.11	6.89	6.82	7.76	7.58	7.19	7.88	7.07	6.73	5.88	7.02	6.96	6.53	4.69	7.22	6.34
pH, Field	pH	5/27/2020	7.16	8.43	7.24	7.59	7.22	7.09	7.18	7.29	6.74	7.37	7.77	7.57	7.4	8.21	7.09	6.85	7.55	7.27	7.31	6.49	6.73	7.51	6.69
pH, Field	pH	8/25/2021	7.12	8.32	6.98	7.36	7.21	7.33	7.13	7.21	6.83	7.23	--	--	7.32	--	--	6.8	--	--	7.34	6.73	6.93	--	6.79
pH, Field	pH	8/25/2022	6.75	8.08	6.74	7.43	7.25	7.51	7.36	7.12	6.68	6.83	--	--	6.91	--	--	6.44	--	--	7.25	6.5	6.99	--	6.89
Specific Conductance, Field	umhos/cm	11/14/2016	582	105.5	15849	3001	8800	1510	454	550	740	640	4382	460	194	2640	593	1158	25021	18155	3743	838	1940	3722	2092
Specific Conductance, Field	umhos/cm	2/13/2017	864	4730	18600	22190	595	1418	321	349	564	435	4171	437	395	2855	900	1286	38810	1782	1305	557	623	3282	1259
Specific Conductance, Field	umhos/cm	5/10/2017	731	3.39	7560	138200	4470	2140	384.7	388	617.3	416.9	5229	359.8	527.5	2504	1358	920	2.56	1757	1926	13.84	835	2009	1409
Specific Conductance, Field	umhos/cm	8/15/2017	802	4401		25560	404	1881	465	441	745	504	5563		586	2943	1771	998	35010	22700	4301	1334	1667	1595	1357
Specific Conductance, Field	umhos/cm	11/30/2017	721	25	19.08	335600	8.54	1813	419	409	594	673	3904	410	589	2865	1507	1150	383700	286000	9.06	905	2190	3260	1658
Specific Conductance, Field	umhos/cm	5/16/2018	831	47	15750	18.3	2445	2062	444	423	670	398	2906	378	--	2162	1131	1107	31150	23.62	3953	1171	1224	2624	1561
Specific Conductance, Field	umhos/cm	11/25/2018	946	55	18.17	--	1800	1279	495	530	818	726	2965	476	567	3353	1709	1194	34.28	3254	12630	1435	4216	3285	1591
Specific Conductance, Field	umhos/cm	5/29/2019	710	71.5	7483	24125	5104	1759	486	510	720	368.1	5742	359.2	512	2537	1242	1043	28990	17144	4067	1141	1113	3839	1347
Specific Conductance, Field	umhos/cm	5/27/2020	868	4809	7550	20570	1967	2675	473.8	494.4	735	379.8	6011	453.5	553.5	2865	1520	1244	33300	18650	3816	1012	1556	3711	1571
Specific Conductance, Field	umhos/cm	8/25/2021	831	6334	10.32	15.86	46.37	35.85	498	498	860	523	--	--	574	--	--	1105	--	--	5515	1369	2852	--	1521
Specific Conductance, Field	umhos/cm	8/25/2022	751	4649	8750	18110	2318	3626	460	456	635	410	--	--	487	--	--	1065	--	--	4336	945	1371	--	1368
Temperature	deg C	11/14/2016	16.2	15.9	17.8	16.1	14.7	15.1	14.9	16.3	18.4	15.1	15.2	15.2	14.7	15	18.3	16.4	16.8	13.9	17	17.2	17.4	17.3	17.7
Temperature	deg C	2/13/2017	11.96	15.1	11.79	9.5	11.47	14.01	11.45	11.1	12.55	9.32	14	10.49	13.26	13.36	1340	11.82	10.75	10.31	12.68	11.5	11.53	12.79	12.94
Temperature	deg C	5/10/2017	12.8	14.56	13.05	11.34	11.77	14.44	12.8	13	14	11.6	14.4	12.7	14.2	14.2	13.94	12.75	11.11	11.05	13.92	13.84	13.88	13.35	13.13
Temperature	deg C	8/15/2017	17.12	16.25	--	17.67	17.76	15.39	15.74	18.44	20.76	17.87	15.65	--	15.01	16.09	18.99	18.56	17.2	15.52	19.73	18.89	18.9	17.42	18.41
Temperature	deg C	11/30/2017	15.2	15.66	15.34	13.78	12.63	13.33	13.52	15.5	15.99	14.09	14.4	13.89	12.67	14.99	16.96	13.89	14.84	11.42	13.7	14.53	14.65	14.83	15.26
Temperature	deg C	5/16/2018	15.74	15.56	14.08	13.05	12.46	15.35	13.7	13.37	15.89	12.94	14.93	14.64	--	14.08	15.64	13.99	12.52	11.37	14.52	14.99	14.6	13.38	14.49
Temperature	deg C	11/25/2018	13.5	14.6	15.81	--	12.46	13.69	12.2	14.66	15.98	13.19	12.93	13.32	12.21	12.95	15.57	13.96	14.62	12.39	14.52	16.02	15.38	14.77	15.64
Temperature	deg C	5/29/2019	13.8	15.6	15.1	12.9	12.8	14.7	13.8	14.1	15.9	14	14.7	14.4	14.1	15.1	16.2	14.4	12.7	11.9	15.3	15	14.8	13.8	15.3
Temperature	deg C	5/27/2020	14.5	16.2	15.9	13.8	13.6	15	14.3	14.5	16.6	14	15.1	14.6	14.7	15.2	15.7	15.1	13.2	12.6	16.2	15.6	15.8	15.1	16.1
Temperature	deg C	8/25/2021	17.4	16.11	18.53	18.24	15.57	15.46	16.3	18.89	21.46	18.14	--	--	14.63	--	--	17.79	--	--	19.43	19.33	19.71	--	20.55
Temperature	deg C	8/25/2022	17.1	16.6	19.16	19.26	15.15	16.58	17.46	18.9	21.3	18.2	--	--	15	--	--	17.4	--	--	20.1	19.72	20.95	--	20.72

Table 4. Data Summary

Port of Seattle Terminal 91

			CPOC Wells																				
Constituent	**Units**	**Event Date**	**CP-GP08**	**CP-GP01B**	**CP-GP09R**	**CP-GP10**	**CP-GP14**	**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**
Petroleum Compounds																									
NWTPH-D-SG	mg/L	11/9/2015	0.05U	0.526	0.074	0.05U	0.113	2.98	1.9	0.63	2.83	6.98	1.12	0.05U	2.35	0.05U	0.05U	6.75	0.152	0.1	0.05U	4.92	5.62	0.185	5.01
NWTPH-D-SG	mg/L	2/8/2016	0.05U	1.04	0.05U	0.05U	0.05U	2.26	3.08	0.555	1.84	6.54	0.606	0.05U	1.68	0.05U	0.182	3.24	0.434	0.05U	0.05U	0.892	1.82	0.05U	5.1
NWTPH-D-SG	mg/L	5/3/2016	0.05U	0.448	0.05U	0.05U	0.05U	1.98	0.999	0.806	6.96	5.33	0.405	0.05U	1.52	0.05U	0.109	0.05U	0.05U	0.05U	0.05U	0.271	0.997	0.078	6.08
NWTPH-D-No Silica Gel	mg/L	8/10/2015	0.05U	0.641Z	0.05U	0.05U	0.05U	0.05U	2.14Z	0.408Z	4.62Z	0.05U	0.27Z	0.05U	1.45Z	0.05U	0.05U	3.88Z	0.05U	0.05U	0.05U	3.42Z	3.73Z	0.05U	11.2Z
NWTPH-D-SG	mg/L	8/15/2016	0.05U	0.414	0.157	0.05U	0.05U	2.12	1.83	0.404	2.37	3.96	0.166	0.05U	1.94	0.05U	0.05U	7.72	0.137	0.091	0.05U	3.78	3.74	0.05U	1.5
NWTPH-D-No Silica Gel	mg/L	11/14/2016	0.26U	0.26U	0.26U	0.25U	0.26U	2.8Z	2.2Z	0.56Z	0.78Z	6.2Z	--	0.26U	0.25U	0.26U	0.26U	0.55Z	0.65Z	0.26U	0.25U	3.6Z	9.5Z	0.26U	5.5Z
NWTPH-D-SG	mg/L	2/13/2017	0.26UX	0.26UX	0.26UX	0.26UX	0.26UX	0.26UX	0.58X	0.38X	0.7X	0.26X	0.26U	0.26UX	0.26UX	0.31UX	0.26UX	0.26UX	0.25UX	0.26UX	0.26UX	0.26UX	0.26UX	0.26UX	0.6X
NWTPH-D-SG	mg/L	5/10/2017	0.26UX	0.26UX	0.25UX	0.26UX	0.26UX	0.26UX	0.53X	0.41X	0.66X	0.42X	0.26UX	0.26UX	0.26UX	0.26UX	0.26UX	0.26UX	0.25UX	0.26UX	0.26UX	0.26UX	0.26UX	0.25UX	0.73X
NWTPH-D-SG	mg/L	8/15/2017	0.26UX1	0.25UX1	0.26UX1	0.25UX1	0.26UX1	0.25UX1	0.64X1	0.52X1	0.83X1	0.53X1	0.27UX1	0.25UX1	0.36X1	0.26UX1	0.26UX1	0.48X1	0.46X1	0.25UX1	0.26UX1	0.45X1	0.26UX1	0.26UX1	0.73X1
NWTPH-D-SG	mg/L	11/30/2017	0.26UX1	0.26UX1	0.25UX1	0.25UX1	0.25UX1	0.26UX1	0.47X1,J	0.39X1,M	0.65X1,M	0.47X1	0.26UX1	0.26UX1	0.26X1,M	0.26UX1	0.26UX1	0.63X1,M	0.25UX1	0.25UX1	0.25UX1	0.26UX1	0.35X1	0.26UX1	0.98X1
NWTPH-D-SG	mg/L	5/16/2018	0.26UX1	0.26UX1	0.26UX1	0.25UX1	0.25UX1	0.26UX1	0.76X1,M	0.64X1,M	0.79X1,M	0.4X1,M	0.31UX1	0.26UX1	0.3X1,M	0.3UX1	0.25UX1	0.26UX1	0.25UX1	0.26UX1	0.26UX1	0.26UX1	0.62X1	0.26UX1	0.9X1,M
NWTPH-D-SG	mg/L	11/15/2018	0.25UX1	0.26UX1	0.25UX1	--	0.26UX1	0.25UX1	0.68X1	0.43X1	0.67X1	0.33X1	0.26UX1	0.25UX1	0.37X1	0.26UX1	0.26UX1	0.43X1	0.25UX1	0.25UX1	0.26UX1	0.47X1	0.41X1	0.25UX1	0.72X1
NWTPH-D-SG	mg/L	5/29/2019	0.25UX1	0.25UX1	0.26UX1	0.25UX1	0.25UX1	0.25UX1	0.69X1	0.63X1	0.67X1,M	0.32X1	0.26UX1	0.25UX1	0.44X1	0.25UX1	0.25UX1	0.4X1	0.25UX1	0.25UX1	0.25UX1	0.35X1,M	0.5X1,M	0.25UX1	0.89X1
NWTPH-D-SG	mg/L	5/27/2020	0.21UX1	0.21UX1	0.2UX1	0.2UX1	0.21UX1	0.24X1	0.78X1	0.5X1	0.86X1	0.59X1	0.22UX1	0.21UX1	0.3X1	0.22UX1	0.2UX1	0.97X1	0.2UX1	0.2UX1	0.2UX1	0.4X1	0.34X1	0.2UX1	0.86X1
NWTPH-D-No Silica Gel	mg/L	8/25/2021	0.48Z	1.5Z	0.45Z	0.2U	0.2U	2.6Z	1.5Z	1.0Z	4.0Z	2.7Z	--	--	1.4Z	--	--	6.2Z	--	--	0.22Z	3.7Z	4.5Z	--	6.2Z
NWTPH-D-SG	mg/L	8/25/2022	0.15UX1	0.15UX1	0.15UX1	0.15UX1	0.15UX1	0.22X1	0.54X1	0.57X1	0.6X1	0.72X1	--	--	0.36X1	--	--	0.34X1	--	--	0.15UX1	0.24X1	0.62X1	--	0.88X1
NWTPH-G	ug/L	8/10/2015	50U	50U	50U	50U	50U	50U	235	554	703	336	50U	50U	171	50U	50U	248	50U	50U	255	50U	50U	84.1	50U
NWTPH-G	ug/L	11/9/2015	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	51.8	50U
NWTPH-G	ug/L	2/8/2016	50U	50U	50U	50U	50U	50U	334	50U	50U	79.2	50U	616	290	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U
NWTPH-G	ug/L	5/3/2016	50U	50U	50U	50U	50U	164	290	712	1730	543	50U	50U	296	50U	50U	50U	50U	50U	1440	50U	50U	58.7	50U
NWTPH-G	ug/L	8/15/2016	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	50U	93.4	50U	50U	50U	50U	50U	50U	148	50U
NWTPH-G	ug/L	11/14/2016	100U	100U	100U	100U	100U	400U	380	300	400U	400U	--	100U	100U	400U	100U	400U	400U	100U	400U	160	400U	100U	400U
NWTPH-G	ug/L	2/13/2017	100U	100U	100U	100U	100U	200	430	390	860	270	100U	100U	320	100U	100U	100U	100U	100U	230	100U	100U	100U	450
NWTPH-G	ug/L	5/10/2017	100U	100U	100U	100U	100U	130	500U	470O	1200O	500U	100U	100U	500U	100U	100U	140	100U	100U	360	100U	100U	100U	400U
NWTPH-G	ug/L	8/15/2017	100U	100U	100U	100U	100U	500U	100U	500U	1200O	500U	100U	100U	500U	100U	100U	500U	100U	100U	500U	500U	100U	100U	500U
NWTPH-G	ug/L	11/30/2017	100U	100U	100U	100U	100U	380O	540O	450O	990O	490O	400U	100U	380O	400U	100U	690O	100U	100U	350	380O	100UX	100U	600O
NWTPH-G	ug/L	5/16/2018	100U	100U	100U	400U	100U	230	630	370	1100	430	400U	100U	380	400U	100U	250	400U	100U	730	150	220	100U	710
NWTPH-G	ug/L	11/15/2018	100U	100U	100U	--	400U	400U	100U	100U	100U	100U	100U	100U	100U	400U	100U	100U	400U	400U	400U	400U	400U	400U	400U
NWTPH-G	ug/L	5/29/2019	100U	100U	100U	100U	100U	170O	500U	500U	790O	500U	500U	100U	500U	500U	100U	500U	100U	100U	330	250O	160O	100U	500U
NWTPH-G	ug/L	5/27/2020	100U	100U	100U	100U	100U	200O	520O	400O	900O	480O	100U	100U	370O	100U	100U	440O	100U	100U	280	190O	160O	100U	640O
NWTPH-G	ug/L	8/25/2021	100U	100U	100U	100U	100U	400U	400U	400U	510O	400U	--	--	400U	--	--	400U	--	--	400U	400U	100U	--	400U
NWTPH-G	ug/L	8/25/2022	100U	100U	100U	100U	100U	170	560	540	950	540	--	--	430	--	--	360	--	--	230	100U	140	--	660
NWTPH-LO-No Silica Gel	mg/L	8/10/2015	0.13Z	0.65Z	0.858Z	0.1U	0.1U	0.659Z	0.1U	0.1U	6.29Z	0.1U	0.1U	0.1U	0.1U	0.1U	0.151Z	5.58Z	0.57Z	0.1U	0.1U	2.44Z	2.17Z	0.196Z	0.1U
NWTPH-LO	mg/L	11/9/2015	0.1U	0.253	0.1U	0.1U	0.1U	0.1U	0.1U	0.76	3.83	0.1U	0.1U	0.1U	0.1U	0.1U	0.104	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U
NWTPH-LO	mg/L	2/8/2016	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.16	2.28	0.104U	0.1U	0.146	0.1U	0.114	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U
NWTPH-LO	mg/L	5/3/2016	0.1U	0.446	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	6.3	0.1U	0.524	0.338	0.103U	0.1U	0.1U	4.21	0.331	0.1U	0.1U	1.72	2.32	0.1U	0.1U
NWTPH-LO	mg/L	8/15/2016	0.1U	0.707	0.314	0.1U	0.1U	0.1U	0.1U	0.24	4.04	0.1U	0.593	0.118	0.1U	0.1U	0.15	0.1U	0.19	0.1U	0.1U	0.1U	0.1U	0.144	1.47
NWTPH-LO-No Silica Gel	mg/L	11/14/2016	0.41U	0.41U	0.41U	0.41U	0.41U	0.93Z	0.52Z	0.46Z	2.3Z	2.8Z	--	0.45Z	0.41U	0.42U	0.41U	2.9Z	0.5Z	0.41U	0.4U	1.5Z	1.9Z	0.41U	1.3Z
NWTPH-LO	mg/L	2/13/2017	0.41UX	0.42UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.4U	0.41UX	0.41UX	0.49UX	0.41UX	0.41UX	0.4UX	0.41UX	0.41UX	0.41UX	0.42UX	0.41UX	0.41UX
NWTPH-LO	mg/L	5/10/2017	0.42UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.42UX	0.41UX	0.41UX	0.42UX	0.41UX	0.41UX	0.4UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX	0.41UX
NWTPH-LO	mg/L	8/15/2017	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.42UX1	0.41UX1	0.41UX1	0.42UX1	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1
NWTPH-LO	mg/L	11/30/2017	0.41UX1	0.41UX1	0.4UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.42UX1	0.41UX1	0.41UX1	0.4UX1	0.4UX1	0.41UX1	0.41UX1	Error	0.41UX1	0.47X1,N
NWTPH-LO	mg/L	5/16/2018	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.49UX1	0.41UX1	0.41UX1	0.49UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1
NWTPH-LO	mg/L	11/15/2018	0.4UX1	0.41UX1	0.4UX1	--	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.4UX1
NWTPH-LO	mg/L	5/29/2019	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1	0.4UX1	0.4UX1	0.4UX1	0.4UX1	0.41UX1	0.41UX1	0.41UX1
NWTPH-LO	mg/L	5/27/2020	0.21UX1	0.21UX1	0.2UX1	0.2UX1	0.21UX1	0.2UX1	0.21UX1	0.21UX1	0.2UX1	0.21UX1	0.22UX1	0.21UX1	0.21UX1	0.22UX1	0.2UX1	0.21UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1
NWTPH-LO-No Silica Gel	mg/L	8/25/2021	0.66Z	1.1Z	0.48NZ	0.35Z	0.26Z	1.3NZ	0.43NZ	0.43Z	2.3NZ	1.8NZ	--	--	0.55NZ	--	--	3.1NZ	--	--	0.27Z	1.1NZ	2.3NZ	--	1.7NZ
NWTPH-LO	mg/L	8/25/2022	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	0.2UX1	--	--	0.2UX1	--	--	0.2UX1	--	--	0.2UX1	0.2UX1	0.27X1,N1	--	0.2UX1

Notes:

mg/L: milligrams per liter

ug/L: micrograms per liter

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

SG: Analysis performed using silica gel.

U: non-detect at reporting limit shown.

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

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

CPOC: Conditional Point of Compliance

Z: sample did not include silical gel preparation and the detected result is biased high relative to the CMP-defined analytical method.

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

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

CP-205B 11.72
CP-205A 11.99
CP-113 11.90
CP-121 12.16
CP-114 11.17
CP-104B 11.59
CP-104A 11.96
CP-115A 11.92
CP-115B 11.54
CP-112 11.70
UT-MW39-1 11.69
CP-GP12 10.61
CP-106B 11.36
CP-106A 11.35
CP-122B 11.22
CP-107 11.58
CP-GP11 10.55
CP-PR-13 10.49
CP-GP13 9.55
CP-110 10.5
B1-93 10.53
PNO-MW101 10.12
CP-111 10.43
PNO-MW104 10.43
CP-103A 10.57
CP-203B 9.34
CP-W210 10.15
CP-108B 6.62
CP-108A 10.69
CP-GP14 9.40
CP-GP06 9.75
CP-GP05 9.55
CP-GP07R 9.87
CP-GP02 9.95
PNO-MW02 9.33
PNO-MW06A 9.33
PNO-MW06B 6.08
CP-GP01B 5.97
CP-GP01A 9.34
CP-GP04R 9.49
CP-GP03AR 8.65
PNO-MW103 8.39
CP-GP08 8.85
CP-GP10 7.78
CP-GP09R 8.35
12
11
10
9
9
0 Feet 150
1 inch = 150 feet
EagleView Technologies, Inc.

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

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

Site Location

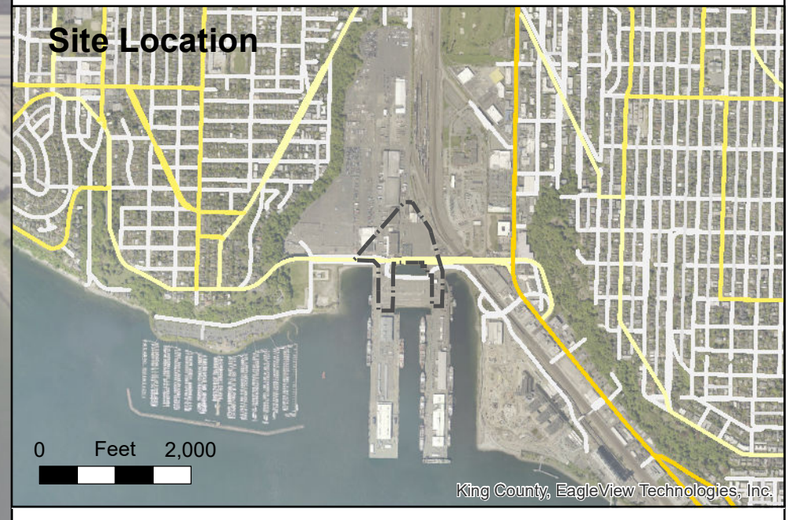
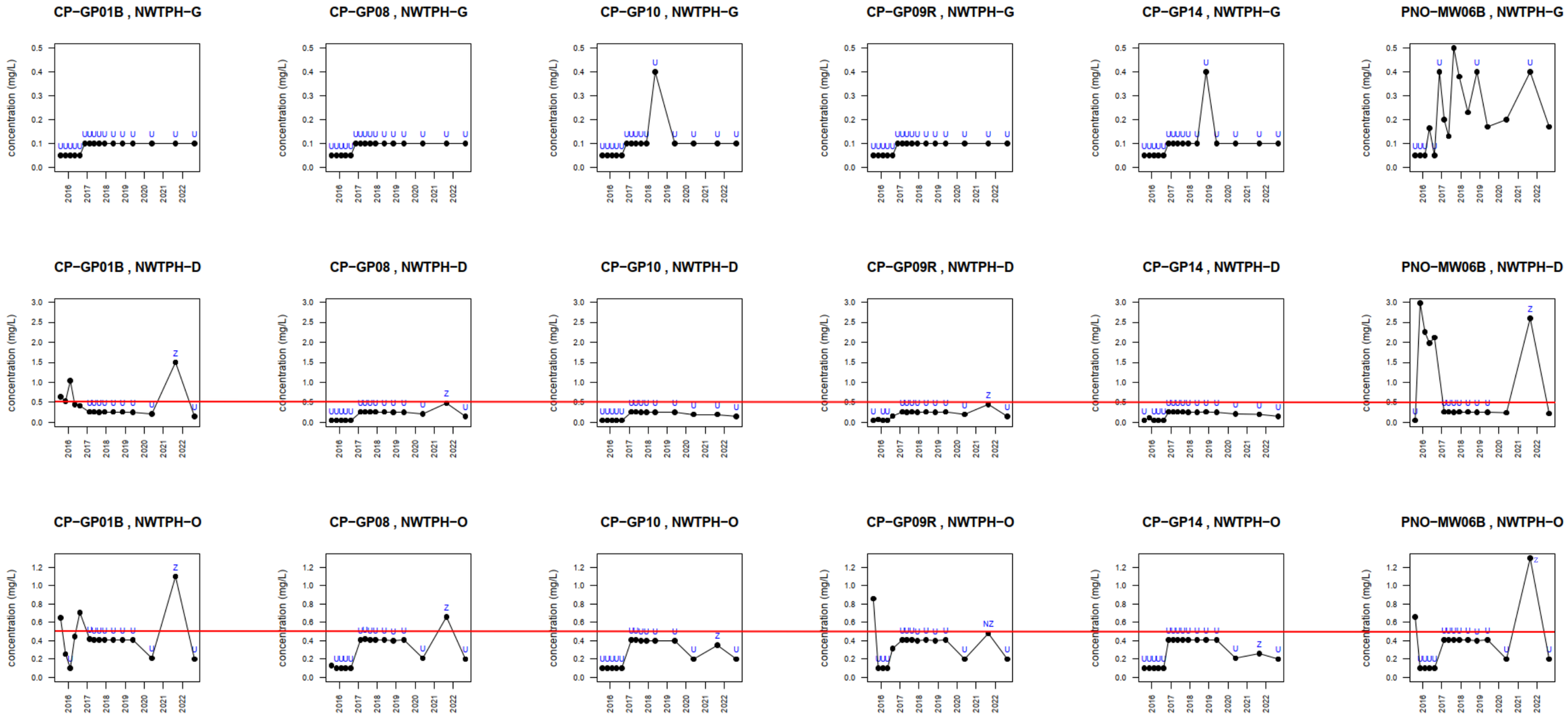


Figure 1
Shallow Groundwater Elevations
August 2022

Port of Seattle Terminal 91

MOTT MACDONALD

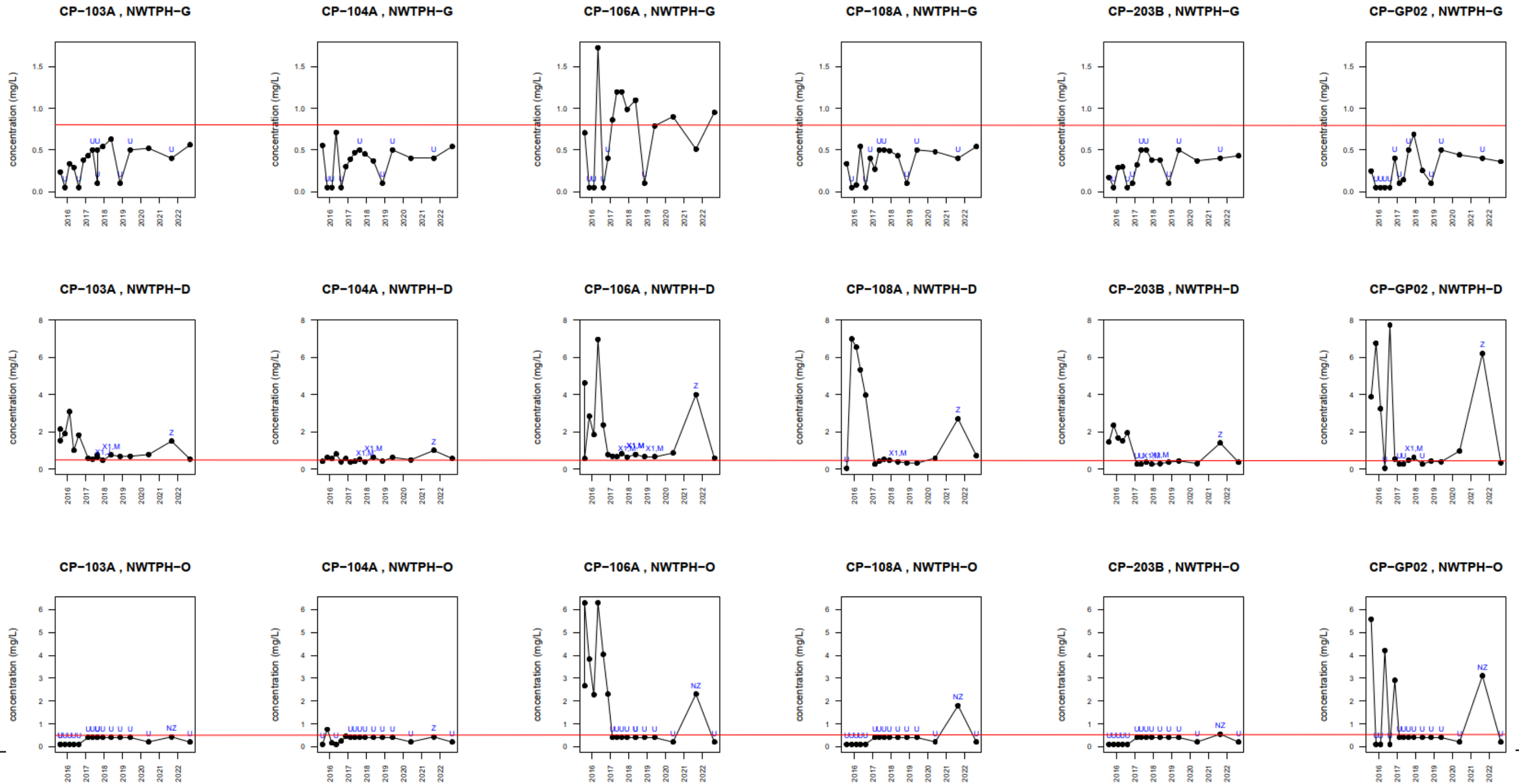
K:\Glen\Terminal 91\GIS\mxds\2022_08_ShallowAquiferWLE.mxd 10/4/2022



See Table 3 for data qualifiers shown in blue text.
Red lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line not shown where cleanup levels are off-scale.
All Z-flagged data are biased high and should not be compared to cleanup levels.

Figure 2a. CPOC Well Time Series TPH Plots
Terminal 91

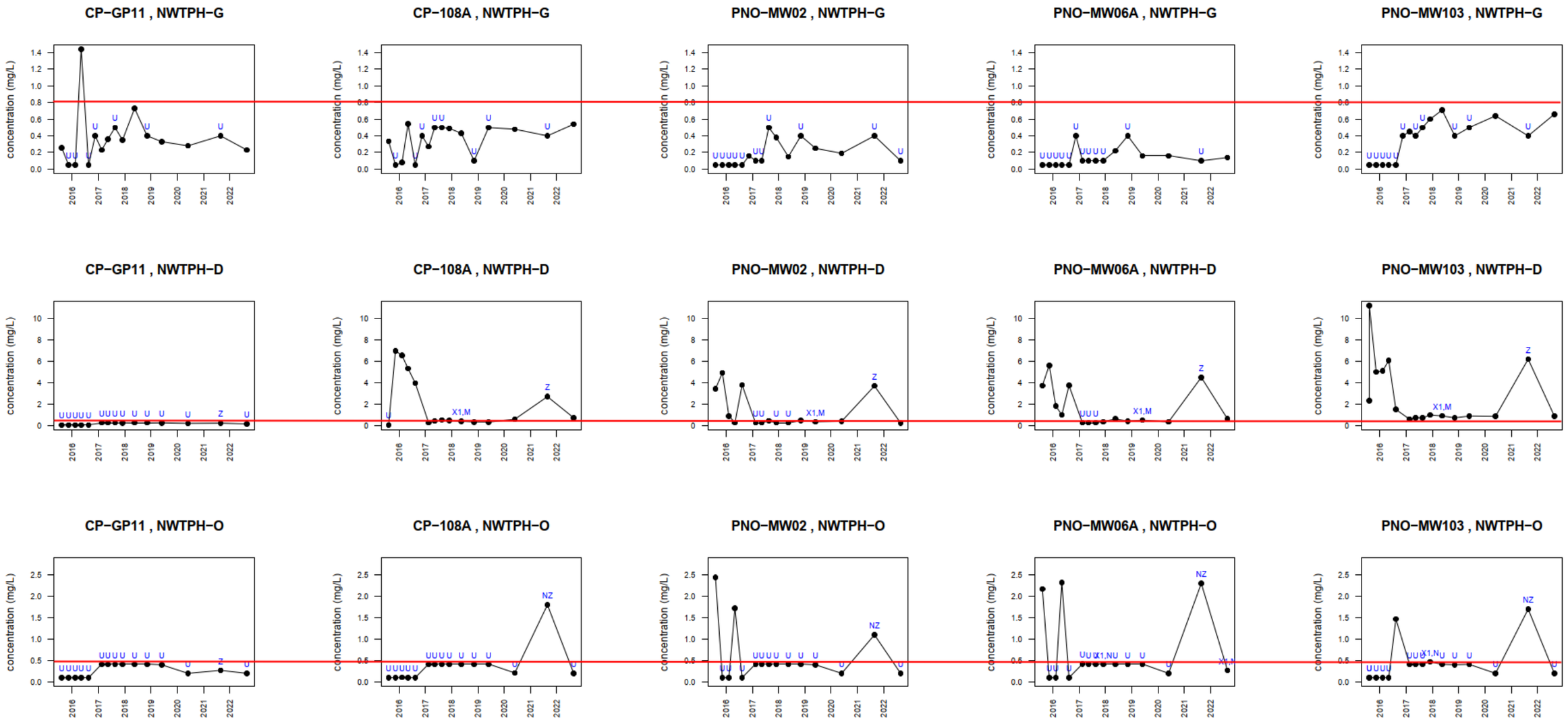
PgG



See Table 3 for data qualifiers shown in blue text.
Red lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line not shown where cleanup levels are off-scale.

Figure 2b. Northern Well Time Series TPH Plots

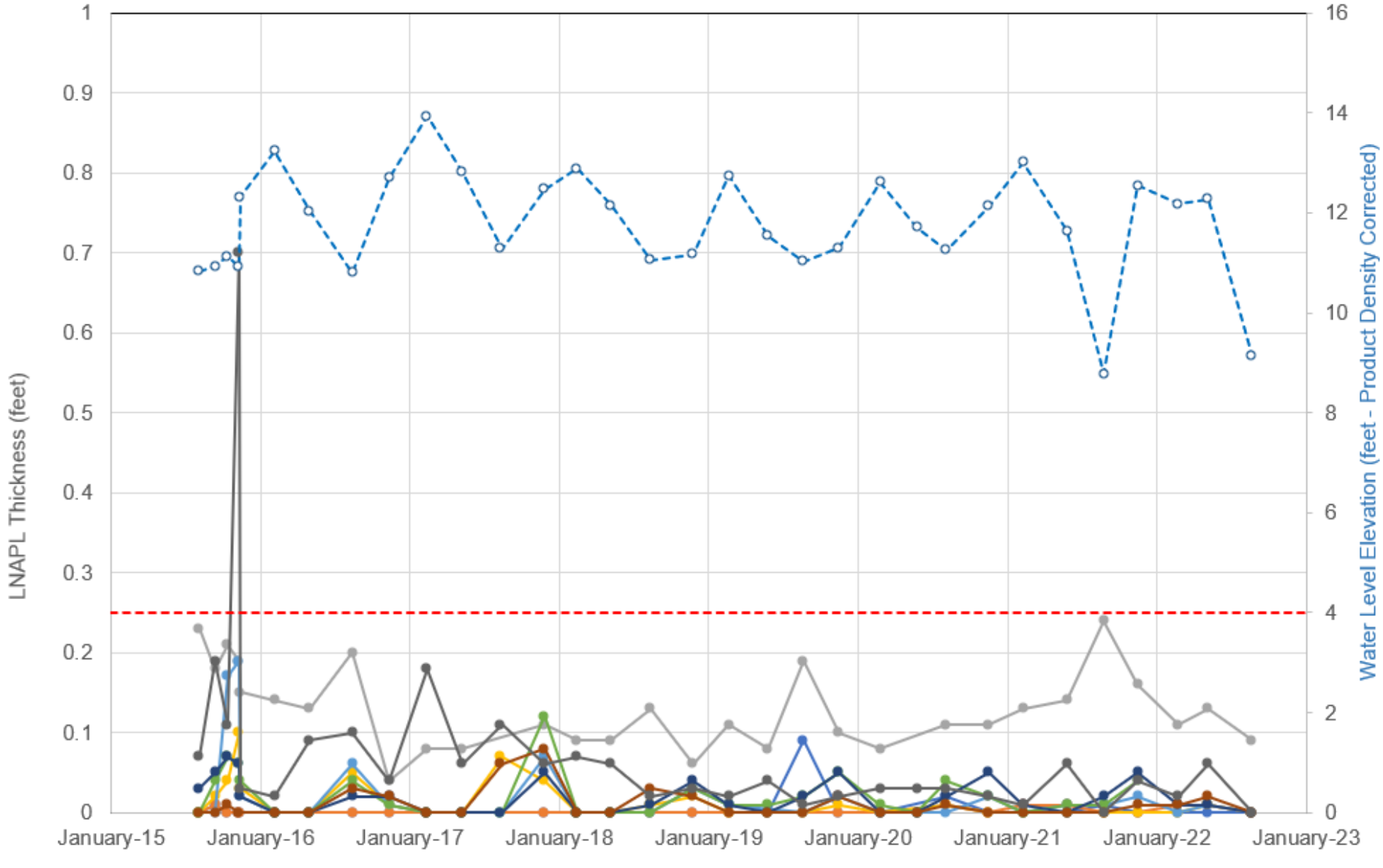
PgG



See Table 3 for data qualifiers shown in blue text.
Red lines are the cleanup levels for TPH-G (0.8mg/L) and TPH-D/O (0.5 mg/L); line not shown where cleanup levels are off-scale.
All Z-flagged data are biased high and should not be compared to cleanup levels.

Figure 2c. Southern Well Time Series TPH Plots
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 3
LNAPL Thickness Trends

Terminal 91

PgG

A. Field Forms (Electronic Only)

Terminal 91 Water Level Snapshot Sheet

Date: 8/25/22

Staff: Cheyenne

Sounder:

Well	Time	DTW 1	DTW 2	DTW 3	Area	LNAPL	Aquifer	Elev.	Depth	Comments
CP-GP01A	12:32	8.45	8.45		P-90		Shallow	17.68	19.20	
CP-GP01B					P-90		Deep	17.60	64.50	
CP-GP02					P-90		Shallow	17.39	20.10	
CP-GP08					P-90		Shallow	17.37	18.00	
CP-GP03AR	12:54	9:35	9.35		P-91		Shallow	17.77	19.85	
CP-GP03BR	1:04				P-91		Deep	17.74	64.50	B1 to Seized.
CP-GP04R	1:19	8:65	8:65		P-91		Shallow	17.90	19.83	
CP-GP07R	1:32	8.2	8.2		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	5:29	6.71	6.71		TF-90		Shallow	17.24	30.00	
CP-103A					TF-90		Shallow	17.11	15.00	
CP-104A					TF-90		Shallow	17.13	15.00	
CP-104B	10:26	5.8	5.8		TF-90		Deep	16.86	50.00	
CP-106A					TF-90		Shallow	18.00	15.00	
CP-106B	11:56	6.7	6.7		TF-90		Deep	17.91	41.50	
CP-108A					TF-90		Shallow	16.58	15.00	
CP-108B	12:12	10:55	10.6	10.6	TF-90		Deep	16.77	60.00	
CP-113	11:15	5.44	5.46		TF-90		Shallow	17.29	17.00	
CP-114	11:40	6.0	6.0		TF-90		Shallow	17.94	14.00	
CP-115A	10:32	5.78	5.82	5.82	TF-90		Shallow	17.74	21.00	
CP-115B	10:38	6.3	6.33		TF-90		Shallow	17.64	42.50	
CP-121	10:50	7.1	5.78	5.75	TF-90		Shallow	17.61	21.00	
CP-122B	12:00	5.85	5.85		TF-90		Deep	16.90	42.50	
CP-203B					TF-90		Deep	16.99	59.95	
CP-205A	11:28	5.7	5.7		TF-90		Shallow	17.74	14.00	
CP-205B	11:32	6.0	6.0		TF-90		Deep	17.73	50.00	
CP-W210	12.22	7.25	7.25		TF-90		Shallow	17.11	14.95	
L CP-107					TF-91	X	Shallow	17.15	20.00	
L CP-110					TF-91	X	Shallow	17.42	16.50	
CP-111	2:30	7.31	7.31		TF-91		Shallow	17.64	15.00	
CP-112	2:57	5.66	5.7	5.7	TF-91		Shallow	17.04	15.00	
CP-GP05	1:55	8.2			TF-91		Shallow	17.44	10.00	
CP-GP06	2:04	8.1			TF-91		Shallow	17.46	17.50	
— CP-GP11					TF-91		Shallow	16.94	20.00	
CP-GP12	2:45	6.7	6.7		TF-91		Shallow	17.42	20.00	
CP-GP13	2:10	6.9	6.9		TF-91		Shallow	17.01	20.00	
— CP-GP14					TF-91		Shallow	17.63	20.00	
CP-PR-13	2:40	6.85	6.85		TF-91		Shallow	17.31	12.90	
PNO-MW101	2:23	7.6	7.6		TF-91		Shallow	17.74	16.30	
L PNO-MW104					TF-91	X	Shallow	17.43	17.40	
UT-MW39-1	3:05	5.2	5.2		TF-91		Shallow	16.65	17.50	

Notes: Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

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.

Record prodcut thickness at tagged LNAPL wells and TFAA trench ends.

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: PND-MW103

Sampling Event: Aug 2022

Sample #:

Project Number: JG1601	Date: 8/25/22
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By:
Client Name: Port of Seattle	Purged By:
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 9.14	Purge Volume Measurement Method: bucket
Depth of Well (feet):	Purge Date/Time: 8/25/22 15:32
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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

9.24
9.23
9.22
9.22
9.22

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	
15:33	0.50	6.90	1473	19.38	0.35	-125.9	clear	600
15:36	0.75	6.90	1461	19.48	0.35	-129.8	clear	600
15:44	1.80	6.90	1379	20.08	0.35	-139.3	clear	600
15:48	2.25	6.89	1369	20.28	0.34	-141.2	clear	600
15:51	2.75	6.89	1360	20.45	0.34	-142.9	clear	600
15:58	3.50	6.89	1368	20.72	0.33	-142.5	clear	

Well Integrity: good

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 16:00

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

PGG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-103A

Sampling Event: Aug 2022

Sample #:

Project Number: JG1601	Date: 8/25/22
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: TWH
Client Name: Port of Seattle	Purged By: TWH
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 6.64	Purge Volume Measurement Method:
Depth of Well (feet):	Purge Date/Time: 8/25/22 16:45
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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)	
16:48	0.25	7.37	513	16.97	0.31	-128.2	clear	6.83
16:50	0.50	7.34	476	16.99	0.28	-129.8	clear	6.85
16:54	1.0	7.29	463	17.09	0.26	-130.9	clear	6.84
16:57	1.25	7.29	461	17.19	0.25	-129.6	clear	6.84
17:07	2.50	7.35	460	17.43	0.25	-129.7	clear	6.85
17:11	3.00	7.36	460	17.46	0.25	-127.5	clear	6.85

Q mL/min: 400, 400, 400, 400, 400, 400

Well Integrity: good

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 17:15

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

PGG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-104A

Sampling Event: August 2022

Sample #:

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle
Laboratory: OnSite Environmental, Redmond, WA
Chain-of-Custody (**yes**/no):
Shipment Method:

Date: 8/25/2022
Location:
Sampled By: GW
Purged By: GW
Date Sent to Lab:
Field CC Sample Number:
Sample Split:

Depth to Water (feet): 5.53 @ 1332
Depth of Well (feet): 15.00

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

Purge Volume Measurement Method:
Purge Date/Time: 8/25/2022 @ 1336 → 7
Purging Equipment: Peristaltic Pump
Water Level Probe Used:

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r^2 h) (7.48 gal/ft^3)

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

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	DTW (ft)
1341	0.6	7.26	460	18.7	0.22	-103.4		5.55
1348	1.4	7.17	458	18.8	0.19	-108.4		5.55
1350	1.7	7.15	457	18.9	0.18	-108.4		-
1353	1.9	7.12	456	18.9	0.18	-108.0		-
sample.								

Well Integrity:

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/2022 @ 1401

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-106A

Sampling Event: August 2022

Sample #:

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

Depth to Water (feet): 6.76 @ 1250	Purge Volume Measurement Method:
Depth of Well (feet): 15.00	Purge Date/Time: 8/25/2022 @ 1252 -7
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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 (ft)	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
6.80	1256	0.3	6.76	604	20.9	0.30	-86	
6.80	1302	0.75	6.72	625	21.2	0.24	-88.8	
6.80	1304	1	6.71	624	21.3	0.25	-90.7	
6.80	1315	2.3	6.68	634	21.2	0.34	-95.7	
—	1318	2.6	6.68	635	21.3	0.32	-96.9	
	Sample.							

Well Integrity:

purge water clear

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/2022 @ 1321

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature: _____

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-108A

Sampling Event: CP-108A Sample #:

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle
Laboratory: OnSite Environmental, Redmond, WA
Chain-of-Custody (yes/no): Y
Shipment Method: Courier

Date: 8-25-22
Location: T91
Sampled By: GSW
Purged By:
Date Sent to Lab: 8-26
Field CC Sample Number:
Sample Split:

Depth to Water (feet): 6.50
Depth of Well (feet):

Purge Volume Measurement Method:
Purge Date/Time: 1740 →

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

Purging Equipment: Peristaltic Pump
Water Level Probe Used: PGC

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 7.42

TIME (2400 hr)	CUMULATIVE VOLUME (gal) (Est)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
1743	0.7	6.39	333	18.1	0.28	-48	
1746		6.37	347	18.3	0.19	-50.1	
1750	1.7	6.43	388	18.5	0.17	-66.5	
1753		6.55	397	18.4	—	—	
1755		6.61	403	18.4	0.15	-91.3	
1758	2.5	6.72	405	18.3	0.15	-102.5	
1801		6.79	411	18.2	0.14	-109.1	
1804	3.5	6.83	410	18.2	0.14	-114.3	
			Sample.				

Well Integrity:
Ok. No bolts.

Bottle Inventory (check applicable rows) Day/Time Sampled: 8-25-22 1800

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-203B

Sampling Event: August 2022

Sample #:

Project Number: JG1601	Date: 8/25/2022
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: GW
Client Name: Port of Seattle	Purged By: GW
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab: 8/26/22
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 8.22	Purge Volume Measurement Method:
Depth of Well (feet): 59.95	Purge Date/Time: 8/25
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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 (ft)
8.27
8.24
8.23
rising tide

TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
1643	1.2	7.19	307	15.5	0.48	-113.8	
1648	2.2	7.14	520	15.3	0.33	-116.3	
1652	2.6	7.10	519	15.2	0.29	-115.6	
1706	3.5	6.95	477	15.0	0.22	-110.3	
1709	3.75	6.94	497	15.0	0.21	-109.6	
1712	4.1	6.91	487	15.0	0.21	-108.3	
	Stable - sample.						

Well Integrity:

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/2022 @ 1705

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP 01B

Sampling Event: August 2022 CP-GP01B

Sample #:

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle
Laboratory: OnSite Environmental, Redmond, WA
Chain-of-Custody (**yes**/no):
Shipment Method:

Date: 8/25/22
Location: T91
Sampled By: GSW
Purged By:
Date Sent to Lab: 8/26
Field CC Sample Number:
Sample Split:

Depth to Water (feet): 11.61
Depth of Well (feet): 17.6
Reference Point: top of casing, N side if no notch
Sampling Equipment: Peristaltic Pump

Purge Volume Measurement Method: Bucket
Purge Date/Time: 1036 →
Purging Equipment: Peristaltic Pump
Water Level Probe Used:

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	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)
11.76	1046	0.6	8.07	4687	17.2	0.29	-144	~~[illegible]~~
11.81	1050	0.8	8.08	4677	16.9	0.18	-161	
11.78	1055	1.25	8.08	4670	16.8	0.15	-167	
	1100	1.5	8.09	4660	16.7	0.14	-171	
	1103	1.7	8.08	4649	16.6	0.14	-172.4	Sample.

Well Integrity:
Ok. No Bolts
Sample/purge started at near low tide → Purge Wks. Unknown tide

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 1110

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx } SB/Hgs
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
~~3~~	~~40mL VOA~~	~~HCl~~		~~NWTPH-G~~

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature: [signature]

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP02

Sampling Event: August 2022 CP-GP02

Sample #:

Project Number:	JG1601	Date:	8-25-22
Project Name:	Terminal 91 (T91)	Location:	T91
Project Address:	2001 W Garfield St.	Sampled By:	GSW
Client Name:	Port of Seattle	Purged By:	
Laboratory:	OnSite Environmental, Redmond, WA	Date Sent to Lab:	8-26
Chain-of-Custody (yes/no):		Field CC Sample Number:	
Shipment Method:	Courier	Sample Split:	

Depth to Water (feet): 7.57

Depth of Well (feet): 20.1

Purge Volume Measurement Method:

Purge Date/Time: 8-25-22 1113 →

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

Purging Equipment: Peristaltic Pump

Sampling Equipment: Peristaltic Pump

Water Level Probe Used:

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)
1122	0.1	6.65	1172	18.7	0.4	-117	Petrol odor.
1128	0.75	6.54	1168	17.6	0.34	-111	
1133	1.4	6.49	1123	17.5	0.47	-105	
1136	1.6	6.48	1115	17.4	0.45	-103.4	
1140	2.1	6.46	1087	17.4	0.42	-101	
1145	2.75	6.44	1065	17.4	0.39	-99.2	

7.92 – 7.94 – 7.94

Well Integrity: Good. No Bdts.

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 1150

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

8 Bottles.

MS/MSD Collected.

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature: GSW

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP08

Sampling Event: August 2022

Sample #:

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle
Laboratory: OnSite Environmental, Redmond, WA
Chain-of-Custody (yes/no): yes
Shipment Method: courier

Date: 8/25/2022
Location:
Sampled By: GW
Purged By: GW
Date Sent to Lab: 8/26/2022
Field CC Sample Number:
Sample Split:

Depth to Water (feet): 8.42 @ 1204
Depth of Well (feet):
Reference Point (surveyors notch, etc.):
Sampling Equipment:

Purge Volume Measurement Method:
Purge Date/Time: 8/25/22 @ 1205 →
Purging Equipment:
Water Level Probe Used:

Three-Casing Volume Constant (CVC): 2-inch = **0.48** gpf ; 4-inch = **1.97** gpf ; 6-inch = **4.41** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water _____ x CVC _____ = _____ gallons Casing diameter (ft/in):

DTW (ft)	TIME (2400 hr)	CUMULATIVE VOLUME (gal / L)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	TURBIDITY (visual / NTU)	Diss O2 (mg/L)	ORP (mV)
8.72	1209	0.5	6.75	756	17.2		0.39	-10
8.71	1214	0.9	6.74	756	17.2		0.31	-18
8.72	1218	1.3	6.74	755	17.1		0.32	-17.8
Stable	1221	1.6	6.75	754	17.1		0.32	-17.4
sample	1224		6.75	751	17.1		0.31	-16.7

Heavy bacterial turbidity on purge
Pumped 1 L/min for 1/2 gallon to clear then reduced rate to 300 mL/min

Well Integrity:

Bottle Inventory

Day/Time Sampled: 8/25/2022 ~~1208~~ 1233

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
2	500 mL PG	HCl		NWTPH-Dx
3	40 mL VOA	HCl		NWTPH-G

Signature:

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP09R

Sampling Event: 2022 Q3 (August)

Sample #:

Project Number: JG1601	Date: 8/25/22
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: HSP
Client Name: Port of Seattle	Purged By:
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 9.32	Purge Volume Measurement Method:
Depth of Well (feet): 18.00	Purge Date/Time: 8/25 1100
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used: waterline model 200 sounder

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 8.68 x CVC 0.16 x Casing Volumes 3 = 4.4 gallons

Q (mL/min)	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	DTW (ft)
400	1108	<0.25	6.83	8760	19.28	1.16	113.6	clear	9.35
400	1113	<0.75	6.77	8760	19.24	0.79	107.5	↓	9.36
400	1119	1.25	6.77	8799	19.18	0.68	101.0	↓	
400	1127	2	6.75	8785	19.18	0.60	96.6	↓	9.38
	1135	3.25	6.74	8750	19.16	0.61	92.9	↓	9.37

Well Integrity:

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 1135

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CPGP10

Sampling Event: 2022 Aug.

Sample #:

Project Number: JG1601	Date: 8/25/22
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By:
Client Name: Port of Seattle	Purged By:
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 7.90	Purge Volume Measurement Method:
Depth of Well (feet): 17.85	Purge Date/Time: 8/25/22 11:16
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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 7.95 x CVC _____ x Casing Volumes _____ = 3.9 gallons

Q mL/min	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	DTW
300	11:22	≈0.25	7.40	16180	19.10	6.60	90.3	clear	9.93
300	11:30	0.80	7.41	16750	19.11	6.44	83.1	clear	9.94
300	11:35	1.3	7.41	17150	19.25	5.92	81.7	clear	9.94
300	11:40	1.75	7.43	18170	19.27	5.69	80.1	clear	9.95
300	11:50	2.75	7.43	18110	19.26	5.66	79.4	clear	9.96

Well Integrity: good.

Q 300mL/min

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 11:45

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP11

Sampling Event: August 2022

Sample #:

Project Number: JG11601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St.
Client Name: Port of Seattle
Laboratory: OnSite Environmental, Redmond, WA
Chain-of-Custody (yes/no): yes
Shipment Method: Courier

Date: 8/25/2022
Location:
Sampled By: GW
Purged By: GW
Date Sent to Lab: 8/26/2022
Field CC Sample Number:
Sample Split:

Depth to Water (feet): 6.43 @ 1438
Depth of Well (feet): 20.00
Reference Point (surveyors notch, etc.):
Sampling Equipment:

Purge Volume Measurement Method:
Purge Date/Time: 8/25
Purging Equipment:
Water Level Probe Used:

Three-Casing Volume Constant (CVC): 2-inch = **0.48** gpf ; 4-inch = **1.97** gpf ; 6-inch = **4.41** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water _____ x CVC _____ = _____ gallons Casing diameter (ft/in):

DTW (ft)	TIME (2400 hr)	CUMULATIVE VOLUME (gal / L)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	TURBIDITY (visual / NTU)	Diss O2 (mg/L)	ORP (mV)
6.67	1443	0.75	7.46	3991	19.0		0.18	-216.3
6.66	1446	1.1	7.34	3870	19.4		0.18	-212.8
6.67	1449	1.4	7.26	3561	19.61		0.18	-209.4
6.67	1451	1.75	7.20	3438	19.91		0.20	-207.2
6.65	1454	2.25	7.18	3765	20.0		0.19	-209.6
—	1457	2.6	7.20	3976	20.0		0.17	-215.7
—	1500	3.3	7.24	4310	20.1		0.16	-224.5
—	1504	3.7	7.25	4356	20.1		0.16	-228.8
	Sampled							

Well Integrity:

Bottle Inventory

Day/Time Sampled: 8/25/2022 @1505

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
2	500 mL PG	HCl		NWTPH-Dx
3	40 mL VOA	HCl		NWTPH-G

Signature:

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: CP-GP14

Sampling Event: 2022 Q3

Sample #:

Project Number: JG1601	Date: 8/25/2022
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: ASP
Client Name: Port of Seattle	Purged By: ASP
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 8.20	Purge Volume Measurement Method:
Depth of Well (feet): 20.00	Purge Date/Time: 8/25/2022 1425
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

Casing Volume Constants (CVC): 2-inch = **0.16** gpf ; 4-inch = **0.656** gpf ; 6-inch = **1.47** gpf PV=(π r^2 h) (7.48 gal/ft^3)

Purge Volume = ft of water 11.80 x CVC 0.16 x Casing Volumes _____ = _____ gallons

Q (mL/min)	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	DTW
350	1430	0.5	7.01	2517	15.09	0.95	-36.3	clear	8.22
350	1436	1	6.98	2431	15.10	0.71	-46.3	"	8.23
350	1442	1.75	7.02	2394	15.00	0.50	-57.1	"	8.23
350	1450	2.25	7.29	2380	14.96	0.41	-65.2	"	8.24
	1457	2.75	7.27	2358	15.07	0.42	-68.1	↓	8.23
	1503	3.25	7.25	2337	15.07	0.47	-71.3		
	1509	3.75	7.26	2322	15.14	0.52	-73.5		8.23
	1515	~4.5	7.25	2318	15.15	0.96	-76.2		

Well Integrity:

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/2022 1515

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

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GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: _____

Sampling Event: August 2022

Sample #: D-100-08252022

Project Number: JG1601
Project Name: Terminal 91 (T91)
Project Address: 2001 W Garfield St
Client Name: Port of Seattle
Laboratory: OnSite Environmental, Redmond, WA
Chain-of-Custody (yes/no): yes
Shipment Method: Courier

Date: 8/25/2022
Location:
Sampled By: GW
Purged By: GW
Date Sent to Lab: 8/26/2022
Field CC Sample Number:
Sample Split:

Depth to Water (feet):
Depth of Well (feet):
Reference Point (surveyors notch, etc.):
Sampling Equipment:

Purge Volume Measurement Method:
Purge Date/Time:
Purging Equipment:
Water Level Probe Used:

Three-Casing Volume Constant (CVC): 2-inch = **0.48** gpf ; 4-inch = **1.97** gpf ; 6-inch = **4.41** gpf PV=(π r² h) (7.48 gal/ft³)

Purge Volume = ft of water _____ x CVC _____ = _____ gallons Casing diameter (ft/in):_____

TIME (2400 hr)	CUMULATIVE VOLUME (gal / L)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	TURBIDITY (visual / NTU)		
Field Blank							

Field Pull DI into bottles

Well Integrity:

Bottle Inventory

Day/Time Sampled: 8/25/2022 @ 1705

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
2	500mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G

Signature: _____

PgG

2W 2E 3W 3E 3E Broken.

5W 5E N

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: August 2022

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

Date: 8/25/22
Location: T91
Measured By: GSW / CS
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
Trench 2E	15:50	TOC	5.25		NMT			
Trench 2W	16:04	TOC	5.20		NMT			
Trench 3E								
Trench 3W	1548	TOC	7.10	7.10	NMT			
Trench 5E	16:08	TOC	10.49		NMT			
Trench 5W	16:13	TOC	7.43					
PNO-104	16:46	TOC	7.25	7.34	0.09			
CP-107	16:21	TOC	6.12		NMT			
CP-110	16:42	TOC	6.96		NMT			

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:

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature: _____

Page _____ of _____

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: PNO-MW02

Sampling Event: 2022 Q3 (August)

Sample #:

Project Number: JG1601	Date: 8/25/2022
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By: ASP
Client Name: Port of Seattle	Purged By: ASP
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 8.54	Purge Volume Measurement Method:
Depth of Well (feet): 17.00	Purge Date/Time: 8/25/2022 1305
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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 8.46 x CVC 0.16 x Casing Volumes 3 = 4.1 gallons

Q (mL/min)	TIME (2400 hr)	CUMULATIVE VOLUME (gal)	pH (units)	EC (umhos/cm 25 c)	Temp. (C)	Diss O_2 (mg/L)	ORP (mV)	TURBIDITY (visual)	DTW
500	1315	0.5	6.52	941	18.52	0.79	-44.4	clear *	8.88
325	1318	~0.75	6.51	938	19.13	0.75	-47.7	clear *	8.84
325	1327	1.25	6.51	940	19.67	0.53	-65.2	clear	8.86
325	1331	1.75	6.51	941	19.67	0.59	-72.3	clear	8.88
325	1338	~2.3	6.50	941	19.69	0.52	-74.5	clear	8.90
300	1349	3.5	6.50	945	19.72	0.48	-75.1	clear	8.91

Well Integrity:

* small, light-colored flocs with fuel odor ~~early~~ throughout purging

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/2022 1355

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

Page of

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: PNO-MW06A

Sampling Event: Aug. 2022

Sample #:

Project Number: JG1601	Date: 8/25/22
Project Name: Terminal 91 (T91)	Location:
Project Address: 2001 W Garfield St.	Sampled By:
Client Name: Port of Seattle	Purged By:
Laboratory: OnSite Environmental, Redmond, WA	Date Sent to Lab:
Chain-of-Custody (**yes**/no):	Field CC Sample Number:
Shipment Method:	Sample Split:

Depth to Water (feet): 8.88	Purge Volume Measurement Method:
Depth of Well (feet):	Purge Date/Time 8/25/22 14:17
Reference Point: top of casing, N side if no notch	Purging Equipment: Peristaltic Pump
Sampling Equipment: Peristaltic Pump	Water Level Probe Used:

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)	
9.26 14:19	0.25	7.18	1423	19.74	0.69	-120.9	clear	ml/min 600
9.69 14:21	0.50	7.13	1356	19.99	0.61	-114.7	~~clear~~ med	600N 300
74 14:23	0.75	7.03	1335	20.71	0.52	-110.3	medium	300
9 9.79 14:28	1.0	7.01	1347	20.81	0.50	-109.1	med	~~500~~ 200
9.64 14:33	1.25	6.99	1375	21.00	0.41	-114.3	med	200
9.61 14:38	1.50	6.99	1371	20.95	0.40	-114.6	med	200

Well Integrity: good

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 14:45

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

PgG

GROUNDWATER SAMPLING FIELD DATA SHEET

Well #: PNO-MW06B

Sampling Event: Aug 2022

Sample #:

Project Number:	JG1601	Date:	8/25/22
Project Name:	Terminal 91 (T91)	Location:	
Project Address:	2001 W Garfield St.	Sampled By:	TWH
Client Name:	Port of Seattle	Purged By:	TWH
Laboratory:	OnSite Environmental, Redmond, WA	Date Sent to Lab:	
Chain-of-Custody (**yes**/no):		Field CC Sample Number:	
Shipment Method:		Sample Split:	

Depth to Water (feet):	12.09	Purge Volume Measurement Method:	bucket
Depth of Well (feet):	55.40	Purge Date/Time:	8/25/22 12:43
Reference Point: top of casing, N side if no notch		Purging Equipment:	Peristaltic Pump
Sampling Equipment: Peristaltic Pump		Water Level Probe Used:	Solinst ET

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/ft^3)

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)	Q
12.03	12:45	~0.25	7.75	2613	17.51	0.59	-156.9	clear	300 mL/min
11.93	12:51	0.50	7.58	3593	17.04	0.32	-221.7	clear	400 mL/min
11.89	12:55	1.00	7.57	3658	16.76	0.28	-232.9	clear	400 mL/min
11.85	13:00	1.50	7.56	3640	16.73	0.28	-236.3	clear	400
11.69	13:10	2.50	7.53	3628	16.73	0.27	-238.8	clear	400
11.65	13:11	2.75	7.53	3626	16.59	0.27	-240.6	clear	500 mL/min
11.59	13:14	3.25	7.51	3628	16.61	0.27	-240.8	clear	
11.50	13:20	4.00	7.51	3626	16.58	0.27	-240.3	clear	500 mL/min

Well Integrity:

Bottle Inventory (check applicable rows) Day/Time Sampled: 8/25/22 13:25

Quantity:	Container:	Preservatives:	Filtered (type):	Remarks:
All Wells				
2	500 mL AG	HCl		NWTPH-Dx
3	40mL VOA	HCl		NWTPH-G
MS/MSD Samples				
3	40mL VOA	HCl		NWTPH-G

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature: _____

PgG

2W 2E 3W 3E 3E Broken.

5W 5E N

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: August 2022

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

Date: 8/25/22
Location: T91
Measured By: GSW / CS
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
Trench 2E	15:50	TOC	5.25		NMT			
Trench 2W	16:04	TOC	5.20		NMT			
Trench 3E								
Trench 3W	1548	TOC	7.10	7.10	NMT			
Trench 5E	16:08	TOC	10.49		NMT			
Trench 5W	16:13	TOC	7.43					
PNO-104	16:46	TOC	7.25	7.34	0.09			
CP-107	16:21	TOC	6.12		NMT			
CP-110	16:42	TOC	6.96		NMT			

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:

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature: _____

Page _____ of _____

PgG

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: MAY 2022

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

Date: 05/10/22
Location:
Measured By: SHELDON PIERCE
Measuring Tool:

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	1225	TOC	9.9[illegible]	9.96	.01	9.95	9.96	.01
Trench 2W	1235		6.90	6.91	.01	6.90	6.91	.01
Trench 3E								
Trench 3W	1315		6.58	6.59	.01	6.58	6.59	.01
Trench 5E	1327		4.28	4.30	.02	4.27	4.30	.03
Trench 5W	1333		4.29	4.35	.06	4.29	4.35	.06
PNO-104	1354		6.62	6.75	.13	6.62	6.74	.12
CP-107	1355		5.28	5.28	NMT	5.28	5.28	NMT
CP-110	1347	↓	6.24	6.25	.01	6.24	6.25	.01

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

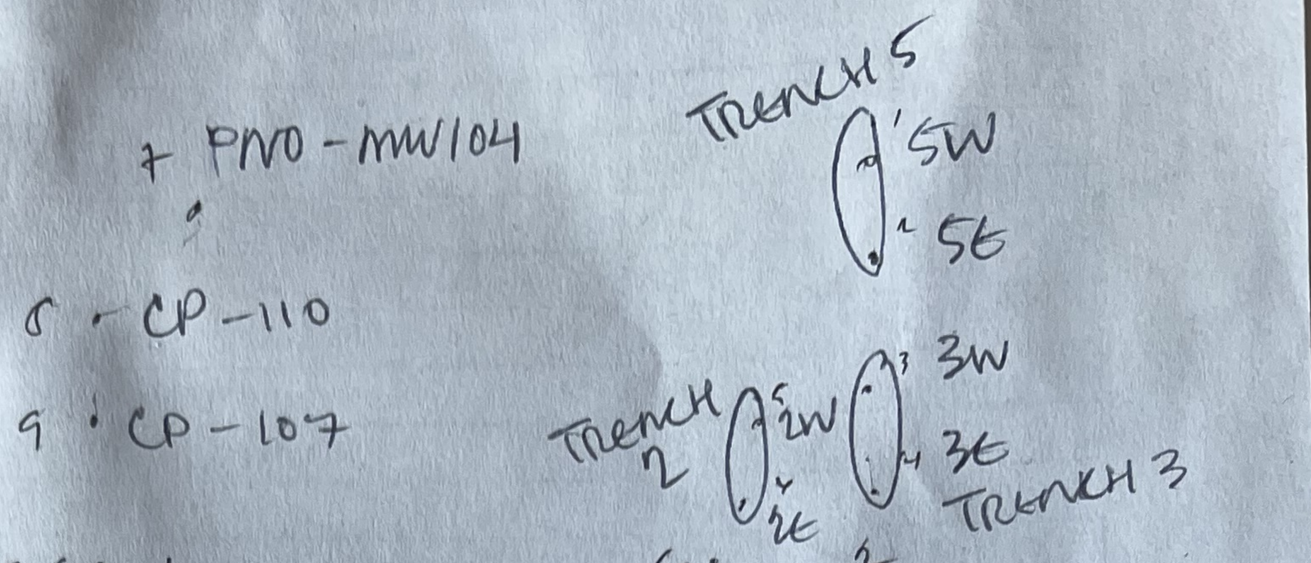
Location	Date	Start Time	End Time	Quantity	Notes:
Could not measure Trench 3E, LATCH MECHANISM not working					

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

PGG

2-25-2022 - DATE
TP11 - LOCATION
SHELDON (SHAP) - MEASURED BY



	TIME	MP	CALIBR	WATER	THICKNESS	CALIBR	WATER	THICKNESS
3W	1117		6.35	6.36	.01	6.35	6.36	.01
5E	1127		4.35	4.36	.01	4.35	4.36	.01
5W	1133		4.38	4.41	.03	4.38	4.40	.02
2E	1150		9.72	9.72	NMT	9.72	9.72	NMT
2W	1155		6.67	6.67	NMT	6.67	6.67	NMT
PNO-MW104	1207		6.20	6.82	.12	6.21	6.82	.11
CP-110	1215		6.29	6.30	.01	6.29	6.30	.01
CP-107			5.32	5.32	NMT	5.32	5.32	NMT

LNAPL MEASUREMENT AND RECOVERY FIELD DATA SHEET

Sampling Event: Nov 2021

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

Date: 11/17/2021
Location: T91
Measured By: GSV / SPierce
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
Trench 2W	1509	TOC	7.31	7.33	0.02	7.31	7.33	0.02
Trench 2WE	1503	TOC	10.35	10.35	NMT	10.35	10.35	NMT ← No sheen on probe
Trench 3E	1443	TOC	7.02	7.05	0.03	7.02	7.06	0.04
Trench 3W	1453	TOC	8.20	8.25	0.05	8.20	8.25	0.05
Trench 5E	1435	TOC	4.03	4.04	0.01	4.03	4.04	0.01
Trench 5W	1430	TOC	4.01	4.05	0.04	4.01	4.05	0.04
PNO-104	1530	TOC	6.12	6.26	0.14	6.10	6.26	0.16
CP-107	1542	TD	4.92	4.92	NMT	4.92	4.92	NMT
CP-110	1515	TOC	5.80	5.80	NMT	5.80	5.80	NMT

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:
		No Recovery this event			
		All thickness < 0.25			

Maritime Operations: (206) 787-3751 Call if wells are covered. Kelli Goodwin is our main point of contact at Ops.

Signature:

PGG

B. Laboratory Data Reports (Electronic Only)

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

September 6, 2022

Glen Wallace
Mott MacDonald
1601 5th Avenue, Suite 850
Seattle, WA 98101

Re: Analytical Data for Project Terminal 91 (T91)
Laboratory Reference No. 2208-290

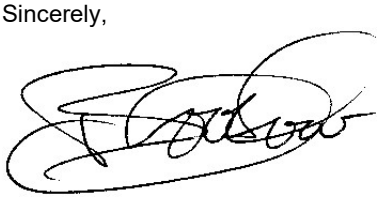
Dear Glen:

Enclosed are the analytical results and associated quality control data for samples submitted on August 26, 2022.

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: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
CP-103A	08-290-01	Water	8-25-22	8-26-22	
CP-104A	08-290-02	Water	8-25-22	8-26-22	
CP-106A	08-290-03	Water	8-25-22	8-26-22	
CP-108A	08-290-04	Water	8-25-22	8-26-22	
CP-203B	08-290-05	Water	8-25-22	8-26-22	
CP-GP01B	08-290-06	Water	8-25-22	8-26-22	
CP-GP02	08-290-07	Water	8-25-22	8-26-22	
CP-GP08	08-290-08	Water	8-25-22	8-26-22	
CP-GP09R	08-290-09	Water	8-25-22	8-26-22	
CP-GP10	08-290-10	Water	8-25-22	8-26-22	
CP-GP11	08-290-11	Water	8-25-22	8-26-22	
CP-GP14	08-290-12	Water	8-25-22	8-26-22	
PNO-MW02	08-290-13	Water	8-25-22	8-26-22	
PNO-MW06A	08-290-14	Water	8-25-22	8-26-22	
PNO-MW06B	08-290-15	Water	8-25-22	8-26-22	
PNO-MW-103	08-290-16	Water	8-25-22	8-26-22	
D-100-08252022	08-290-17	Water	8-25-22	8-26-22	

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

Case Narrative

Samples were collected on August 25, 2022 and received by the laboratory on August 26, 2022. 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: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-103A**					
Laboratory ID:	08-290-01					
Gasoline Range Organics	**560**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*65-122*				
Client ID:	**CP-104A**					
Laboratory ID:	08-290-02					
Gasoline Range Organics	**540**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*65-122*				
Client ID:	**CP-106A**					
Laboratory ID:	08-290-03					
Gasoline Range Organics	**950**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*65-122*				
Client ID:	**CP-108A**					
Laboratory ID:	08-290-04					
Gasoline Range Organics	**540**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*65-122*				
Client ID:	**CP-203B**					
Laboratory ID:	08-290-05					
Gasoline Range Organics	**430**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*65-122*				
Client ID:	**CP-GP01B**					
Laboratory ID:	08-290-06					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*65-122*				
Client ID:	**CP-GP02**					
Laboratory ID:	08-290-07					
Gasoline Range Organics	**360**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*65-122*				

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP08**					
Laboratory ID:	08-290-08					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*80*	*65-122*				
Client ID:	**CP-GP09R**					
Laboratory ID:	08-290-09					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*65-122*				
Client ID:	**CP-GP10**					
Laboratory ID:	08-290-10					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*65-122*				
Client ID:	**CP-GP11**					
Laboratory ID:	08-290-11					
Gasoline Range Organics	**230**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*81*	*65-122*				
Client ID:	**CP-GP14**					
Laboratory ID:	08-290-12					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*65-122*				
Client ID:	**PNO-MW02**					
Laboratory ID:	08-290-13					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*84*	*65-122*				
Client ID:	**PNO-MW06A**					
Laboratory ID:	08-290-14					
Gasoline Range Organics	**140**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*82*	*65-122*				

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PNO-MW06B**					
Laboratory ID:	08-290-15					
Gasoline Range Organics	**170**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*65-122*				
Client ID:	**PNO-MW-103**					
Laboratory ID:	08-290-16					
Gasoline Range Organics	**660**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*83*	*65-122*				
Client ID:	**D-100-08252022**					
Laboratory ID:	08-290-17					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*85*	*65-122*				

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

GASOLINE RANGE ORGANICS
NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0830W1					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*81*	*65-122*				
Laboratory ID:	MB0830W2					
Gasoline	**ND**	100	NWTPH-Gx	8-30-22	8-30-22	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*80*	*65-122*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-290-08										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*80*	*80*	*65-122*			
Laboratory ID:	08-299-01										
	ORIG	DUP									
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*85*	*90*	*65-122*			

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-103A**					
Laboratory ID:	08-290-01					
Diesel Range Organics	**0.54**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*111*	*50-150*				
Client ID:	**CP-104A**					
Laboratory ID:	08-290-02					
Diesel Range Organics	**0.57**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*126*	*50-150*				
Client ID:	**CP-106A**					
Laboratory ID:	08-290-03					
Diesel Range Organics	**0.60**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*103*	*50-150*				
Client ID:	**CP-108A**					
Laboratory ID:	08-290-04					
Diesel Range Organics	**0.72**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*104*	*50-150*				
Client ID:	**CP-203B**					
Laboratory ID:	08-290-05					
Diesel Range Organics	**0.36**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*104*	*50-150*				
Client ID:	**CP-GP01B**					
Laboratory ID:	08-290-06					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*97*	*50-150*				

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CP-GP02**					
Laboratory ID:	08-290-07					
Diesel Range Organics	**0.34**	0.15	NWTPH-Dx	9-1-22	9-6-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-6-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*123*	*50-150*				
Client ID:	**CP-GP08**					
Laboratory ID:	08-290-08					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*127*	*50-150*				
Client ID:	**CP-GP09R**					
Laboratory ID:	08-290-09					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*125*	*50-150*				
Client ID:	**CP-GP10**					
Laboratory ID:	08-290-10					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*102*	*50-150*				
Client ID:	**CP-GP11**					
Laboratory ID:	08-290-11					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*116*	*50-150*				
Client ID:	**CP-GP14**					
Laboratory ID:	08-290-12					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*123*	*50-150*				

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**PNO-MW02**					
Laboratory ID:	08-290-13					
Diesel Range Organics	**0.24**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*124*	*50-150*				
Client ID:	**PNO-MW06A**					
Laboratory ID:	08-290-14					
Diesel Range Organics	**0.62**	0.15	NWTPH-Dx	9-1-22	9-6-22	X1
Lube Oil Range Organics	**0.27**	0.20	NWTPH-Dx	9-1-22	9-6-22	X1,N1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*107*	*50-150*				
Client ID:	**PNO-MW06B**					
Laboratory ID:	08-290-15					
Diesel Range Organics	**0.22**	0.15	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*126*	*50-150*				
Client ID:	**PNO-MW-103**					
Laboratory ID:	08-290-16					
Diesel Range Organics	**0.88**	0.15	NWTPH-Dx	9-1-22	9-6-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-6-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*107*	*50-150*				
Client ID:	**D-100-08252022**					
Laboratory ID:	08-290-17					
Diesel Range Organics	**ND**	0.15	NWTPH-Dx	9-1-22	9-6-22	X1
Lube Oil Range Organics	**ND**	0.20	NWTPH-Dx	9-1-22	9-6-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*120*	*50-150*				

Date of Report: September 6, 2022
Samples Submitted: August 26, 2022
Laboratory Reference: 2208-290
Project: Terminal 91 (T91)

DIESEL AND HEAVY OIL RANGE ORGANICS
NWTPH-Dx
QUALITY CONTROL

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0901W1					
Diesel Range Organics	**ND**	0.16	NWTPH-Dx	9-1-22	9-2-22	X1
Lube Oil Range Organics	**ND**	0.16	NWTPH-Dx	9-1-22	9-2-22	X1
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*102*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-290-07										
	ORIG	DUP									
Diesel Range Organics	**0.339**	**0.171**	NA	NA		NA		NA	66	NA	X1
Lube Oil Range	**ND**	**ND**	NA	NA		NA		NA	NA	NA	X1
Surrogate:											
o-Terphenyl						*123*	*68*	*50-150*			
Laboratory ID:	SB0901W1										
	ORIG	DUP									
Diesel Fuel #2	**0.468**	**0.440**	NA	NA		NA		NA	6	NA	X1
Surrogate:											
o-Terphenyl						*100*	*86*	*50-150*			

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 2

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

Laboratory Number: 08-290

Company: Mott MacDonald
Project Number:
Project Name: Terminal 91 (T91)
Project Manager: Glen Wallace
Sampled by: TJK/AP/GSW

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

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	~~NWTPH-Gx/BTEX (8021 ☐ 8260 ☐)~~	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
1	CP-103A	8-25-22	1715	W	5		X	X	X																		
2	CP-104A		1401	W	5			X	X																		
3	CP-106A		1321	W	5			X	X																		
4	CP-108A		1800	W	5			X	X																		
5	CP-203B		1700	W	5			X	X																		
6	CP-GP01B		1110	W	5			X	X																		
7	CP-GP02		1150	W	8			X	X														MS/MSD Volume				
8	CP-GP08		1233	W	5			X	X																		
9	CP-GP09R		1135	W	5			X	X																		
10	CP-GP10	8-25-22	1145	W	5			X	X																		

	Signature	Company	Date	Time
Relinquished		Mott MacDonald	8/26/22	1020
Received	Van	SPL	8/26/22	1020
Relinquished	Van	SPL	8/26/22	1132
Received		OPE	8/26/22	1132
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
Acid Silica Gel and TPH-Dx Analysis
EDD: EIM/Port Seattle/PGG

Data Package: Standard ☑ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☑

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: MoH MacDonald
Project Number:
Project Name: Terminal 91 (T91)
Project Manager: Glen Wallace
Sampled by: GSW/AP/TJK

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

Laboratory Number: 08-290

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
11	CP-GP11	8-25-22	1505	W	5			X	X																		
12	CP-GP14		1515	W	5			X	X																		
13	PNO-MW02		1355	W	5			X	X																		
14	PNO-MW06A		1445	W	5			X	X																		
15	PNO-MW06B		1325	W	5			X	X																		
16	PNO-MW-103		1600	W	5			X	X																		
17	D-100-08252022	8-25-22	1705	W	5			X	X																		

	Signature	Company	Date	Time
Relinquished		MoH MacDonald	8/26/22	10:20
Received		SPdy	8/26/22	1020
Relinquished		SPdy	8/26/22	1132
Received		OSE	8/26/22	1132
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
Acid Silica Gel Cleanup all TPH-Dx Analyses.
EDD: Port of Seattle/EIM/PGG

Data Package: Standard ☑ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☑

Sample/Cooler Receipt and Acceptance Checklist

Client: _____

Client Project Name/Number: Terminal 91

OnSite Project Number: 08-290

Initiated by: MN

Date Initiated: 8/26/12

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: 6,6
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:

2.4) #9) CP-GP09R on labels - Correct PD

3.4) #6) pH 3 & pH 7 amber bottles

3.5) #6,7) 3 vials w/bubbles

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