ANNUAL TERMINAL 30 SITE PERFORMANCE REPORT – YEAR 1

Port of Seattle

Terminal 30 Site

March 10, 2021

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Acronyms and Abbreviations

AS	air sparging
ALS	Australian Laboratory Services
CAP	Cleanup Action Plan
CMP	Groundwater Compliance Monitoring Plan
cPAH	carcinogenic polyaromatic hydrocarbon
COI	contaminant of interest
COC	contaminant of concern
CLP	contract laboratory program
CTD	conductivity, temperature, and depth
CRETE	Crete Consulting
DQO	data quality objective
T30 or Site	Terminal 30
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
EDR	Engineering Design Report
EPA	United States Environmental Protection Agency
HCID	hydrocarbon identification
ISL	interim screening level
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
LNAPL	light non-aqueous phase liquid
MDL	method detection limit
MRL	method reporting limit
MS/MSD	matrix spike/matrix spike duplicate
NAD83	North American Datum of 1983 (horizontal)
PARCC	precision, accuracy, representativeness, comparability, and completeness
PDF	portable document format
Port	Port of Seattle
PQL	practical quantitation limit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
REL	remediation level
RPD	relative percent difference
scfm	standard cubic feet per minute
SOP	standard operating procedure
SVOC	semi-volatile organic compound
SVE	soil vapor extraction
TEF	toxicity equivalency factor

TEQ	toxic equivalent concentration
TOC	total organic carbon
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
WAC	Washington Administrative Code

1 Introduction

In 2019 the Port of Seattle (Port), under the oversight of Washington State Department of Ecology (Ecology), completed construction of the selected cleanup action alternative at the Terminal 30 project site (site), located at 1901 East Marginal Way South in Seattle, Washington (Figure 1), to satisfy requirements of the Consent Decree (CD) between Ecology and the Port, filed July 19, 2017 (Ecology 2017). Details of the construction action are documented in the Construction Completion Report (CRETE 2020a). The selected cleanup action remedy for the T30 site includes an Air Sparge/Soil Vapor Extraction (AS/SVE) system, free product recovery, and compliance monitoring. The construction of the cleanup remedy was completed from July 6, 2019 through November 9, 2019 and cleanup elements included the installation of three horizontal SVE wells, seven vertical SVE wells, 27 AS wells, 10 LNAPL recovery wells, an AS/SVE system, and a vapor treatment thermal oxidizer. The purpose of the AS/SVE system is to reduce contaminant mass in shallow groundwater downgradient of the sheen area. The purpose of free product recovery is to reduce free product thickness to a sheen (less than 0.01 feet). The footprint of the cleanup action is shown on Figures 2 and 3.

This Annual Report was prepared by Crete Consulting (CRETE) on behalf of the Port and was developed using data collected from October 2019 through December 2020 representing the first year of monitoring, referenced as Year 1 in this Annual Report. This Annual Report is based on the monitoring requirements included in the *Groundwater Compliance Monitoring Plan and Quality Assurance Project Plan* (CMP and QAPP) included as Appendix E of the Engineering Design Report (CRETE 2018). This Annual Report provides the first year (Year 1) of operation and monitoring results for the site cleanup action including the performance and confirmational sampling data associated with the operation and monitoring. Groundwater cleanup and remediation levels (RELs) have been developed[1] to monitoring the performance of the AS/SVE system by tracking trends in groundwater collected from site monitoring wells. This Annual Report evaluates data collected during the reporting period and compares the results to the groundwater cleanup levels and RELs.

[1] The EDR and CMP include the details on how groundwater cleanup and RELs were developed for the site.

2 Site Monitoring Plan

The site cleanup action monitoring plan is detailed in the CMP and summarized briefly in this section. Monitoring includes AS/SVE system performance monitoring, Puget Sound Clean Air Agency (PSCAA) vapor compliance sampling, free product gauging and removal, and groundwater sampling at groundwater monitoring wells across the site (Figure 3).

The AS/SVE system operation and maintenance activities include system checks and collection of PSCAA vapor samples to ensure that discharge vapors are below acceptable limits.

Free product removal includes gauging and product removal at 19 wells across the site (shown on Figure 3).

Monitoring at site groundwater monitoring wells includes gauging, including free product gauging, and groundwater sampling. Groundwater monitoring wells are shown on Figure 3 and are grouped by monitoring purpose as follows:

- **Performance Monitoring Wells** (within the AS/SVE field zones): MW-59, RW-11A, and MW-89
- **Performance Monitoring Wells** (downgradient of AS/SVE field zones): MW-36A, RW-9, MW-39A, and MW-42
- **Interior Monitoring Wells**: RW-1, RW-5A, MW-93[2]
- **Conditional Point of Compliance (CPOC) Monitoring Wells**: MW-45A, MW-46B, MW-58A, MW-86B, and MW-92
- **Shoreline Water Quality Monitoring Wells**: MW-84A, MW-85A, MW-86B, and MW-87A
- **Free Product Gauging**: MW-59, RW-12, new recovery wells (RW-101-110), MW-36, MW-39A, MW-89, and MW-93
- **Interior Monitoring Wells** (Gauging Only): MW-35, MW-36, MW-54, and MW-64

Samples from groundwater monitoring wells are analyzed for the site Indicator Hazardous Substances (IHSs; Table 1). Samples are collected from Performance, select Interior, CPOC, and Shoreline Water Quality Monitoring Wells according to the compliance monitoring phase and sampling plan. Water quality samples are not collected from free product gauging wells or Interior Monitoring Wells that are gauged only. The frequency of groundwater monitoring varies by well group and by compliance monitoring phase (Table 2). Compliance monitoring is divided into three sequential phases:

- Baseline Monitoring- A full round of compliance well gauging and sampling that occurs shortly before or during start-up of the AS/SVE system and initiation of free product recovery activities (**completed in October 2019, summarized in this Annual Report**).

[2] MW-38 has been removed from the Interior Monitoring Well network because this well is damaged.

- Performance Monitoring– Compliance well gauging and sampling that occurs during and for 2 years after cleanup system operation, for both the AS/SVE system and free product recovery, to determine whether rebound occurs or cleanup actions continue to achieve remediation levels **(the current period of monitoring).**
- Confirmational Monitoring – Long-term compliance well gauging and sampling that occurs once remediation levels and cleanup levels have been achieved in Performance and CPOC Monitoring Wells. Confirmational monitoring is discussed in the CMP but is not discussed in this Year 1 Annual Report.

Table 3 illustrates the monitoring schedule by compliance monitoring phase.

2.1 Sampling and Analysis Plan

Samples were collected in accordance with the CMP and QAPP (CRETE 2018). This section provides an overview of sampling methods and discusses any deviations from the CMP.

2.1.1 PSCAA Vapor Sampling Methods

Vapor samples are collected from 2 dedicated sampling ports - one is located on the downstream side of the oxidizer and one is located prior to entering the oxidizer for treatment. These 2 sample locations represent a treated sample and a pre-treated sample. This vapor data is used to evaluate how the oxidizer is performing, which is measured by comparing the pre- and post-VOC concentrations and determining destruction efficiency. The data is also used to confirm that the VOCs present in the treated sample are below PSCAA regulatory thresholds. The results of the sampling efforts are discussed in Section 3.2.

Samples are collected with a laboratory provided SUMA canister. Tubing is connected to the sampling port and the sample canister, opening the canister results in a negative pressure which draws the sample stream into the sample canister.

2.1.2 Free Product Gauging and Removal Methods

Site groundwater wells are gauged monthly for free product based on the schedule included in Table 2. Gauging includes using a dual interface probe which is decontaminated between each well. Notes are recorded on field sheets.

Free product removal is completed using two methods, vacuum truck evacuations and drum vacuum extractions. The vacuum truck uses a multi-lobed positive displacement blower to create a vacuum in the attached holding tank, this tank vacuum in turn pulls fluids through the attached hoses and/or piping. The drum vacuum pump applies a vacuum to a drum, which in turn pulls free product and oily water up out of the well and through the attached hose to the drum. During removal a down-well “stinger” or pipe is inserted into the well to the targeted level (just below the measured bottom of free product) to remove free product and water. The vacuum truck applies a larger vacuum pressure and is typically capable of removing more fluids (oil and water) at a more rapid rate from the target wells. The vacuum truck was used primarily on the “RW” series wells (RW-1, RW-101 through RW-110), which have dedicated well head fittings to connect to

the equipment on the vacuum truck. The drum vacuum pump was used on all free product removal events and used primarily on monitor wells (wells without dedicated free product removal heads). The drum vacuum pump was also used for the "RW" series wells when the vacuum truck was not available. Free product removal activities followed SOP 505 which is included in Operation Maintenance & Monitoring Plan (CRETE 2020b).

2.1.3 Groundwater Sampling Methods

Groundwater samples were collected using EPA Low-Flow Groundwater Sampling Procedure (EPA, 2010b), detailed in the CMP. Groundwater wells were gauged prior to purging. This information was used to ensure that no free product was present and to determine the placement depth for the groundwater sampling inlet tubing. The groundwater sample tubing inlet was maintained near the mid-point of the saturated well screen interval. For wells with significant tidal influence the sample tubing inlet was placed at least 2 feet from the bottom of the well. During purging field parameters (temperature, specific conductance, and pH) were measured to determine when conditions had stabilized, indicated by recording three consecutive field parameter measurements measured at not less than a 2 minute interval. Groundwater samples were collected in a manner that minimized volatilization of constituents and using a lower flow pumping rate (~100 to 200 mL/min). All water samples were collected from the pump discharge lines directly into the appropriate laboratory provided sample containers. Samples submitted for dissolved analyses were field filtered using a 0.45-micron in-line disposable filter. All sample equipment was either decontaminated between monitoring wells (such as the water level tape) or new dedicated materials was used (such as tubing and gloves).

A subset of wells at T30 are sufficiently tidally influenced that they require sampling at specific times to ensure that tidal influence on groundwater chemistry is minimized. Best-practice includes sampling at the tidal lag times to ensure a representative sample. Below is a summary tidal lag times for wells sampled during this Annual Report[3]:

- CPOC Monitoring Well MW-58A will be sampled between 70 and 130 minutes after low-low tide
- CPOC Monitoring Well MW-86B will be sampled between 130 and 190 minutes after low-low tide
- Performance Monitoring Well MW-89 will be sampled between 130 and 190 minutes after low-low tide
- Shoreline Water Quality Monitoring Wells (MW-84A, MW-85A, MW-86B, MW-87A) will be sampled between 130 and 190 minutes after low-low tide
- All other CPOC, Performance, and Interior Monitoring Wells have limited tidal influence and do not require coordinating sampling time with tidal lag.

2.2 Deviations from the CMP

Deviations from the GW CMP included the following:

[3] Low-low tide is as measured at NOAA Tide Station ID: 9447130.

- MW-38 is an interior Monitoring Well. MW-38 was found to have an obstruction at approximately 10.35 feet below ground surface which prohibits placing groundwater equipment in the saturated zone. The well is assumed to be broken and was not sampled during Year 1. MW-38 has been removed from the monitoring well sampling network. This location has two groundwater monitoring wells, Interior Monitoring Wells MW-93 and RW-1 in close proximity shown on Figure 3. Data collected from MW-93, which was sampled in September 2020, can be used to provide information on the groundwater conditions near MW-38.

There were no other deviations from the GW CMP during the reporting period.

3 AS/SVE System Performance

The AS/SVE system requires routine system performance monitoring and adjustments to ensure that the mechanical system is operating as designed. During the reporting period the AS/SVE system was checked frequently during system startup (daily) with inspections reduced to weekly and biweekly after the system was fully brought on-line. System maintenance also includes the collection of vapor discharge samples in accordance with the PSCAA requirements. This section summarizes the AS/SVE system performance from system startup (September 19, 2019) through December 31, 2020. The remediation system was not in operation from March 24, 2020 to August 19, 2020 due to the Covid-19 pandemic.

Remediation system field data sheets are included in Appendix A. A layout of the AS/SVE system components is included on Figure 2.

3.1 System Operation and Maintenance

Daily, weekly and bi-weekly inspections were conducted on the AS/SVE system throughout the reporting period by CRETE. Work included checking flow rates, operating temperatures, pressure levels, and estimation of VOC mass treated and discharged. Routine maintenance activities were completed by the Port (Marine Maintenance department) which included changing the oil, greasing components, checking and replacing filters, checking and replacing belts, and checking levels in the moisture separator tanks. The AS/SVE system was shut down March 24, 2020 to August 19, 2020, during that time monitoring maintenance activities included a visual inspection of the above ground components, rotating the blower fan blades and greasing bearings.

Tables 4 through 5 summarize data collected during maintenance inspections. Copies of field forms completed during inspections are included in Appendix A. The SVE component of the AS/SVE system operated between a flow rate of 98 scfm (standard cubic feet per minute [system startup, 9/19/2019]) to 308 scfm (12/6/2019), with an average operating flow rate of 236 scfm (this excludes the system startup values); all values are well below the PSCAA maximum flow rate of 375 scfm. During Year 1 the AS/SVE system performed as designed with no significant system failures or issues.

3.2 Soil Vapor Gas Sampling

Soil gas samples are collected on a routine basis (monthly) to comply with PSCAA discharge reporting and to ensure that vapor treatment system (the oxidizer) is performing as designed. Gas samples are collected prior to treatment and post treatment, comparing the pre and post treatment determines the destruction efficiency. The destruction efficiency is also estimated during routine inspections by using PID values of the vapors before and after oxidizer processing.

Soil gas samples are analyzed for air phase hydrocarbons (APH) by Method MA-APH and for volatiles by Method TO-15 for BTEX components. Vapor Analytical Laboratory Reports for the monthly gas samples are included in Appendix B and summarized on table 6.

Soil vapor samples were collected on: 10/23/2019, 11/27/2019, 12/23/2019, 1/15/2020, 2/11/2020, 3/12/2020, 9/29/2020, 10/27/2020, 11/18/2020 and 12/16/2020. Data samples collected post treatment, which represent vapor discharging to the environment, are well below PSCAA limits, as shown on Table 6. Average destruction efficiency range from 98.9% (98.9% [2/11/2020] to 99.9% [12/23/2019]) well above the PSCAA regulation threshold of 98.5%. Based on laboratory samples, the oxidizer component of the AS/SVE system has discharged 30 lbs/per year of toxic contaminants for 2020 and 5.5 lbs/year for 2019, which is less than the PSCAA regulations of 1,000 for TPH. The majority of the toxic contaminants in the vapor samples are TPH compounds, BTEX compounds were also detected and are shown on Table 6.

Based on pre-treatment samples (collected prior to the vapor stream entering the oxidizer), the AS/SVE system has extracted from the ground over 5,000 lbs. of TPH from the soil vapor since system startup (September 19, 2019 through December 31, 2020), shown on Table 4.

Laboratory reports are provided in Appendix B. All samples were hand delivered to Freidman & Bruya Inc., located in Seattle Washington. Laboratory reports were reviewed and reporting flags, when applicable, were accepted and are included in the data tables presented in this report. All laboratory quality assurance metrics were achieved for this project and all data was determined to be usable. During the March 12, 2020 and the November 18, 2020 sampling event one of the field data samples collected was considered to be suspect and likely not representative of actual conditions. This data is included in this report, but is flagged in the tables.

3.3 Conversion of Thermal to Catalytic Oxidizer

Based on SVE gas concentrations some sort of exhaust treatment is required on the AS/SVE system. For T30 an oxidizer was installed since system start up. The oxidizer destroys inlet VOCs by thermal treatment. VOCs in the airstream are heated to a very high temperature and the VOCs are converted to carbon dioxide and water vapor via an exothermic reaction. The SVE system was initially started with a thermal oxidizer to treat the vapor stream extracted from the SVE wells prior to discharge. A thermal oxidizer was used because the initial VOC concentrations were above the treatment capacity of a catalytic oxidizer (concentrations are approximate based on PID readings, shown on Table 4). On March 19, 2020 the system was converted to a catalytic oxidizer, which treats VOCs the same was as a thermal oxidizer but treats at a lower temperature and uses less fuel and is more cost efficient.

4 Free Product Gauging and Recovery Summary

Free product gauging and recovery events have been occurring monthly since January 2020, shortly after the startup of cleanup system, in accordance with the CMP. During this reporting periods (October 2019 through December 2020) wells were gauged during the baseline sampling event (October 2019) and monthly January through December 2020. The first free product removal event was conducted in January 2020 after the AS/SVE system was fully brought back online. No free product removal event was completed in April 2020 due to the Covid-19 pandemic and no free product recovery occurred in December 2020 (gauging only) due to schedule change to bimonthly free product recovery.

Monthly free product thickness was measured at the following wells:

- MW-36, MW-36A, MW-39A, MW-59, MW-89, MW-93, RW-1, RW-12, and free product removal wells (RW-101 through RW-110). During some events shipping containers blocked select wells, these are noted on the sampling sheets.
- MW-35 was added to the monthly free product gauging well list after free product was detected in during the baseline September 2019 event.
- Free product thickness was also measured at each groundwater sampling well during the groundwater sampling events (discussed in Section 5).

A summary of the free product gauging is shown on Table 7.

4.1 Free Product Removal Events

Free product removal was conducted using a vacuum truck and/or a drum vacuum, discussed in Section 2.1.2. The vacuum truck was used primarily on RW-1, RW-101 through RW-110 and the drum vacuum was used on the remaining targeted wells during free product removal Events 1 through 5 (January, February, March, May and June 2020), and Event 10 (November 2020). For the other free product removal events the vacuum truck was not available and only the drum vacuum pump was used on all targeted wells (Events 6 through 9 [July through October 2020]).

Table 7 provides a summary of the data collected during the free product removal events. It is estimated that in Year 1 between 360-510 gallons of free product was removed during these 10 events and over 8,700-gallons of combined water and free product. This is an approximate value as it is difficult to measure a precise volume of free product collected in the holding tank of the vacuum truck. Recovered free product is a mixture of free product and extracted oily water. Detailed gauging tables providing results of the removal events are included Appendix C.

Following the November 2020 free product removal event (Event 10), removal activities transitioned to a bi-monthly schedule (every 2 months). LNAPL presence and accumulation

thickness have generally decreased in observed wells. The last measurable observation of LNAPL at MW-36, MW-39A, MW-59 and MW-93 was on August 21, 2020 (Event 7).

4.2 Free Product Recovery Termination

Free product recovery at an individual well will be terminated when product thickness has been reduced to less than a measurable thickness (0.01-feet) for a period of three consecutive removal events. This recovery termination criterion will result in sequential removal of recovery wells from recovery events as the area with measurable free product shrinks. Wells RW-101 through RW-110 will be left in place for 1 year after the last well meets the termination criteria, after which they will be decommissioned consistent with WAC 173-160.

Based on these criteria the following wells have been removed from free product recovery but continue to be gauged:

- MW-89 - Free product was measured in this well on October 1, 2019 at a thickness of 2.39-ft of LNAPL. On November 14, 2019, approximately 4 gallons of LNAPL and water were removed from MW-89. No product has been measured from this well since October 2019. MW-89 will be monitored as part of the free product removal activities, and if free product returns, it will be reverted back to the free product removal program.
- Monitoring wells MW-36, MW-39A, MW-59 and MW-93 have not had measurable free product since the August 21, 2020 (free product removal Event 7). These wells will be gauged and fluids removed during the January 2021 event. If no free product is observed in January 2021 that will be three consecutive removal events with no measurable free product. These wells will be removed from the free product removal schedule. The wells will continue to be gauged and if free product returns, they will be reverted back to the free product removal program.

5 Groundwater Data Evaluation

During the reporting period 3 groundwater sampling events were conducted; the baseline sampling event (October 16 through 21, 2019), and 2 performance monitoring events. The performance monitoring events were completed on April 11, 2020 (the every 6-month event) and September 18 through 29, 2020 (the yearly event). The September 18 - 29, 2020 event also included the first year groundwater sampling event of the Interior monitoring wells and CPOC Monitoring Wells, which are sampled every 2 years. Table 2 includes a summary of the sampling program and Table 3 includes a schedule.

Groundwater samples were collected and analyzed consistent with the protocols outlined in the CMP. This section provides an overview of the sampling activities. Well locations are shown on Figure 3, gauging and analytical results are summarized on Tables 8 through 10, copies of groundwater sampling sheets are included in Appendix D and laboratory reports are included in Appendix E.

5.1 Performance Monitoring Well Data Analysis

Performance Monitoring Wells are located within and downgradient of the AS/SVE system radius of influence and are used to track system effectiveness. Performance monitoring well gauging and sampling occurs during and for 2 years after cleanup system operation, for both the AS/SVE system and free product recovery, to determine whether rebound occurs or cleanup actions continue to achieve remediation levels. Samples are analyzed for NWTPH-G/BTEX and NWTPH-Dx. Groundwater results are summarized on Table 8, well locations are shown on Figure 3, copies of field notes are included in Appendix D and laboratory reports are provided in Appendix E. Performance monitoring wells sampled during these events include:

- Performance Monitoring Wells (Within the AS/SVE field zones): RW-11A, and MW-89
- Performance Monitoring Wells (Downgradient of AS/SVE field zones): MW-36A, RW-9, and MW-42

Table 9 summarizes the results of the performance monitoring well sampling.

Wells with detectable free product are not sampled during groundwater sampling events, the presence of free product is assumed to be an indication of TPH compounds present above site cleanup goals (remediation levels and cleanup levels). Free product was present during the baseline event in 4 monitoring wells (MW-36A, -39A, -59, and -89) but was not present in the next sampling event (either April 2020 or September 2020) in all the wells except MW-59. Free product was present at MW-59 during the baseline and April 2020 events, but was not detected in the October 2020. During the September 2020 event total TPH-diesel (diesel and lube oil range TPH) was detected in groundwater samples above the site remediation level of 500 µg/L in MW-89 (550 µg/L), MW-36A (560 µg/L) and MW-59 (830 µg/L) and detected above the site clean cleanup level of 2,085 µg/L in monitoring well MW-39A (2,270 µg/L). Figure 4 shows the total TPH concentrations over the sampling

events. Wells with free product present are assumed to have a TPH concentration of 3,000 µg/L, this value is used only to represent free product and does not reflect actual TPH concentrations in these wells.

During the baseline sampling event, groundwater samples from MW-42 exceeded cleanup level for TPH-gasoline and benzene; however, these compounds were not detected above site cleanup levels during the September 2020 event. TPH-gasoline and BTEX compounds were not detected above site cleanup goals in the other performance monitoring wells during the reporting period.

5.2 Interior Monitoring Well Data Analysis

Interior Monitoring Wells are located upgradient of the AS/SVE system within the sheen area but with no measurable product thickness (Figure 3). Interior Monitoring Wells are used to track long-term reductions in contaminant mass that are not associated with operation of the AS/SVE system. Samples were analyzed for NWTPH-G/BTEX and NWTPH-Dx. Groundwater results are summarized on Table 8, well locations are shown on Figure 3, copies of field notes are included in Appendix D and laboratory reports are provided in Appendix E. Interior Monitoring Wells sampled during these events include:

- Interior Monitoring Wells: RW-1, RW-5A, MW-93
- Interior Monitoring Wells (Gauging Only): MW-35, MW-36, MW-54, and MW-64

MW-38 has been removed from the Interior Monitoring Well network because this well is broken.

Wells with detectable free product are not sampled during groundwater sampling events, the presence of free product is assumed to be an indication of TPH compounds present above site cleanup goals. Free product was present during the baseline event in 2 monitoring wells (MW-93 and RW-1). Free product was also present in both of these wells during the next sampling event (September 2020) but was only present at a trace amount at MW-93. Even though a trace amount of free product was detected at MW-93, a groundwater sample was collected to provide a data point to track AS/SVE system performance over time. Total TPH-diesel was detected at MW-93 above site cleanup and remediation levels, detected at a concentration of 8,600 µg/L (9/19/2020).

Total TPH-diesel, TPH-gasoline and BTEX compounds were not detected above site cleanup goals in the other Interior Monitoring Wells during the reporting period.

5.3 CPOC Monitoring Well Data Analysis

Groundwater monitoring at the CPOC Monitoring Wells is used to assess concentrations of site IHSs at the CPOC Monitoring Wells relative to cleanup levels. Samples are analyzed for the IHSs listed in Table 1. Groundwater results are summarized on Tables 9 through 10, well locations are shown on Figure 3, copies of field notes are included in Appendix D and laboratory reports are provided in Appendix E. CPOC monitoring wells sampled during these events include:

- MW-45A, MW-46B, MW-58A, MW-86B, and MW-92

During the baseline sampling event groundwater from MW-86B exceeded the site cleanup level of 500 µg/L for TPH-diesel (detected at 1,600 µg/L) but was detected below cleanup levels in the September 2020 event (detected at 95 µg/L).

Total TPH-diesel, TPH-gasoline, BTEX, and PAH compounds were not detected above site cleanup levels in the other CPOC Monitoring Wells during the reporting period.

5.4 Shoreline Water Quality Monitoring Wells

Groundwater monitoring at the Shoreline Water Quality Wells is used to assess concentrations of site IHSs at the shoreline wells relative to cleanup levels. Samples were analyzed for the IHSs listed in Table 1. Groundwater results are summarized on Tables 9 through 10, well locations are shown on Figure 3, copies of field notes are included in Appendix D and laboratory reports are provided in Appendix E. Shoreline Water Quality Monitoring Wells sampled during these events include:

- MW-84A, MW-85A, MW-86B, and MW-87A

Total TPH-diesel, TPH-gasoline, BTEX, and PAH compounds were not detected above site cleanup goals in any of the shoreline water quality monitoring wells during the reporting period.

5.5 Quality Assurance

The GW CMP includes quality assurance protocols, detailed in the Quality Assurance Project Plan (QAPP). During each of the groundwater sampling events duplicate samples were collected from each groundwater monitoring well to access field and laboratory precision. Field and laboratory precision is determined by the relative percent difference (RPD) between a sample and it's duplicate. The tolerance limit for percent differences between field duplicates is $\pm$ 35 percent for groundwater. Table 11 provides a summary of the RPD between the parent and duplicate samples collected during the reporting period. The RPD was within the project goals for all samples.

Laboratory reports are provided in Appendix E. All samples were hand delivered to Freidman Bruya Inc located in Seattle Washington. Laboratory reports were reviewed and reporting flags, when applicable, were accepted and are included in the data tables presented in this report. All laboratory quality assurance metrics were achieved for this project and all data was determined to be usable.

6 Conclusions and Schedule

This report presents the results of the baseline and first year of compliance monitoring at the T30 Cleanup site. Key take-aways during the Year 1 reporting period include:

- The AS/SVE system operated for over 7,420 hours. The SVE component of the system was in operation was from September 19, 2019 through March 24, 2020 and August 17 through December 30, 2020 with minor down time due to preventative maintenance or low propane fuel (Table 4). The AS sparge component was in operation from January 17 through March 24 and September 2 through December 30, 2020 with minor down time due to preventative maintenance (Table 5). The AS/SVE system was not in operation from March 24, 2020 through August 17, 2020 due to Covid-19 pandemic.
- The AS/SVE system extracted over 5,000 pounds of total petroleum hydrocarbon vapors, mainly as EC5-8 and EC9-12 aliphatic range air phase hydrocarbons (Table 6). Soil vapor data collected from the oxidizer indicates that the AS/SVE system has operated within PSCAA permit thresholds (Table 6).
- LNAPL recovery events recovered an estimated 8,700-gallons (Table 7) of cumulative water and free product (total fluids) during 10 free product recovery events.
- Groundwater monitoring results presented in Section 5 indicate that IHS concentrations are decreasing (Figure 4, TPH-Dx) in Performance Monitoring Wells. CPOC and Shoreline Water Quality Monitoring Wells have no cleanup goal exceedances and generally show decreasing concentrations during Year 1.
- The cleanup actions conducted are demonstrating significant mass recovery and decreasing IHS concentrations. Similar cleanup actions will continue into Year 2.

6.1 CMP Modifications and Recommendations

As per the CMP, data collected from the Performance Monitoring Wells is evaluated and used to make decisions regarding AS/SVE system operation as shown in the flow chart provided on Figure 5 of the CMP, included for reference in Appendix F. As stated in the CAP, the overall goal of the AS/SVE system is to reduce contaminant mass in the sheen area at and downgradient of the sparge wells. The AS/SVE system is not intended to reduce contaminant concentrations in groundwater upgradient of the AS/SVE system. The AS/SVE system will be operated until Performance Monitoring Wells within and downgradient of the AS/SVE field zones (RW-9, RW-11A, MW-42, MW-39A, MW-36A, MW-59, and MW-89) achieve remediation levels or if the AS/SVE system is no longer significantly removing contaminant mass[4], consistent with the CAP. Select performance wells exceed remediation

[4]The statement "the AS/SVE system is no longer significantly removing contaminant mass" has not been defined. This standard will need to be negotiated, if necessary, at a future time. This could involve analysis of vapor extraction concentrations, groundwater dissolved oxygen concentrations, performance well groundwater concentrations, or other similar measure.

levels (MW-39A) and continued operation of the AS/SVE system is planned for Year 2 (2021). No modifications to the AS/SVE system are proposed for the 2021 monitoring year.

Existing site free product removal wells MW-36, MW-39A, MW-59 and MW-93 have not had measurable free product during the previous 2 removal events. If they do not exhibit measurable free product during the January 2021 free product removal event then free product recovery at these wells will cease as the January 2021 event will be the third consecutive event with no measurable free product present. These wells will continue to be monitored during free product gauging and removal activities.

6.2 Contingent Actions

This section describes consistent protocols to be used to determine if implementation of a contingent action is warranted. Contingent actions are detailed in the CMP. Contingent actions are triggered if the following occurs:

- Free product measured in a well.
- For CPOC Monitoring Wells, the consistent protocol for determining if a contingent action is warranted is illustrated in Figure 6 of the CMP (included in Appendix F). Essentially this is based on a groundwater sample exceeding a cleanup level.
- A contingent action will be triggered once a cleanup level has been exceeded in a Shoreline Water Quality Well based on results averaged over a minimum of 4 consecutive quarters consistent with WAC 173-340-720(9)(c)(v)

None of these events occurred during the reporting period; therefore, based on the data presented in this Year 1 Annual Report, no contingent action is triggered.

6.3 Schedule and Reporting

The groundwater monitoring frequencies are provided on Tables 2 and 3. The schedule will be based on the performance of the AS/SVE system and wells achieving cleanup levels or remediation levels, as appropriate. Free product will be gauged at least quarterly until termination criteria are achieved. Schedule revisions will be documented in quarterly status reports and annual groundwater monitoring reports.

Annual reports will continue to be prepared for Years 2 through 4. Reports will be submitted to Ecology in the first quarter following the end of the yearly monitoring cycle. The next annual report will be for the Year 2 and will be submitted in the first quarter of 2022.

After 5 years of system operation, an evaluation report will be prepared that will include a summary of the five preceding annual reports and discussions about longer term trends in the groundwater data. The CMP will be reviewed and updated by addendum (with Ecology review), if changes to the monitoring program are appropriate.

7 References

CRETE 2018. Engineering Design Report. December 20, 2018.

CRETE 2020a. Construction Completion Report, Terminal 30 Cleanup Project. February 27, 2020.

CRETE 2020b. , Terminal 30 Cleanup Project Operation Maintenance & Monitoring Plan. March 2020.

Ecology, 2005. Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation. Publication No. 05-09-091 (Version 1.0). July.

Ecology, 2017. Consent Decree and Cleanup Action Plan. July 19, 2017.

ENSR|AECOM, 2010. Terminal 30 Cargo Terminal Construction Completion Report. Prepared for Port of Seattle Terminal 30 by AECOM. Seattle, Washington. January 2010.

Tables

Table 1 Indicator Hazardous Substances

Constituent (BTEX, SVOC, TPH)	Constituent (PAH)
BTEX Compounds	***PAH Compounds (filtered)***
Benzene	Acenaphthene
Toluene	Acenaphthylene
Ethylbenzene	Anthracene
Xylenes (total)	Benzo[a]anthracene
Semivolatile Organic Compounds	Benzo[a]pyrene
2-Methylnaphthalene	Benzo[b]fluoranthene
Petroleum Hydrocarbons	Benzo[g,h,i]perylene
TPH, gasoline range organics	Benzo[k]fluoranthene
TPH, diesel range organics	Chrysene
TPH, heavy oils	Dibenzo[a,h]anthracene
	Fluoranthene
	Fluorene
	Indeno[1,2,3-cd]pyrene
	Naphthalene
	Phenanthrene
	Pyrene
	Naphthalene

Table 2 Compliance Monitoring Frequency and Analytes

Well Network	Compliance Monitoring Phase		
	Baseline Sampling	Performance Monitoring*	Confirmational Monitoring
Groundwater Sampling (See Note 1)			
Performance Monitoring Wells – Within (MW-59, RW-11A, MW-89)**	Single Event **- Sampled: 10/2019** (NWTPH-G/BTEX, NWTPH-Dx)	Every 6 Months - **Sampled: 4/2020 & 9/2020** (NWTPH-G/BTEX, NWTPH-Dx)	None Scheduled
Performance Monitoring Wells – Downgradient (MW-36A, RW-9, MW-39A, MW-42)		Every Year **- Sampled: 9/2020** (NWTPH-G/BTEX, NWTPH-Dx)	
Interior Monitoring Wells (MW-38, MW-93, RW-1, RW-5A)	Single Event **- Sampled: 10/2019** (NWTPH-G/BTEX, NWTPH-Dx)	Every 2 Years - **Sampled: 9/2020** (NWTPH-G/BTEX, NWTPH-Dx)	Every 5 Years (NWTPH-G/BTEX, NWTPH-Dx)
Interior Monitoring Wells - Gauging Only (MW-35, MW-36, MW-54, MW-64)	Single Event **- Gauged 10/2019** (Free Product Gauging)	Every 2 Years **- Gauged 9/2020** (Free Product Gauging)	Every 5 Years (Free Product Gauging)
CPOC Monitoring Wells (MW-45A, MW-46B, MW-58A, MW-86B*, MW-92)**	Single Event **- Sampled: 10/2019** (NWTPH-G/BTEX, NWTPH-Dx, PAHs, 2-methylnaphthalene)	Every 2 Years **- Sampled: 9/2020** (NWTPH-G/BTEX, NWTPH-Dx, PAHs, 2-methylnaphthalene)	Varies – See Table 3 (NWTPH-G/BTEX, NWTPH-Dx, PAHs, 2-methylnaphthalene)
Shoreline Water Quality Monitoring Wells (MW-84A, MW-85A, MW-86B*, MW-87A)**	Single Event **- Sampled: 10/2019** (NWTPH-G/BTEX, NWTPH-Dx, PAHs, 2-methylnaphthalene)	None Scheduled	None Scheduled

Notes:
1. This schedule can be modified based on data collected during system performance, see Section 6.
2. For all monitoring wells, the measurement of free product in a well will trigger free product removal activities.
3. All NWTPH-Dx are sampled with silica gel cleanup. All PAH samples are field filtered prior to analysis.
* Performance monitoring will continue for the duration of AS/SVE system operation plus 2 years, at which time confirmational monitoring will be initiated.
** MW-59 and MW-39A will become Performance Monitoring Wells once free product has not been present for 2 consecutive quarters.
***MW-86B is both a CPOC Monitoring Well and a Shoreline Water Quality Well
MW-38 is broken and was not sampled. No product was measured.

Table 3 Compliance Monitoring Schedule (Annual Report Year 0 through 1 - 2020)

Post AS/SVE Startup Years:	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**22**	**27**	**32**
Post AS/SVE Shutdown Years:							**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**17**	**22**	**27**
Confirmational Monitoring Years:									**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**15**	**20**	**25**
	Baseline	**Performance Monitoring Period**							**Confirmational Monitoring Period**												
CPOC Monitoring Wells	*Once*	*Biannual*							*Annual*					*Biannual*				*Every 5 years*			
MW-45A	X	X		X		X		X	X	X	X	X	X	X		X		X	X	X	X
MW-46B	X	X		X		X		X	X	X	X	X	X	X		X		X	X	X	X
MW-58A	X	X		X		X		X	X	X	X	X	X	X		X		X	X	X	X
MW-86B	X	X		X		X		X	X	X	X	X	X	X		X		X	X	X	X
MW-92	X	X		X		X		X	X	X	X	X	X	X		X		X	X	X	X
Performance Monitoring Wells																					
Within	*Once*	*Semiannual*							None												
MW-59	X	XX	XX	XX	XX	XX	XX	XX													
MW-89	X	XX	XX	XX	XX	XX	XX	XX													
RW-11A	X	XX	XX	XX	XX	XX	XX	XX													
Downgradient	*Once*	*Annual*							None												
MW-36A	X	X	X	X	X	X	X	X													
MW-39A	X	X	X	X	X	X	X	X													
MW-42	X	X	X	X	X	X	X	X													
RW-9	X	X	X	X	X	X	X	X													
Interior Monitoring Wells	*Once*	*Biannual*							*Every 5 years*												
MW-38	X	X		X		X		X					X					X	X	X	X
MW-93	X	X		X		X		X					X					X	X	X	X
RW-1	X	X		X		X		X					X					X	X	X	X
RW-5A	X	X		X		X		X					X					X	X	X	X

Notes

The monitoring frequency for the Shoreline Water Quality Monitoring Wells and free product gauging wells are not shown on this table.

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Table 4

Summary of SVE System Operational Data

LOCATION: **SVE SYSTEM (PRE-OXIDIZER)**

Date	Time	Total SVE Inlet Vacuum (Inches H_2O)	Total SVE Inlet ΔP (Inches H_2O)	Total SVE Inlet Temperature (^oF)	SVE Vapor Flow Rate (scfm)	Cumulative SVE Blower Hour Meter (Hours)	Cumulative SVE Blower Run Time (Days)	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total SVE VOC Inlet Concentration ($\mu g/m^3$)	Total SVE VOC Inlet PID Measurement (ppm)	Extraction Rate (Pounds/Day)	Cumulative Mass Extracted (Pounds)	Comments/Notes
9/19/2019	12:00	35.0	0.25	72	98	9.9	START						0		0.0	0.0	SVE Start
9/20/2019	16:04	35.0	0.25	68	99	33.9	1.0						238,228	198	2.1	1.1	
9/23/2019	13:58	35.0	0.25	68	99	105.9	4.0						255,073	212	2.3	7.6	
9/24/2019	10:00	30.0	0.25	70	99	129.9	5.0						258,682	215	2.3	9.9	
9/25/2019	9:20	34.0	0.25	66	99	153.9	6.0						262,292	218	2.3	12.2	
9/26/2019	9:00	38.0	0.25	66	98	176.1	6.9						487,285	405	4.3	15.3	
9/28/2019	12:19	46.0	0.25	65	97	227.5	9.1						529,396	440	4.6	24.9	
9/30/2019	9:35	56.0	0.25	62	96	272.5	10.9						557,069	463	4.8	33.8	
10/1/2019	9:25	54.0	0.25	61	97	296.6	11.9						587,148	488	5.1	38.7	
10/2/2019	9:20	44.0	0.25	62	98	320.6	12.9						513,755	427	4.5	43.6	
10/3/2019	8:50	50.0	0.25	61	97	344.1	13.9						549,850	457	4.8	48.1	
10/4/2019	11:40	55.0	0.25	66	96	371.0	15.0						564,288	469	4.9	53.6	
10/7/2019	12:08	61.0	0.25	65	95	443.4	18.1						560,678	466	4.8	68.2	
10/8/2019	9:05	70.0	0.25	60	95	464.4	18.9						585,945	487	5.0	72.5	
10/9/2019	10:07	73.0	0.25	60	94	489.4	20.0						594,367	494	5.0	77.7	
10/10/2019	10:24	69.0	0.25	61	95	513.7	21.0						622,040	517	5.3	82.9	
10/13/2019	9:33	78.0	0.5	60	132	585.7	24.0						661,745	550	7.9	102.6	
10/14/2019	9:39	81.0	0.5	61	131	608.9	25.0						671,370	558	7.9	110.3	
10/15/2019	12:25	82.0	0.75	64	160	632.9	26.0						802,516	667	11.6	120.0	
10/23/2019	11:20	86.0	1	60	185	826.5	34.0	796,500	160	7,200	170	500	796,500	662	13.2	220.0	Lab Data
10/24/2019	9:35	93.0	1.5	57	224	848.8	35.0						766,421	637	15.5	233.4	
10/25/2019	9:50	90.0	1.75	58	243	873.0	36.0						904,785	752	19.8	251.1	
10/28/2019	11:00	85.0	2.5	56	294	946.1	39.0						954,116	793	25.2	319.6	
10/29/2019	9:15	82.0	2.5	56	295	969.6	40.0						990,211	823	26.3	344.8	
10/30/2019	12:30	81.0	2.5	56	295	995.7	41.1						895,160	744	23.8	372.0	
11/1/2019	14:00	79.0	2.5	56	296	1045.1	43.1						883,128	734	23.5	420.7	
11/4/2019	16:05	80.0	2.75	55	311	1120.3	46.3						794,094	660	22.2	492.3	
11/6/2019	10:18	86.0	2.75	56	307	1162.5	48.0						806,125	670	22.3	531.4	
11/8/2019	9:08	86.0	2.75	55	308	1209.3	50.0						755,592	628	20.9	573.5	
11/12/2019	10:30	92.0	2.5	56	290	1306.6	54.0						786,875	654	20.5	657.5	
11/13/2019	9:30	91.0	2.5	56	291	1329.6	55.0						759,202	631	19.9	676.9	
11/15/2019	12:40	91.0	2.75	56	305	1377.6	57.0						738,748	614	20.3	717.0	
11/25/2019	10:52	89.0	2.75	50	308	1477.2	61.1						656,932	546	18.2	796.8	SVE & oxidizer down on 11/19/19 at 12:23 due to low propane. Restarted on 11/25/19 at 10:00.
11/26/2019	10:25	88.0	2.75	50	308	1500.8	62.1						747,170	621	20.7	815.8	
11/27/2019	10:40	88.0	2.75	50	308	1524.8	63.1	917	0.99	58	1.3	4	650,916	541	18.0	835.3	Lab Data is questionable and not used in calculations.
12/2/2019	9:53	88.0	2.75	50	308	1644.2	68.1						510,145	424	14.1	915.3	
12/3/2019	14:00	84.0	2.75	50	310	1671.1	69.2						611,211	508	17.0	932.8	SVE system shutdown on 12/3/19 between 12:13 and 13:45 due to power outage.
12/6/2019	9:21	89.0	2.75	50	308	1738.4	72.0						573,913	477	15.9	979.0	
12/9/2019	9:14	98.0	2.75	50	303	1810.3	75.0						564,288	469	15.4	1,025.8	
12/16/2019	10:47	99.0	2.5	50	289	1979.9	82.1						610,008	507	15.8	1,136.2	
12/18/2019	10:34	94.0	2.5	50	291	2027.4	84.1						531,802	442	13.9	1,165.6	
12/20/2019	9:46	94.0	2	50	260	2074.7	86.0						883,128	734	20.7	1,199.7	
12/23/2019	12:02	96.0	2	50	260	2148.9	89.1	1,381,000	320	770	54	96	1,381,000	662	32.2	1,281.5	Lab Data. Re-sample for 11/27/19.
12/26/2019	9:38	90.0	2.25	50	278	2218.6	92.0						782,289	375	19.6	1,356.7	Empty water storage tank on 12/24/19.
1/3/2020	15:00	88.0	2	50	263	2416.1	100.3						1,013,846	486	24.0	1,535.8	
1/7/2020	10:25	85.0	1.75	50	247	2507.7	104.1						1,287,125	617	28.6	1,636.0	Empty water storage tank on 1/7/20.
1/9/2020	10:55	81.0	1.75	50	249	2556.2	106.1						901,196	432	20.1	1,685.3	
1/15/2020	11:32	84.0	1.5	50	229	2701.0	112.1	188,970	23	730	17	51	188,970	353	3.9	1,757.8	Lab Data.
1/17/2020	14:30	84.0	1.75	50	247	2750.6	114.2						183,081	342	4.1	1,766.0	Started air sparging.
1/21/2020	10:00	86.0	1.75	50	247	2848.0	118.3						248,926	465	5.5	1,785.5	
1/22/2020	15:12	92.0	1.75	50	244	2873.1	119.3						279,440	522	6.1	1,791.6	
1/23/2020	11:00	93.0	1.5	50	226	2893.3	120.1						301,924	564	6.1	1,796.8	Empty water storage tank on 1/23/20.
1/27/2020	1:51	88.0	1.75	50	246	2992.2	124.3						263,380	492	5.8	1,821.4	Empty water storage tank on 1/27/20.
1/30/2020	9:36	93.0	1.75	50	244	3059.8	127.1						293,894	549	6.4	1,838.7	Empty water storage tank on 1/30/20.
2/4/2020	13:25	97.0	1.75	50	242	3183.4	132.2						304,600	569	6.6	1,872.4	Empty water storage tank on 2/5/20.
2/6/2020	16:30	84.0	1.5	50	229	3234.4	134.4						341,538	638	7.0	1,886.9	
2/11/2020	12:05	75.0	1.5	50	232	3350.2	139.2	94,970	12	730	17	51	94,970	462	2.0	1,908.7	Collected lab air sample. Sample suspect.
2/14/2020	9:34	69.0	1.5	50	234	3418.1	142.0						240,897	450	5.1	1,918.7	Empty water storage tank on 2/13/20. AS system off from 2/13/20 @ 09:00 to 2/14/20 @ 09:00.

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Table 4

Summary of SVE System Operational Data

LOCATION: SVE SYSTEM (PRE-OXIDIZER)

Date	Time	Total SVE Inlet Vacuum (Inches H_2O)	Total SVE Inlet ΔP (Inches H_2O)	Total SVE Inlet Temperature (^oF)	SVE Vapor Flow Rate (scfm)	Cumulative SVE Blower Hour Meter (Hours)	Cumulative SVE Blower Run Time (Days)	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total SVE VOC Inlet Concentration ($\mu g/m^3$)	Total SVE VOC Inlet PID Measurement (ppm)	Extraction Rate (Pounds/Day)	Cumulative Mass Extracted (Pounds)	Comments/Notes
2/17/2020	9:40	72.0	1.5	50	233	3490.3	145.0						247,321	462	5.2	1,934.1	
2/20/2020	13:45	40.0	0.75	52	172	3566.4	148.2						201,818	377	3.1	1,947.3	Empty water storage tank on 2/20/20. Approximately 12" in tank. Turned down vacuum to SVE well field to reduce water extracted.
2/26/2020	13:34	42.0	1	56	198	3710.3	154.2						201,818	377	3.6	1,967.4	Started pulsing AS system. Zones 4 & 5 ON. Pulsing every 8 hours between Zones 1, 2, and 3. AS system down between 08:24 on 2/27/20 and 10:00 on 2/27/20 due to PSH Alarm.
2/28/2020	10:23	50.0	1.25	51	220	3755.2	156.1						201,818	377	4.0	1,974.5	AS system down between 18:49 on 2/27/20 and 09:00 on 2/28/20 due to PSH Alarm. Pulsing AS system with Zone 5 ON. Pulsing every 6 hours between Zones 1, 2, 3, and 4.
3/6/2020	10:30	50.0	1	52	196	3923.5	163.1						214,666	401	3.8	2,001.7	
3/11/2020	14:30	50.0	1.25	52	219	4046.3	168.2						192,717	360	3.8	2,021.7	
3/12/2020	10:15	50.0	1.25	51	220	4066.0	169.0	641	1.1	62	1.4	4.3	170,234	318	3.4	2,024.7	Collected Lab air sample. Inlet concentration lab data suspect. Need to re-sample upon start up. Lab data not used in calculations.
3/19/2020	14:15	50.0	1.25	52	219	4211.6	175.1						152,033	284	3.0	2,044.0	System off for 6.5 hours on 3/19/20 to install catalyst in oxidizer.
3/24/2020	14:30	50.0	1.25	56	219	4325.4	179.8						170,769	319	3.4	2,059.0	System shut off at 15:00 on 3/24/20 due to COVID-19 travel restrictions.
8/17/2020	9:59	69	0.5		142	4334.7	180.2						78,693	147	1.0	2,059.9	Measurement within 2-hours after system re-start since 3/24/2020. SVE wells being turned on one at a time.
8/17/2020	11:50	63	0.5		144	4336.9	180.3						75,481	141	1.0	2,060.0	All SVE wells except HSVE-1 and HSVE-2 turned on.
8/18/2020	7:26	61	0.5		144	4356.2	181.1						103,532	193	1.3	2,060.9	All SVE wells except HSVE-1 and HSVE-2 turned on.
8/18/2020	8:54	63	0.5		144	4357.8	181.2						170,234	318	2.2	2,061.0	Extracting at all SVE wells except HSVE-1 (partially open).
8/20/2020	13:39	62	0.5	82	133	4410.7	183.4						208,028	389	2.5	2,066.2	Readings prior to individual SVE well adjustments
8/20/2020	14:28	58	0.5	82	133	4411.6	183.4						214,666	401	2.6	2,066.3	Readings after to individual SVE well adjustments
8/21/2020	6:51	60	0.5	79	133	4427.8	184.1						259,633	485	3.1	2,068.2	No system adjustments conducted
8/26/2020	14:07	59	0.5	78	134	4555.7	189.4	2,101,500	260	680	97	251	2,101,500	408	25.3	2,143.8	Collected lab gas sample and PID measurements at 1407
8/26/2020	15:18	68	0.5	78	132	4556.3	189.4						1,720,346	334	20.4	2,144.3	Adjusted Hertz on SVE blower and made individual SVE well adjustments on manifold.
8/28/2020	13:48	68	0.5	80	132	4602.8	191.4						1,558,097	303	18.4	2,182.0	No appreciable oil in SVE-4 and SVE-5 flow gauges.
8/28/2020	14:39	68	0.5	80	132	4603.6	191.4						1,554,492	302	18.4	2,182.6	Readings after system adjustments
9/2/2020	11:22	64	0.5	81	132	4719.9	196.3						1,519,467	295	18.1	2,271.0	Readings pre-adjustments
9/2/2020	14:44	63	1.5	81	230	4723.3	196.4						1,560,673	303	32.2	2,274.6	Readings post-adjustments
9/4/2020	11:55	80	2	80	259	4768.6	198.3						1,715,710	333	39.9	2,342.6	Readings after draining water from SVE-6, SVE-8, SVE-9, and after air sparge schedule and flow adjustments
9/10/2020	8:08	84	2	78	258	4909.0	204.1						1,791,941	348	41.5	2,580.7	Before system tweaks/adjustments.
9/10/2020	8:54	76	2	78	261	4909.4	204.1						1,695,622	329	39.8	2,581.4	After system tweaks/adjustments.
9/15/2020	15:21	78	2	78	260	5036.3	209.4						1,817,694	353	42.5	2,798.8	

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Table 4

Summary of SVE System Operational Data

LOCATION:		**SVE SYSTEM (PRE-OXIDIZER)**															
Date	Time	Total SVE Inlet Vacuum (Inches H_2O)	Total SVE Inlet ΔP (Inches H_2O)	Total SVE Inlet Temperature (^oF)	SVE Vapor Flow Rate (scfm)	Cumulative SVE Blower Hour Meter (Hours)	Cumulative SVE Blower Run Time (Days)	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total SVE VOC Inlet Concentration ($\mu g/m^3$)	Total SVE VOC Inlet PID Measurement (ppm)	Extraction Rate (Pounds/Day)	Cumulative Mass Extracted (Pounds)	Comments/Notes
9/23/2020	7:00	77	1.75	72	245	5220.0	217.1						**1,627,890**	**316**	**35.8**	**3,098.6**	Collected measurements without PID/LEL meter. Used averages of before and after values
9/29/2020	9:02	78	1.75	78	243	5366.3	223.2	1,460,900	120	680	56	118	1,460,900	279	31.9	3,305.2	Collected lab gas sample
10/6/2020	8:14	78	2	69	262	5533.6	230.2						2,090,887	400	49.3	3,588.3	
10/16/2020	14:59	81	2	66	262	5748.9	239.1						1,716,244	**999**	40.4	3,990.5	Suspect MultiRAE PID probe saturation (biased high measurement). Measurement >999-ppm. Used average of before and after PID measurements.
10/23/2020	8:22	82	2	60	263	5910.3	245.9						1,339,507	256	31.7	4,232.7	Used MultiRAE PID. No apparent probe saturation.
10/27/2020	8:43	82	2	59	263	6006.8	249.9	394,000	270	16,000	370	1,120	394,000	166	9.3	4,315.0	Collected lab gas sample. Used MultiRAE PID. No apparent probe saturation.
11/2/2020	14:48	80	2	63	263	6158.1	256.2						267,967	113	6.3	4,364.4	Used RKI.
11/10/2020	14:39	86	2	54	263	6348.7	264.1						270,341	114	6.4	4,414.9	Used RKI. Readings SVE flow pre-adjustments.
11/10/2020	15:01	80	2	54	265	6349.0	264.1						304,994	129	7.3	4,414.9	Used RKI. Readings SVE flow post-adjustments.
11/18/2020	13:56	84	2	52	264	6540.1	272.1	452,000	140	8,100	190	560	452,000	139	10.7	4,486.6	Used RKI. Readings SVE flow post-adjustments.
12/4/2020	13:18	76	2	52	267	6832.3	284.3						348,342	107	8.4	4,602.9	Used MultiRAE. Readings SVE flow pre-adjustments. Run time hour tally reset on PLC, SVE cumulative run time hours calculated.
12/4/2020	13:40	79	2	53	266	6832.7	284.3						374,663	115	9.0	4,603.0	Used MultiRAE. Readings SVE flow post-adjustments.
12/10/2020	15:37	79	2	51	266	6977.6	290.3						**361,503**	**1,141**	**8.7**	**4,656.2**	Used RKI. Probe saturation. Individual PID value not representative. Used average of previous two PID values as substitute.
12/16/2020	8:21	83	1.5	50	229	7107.9	295.7	1,151,000	73	2,600	61	181	1,151,000	79	23.7	4,744.1	Collected lab gas samples. Measurement collected pre-adjustments.
12/29/2020	8:22	84	1.5	50	229	7420.1	308.8						1,279,213	88	26.4	5,070.0	

Notes:
1. H_2O = Water
2. ΔP = Differential Pressure
3. scfm = Standard Cubic Feet Per Minute
4. $\mu g/m^3$ = micrograms per cubic meter
5. TPH = Total Petroleum Hydrocarbons
6. ^oF = Degrees Fahrenheit
7. ppm = Parts Per Million
8. For dates without laboratory data, the Total SVE VOC Inlet Concertation is extrapolated by comparing the laboratory data to the Total SVE VOC Inlet PID Measurement on the date of laboratory sampling and applying this proportion to the dates without laboratory data.

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Table 5

LOCATION:	Oxidizer Discharge	Summary of Oxidizer Operational Data								
Date	Time	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge PID Measurement (ppm)	Destruction Efficiency (%)	Comments/Notes
9/19/2019	12:00							NT	NA	Oxidizer Start
9/20/2019	16:04							NT	NA	
9/23/2019	13:58							NT	NA	
9/24/2019	10:00							NT	NA	
9/25/2019	9:20							NT	NA	
9/26/2019	8:50							NT	NA	
9/28/2019	12:15							NT	NA	
9/30/2019	9:15							NT	NA	
10/1/2019	9:20							9.4	98.1	
10/2/2019	9:28							8.7	98.0	
10/3/2019	8:55							NT	NA	
10/4/2019	11:43							7.9	98.3	
10/7/2019	12:02							5.2	98.9	
10/8/2019	9:02							8.8	98.2	
10/9/2019	10:04							7.0	98.6	
10/10/2019	10:26							4.1	99.2	
10/13/2019	9:28							8.3	98.5	
10/14/2019	9:35							NT	NA	
10/15/2019	12:18							5.4	99.2	
10/23/2019	11:15	4,590	210	150	4	18	4,590	8.8	99.4	Destruction Efficiency Based on Lab Data
10/24/2019	9:40							7.7	98.8	
10/25/2019	9:55							6.3	99.2	
10/28/2019	10:52							7.3	99.1	
10/29/2019	10:20							7.7	99.1	
10/30/2019	12:25							6.7	99.1	
11/1/2019	14:10							6.1	99.2	
11/4/2019	16:00							4.8	99.3	
11/6/2019	10:22							4.9	99.3	
11/8/2019	9:15							5.0	99.2	
11/12/2019	10:25							3.6	99.4	
11/13/2019	9:45							7.0	98.9	
11/15/2019	12:30							3.7	99.4	
11/25/2019	10:52							7.5	98.6	
11/26/2019	10:25							4.4	99.3	
11/27/2019	9:00	1,705	130	64	1.5	0.89	1,705	5.6	99.0	Destruction Efficiency Based on PID. Questionable inlet sample.
12/2/2019	9:53							4.0	99.1	
12/3/2019	14:00							4.5	99.1	
12/6/2019	9:21							4.8	99.0	
12/9/2019	9:14							4.4	99.1	
12/16/2019	10:47							4.0	99.2	
12/18/2019	10:34							8.2	98.1	
12/20/2019	9:46							4.6	99.4	
12/23/2019	12:02	1,125	18	57	1	4	1,125	4.9	99.9	Destruction Efficiency Based on Lab Data

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Table 5

LOCATION:		Oxidizer Discharge			Summary of Oxidizer Operational Data					
Date	Time	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge PID Measurement (ppm)	Destruction Efficiency (%)	Comments/Notes
12/26/2019	9:38							6.6	98.2	
1/3/2020	15:00							4.9	99.0	
1/7/2020	10:25							5.1	99.2	
1/9/2020	10:55							4.3	99.0	
1/15/2020	10:45	340	2.6	60	1.4	4.2	340	6.9	99.8	Destruction Efficiency Based on Lab Data
1/17/2020	14:30							6.0	98.2	
1/21/2020	10:00							3.3	99.3	
1/22/2020	15:12							2.6	99.5	
1/23/2020	11:00							5.0	99.1	
1/27/2020	1:51							2.5	99.5	
1/30/2020	9:36							5.9	98.9	
2/4/2020	13:00							6.1	98.9	
2/6/2020	16:05							2.8	99.6	
2/11/2020	11:40	1,090	3	150	4	11	1,090	4.9	98.9	Destruction Efficiency Based on Lab Data
2/14/2020	9:17							5.6	98.8	
2/17/2020	9:40							4.1	99.1	
2/20/2020	13:45							6.3	98.3	
2/26/2020	13:34							NT	NA	
2/28/2020	10:23							NT	NA	
3/11/2020	14:30							5.7	98.4	
3/12/2020	10:15	515	0.96	57	1.3	3.9	515	7.5	99.7	Collected Lab air sample. Inlet concentration lab data suspect. Need to re-sample upon start up. Destruction efficiency based on lab results.
3/19/2020	14:15							3.5	98.8	
3/24/2020	14:30							3.1	99.0	
8/17/2020	9:59							1.3	99.1	SVE system re-start since 3/24/2020
8/17/2020	11:50							0.5	99.6	
8/18/2020	7:26							0.5	99.7	
8/18/2020	8:54							1.5	99.5	
8/20/2020	13:39							0.4	99.9	
8/20/2020	14:28							0.8	99.8	
8/21/2020	6:51							0.6	99.9	
8/26/2020	14:02	6,570	11	660	15	45	6,570	0.4	99.7	Collected lab gas sample and PID measurements at 1402. Destruction Efficiency based on lab data.
8/26/2020	15:18							0.6	99.8	Adjusted Hertz on SVE blower and made individual SVE well adjustments on manifold.
8/28/2020	13:48							0.7	99.8	
8/28/2020	14:39							0.5	99.8	
9/2/2020	11:22							0.6	99.8	
9/2/2020	14:44							0.5	99.8	Post AS system re-start since 3/24/2020.
9/4/2020	11:55							0.0	100.0	
9/10/2020	8:18							0.9	99.7	Before system adjustments
9/10/2020	8:45							0.6	99.8	After system adjustments.
9/15/2020	15:21							0.7	99.8	

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Table 5

LOCATION:		**Oxidizer Discharge**				**Summary of Oxidizer Operational Data**				
Date	Time	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge PID Measurement (ppm)	Destruction Efficiency (%)	Comments/Notes
9/23/2020	7:00							NM	NA	Collected measurements without PID/LEL meter
9/29/2020	9:02	9,570	11	660	15	45	9,570	0.7	99.3	Collected lab gas sample
10/6/2020	8:14							1.9	99.5	
10/16/2020	14:59							14.0	99.9	Suspect MultiRAE PID probe saturation (biased high measurement). Used average of before and after PID measurements.
10/23/2020	8:22							1.0	99.6	Used MultiRAE PID. No apparent probe saturation.
10/27/2020	8:43	5,250	4.5	260	6.1	18.1	5,250	1.0	98.7	Collected lab gas sample. Used MultiRAE PID. No apparent probe saturation.
11/2/2020	14:48							0.8	99.3	Used RKI.
11/10/2020	14:39							0.8	99.3	Used RKI. Readings SVE flow pre-adjustments.
11/10/2020	15:01							1.3	99.0	Used RKI. Readings SVE flow post-adjustments.
11/18/2020	13:56	14,400	12	680	16	47	14,400	0.7	99.0	Value based on PID level. Used RKI. Readings SVE flow post-adjustments.
12/4/20220	13:18							1.6	98.5	Used MultiRAE. Readings SVE flow pre-adjustments.
12/4/2020	13:40							1.7	98.5	Used MultiRAE. Readings SVE flow post-adjustments.
12/10/2020	15:37							5.9	99.9	Used RKI. Probe saturation. Individual PID value not representative. Used average of previous two PID values as substitute.
12/16/2020	8:21	9,170	4.8	280	6.5	31.5	9,170	1.0	99.2	Collected lab gas sample.
12/29/2020	8:22							1.0	98.9	No Oxidizer discharge PID hits (checked multiple times).

Notes:

1. $\mu g/m^3$ = micrograms per cubic meter
2. TPH = Total Petroleum Hydrocarbons
3. ppm = Parts Per Million
4. NT = Not Taken
5. NA = Not Applicable

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Table 5 Summary of Oxidizer Operational Data

LOCATION:		**Oxidizer Discharge**								
Date	Time	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge PID Measurement (ppm)	Destruction Efficiency (%)	Comments/Notes
9/19/2019	12:00							NT	NA	Oxidizer Start
9/20/2019	16:04							NT	NA	
9/23/2019	13:58							NT	NA	
9/24/2019	10:00							NT	NA	
9/25/2019	9:20							NT	NA	
9/26/2019	8:50							NT	NA	
9/28/2019	12:15							NT	NA	
9/30/2019	9:15							NT	NA	
10/1/2019	9:20							9.4	98.1	
10/2/2019	9:28							8.7	98.0	
10/3/2019	8:55							NT	NA	
10/4/2019	11:43							7.9	98.3	
10/7/2019	12:02							5.2	98.9	
10/8/2019	9:02							8.8	98.2	
10/9/2019	10:04							7.0	98.6	
10/10/2019	10:26							4.1	99.2	
10/13/2019	9:28							8.3	98.5	
10/14/2019	9:35							NT	NA	
10/15/2019	12:18							5.4	99.2	
10/23/2019	11:15	4,590	210	150	4	18	4,590	8.8	99.4	Destruction Efficiency Based on Lab Data
10/24/2019	9:40							7.7	98.8	
10/25/2019	9:55							6.3	99.2	
10/28/2019	10:52							7.3	99.1	
10/29/2019	10:20							7.7	99.1	
10/30/2019	12:25							6.7	99.1	
11/1/2019	14:10							6.1	99.2	
11/4/2019	16:00							4.8	99.3	
11/6/2019	10:22							4.9	99.3	
11/8/2019	9:15							5.0	99.2	
11/12/2019	10:25							3.6	99.4	
11/13/2019	9:45							7.0	98.9	
11/15/2019	12:30							3.7	99.4	
11/25/2019	10:52							7.5	98.6	
11/26/2019	10:25							4.4	99.3	
11/27/2019	9:00	1,705	130	64	1.5	0.89	1,705	5.6	99.0	Destruction Efficiency Based on PID. Questionable inlet sample.
12/2/2019	9:53							4.0	99.1	
12/3/2019	14:00							4.5	99.1	
12/6/2019	9:21							4.8	99.0	
12/9/2019	9:14							4.4	99.1	
12/16/2019	10:47							4.0	99.2	
12/18/2019	10:34							8.2	98.1	
12/20/2019	9:46							4.6	99.4	
12/23/2019	12:02	1,125	18	57	1	4	1,125	4.9	99.9	Destruction Efficiency Based on Lab Data

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Table 5 Summary of Oxidizer Operational Data

LOCATION:		**Oxidizer Discharge**								
Date	Time	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge PID Measurement (ppm)	Destruction Efficiency (%)	Comments/Notes
12/26/2019	9:38							6.6	98.2	
1/3/2020	15:00							4.9	99.0	
1/7/2020	10:25							5.1	99.2	
1/9/2020	10:55							4.3	99.0	
1/15/2020	10:45	340	2.6	60	1.4	4.2	340	6.9	99.8	Destruction Efficiency Based on Lab Data
1/17/2020	14:30							6.0	98.2	
1/21/2020	10:00							3.3	99.3	
1/22/2020	15:12							2.6	99.5	
1/23/2020	11:00							5.0	99.1	
1/27/2020	1:51							2.5	99.5	
1/30/2020	9:36							5.9	98.9	
2/4/2020	13:00							6.1	98.9	
2/6/2020	16:05							2.8	99.6	
2/11/2020	11:40	1,090	3	150	4	11	1,090	4.9	98.9	Destruction Efficiency Based on Lab Data
2/14/2020	9:17							5.6	98.8	
2/17/2020	9:40							4.1	99.1	
2/20/2020	13:45							6.3	98.3	
2/26/2020	13:34							NT	NA	
2/28/2020	10:23							NT	NA	
3/11/2020	14:30							5.7	98.4	
3/12/2020	10:15	515	0.96	57	1.3	3.9	515	7.5	99.7	Collected Lab air sample. Inlet concentration lab data suspect. Need to re-sample upon start up. Destruction efficiency based on lab results.
3/19/2020	14:15							3.5	98.8	
3/24/2020	14:30							3.1	99.0	
8/17/2020	9:59							1.3	99.1	SVE system re-start since 3/24/2020
8/17/2020	11:50							0.5	99.6	
8/18/2020	7:26							0.5	99.7	
8/18/2020	8:54							1.5	99.5	
8/20/2020	13:39							0.4	99.9	
8/20/2020	14:28							0.8	99.8	
8/21/2020	6:51							0.6	99.9	
8/26/2020	14:02	6,570	11	660	15	45	6,570	0.4	99.7	Collected lab gas sample and PID measurements at 1402. Destruction Efficiency based on lab data.
8/26/2020	15:18							0.6	99.8	Adjusted Hertz on SVE blower and made individual SVE well adjustments on manifold.
8/28/2020	13:48							0.7	99.8	
8/28/2020	14:39							0.5	99.8	
9/2/2020	11:22							0.6	99.8	
9/2/2020	14:44							0.5	99.8	Post AS system re-start since 3/24/2020.
9/4/2020	11:55							0.0	100.0	
9/10/2020	8:18							0.9	99.7	Before system adjustments
9/10/2020	8:45							0.6	99.8	After system adjustments.
9/15/2020	15:21							0.7	99.8	

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Table 5 Summary of Oxidizer Operational Data

LOCATION:		**Oxidizer Discharge**								
Date	Time	TPH Concentration ($\mu g/m^3$)	Benzene Concentration ($\mu g/m^3$)	Toluene Concentration ($\mu g/m^3$)	Ethylbenzene Concentration ($\mu g/m^3$)	Total Xylenes Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge Concentration ($\mu g/m^3$)	Total Oxidizer VOC Discharge PID Measurement (ppm)	Destruction Efficiency (%)	Comments/Notes
9/23/2020	7:00							NM	NA	Collected measurements without PID/LEL meter
9/29/2020	9:02	9,570	11	660	15	45	9,570	0.7	99.3	Collected lab gas sample
10/6/2020	8:14							1.9	99.5	
10/16/2020	14:59							14.0	99.9	Suspect MultiRAE PID probe saturation (biased high measurement). Used average of before and after PID measurements.
10/23/2020	8:22							1.0	99.6	Used MultiRAE PID. No apparent probe saturation.
10/27/2020	8:43	5,250	4.5	260	6.1	18.1	5,250	1.0	98.7	Collected lab gas sample. Used MultiRAE PID. No apparent probe saturation.
11/2/2020	14:48							0.8	99.3	Used RKI.
11/10/2020	14:39							0.8	99.3	Used RKI. Readings SVE flow pre-adjustments.
11/10/2020	15:01							1.3	99.0	Used RKI. Readings SVE flow post-adjustments.
11/18/2020	13:56	14,400	12	680	16	47	14,400	0.7	99.0	Value based on PID level. Used RKI. Readings SVE flow post-adjustments.
12/4/20220	13:18							1.6	98.5	Used MultiRAE. Readings SVE flow pre-adjustments.
12/4/2020	13:40							1.7	98.5	Used MultiRAE. Readings SVE flow post-adjustments.
12/10/2020	15:37							5.9	99.9	Used RKI. Probe saturation. Individual PID value not representative. Used average of previous two PID values as substitute.
12/16/2020	8:21	9,170	4.8	280	6.5	31.5	9,170	1.0	99.2	Collected lab gas sample.
12/29/2020	8:22							1.0	98.9	No Oxidizer discharge PID hits (checked multiple times).

Notes:

1. $\mu g/m^3$ = micrograms per cubic meter
2. TPH = Total Petroleum Hydrocarbons
3. ppm = Parts Per Million
4. NT = Not Taken
5. NA = Not Applicable

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Table 7 Summary of Free Gauging and Removal Events

Date:	October 1, 2019	January 9, 2020			February 13, 2020			March 12, 2020			May 16, 2020			June 19, 2020		
	Baseline LNAPL Thickness	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered
Well Location	(Feet)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)
MW-35	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	---	NM	NM	---
MW-36	0.18	0.14	0.00	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	---	0.0	1.00	0.01	0.2
MW-36A	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	---	NA	---	---	---	---
MW-38	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-39A	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.35	---	0.1	0.16	<0.01	0.0
MW-42	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-45A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-46B	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-54	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-58A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-59	0.9	2.19	0.00	6	0.23	0.10	5	0.09	<0.01	1.5	1.06	---	0.2	0.93	<0.01	0.2
MW-64	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-84A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-85A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-86B	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-87A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	NA	---	---	---
MW-89	2.39	<0.01[A]	<0.01	0.0	<0.01	<0.01	0.1	<0.01	<0.01	<0.01	---	NA	---	---	---	---
MW-92	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	---	---	---	---
MW-93	1.04	<0.01	<0.01	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	---	0.0	0.18	<0.01	0.0
RW-1	0.55	0.03	0.01	0.1	0.01	<0.01	0.1	0.05	<0.01	3.7	0.56	0.22	0.0	0.59	---	3.5
RW-5A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	---	---	---	---
RW-9	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	---	---	---	---
RW-11A	<0.01	NM	NM	NA	NM	NM	NA	NM	NM	NA	---	---	---	---	---	---
RW-12	<0.01	0.71	0.03	10	0.25	0.03	15	0.78	0.08	14.7	0.78	0.05	4.6	0.59	---	3.5
RW-101	<0.01	0.02	<0.01	0.5	<0.01	NM	NA	0.03	<0.01	1	0.08	---	0.2	0.07	---	0.0
RW-102	<0.01	0.00	NM	NA	Under Container-Not Accessible			0.00	NM	NA	---	NA	---	---	---	---
RW-103	0.42	1.16	<0.01	13.3	Under Container-Not Accessible			0.71	0.01	5	0.45	0.01	1.2	0.29	0.01	0.8
RW-104	<0.01	0.00	NM	NA	NM	NM	NA	0.00	NM	NA	---	NA	---	0.00	---	---
RW-105	<0.01	0.00	NM	NA	NM	NM	NA	0.00	NM	NA	---	NA	---	0.00	---	---
RW-106	0.77	1.00	<0.01	6.5	1.40	<0.01	0.9	1.05	0.06	11.5	1.10	---	2.9	1.01	---	2.6
RW-107	0.09	0.98	<0.01	7.0	0.34	0.09	0.2	1.37	<0.01	10	0.84	---	2.2	1.09	0.27	2.8
RW-108	NM	0.00	NM	NA	0.00	NM	NA	0.00	NM	NA	---	NA	---	---	---	---
RW-109	NM	0.00	NM	NA	0.00	NM	NA	0.00	NM	NA	---	NA	---	---	---	---
RW-110	NM	0.02	<0.01	3.1	0.09	<0.01	0.1	0.04	<0.01	1	0.10	---	0.3	0.34	---	0.9
Estimated LNAPL Removed (gallons)				46.6			21.3			48.4			11.5			14.5

Notes:

1. LNAPL = Light Non-Aqueous Phase Liquid
2. NM = Not Measured
3. NL = No Level (no LNAPL)
4. NA = Not Available, but indications of LNAPL present

A- Approximately 4 gallons of LNAPL and water was removed from this well (MW-89) on November 14, 2019.

--- No data available, not measured, or otherwise not applicable

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Table 7 Summary of Free Gauging and Removal Events

Date:	July 28, 2020			August 21, 2020			September 10, 2020			October 8, 2020			November 11, 2020			December 10, 2020
	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Initial LNAPL Thickness	Post-LNAPL Thickness	Estimated LNAPL Recovered	Gaged LNAPL Thickness
Well Location	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)	(Feet)	(Gallons)	(Feet)
MW-35	NM	NM	---	NM	NM	---	NM	NM	---	0.52	NL	MINOR	0.19	DRY	0.8	0.02
MW-36	0.95	<0.01	0.8	0.16	---	0.0	NL	NM	---	NL	NL	TRACE	NL	NL	0.0	NL
MW-36A	---	---	---	<0.01	---	---	NL	NM	---	NL	NL	TRACE	NL	NL	TRACE	NL
MW-38	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-39A	0.10	0.01	---	0.04	<0.01	0.0	NA	NA	TRACE	NL	NL	0.0	NL	NL	0.0	NL
MW-42	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-45A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-46B	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-54	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-58A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-59	0.76	0.01	9	1.12	<0.01	3.3	NL	NM	---	<0.01	NL	TRACE	NL	NL	0.0	NL
MW-64	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-84A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-85A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-86B	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-87A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-89	---	---	---	---	---	---	NL	NM	---	NL	NL	---	NL	NL	---	NL
MW-92	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
MW-93	0.18	---	0.4	0.05	<0.01	0.0	NA	NA	TRACE	NL	NL	0.0	NL	NL	0.0	NL
RW-1	0.47	0.02	4.4	0.32	0.01	6.7	0.20	<0.01	8.2	0.11	0.01	8.4	0.28	0.09	NM	0.04
RW-5A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
RW-9	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
RW-11A	---	---	---	---	---	---	NM	NM	---	NM	NM	---	NM	NM	---	---
RW-12	0.60	---	8.6	0.35	0.02	8.6	0.24	0.02	1.6	0.45	0.02	8.4	0.43	NM	5.0	0.16
RW-101	0.09	---	0.2	---	---	---	NL	NM	---	0.05	NL	TRACE	[<0.01]	NL	NM	NL
RW-102	---	---	---	---	---	---	NL	NM	---	<0.01	NM	---	NL	NL	---	NL
RW-103	0.31	---	---	0.23	0.01	3.2	1.74	NL	1.6	0.86	NL	5.9	1.01	NL	NM	0.40
RW-104	---	---	---	---	---	---	NL	NM	---	NL	NM	---	NL	NL	---	NL
RW-105	---	---	---	---	---	---	NL	NM	---	NL	NM	---	NL	NL	NM	NL
RW-106	0.77	<0.01	2.9	0.73	---	6.8	1.55	NL	2.5	0.73	NL	5.0	0.80	NL	NM	0.84
RW-107	1.19	<0.01	7	1.41	---	2.6	2.17	NL	2.5	2.49	NM	7.5	1.83	NL	NM	1.05
RW-108	---	---	---	---	---	---	NL	NM	---	NL	NM	---	NL	NL	---	NL
RW-109	---	---	---	---	---	---	NL	NM	---	NL	NM	---	NL	NL	---	NL
RW-110	0.46	<0.01	2	0.30	---	0.4	NL	NM	---	0.01	<0.01	VERY TRACE	0.02	NL	NM	NL
Estimated LNA			35.3			31.6			16.4			35.2			98.0	

Notes:

1. LNAPL = Ligh
2. NM = Not M
3. NL = No Leve
4. NA = Not Ava

A- Approximate

--- No data ava

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Table 8 Groundwater Performance and Interior Monitoring Well Data Results

Well Type	Well ID	Sample Date	Units	Diesel Range Organics SGC	Lube Oil SGC	Total TPH (Diesel + Lube Oil) [1]	Gasoline Range Organics	Benzene	Toluene	Ethyl-benzene	Total Xylenes
Well	GW Cleanup Levels (ug/L)			--	--	500	1000/800	23	15,000	2,100	1,000
Type	Remediation Level			--	--	2,085	2085	47	30,000	4,200	2,000
Performance Wells	MW-42	10/17/19	ug/L	**330 x**	250 U	**330 x**	**2100**	**37**	**17**	**5.1**	**16**
		9/18/20	ug/L	**110 x**	250 U	**110 x**	**620**	**5.2**	**3.5**	1 U	**7.4**
	RW-11A	10/17/19	ug/L	**1100**	250 U	**1100**	**260**	1 U	1 U	1 U	**3**
		4/11/20	ug/L	**140**	250 U	**140**	100 U	1 U	1 U	1 U	3 U
		9/18/20	ug/L	**98**	250 U	**98**	100 U	1 U	1 U	1 U	3 U
	RW-9	10/17/19	ug/L	**1200**	250 U	**1200**	**720**	1 U	1 U	**1.6**	**3.9**
		9/18/20	ug/L	**450**	250 U	**450**	**430**	1 U	**1.4**	1 U	3 U
	MW-89	10/18/19	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		4/11/20	ug/L	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
		9/29/20	ug/L	**550**	250 U	**550**	**140 x**	1 U	1 U	1 U	3 U
	MW-36A	10/17/19	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		9/19/20	ug/L	**560**	250 U	**560**	**120**	1 U	1 U	1 U	3 U
	MW-39A	10/17/19	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		9/19/20	ug/L	**1500**	**770**	**2270**	**160**	1 U	1 U	1 U	3 U
	MW-59	10/17/19	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		4/11/20	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		9/29/20	ug/L	**830**	250 U	**830**	100 U	1 U	1 U	1 U	3 U
Interior Wells	RW-5A	10/17/19	ug/L	**290 x**	250 U	**290 x**	**190**	1 U	1 U	1 U	3 U
		9/18/20	ug/L	**120 x**	250 U	**120 x**	**230**	1 U	1 U	1 U	3 U
	RW-1	10/17/19	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		9/19/20	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
	MW-93	10/17/19	ug/L	NS*	NS*	NS*	NS*	NS*	NS*	NS*	NS*
		9/19/20	ug/L	**5400**	**3200**	**8600**	**280**	1 U	1 U	1 U	3 U

Notes :

1. Total TPH Dx + lube oil is the sum of the Silica Gel Cleanup results.

U - not detected above the laboratory reporting limit

NR - Not Reported

NS* - Not Sampled due to measurable product in the monitoring well at time of sampling

BLUE shade denotes a value above the Site Cleanup Level

RED shade denotes a value above the site Remediation Level

MW-38 is broken and was not sampled. No product was measured.

ug/L = micrograms per liter

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

Port of Seattle
Terminal 30
Table 9 Groundwater CPOC and Shoreline Water Qaulity Monitoring Well Data Results - TPH and BTEX

Well Type	Well ID	Sample Date	Units	Diesel Range Organics SGC	Lube Oil SGC	Total TPH (Diesel + Lube Oil) [1]	Gasoline Range Organics	Benzene	Toluene	Ethyl-benzene	Total Xylenes
	GW Cleanup Levels (ug/L)			--	--	500	1000/800	23	15,000	2,100	1,000
	Remediation Level			--	--	2085	2085	47	30,000	4,200	2,000
CPOC Wells	MW-45A	10/21/19	ug/L	**71 x**	250 U	**71 x**	100 U	1 U	1 U	1 U	3 U
		9/18/20	ug/L	**54 x**	250 U	**54 x**	100 U	1 U	1 U	1 U	3 U
	MW-46B	10/16/19	ug/L	**150 x**	250 U	**150 x**	100 U	1 U	1 U	1 U	3 U
		9/18/20	ug/L	**81 x**	250 U	**81 x**	**110**	1 U	1 U	1 U	3 U
	MW-58A	10/17/19	ug/L	**280 x**	250 U	**280 x**	**360**	1 U	1 U	1 U	3 U
		9/24/20	ug/L	**420**	250 U	**420**	**390**	1 U	1 U	1 U	**4.7**
	MW-86B	10/17/19	ug/L	**1600**	250 U	**1600**	**360**	1 U	1 U	1 U	3 U
		9/24/20	ug/L	**95**	250 U	**95**	**130**	1 U	1 U	1 U	3 U
		9/24/2020 DUP	ug/L	**94**	250 U	**94**	100 U	1 U	1 U	1 U	3 U
	MW-92	10/16/19	ug/L	**120 x**	250 U	**120 x**	**250**	1 U	1 U	**1.2**	3 U
		9/18/20	ug/L	**75 x**	250 U	**75 x**	**200**	1 U	1 U	1 U	3 U
Shoreline Water Quality Wells	MW-84A	10/17/19	ug/L	**410 x**	250 U	**410 x**	100 U	1 U	1 U	1 U	3 U
	MW-85A	10/18/19	ug/L	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
		10/18/2019 DUP	ug/L	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U
	MW-87A	10/18/19	ug/L	50 U	250 U	250 U	100 U	1 U	1 U	1 U	3 U

Notes :

1. Total TPH Dx + lube oil is the sum of the Silica Gel Cleanup results.

U - not detected above the laboratory reporting limit

BLUE shade denotes a value above the Site Cleanup Level

ug/L = micrograms per liter

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

Port of Seattle
Terminal 30
Table 10 Groundwater CPOC and Shoreline Water Qaulity Monitoring Well Data Results - PAH

Well Type	Well ID	Sample Date	Units	Naphth-alene	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Anthra-cene	Fluoran-thene	Pyrene	Benzo (ghi) perylene	Benzo[a] anthracene	Chrysene	Benzo[a]pyrene	Benzo[b] fluoran-thene	Benzo[k] fluoran-thene	Indeno[1, 2,3-cd]pyrene	Dibenzo [a,h] anthracene	Total cPAH TEQ [2]
	GW Cleanup Levels (ug/L)			4,940	NV	643	3,460	NV	25,900	90	2,590	NV	See cPAH TEQ							0.018
CPOC Wells		10/21/19	ug/L	0.1 U	**0.039**	**4.0**	**0.35**	**0.77**	0.01 U	**0.032**	**0.017**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-45A	9/18/20	ug/L	**0.11**	**0.036**	**4.3**	**0.17**	**0.21**	**0.022**	**0.014**	**0.012**	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
		10/16/19	ug/L	0.1 U	0.01 U	**3.1**	**0.036**	**0.080**	0.01 U	**0.049**	**0.035**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-46B	9/18/20	ug/L	0.1 U	**0.012**	**2.3**	0.01 U	**0.052 fb**	**0.013**	**0.017**	**0.017**	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
		10/17/19	ug/L	**0.96**	**0.10**	**5.8**	**1.3**	**4.2**	**0.34**	**1.0**	**0.51**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-58A	9/24/20	ug/L	**0.65**	**0.22**	**6.0**	**2.1**	**0.054**	**0.33**	**0.52**	**0.26**	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
		10/17/19	ug/L	0.1 U	**0.053**	**3.2**	**0.079**	**0.17**	**0.15**	**0.51**	**0.26**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-86B	9/24/20	ug/L	0.1 U	**0.057**	**1.9**	0.01 U	**0.016**	**0.041**	**0.49**	**0.31**	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
		10/16/19	ug/L	0.1 U	**0.012**	**0.071**	**0.027**	**0.029**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-92	9/18/20	ug/L	0.1 U	0.01 U	**0.087**	0.01 U	**0.020 fb**	**0.013**	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
Shoreline Water Quality Wells	**MW-84A**	10/17/19	ug/L	0.1 U	**0.56**	**64**	**0.74**	**1.3**	**0.050**	**0.031**	**0.033**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-85A	10/18/19	ug/L	0.1 U	**0.38**	**49**	**0.51**	**0.90**	**0.034**	**0.018**	**0.018**	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008
	MW-87A	10/18/19	ug/L	0.1 U	0.01 U	**0.14**	0.015	0.019	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.008

Notes
PAH = polyaromatic hydrocarbon, cPAH = carcinogenic polyaromatic hydrocarbon
2. cPAH values are based on the TEF. For ND values, 1/2 of the reporting limit is used.
U - not detected above the laboratory reporting limit
NV - No Value
PAH compounds do not have remediation levels
ug/L = micrograms per liter

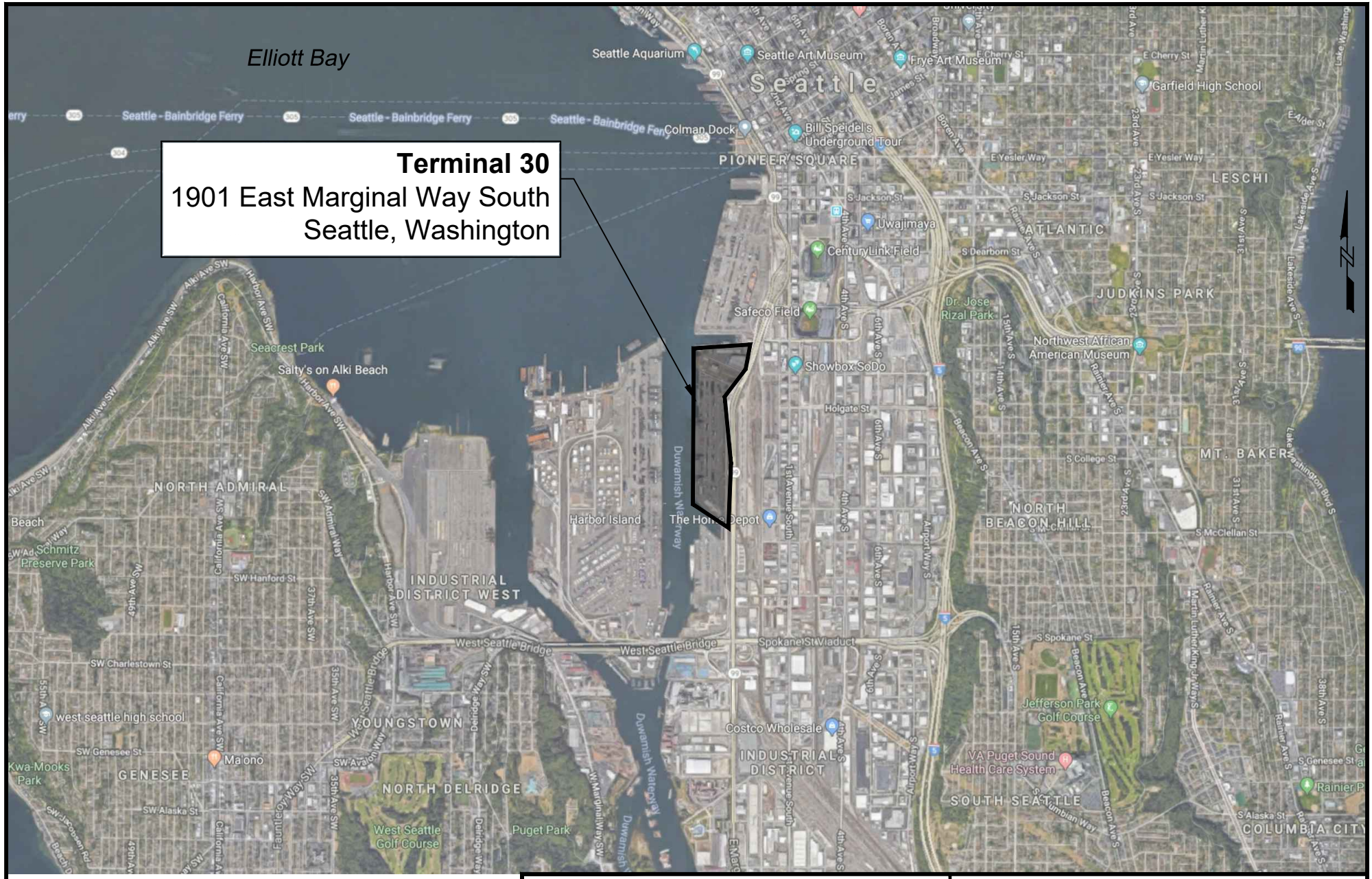
Port of Seattle
Terminal 30
Table 11 Groundwater Duplicate Results

Sample ID	MW-86B	MW-86B (DUP-092420)		RW-11A	RW-11A (MW-105)		MW-85A (MW-99A)	
Sample Date	9/24/20	9/24/20	RPD	4/11/20	4/11/20	RPD	10/18/19	RPD
Units	ug/L	ug/L	%	ug/L	ug/L	%	ug/L	%
Diesel Range Organics	**650**	**890**	**31.2**	**3700**	**4400**	**17.3**	**130 x**	**0**
Lube Oil	250 U	250 U	0	**440**	**480**	0	250 U	0
Diesel Range Organics SGC	**95**	**94**	**1.1**	**140**	**160**	**13.3**	50 U	0
Lube Oil SGC	250 U	250 U	0	250 U	250 U	0	250 U	0
TPH, diesel range organics + heavy oils [1]	**95**	**94**	**1.1**	**140**	**160**	**13.3**	250 U	0
Gasoline Range Organics	**130**	100 U	**26.1**	100 U	100 U	**0.0**	100 U	0
Benzene	1 U	1 U	0	1 U	1 U	0	1 U	0
Toluene	1 U	1 U	0	1 U	1 U	0	1 U	0
Ethylbenzene	1 U	1 U	0	1 U	1 U	0	1 U	0
Total Xylenes	3 U	3 U	0	3 U	3 U	0	3 U	0
Naphthalene	0.1 U	0.1 U	0	NA	NA	NA	NA	NA
Acenaphthylene	**0.057**	**0.05**	**13.1**	NA	NA	NA	NA	NA
Acenaphthene	**1.9**	**2.2**	**14.6**	NA	NA	NA	NA	NA
Fluorene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Phenanthrene	**0.016**	**0.012**	**28.6**	NA	NA	NA	NA	NA
Anthracene	**0.041**	**0.048**	**15.7**	NA	NA	NA	NA	NA
Fluoranthene	**0.49**	**0.53**	**7.8**	NA	NA	NA	NA	NA
Pyrene	**0.31**	**0.38**	**20.3**	NA	NA	NA	NA	NA
Benzo(ghi)perylene	0.02 U	0.02 U	0	NA	NA	NA	NA	NA
1-Methylnaphthalene	0.1 U	0.1 U	0	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.1 U	0.1 U	0	NA	NA	NA	NA	NA
Benzo[a]anthracene	0.01 U	**0.011**	**9.5**	NA	NA	NA	NA	NA
Chrysene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Benzo[a]pyrene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Dibenzo[a,h]anthracene	0.01 U	0.01 U	0	NA	NA	NA	NA	NA
Benzo[a]anthracene (TEF=0.1)	0.0005	0.0005	0	NA	NA	NA	NA	NA
Chrysene (TEF=0.01)	0.00005	0.00005	0	NA	NA	NA	NA	NA
Benzo[a]pyrene (TEF=1)	0.005	0.005	0	NA	NA	NA	NA	NA
Benzo[b]fluoranthene (TEF=0.1)	0.0005	0.0005	0	NA	NA	NA	NA	NA
Benzo[k]fluoranthene (TEF=0.1)	0.0005	0.0005	0	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene (TEF=0.1)	0.0005	0.0005	0	NA	NA	NA	NA	NA
Dibenzo[a,h]anthracene (TEF=0.1)	0.0005	0.0005	0	NA	NA	NA	NA	NA
Total cPAH TEQ [2]	0.008	0.008	0	NA	NA	NA	NA	NA

Notes :
NA - Not analyzed
RPD - relative percent difference
ug/L = micrograms per liter

Figures

File: E:\Project\clients\Crete\T30\T30_001.dwg Layout: FIG 1.1 User: sangw Plotted: Nov 18, 2017 - 7:08am Xref's:



CRETE CONSULTING, INC.

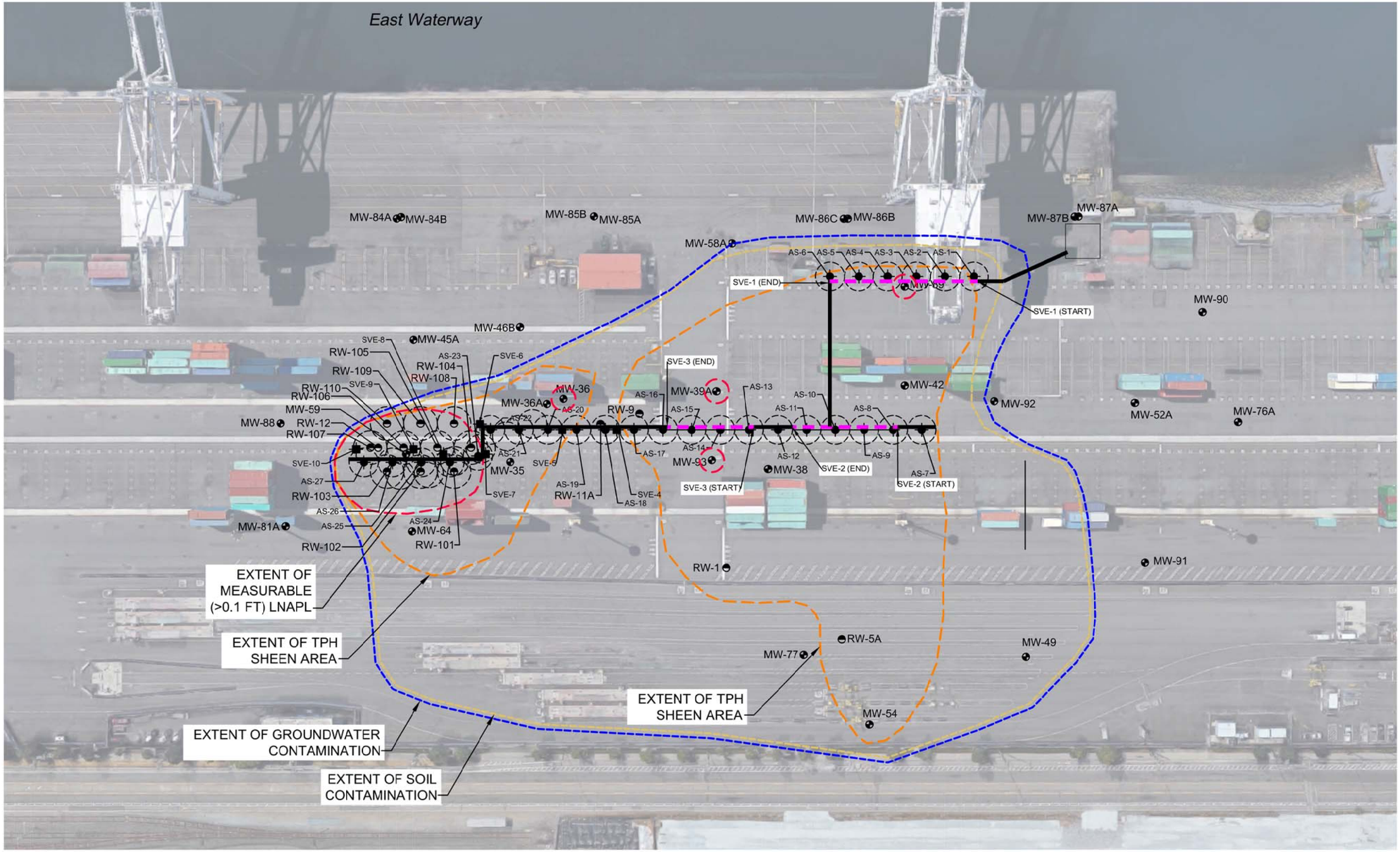
1500 0 3000

Approx Scale in Feet

Engineering Design Report
Terminal 30 Cleanup Action

Site Location

DATE: 11/18/2017 | DRWN: bts | **Figure 1**



CRETE CONSULTING, INC.

50 0 100

Approx Scale in Feet

LEGEND

- AS WELL
- SVE WELL (VERTICAL)
- MONITORING WELL
- PRODUCT RECOVERY WELL

Compliance Monitoring Plan
Terminal 30 Cleanup Action

Extent of Impacts and Location of Cleanup Action

DATE: 12/2/2017 | DRWN: BTS | | **Figure 2**

East Waterway

MW-84A
MW-84B
MW-85B
MW-85A
MW-86C
MW-86B
MW-87A
MW-58A
MW-89
MW-90
MW-46B
MW-45A
RW-105
RW-109
RW-104
RW-108
RW-110
RW-106
MW-59
MW-88
RW-12
RW-107
MW-36
MW-36A
MW-39A
RW-9
MW-42
MW-92
MW-52A
MW-76A
MW-35
MW-93
SVE-2
(END)
MW-38
RW-103
RW-11A
MW-81A
MW-64
RW-101
RW-102
RW-1
MW-91
RW-5A
MW-77
MW-49
MW-54

50 0 100
Approx Scale in Feet

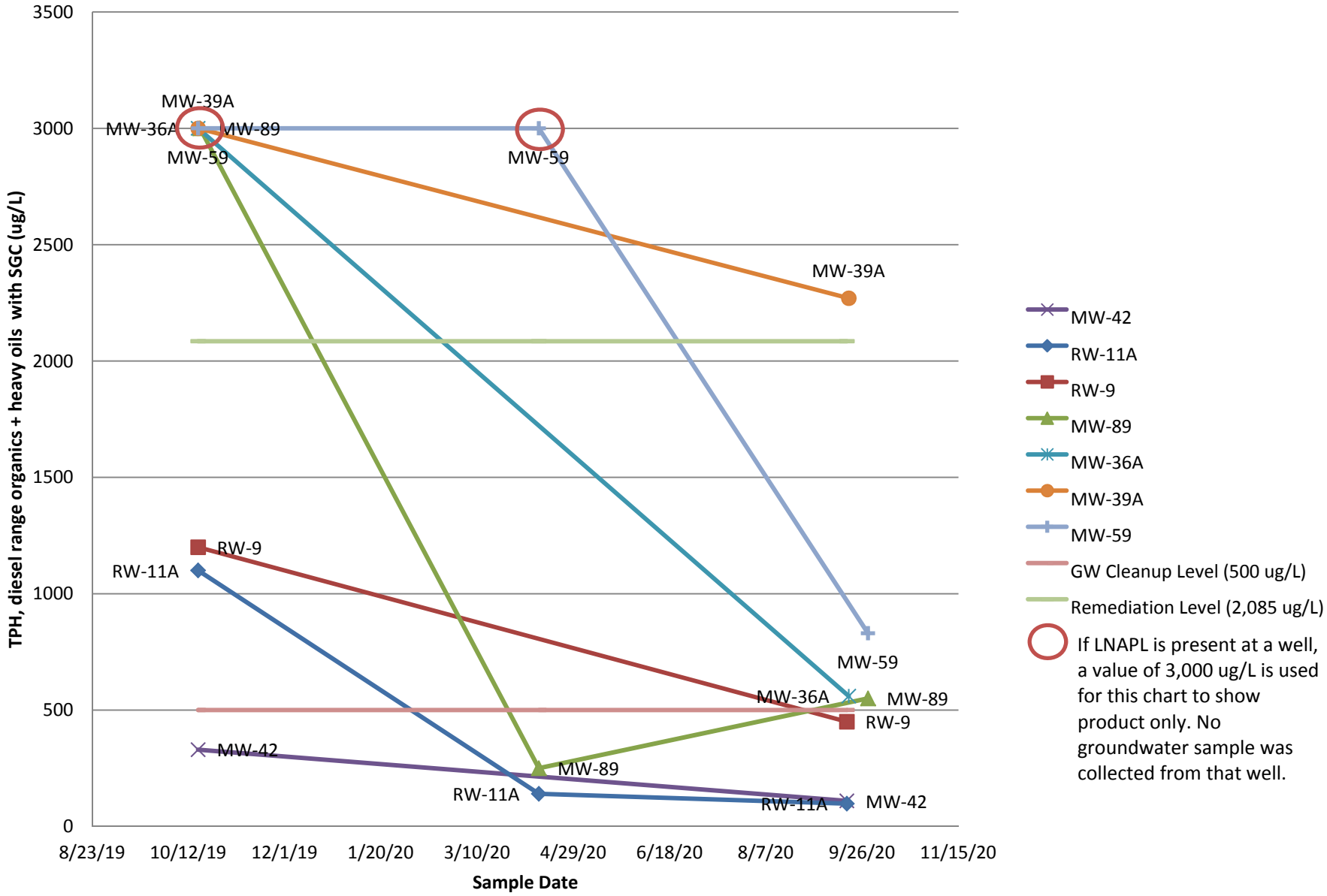
LEGEND

- MONITORING WELL
- PRODUCT RECOVERY WELL
- PERFORMANCE MONITORING WELL
- INTERIOR MONITORING WELL (RW-1, RW-5A, MW-93 are gauging only)
- CPOC MONITORING WELL
- SHORELINE MONITORING WELL
- FREE PRODUCT GAUGING WELL

CRETE CONSULTING, INC.

Compliance Monitoring Plan Terminal 30 Cleanup Action			**Compliance Monitoring Network**
DATE: 12/2/2017	DRWN: BTS		Figure 3

Figure 4: Total TPH-Dx in Performance Monitoring Wells



Appendix A

Vapor Laboratory Analytical Reports

Appendix B

Remediation System Field Data Forms

Appendix C

Free Product Removal Event Reports

Appendix D

Groundwater Sampling Field Forms

Appendix E

Groundwater Laboratory Analytical Reports

Appendix F

Select Figures from the Groundwater Compliance Monitoring Plan