2013 ANNUAL SITE REPORT
BP WEST COAST PRODUCTS TERMINAL, HARBOR ISLAND
1652 SW LANDER STREET
SEATTLE, WASHINGTON

CONSENT DECREE NO. 00-2-05714-8SEA

April 2014

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Northwest Regional Office
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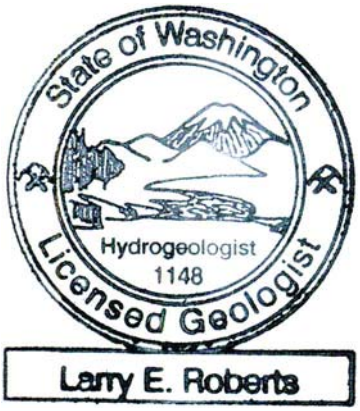

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List of Abbreviations and Acronyms

ARCO	-	Atlantic Richfield Company
BP	-	British Petroleum Company
BTEX	-	Benzene, Toluene, Ethylbenzene, Xylenes
cPAHs	-	Carcinogenic Polycyclic Aromatic Hydrocarbons
CAP	-	Cleanup Action Plan
CATOX	-	Catalytic Oxidation
CCR	-	Construction Completion Report
DAS	-	Diffused Air Stripper
Ecology	-	The Washington State Department of Ecology
EDR	-	Engineering Design Report
EPA	-	United States Environmental Protection Agency
FFS	-	Focused Feasibility Study
GPM	-	Gallons per Minute
IHSs	-	Indicator Hazardous Substances
OHW	-	Ordinary High Water level
KCDNR	-	King County Department of Natural Resources
LNAPL	-	Light Non-Aqueous Phase Liquid
MHHW	-	Mean Higher High Water
MTCA	-	Model Toxics Control Act
NMFS	-	National Marine Fisheries Service
PRP	-	Potentially Responsible Party
Product	-	Free Phase Hydrocarbons
O&M	-	Operation and Maintenance
OU	-	Operable Unit
OWS	-	Oil Water Separator
PPMV	-	Parts Per Million by Volume
PSCAA	-	Puget Sound Clean Air Agency
RI	-	Remedial Investigation
RI/FS	-	Remedial Investigation and Feasibility Study
SAP	-	Sampling and Analysis Plan
S&GOU	-	Harbor Island Soil and Groundwater Operable Unit
SVE	-	Soil Vapor Extraction
TPH	-	Total Petroleum Hydrocarbons
USACE	-	United States Army Corps of Engineers
USFWS	-	United Stated Fish and Wildlife Service
WAC	-	Washington Administrative Code
WDFS	-	Washington Department of Fish and Wildlife
WDNR	-	Washington Department of Natural Resources

Executive Summary

On-going remedial cleanup actions are being conducted at the BP West Coast Products (BP) Terminal 21T (formerly ARCO) (the Site) located on Harbor Island in Seattle, Washington. These actions have been conducted from 2002 to date per a Site Consent Decree and built upon interim actions conducted from 1992 through 2002. This report summarizes actions conducted for 2013. The Consent Decree, cooperatively entered into in 2000, required implementation of remedial activities to address petroleum hydrocarbon impacted soil and groundwater. Remedies included installing and operating active remediation systems in inaccessible areas (e.g. beneath structures) located adjacent to the Duwamish Waterway, excavation of accessible soil "hot spots" at areas inland from the waterfront, and natural attenuation of inaccessible soil hot spots. A Groundwater Monitoring and Contingency Program was established to determine the effectiveness of remedial actions. The Consent Decree established restoration timetables for removal of petroleum product beneath the warehouse, and for groundwater restoration as measured at property boundaries. These timetables have been extended and remedial actions are ongoing to meet Site cleanup objectives.

Ongoing monitoring results show that Site remedial actions are achieving Consent Decree cleanup goals. Ecology and BP have determined that groundwater/LNAPL recovery, soil vapor extraction (SVE), and air sparging remediation systems operating along the Plant 1 waterfront have effectively protected the Duwamish Waterway. The systems have removed most recoverable LNAPL and dissolved hydrocarbons along the waterfront. Waterfront SVE and air sparging operations have been discontinued with Ecology's approval, as continued system operation no longer benefits ongoing remedial actions. Groundwater samples collected from compliance wells located along the waterfront have been consistently below cleanup levels for established indicator hazardous substances (IHSs), with the exception of benzene detected in two wells located at the southern end of the warehouse. In 2013, seven of eight samples analyzed for benzene from these two wells were below the cleanup level, continuing a declining concentration trend in these wells. The groundwater recovery system continues to provide hydraulic control and recovers dissolved IHSs, including benzene, in this area.

Inland soil remedial actions (excavation, natural attenuation, and SVE) have been effective in protecting groundwater at property boundaries. Ecology determined that remedial actions at Plant 2, located in the north-central portion of the Island, appear complete. At Plant 1, ongoing monitoring shows an old source of highly weathered gasoline-range hydrocarbons was located inland from the waterfront near the Site's southern boundary. The old source is in the "smear" zone of the seasonally fluctuating water table. A second SVE system was installed in this area in 2008 to accelerate soil and groundwater cleanup. Data collected from this system indicate it is operating as designed, and has improved groundwater quality in the area.

Plans to install a new seawall along the Plant 1 waterfront were initiated in 2010 to enhance seismic stability. The seawall design was finalized in 2012 and was discussed with Ecology. Installation of the seawall was delayed in 2013, primarily due to permitting issues. Pending permit approval, the 740-foot long seawall will be installed in two separate phases beginning with the installation of the northern 325 linear feet, with the southern 415 feet will be installed

the following year. Installation is not anticipated to begin until 2015, at the earliest. The new seawall will affect Site hydrology, which will be further evaluated following installation.

1. Introduction

TechSolve Environmental Inc. (TechSolve) has prepared this report on behalf of British Petroleum (BP) to summarize remedial investigation and cleanup activities conducted during 2013 at BP West Coast Products (formerly Atlantic Richfield Company [ARCO]) Terminal (the Site) located on Harbor Island in Seattle, Washington. This report has been prepared to satisfy Annual Reporting Requirements of Model Toxics Control Act (MTCA) Consent Decree No. 00-2-05714-8SEA, cooperatively entered into between ARCO and the Washington State Department of Ecology (Ecology). The Consent Decree was entered into court on March 24, 2000 (Ecology, 2000b) by the Washington State Attorney General.

This report is organized into seven sections and includes two appendices. Many of the required background and general discussion components summarized in this Annual Site Report have been further explained in previous documents submitted to Ecology and are referenced in the appropriate sections. The report is organized as follows:

- Section 1 – Provides a summary of the project, descriptions of the reporting requirements for the Site, and summarizes the organization of this report.
- Section 2 – Provides descriptions of the Site history and regulatory status, historical investigations, selection of remedial actions, and cleanup action levels for the Site.
- Section 3 – Summarizes remedial actions that have occurred at the Site.
- Section 4 – Summarizes groundwater monitoring activities conducted at the Site and provides results and findings of these activities.
- Section 5 – Provides a summary of additional activities conducted at the Site in 2013, including continued planning for the installation of a new seawall at Plant 1.
- Section 6 – Summarizes the information presented in this report.
- Section 7 – Documents the references cited in this report.
- Appendix A: KCDNR Discharge Reports – Provides the two 2013 semi-annual discharge reports provided to the King County Department of Natural Resources (KCDNR).
- Appendix B: Sheen Observations – Documents the occurrence of sheen within booms located on the Duwamish Waterway from 2002 through 2012.

2. Site Description and History

The Site is located on Harbor Island and consists of two separate bulk fuel storage plants (Figure 1). Harbor Island is a 455-acre man-made island that lies between the East and West Waterways of the Duwamish River. Plant 1 occupies about 12 acres on the western portion of the island, along the West Waterway of the Duwamish River. Plant 2 occupies about 3.5 acres in the north-central part of the island. Both plants were constructed in the 1930s and have operated as bulk fuel storage and transfer facilities under several owners since that time. ARCO assumed operation of Plant 1 in the 1940s and Plant 2 in the 1950s.

Harbor Island was created primarily from marine sediments dredged from the Duwamish River. Currently, about 95 percent of the island is covered with industrial buildings, paved roads, or other impervious surfaces. The pervious surfaces of the island consist primarily of land adjacent to aboveground storage tanks and railroad tracks.

In the northern portion of the island, where the Site is located, groundwater flows in a radial pattern outward from the island center and enters the marine surface water at the island's edge. This flow pattern was reconfirmed in 2013, as discussed in Section 4.1.6. Groundwater is an artifact of island construction and local recharge is from rainfall and, possibly, leaking underground utilities (e.g., storm sewers and public water supply piping). Recharge of island-wide groundwater from rainfall has decreased significantly over the past several decades due to substantial increases in impermeable surface areas from island redevelopment activities. Ecology and the United States Environmental Protection Agency (EPA) have determined that groundwater beneath Harbor Island is non-potable, and this determination is unlikely to change due to extensive industrial land use on the island.

2.1. Site Regulatory Status

Harbor Island was placed on the National Priorities List in 1983 as a Superfund Site due to elevated levels of hazardous substances in soil, primarily lead. The Harbor Island Superfund Site consists of several operable units (OUs). The BP Terminal, along with the adjacent Shell (formerly Equiva Services, LLC, Equilon, and Texaco) and Kinder Morgan (formerly GATX and Shell) terminals, form the Tank Farm OU. Ecology is the lead regulatory agency for the Tank Farm OU. A large portion of the island is included in the Soil and Groundwater OU (S&GOU), which is under EPA jurisdiction. ARCO is involved with these two OUs as discussed below.

ARCO and Ecology cooperatively entered into Agreed Order No. DE 92 TC-N158 in 1992 (Ecology, 1992) to conduct Site characterization activities and develop remedial actions. Remedial Investigation/Feasibility Studies (RI/FS) completed in 1997 (Geraghty & Miller, 1994, 1996, and 1997) showed that hazardous substances present in groundwater and soil at the Site were primarily highly weathered total petroleum hydrocarbons (TPH) as diesel (TPH-D) with lesser amounts of weathered gasoline (TPH-G) and heavier oil (TPH-O). The weathered TPH likely resulted from historic spills at the Site. The RI/FS showed the primary area of impact at the Site was a petroleum-based light non-aqueous phase liquid (LNAPL) plume located beneath the warehouse adjacent to the Duwamish River at Plant 1. Secondary areas of concern included

petroleum impacted soils located within the Plant 1 and Plant 2 tank farms (Figure 2 and 3). Site-specific cleanup alternatives for groundwater and soil were next developed and evaluated to protect human health and the environment at the Site.

ARCO entered into a Consent Decree with Ecology in 2000 for implementing remedial actions at the Site. Separate cleanup actions for the Plant 1 Waterfront area and for Plant 1 and 2 soils were specified in a Cleanup Action Plan (CAP) (Ecology, 1999) and in an Engineering Design Report (EDR) (TechSolv and AG&M, 2000a). Cleanup actions were selected from site-specific cleanup action alternatives developed as part of a Focused Feasibility Study (FFS) (Geraghty & Miller, 1997). Elements of the selected cleanup actions include:

- Pumping and treatment for an LNAPL plume and dissolved hydrocarbon recovery.
- Excavation of accessible TPH impacted soil "hot spots" in the inland portions of Plant 1 and Plant 2.
- Air Sparging and Soil Vapor Extraction (SVE) for accelerated mass removal of residual hydrocarbons in inaccessible soils.
- Groundwater compliance monitoring.
- Natural attenuation.
- Deed restrictions.
- Institutional controls.

A period of 18 months was established for removal of LNAPL beneath the warehouse, and 5 years for groundwater restoration as measured at property boundaries. Additional contingency actions have been implemented at the Site, including continued operation of the waterfront recovery system beyond 5 years and installation of a second SVE system to address inaccessible hot spot soils inland from the waterfront at Plant 1, as further discussed in Section 3.3.

ARCO also entered into a Consent Decree with EPA in 1994 (EPA, 1994) to have minor participation in the long term monitoring activities and for funding EPA oversight for the S&GOU. ARCO, Lockheed, and Equilon equally share 75% of one share of the 8.75 total shares for the Potentially Responsible Party (PRP) group, bringing ARCO's overall commitment to the S&GOU to approximately 2.9%. As a PRP to the S&GOU, ARCO assisted with preparation and implementation of the Groundwater Monitoring Plan.

2.2. Cleanup Criteria

Indicator hazardous substances (IHSs) for the Site were identified and defined in the CAP. The following section provides a summary of IHSs and Site cleanup levels.

The subsurface soil cleanup action level for TPH at the primary area of concern (Plant 1) was set to meet remedial objectives of protecting surface water at property boundaries and

shorelines. The Total TPH (TPH-G+TPH-D+TPH-O) cleanup level is also protective for other chemical constituents in petroleum product (i.e., benzene, toluene, ethylbenzene, xylenes [BTEX]) and is:

Total TPH	10,000 milligrams/kilogram (mg/kg)

The subsurface soil cleanup action level for TPH at the secondary area of concern (Plant 2) was set to meet remedial objectives of protecting surface water at property boundaries by improving general groundwater conditions at the source. This cleanup level was also set to enhance the timely restoration of impacted areas through natural attenuation, and is:

Total TPH	20,000 mg/kg

Site groundwater cleanup levels established by Ecology were based on surface water standards, to be protective of aquatic organisms in the Duwamish River. These standards are adopted ambient water quality criteria (WAC 173-201A and Section 304 of the Federal Clean Water Act). Surface water standards were not established for TPH when the CAP was approved; therefore, groundwater cleanup levels for TPH-G, TPH-D, and TPH-O were selected by Ecology as protective cleanup goals. Site groundwater cleanup levels are:

Product (LNAPL)	No sheen
Benzene	71 micrograms/liter (µg/L)
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)	0.031 µg/L
Copper	2.9 µg/L
TPH-G	1,000 µg/L
TPH-D	10,000 µg/L
TPH-O	10,000 µg/L

3. Summary of Selected Remedial Actions and Implementation

The following sections summarize remedial actions selected for the Site based on the RI/FS and subsequent investigations, and the status of their implementation. The active portions of the accessible soil remedies have been completed and have been detailed in other referenced documents. The inaccessible soil and groundwater remedies are ongoing and, therefore, are discussed at greater length than the accessible soil remedies.

3.1. Waterfront Remedial Actions

Groundwater remedial actions have been conducted along the waterfront at Plant 1 (Figure 2) since 1992. An interim groundwater/LNAPL recovery system operated from 1992 through 2002, and an interim SVE system operated from 1996 through 2002. Final remediation systems were installed in 2002, described in the EDR (TechSolv, 2002), and are summarized below.

Final remediation system designs were based upon interim system success, and consisted of a combination of SVE, groundwater/LNAPL recovery, and air sparging. The groundwater/LNAPL recovery system was designed to capture LNAPL and dissolved hydrocarbons in groundwater and provide hydraulic control along the waterfront. The air sparging system was designed to mobilize LNAPL to aide in capture, to enhance in-situ biodegradation of residual hydrocarbons, and to strip volatile hydrocarbons from groundwater. The SVE system was designed to capture volatile hydrocarbons vapors and enhance in-situ biodegradation of residual hydrocarbons in the vadose zone. The main components of these systems are located along the waterfront, in the warehouse and by the truck loading rack area of Plant 1 (Figure 4). These systems are further discussed in the following sections.

The February 28, 2001 Nisqually earthquake damaged the warehouse at the Site and delayed installation of final remediation systems until repairs were made (TechSolv, 2002). System construction activities were completed in 2003 and were detailed in the Construction Completion Report (CCR) (TechSolv, 2003c). The CCR was prepared following system testing and startup and documented that Consent Decree and EDR requirements were followed during system construction. The CCR was approved by Ecology in 2004 (Ecology, 2004a).

Operation and maintenance (O&M) requirements for the final remediation system were presented in the Final O&M Manual (TechSolv, 2003d), which was approved by Ecology in 2004 (Ecology, 2004a) The O&M Manual presents descriptions of systems, startup and shutdown procedures, alarm condition causes and remedies, normal operating conditions, system safety features, waste handling procedures, and vendor-supplied manuals for system components. The O&M manual is utilized as a working field document and a copy is maintained on-site. The manual is updated as system operations/procedures change or as equipment is replaced.

3.1.1. Waterfront Groundwater/LNAPL Recovery System

The waterfront groundwater/LNAPL recovery system captures LNAPL and groundwater containing dissolved hydrocarbons. The system utilizes total-fluid pumps in recovery wells to

pump LNAPL and groundwater to the remediation system treatment area. The system consists of 10 recovery wells (GM-11S, RW-1, RW-2, RW-4, RW-5, RW-6, RW-7, RW-8, RW-9, RW-10) located along the waterfront at Plant 1 (Figure 4). Recovered LNAPL and groundwater are pumped into an oil/water separator (OWS), which separates LNAPL from groundwater. LNAPL is recycled off-site. Separated groundwater enters a diffused air stripper (DAS), which strips dissolved volatile hydrocarbons from wastewater. Treated groundwater flows through a totalizer and to the sanitary sewer. The OWS and DAS help achieve compliance with KCDNR sanitary sewer discharge limits.

3.1.1.1. Recovery System History

Groundwater Well RW-1 has been utilized as a recovery well since interim system startup in 1992. Well RW-4 operated as part of the interim system from 1998 to 1999 and was brought back online in 2001 with Wells RW-2, RW-5, and RW-6, following system installation activities north of the warehouse. Well GM-11S was converted from a monitoring well to a recovery well in 2000 after LNAPL was observed in the well. Wells RW-7, RW-8, RW-9, and RW-10 were completed during final system construction and brought on-line during final startup in 2002.

In 2003, decreased LNAPL recovery triggered a soil investigation at Plant 1 (TechSolv, 2003b). The investigation verified the extent of LNAPL beneath the warehouse floor and filled data gaps from the RI. Soil cores analyzed for LNAPL presence showed no LNAPL existing outside recovery wells' capture zones, supporting data showing most LNAPL has been recovered from the warehouse area.

The groundwater/LNAPL recovery system is monitored weekly and maintenance is performed as needed to ensure that the system operates as designed and in accordance with permit requirements. Compliance testing of influent and effluent streams (Table 1) is conducted monthly to ensure compliance with KCDNR Permit 7592-04 for Sample Site A43262 and Puget Sound Clean Air Agency (PSCAA) Discharge Authorization No. 9817 requirements.

In 2013, Permit 7592-04 required submittal of semi-annual compliance monitoring data and monthly gallonage discharge totals of processed groundwater. Effluent discharges are monitored for both volume of wastewater discharged and for concentrations of chemicals of concern. The two 2013 semi-annual KCDNR Waste Discharge Self-Monitoring Reports are included in Appendix A. Analytical results from compliance testing (Table 1, Figures 5 through 7) show that the treatment system effectively treated recovered groundwater and met discharge compliance requirements. During 2013, effluent wastewater monitoring results showed discharges were below permitted limits during all monitoring periods. Should discharges exceed permit guidelines, recovery systems will be shut down and KCDNR contacted regarding the exceedance. To date, monitoring of analytes has shown that the system continues to operate as designed.

PSCAA air discharge authorization Notice of Construction No. 9817 was renewed in 2008, allowing for continued air discharge from both the now discontinued waterfront SVE system and the DAS portion of the groundwater/LNAPL recovery system. Air monitoring data are

collected to verify compliance with PSCAA's air discharge limits and are provided to PSCAA upon request. In 2013, air discharges from the DAS were below PSCAA's exemption threshold for soil and groundwater remediation projects listed in PSCAA Regulation I, Article 6, Section 6.03(c)(94), indicating that air permitting is no longer required. Permits and air data are retained by TechSolve and are available for review upon request.

Groundwater samples are voluntarily collected semi-annually from individual recovery wells to evaluate trends in shallow groundwater quality in each well (Table 2). In 2013, samples from two of ten recovery wells (RW-5 and RW-9) exceeded the TPH-D cleanup level, samples from a single well (RW-4) exceeded the TPH-G cleanup level, and samples from a single well (RW-2) exceeded the benzene cleanup level. Samples from the remaining six recovery wells (RW-10, RW-8, RW-7, RW-1, RW-6, and GM-11S) were below all groundwater cleanup levels. Data continue to show that the groundwater/LNAPL recovery system has reduced concentrations of dissolved hydrocarbons in shallow groundwater to below groundwater cleanup levels (Section 2.2.) in most recovery wells and that much of the available TPH-D, TPH-G, and benzene have been recovered by the system.

Based upon the sampling results listed above, shallow groundwater containing concentrations of dissolved TPH-G and benzene above cleanup levels appears to be limited to the northern end of the warehouse and truck loading rack area. Remaining TPH-D above the cleanup level appears to be limited to the southern portion of the remediation system. Recovery wells will continue to be voluntarily monitored in 2014 to evaluate data trends.

3.1.1.2. Recovery System Drawdown

The groundwater/LNAPL recovery system was designed during the RI to pump shallow groundwater, with water table drawdown extending to the bottom of the LNAPL smear zone (approximately 4 feet in total height). Pumping tests (TechSolv, 1999a) showed that an appropriate capture zone could be achieved with pumping rates from 0.7 to 0.9 gallons per minute (gpm) per well. These pumping rates were confirmed to achieve the drawdown during groundwater/LNAPL recovery system startup testing.

Results of operation through 2013 (Table 3) have shown that the desired water table drawdown and hydraulic capture/control are being achieved along the waterfront. Recovery wells are visually monitored during routine O&M activities to ensure that proper drawdown and capture are being achieved. Biological fouling of soil formations surrounding recovery well screens likely caused lower recovery rates in 2013 when compared to historic rates. Fouling is mainly from biological growth and associated deposits generated by high iron and manganese concentrations in groundwater. These biological deposits are routinely cleaned from wells, pumps, and associated piping to prevent fouling and blockages. O&M activities were performed on groundwater recovery wells in 2013 to remove fouling and redevelop wells in an attempt to improve pumping rates. These activities included well acidification, jetting, and surging, and are further discussed in Section 3.1.1.4. While fouling may reduce pumping rates, the desired drawdown is being achieved and the system continues to respond to tidally-influenced changes in groundwater elevation.

Groundwater elevations vary daily in groundwater/LNAPL recovery wells due to tidal fluctuations in the adjacent Duwamish Waterway. Testing has shown that while the Duwamish Waterway fluctuates up to 14 feet during a daily tidal cycle, shallow groundwater only fluctuates approximately 1 foot over the same period (TechSolv, 2004). The RI, determined that the difference in tidal response for shallow groundwater versus deeper groundwater is due to the dampening effect of the western warehouse foundation (driven interlocking sheet piling underlying the warehouse foundation), bulkheads at the island edge, and decreased seepage through a silty/clay layer that partially separates upper and lower water tables in some areas.

Data collected in 2013 continue to show that fluctuations in tidal elevations aaffect groundwater/LNAPL recovery system pumping rates. The recovery system automatically records flow rates several times a day during various tidal stages. These data show a direct correlation between tidal elevation and groundwater recovery (Figure 8). The data indicate that the groundwater/LNAPL recovery system affects deeper groundwater and that the system achieves desired drawdown without adjustment to account for daily tidal fluctuations (i.e., total-fluids pumps automatically pump faster during periods of high tides).

In 2010, BP started planning for the installation of a new seawall along the shoreline at Plant 1 to enhance seismic stability of the Site. The final design of the seawall is anticipated to reduce tidal fluctuations in groundwater and will likely affect the operation of the groundwater/LNAPL recovery system, as further discussed in Section 5.

3.1.1.3. LNAPL/Groundwater Recovery

Data from groundwater/LNAPL recovery system operation indicate that the majority of LNAPL has been removed from beneath the warehouse and loading rack areas, as required by the Consent Decree. Table 3 details quantities and concentrations of recovered LNAPL and dissolved hydrocarbons since the final groundwater/LNAPL recovery system was started in October 2002. Low LNAPL and dissolved hydrocarbon recovery rates over the past several years indicate only a minor amount of LNAPL remains beneath the warehouse and loading rack areas. LNAPL collection data shown in Table 3 are only recorded when a sufficient quantity has been generated to warrant off-site recycling, which has not occurred since 2008. Most LNAPL currently recovered occurs as a sheen or thin layer that is removed from the recovery system with biological residue as waste, which cannot be quantified in LNAPL recovery totals.

The cumulative amount of LNAPL recovered by both interim and final groundwater/LNAPL recovery systems is about 10,088 gallons (Figure 9 and Table 4). The final system has recovered 395 gallons of LNAPL from October 2002 through December 2013, and 390 gallons of dissolved hydrocarbons (Tables 3 and 4). The total combined recovery including recovered LNAPL, dissolved hydrocarbons, historical SVE recovery, and biodegradation processes (discussed in Section 3.1.2), is about 29,753 gallons of LNAPL recovered to date (Tables 3 and 4). Influent concentrations of IHSs in recovered groundwater for 2013 are shown on Figures 5 through 7, and listed in Table 1.

Influent concentrations of dissolved IHSs in recovered groundwater have decreased over time, consistent with decreasing concentrations seen in individual recovery wells (Section 3.1.1.1), indicating groundwater conditions at the Site have improved. Concentrations of IHSs do vary over time and often appear higher during winter months when the overall groundwater elevation is generally higher, as discussed in Section 4.1.6. Data indicate that the source of dissolved hydrocarbons is primarily residual hydrocarbons in the smear zone at the water table and that groundwater recovery continues to be an effective means of reducing dissolved hydrocarbon concentrations in groundwater.

3.1.1.4. Recovery System Maintenance and Repairs

Since startup, the groundwater/LNAPL recovery system has remained operational to date. The system, or individual portions of the system, were taken off-line periodically in 2013 to perform maintenance or repair activities. The system was off-line approximately 8 full days in 2013, and was never offline for a period of more than 3 days. Separate portions of the system were also shutdown from time to time to address sediment, scale, and biofouling buildup on pumps and in groundwater piping, attributed to high concentrations of iron and manganese in groundwater.

Independent corrosion engineers have performed annual integrity inspections on steel total fluids piping since 2003. Piping is also inspected as part of system routine O&M activities. Inspections evaluate piping at recovery wellheads, along the waterway, and at other accessible areas. Corrosion inspections confirm that systems can continue operation and that systems are connected to the Terminal cathodic protection system, protecting buried pipe from external corrosion. Annual reports are prepared by the corrosion engineers summarize the inspections. Reports are kept on file at TechSolve's office and are available for review upon request.

The most recent corrosion inspection was conducted on April 24, 2013. The results of this inspection determined that while steel total fluids piping is susceptible to corrosion, the thickness of system piping is adequate to safely convey recovered remediation fluids. The inspection also recommended the application of protective coatings to exposed piping, which has been completed to the extent practical.

Groundwater conveyance piping has been replaced as needed due to corrosion or when internal blockages could not be addressed by standard maintenance activities. No piping replacement activities occurred in 2013. The last major piping replacement event occurred in December 2012, as discussed in the 2012 Annual Site Report (TechSolve, 2013).

3.1.1.5. Recovery Well Redevelopment

Well redevelopment is conducted as needed to improve well productivity by cleaning and removing sediment, scale, and biofouling from well screens and surrounding sand packs. Redevelopment activities have been conducted during previous years, as discussed in past reports (TechSolve, 2012). In 2013, two separate rehabilitation efforts were conducted to improve recovery well production.

In June 2013, redevelopment actions were conducted on Wells RW-10, RW-6, and RW-5 to evaluate the effectiveness of three acid formulations in rehabilitating and improving well production. Wells RW-10, RW-6, and RW-5 were selected due to their similar designs (well diameter, screened intervals, and surrounding soil lithology). Acids were obtained from vendors including CETCO, Design Water Technologies, and Analytix Technologies, LLC. Vendor prescribed acid application methods were followed and wells were brushed, surged, jetted, and pumped to enhance rehabilitation efforts. Although well production improvements were minimal, CETCO and Design Water Technology formulations were found to provide the greatest improvements in well production and were the easiest formulations to work with in the field.

Based upon June redevelopment results, recovery wells RW-8, RW-6, RW-5, and RW-4 underwent redevelopment treatments in late October. These wells were acidized, surged, jetted, and pumped over several days to maximize results. Improvements in production from redevelopment were evaluated by monitoring pumping rates at each well before and after treatment and moderate improvements in production were observed. The greatest improvement was observed in Well RW-4, which continues to produce around 1 gpm at the time of this report.

Redevelopment activities will continue to be conducted as needed in 2014 to maintain and improve productivity from groundwater recovery wells.

3.1.2. Waterfront Soil Vapor Extraction System

Operation of the waterfront SVE system was discontinued in May 2008 after an internal peer review determined the system was no longer recovering measurable concentrations of hydrocarbons and was no longer influencing the biodegradation of inaccessible hot spot soils. SVE system shutdown was approved by Ecology during the 5-year review (Ecology, 2008).

About 3,582 gallons of TPH-G (as vapor) was recovered by the waterfront SVE system. Additionally, enhanced biodegradation from SVE system operation added about 16,075 gallons, for a total of 19,657 gallons of petroleum hydrocarbons recovered by SVE (Table 4, Figure 9), as calculated from SVE vapor stream monitoring data. Waterfront SVE system operation was discussed in greater detail in previous Annual Reports (e.g. TechSolv, 2009).

3.1.3. Waterfront Air Sparging System

Air sparging along the waterfront was discontinued in May 2008 as SVE air monitoring data indicated air-sparging operations were no longer volatilizing measurable quantities of hydrocarbons. Additionally, air-sparging operations were likely causing increased fouling in the groundwater/LNAPL recovery system. Additional information on air sparging system operation was presented in previous Annual Reports (e.g. TechSolv, 2009).

3.2. Containment Boom Monitoring

Two oil sorbent booms are maintained in the West Duwamish Waterway adjacent to Plant 1 to contain oil sheens that have historically appeared on water. Booms are located near the loading rack area and middle of the warehouse (Figure 4). Boom locations are selected to best contain occasional sheens, which likely originate from small cracks and discontinuities in the warehouse foundation or island bulkhead. The foundation and bulkhead act as a "hanging" wall, trapping LNAPL while allowing groundwater to flow beneath the base of the foundation and bulkhead. A new seawall is planned to be installed waterward of the existing bulkhead, as further discussed in Section 5. The new seawall is anticipated to further retard sheen migration to the waterway.

Booms are monitored weekly, at a minimum, for the presence of oil sheens and integrity, and augmented by checks made by Terminal personnel. Booms are replaced when integrity monitoring determines it necessary. A Containment Boom Log (Table 5) is maintained on-site to document sheens observances, or lack thereof, within the booms and the date and time of inspection. The extent of observed sheens are recorded on a scale from zero to two, with zero representing no sheen, one representing a light sheen visible in a portion of the boom, and two representing a heavy sheen visible throughout the boom. The Duwamish Waterway tidal stage is also recorded to evaluate if sheens correlate with tidal stage. Results of containment boom monitoring in 2013 are shown for loading rack area and warehouse area booms on Figures 10 and 11, respectively. Figures showing sheen observations from previous years are included in Appendix B.

Results of sheen monitoring indicate that sheens on the Duwamish Waterway have been infrequent and relatively minor since startup of the final system in October 2002. The number of sheen events in 2013 continued a decreasing trend when compared to previous years, with three light sheens observed in 2013. These sheens were all contained within the warehouse area boom and sheen impacts were mitigated by the boom. No sheens have been observed in the loading rack area boom since February 2009.

The three observed sheen events in 2013 occurred during periods when the groundwater/LNAPL recovery system was temporarily offline. The first sheen event was observed when the system was offline for monthly O&M, the second when the system was offline for well rehabilitation (Section 3.1.1.5), and the third when the system was offline for voluntary semi-annual groundwater monitoring of recovery wells (Section 3.1.1.1). Once system operations resumed, sheens were no longer observed. Similar correlations have been observed and documented in past annual reports (TechSolve 2013), and indicate that groundwater/LNAPL recovery system operation prevents sheen occurrences, as designed.

The Western Duwamish Waterway adjacent to the Terminal is also monitored for "orphan" sheens from off-site sources, occurring outside boomed areas. Historical orphan sheens often could not be correlated to specific sources; however, some sheens appeared to emanate from the Lander Street and Florida Street stormwater outfalls (Figure 2). The Terminal does not connect to storm sewer systems that feed these outfalls. The Terminal and TechSolve continue

to monitor for orphan sheens and documentation of these sheens is maintained at TechSolve's office. No such sheens were observed in 2013, or in several preceding years.

3.3. Inland Soil and Groundwater Remedial Actions

The primary remedy for soils above subsurface soil cleanup action levels (Section 2.2) for TPH was excavation of accessible "hot spot" soils. In-situ treatment methods, including natural attenuation and SVE, were also selected to treat remaining inaccessible hot spot soils located beneath, buildings, paved drive area, etc. Areas identified for cleanup actions are shown on Figures 2 and 3. Additionally, a Restrictive Covenant, effective May 30, 2000, restricts property to "industrial use" only and imposes restrictions on activities in selected areas of the Site (primarily soil disturbance activities or those that create new exposure routes in identified areas). Excavation and in-situ soil remedy plans were described in the EDR (TechSolv and AG&M, 2000a) and in the Inland Soils Plans and Specifications (TechSolv and AG&M, 2000b).

Cleanup actions for inland soils accessible for excavation at Plants 1 and 2 were completed in 2000. Excavations focused on predetermined areas with additional areas excavated as conditions dictated. A total of 3,470 cubic yards of contaminated soil was removed from Plant 1 and Plant 2, as detailed in the TPH Hot Spot Soils Excavation Completion Report (TechSolv and AG&M, 2001).

Ongoing performance groundwater monitoring, conducted following the soil excavations, showed that cleanup objectives for inland soils at Plant 2 had been met. In 2004, Ecology concurred that cleanup objectives at Plant 2 appeared to have been met, that remaining inaccessible TPH in soils (Figure 12) is being adequately treated by natural attenuation, and that remedial actions appeared to be complete (Ecology, 2004a).

Inaccessible hot spot soils were identified at Plant 1 following soil excavation activities (Figure 13). At the southern property boundary, groundwater monitoring indicated that excavations had not restored groundwater quality to meet cleanup standards within the 5 years restoration period, most notably in Well AR-03 (Section 4). Groundwater in Well AR-03 (Figure 14) is monitored for benzene, TPH-G, TPH-D, and TPH-O, and detected concentrations of benzene and TPH-G often fluctuated and exceeded associated cleanup levels. Fluctuating concentrations of TPH (most notably benzene) detected in Well AR-03 directly correlated to seasonal water table elevation fluctuations indicating that the source was located in the vadose zone, which becomes saturated during periods of high precipitation.

A focused soil probing investigation was conducted in 2005 in the drive area south of the Plant 1 Tank Farm. The investigation showed TPH-G and benzene to exist within an approximate one-acre source area in soils south of the Plant 1 Tank Farm and that this source area was responsible for continued groundwater impacts at the property boundary (TechSolv, 2006). Additional wells were installed in this area in 2006 to monitor groundwater conditions, as discussed in Section 4.1, and contingency remedial actions were implemented as discussed below.

3.3.1. Inland SVE System

Contingency remedial actions for soil and groundwater were evaluated in 2007 to remediate the hydrocarbon source area described in the previous section. Based on several criteria, SVE with catalytic oxidation (CATOX) emission control was selected as the preferred alternative. Air emission control requirements were set by PSCAA in Notice of Construction No. 9858. System design (Figure 15), installation, pilot testing, and startup occurred in 2008, and the system has remained in operation to date. O&M requirements for the final remediation system have been incorporated in the Final O&M Manual (TechSolv, 2003d), which is a working field document updated as system operations change or as equipment is replaced.

The system is inspected weekly, when operating, and air samples are collected and analyzed monthly to ensure compliance with PSCAA requirements, to monitor changes in the vapor stream, and to calculate hydrocarbon recovery rates.

Through 2013, the Inland SVE System has recovered approximately 7,912 pounds (1,287 gallons) of TPH-G (Table 6 and Figure 16). Concentrations of TPH-G and benzene in recovered influent vapor streams decreased sharply after initial system startup and have generally been well below PSCAA discharge limits of 50 Parts Per Million by Volume (ppmv) for TPH-G and 0.5 ppmv for benzene since late 2008 (Figures 17 and 18). CATOX emission control was discontinued in 2009 as influent hydrocarbon vapor concentrations are now below PSCAA treatment thresholds (TechSolv, 2010). Air discharges in 2013 were also below PSCAA's exemption threshold for soil and groundwater remediation projects listed in PSCAA Regulation I, Article 6, Section 6.03(c)(94), indicating that air discharge permitting is no longer required.

In addition to direct hydrocarbon recovery, SVE enhances biodegradation of residual hydrocarbons is soil due to the induced airflow SVE creates within these soils. Biodegradation calculations use influent flow rates and carbon dioxide levels above background (atmospheric) to estimate the mass of hydrocarbons reduced by enhanced biodegradation. Through December 2013, enhanced biodegradation is estimated to have reduced an additional 4,355 gallons of hydrocarbons, bringing combined biodegradation and vapor recovery of petroleum hydrocarbons to 5,642 gallons (Table 6 and Figure 19). Carbon dioxide concentrations measured during 2013 were generally at atmospheric levels, indicating that the bulk of hydrocarbons available to aerobic biodegradation have been reduced or captured.

Operation of the Inland SVE System has been periodically discontinued due to high seasonal groundwater elevations, discussed in Section 4.1.6. High groundwater elevations increases water capture, SVE system fouling, and at times submerge the horizontal SVE well screens. System operation is discontinued during these periods until groundwater elevations fall to acceptable levels. Well gauging frequency is increased when the system is off-line to better assess water level changes in the area of the Inland SVE System.

High groundwater elevation necessitated SVE shutdown from November 2012 through April 2013. A hydrograph for the inland area (Figure 20) shows that during the 2013 shutdown, groundwater elevations were the highest recorded since beginning system operation. The

overall groundwater elevation fell to a safe level to resume SVE operation in April 2013 and the system has remained in operation to date. The system will continue to be operated until Site cleanup objectives for this area are met or it is determined that system operation no longer benefits ongoing remedial actions.

System operation is currently adjusted to pull more vapors from the southwestern horizontal recovery wells. This system modification was conducted in response to recent concentrations of IHSs (mainly benzene and TPH-G) detected in groundwater above cleanup levels in Monitoring Wells GM-15S and MW-3-T9, as discussed in Section 4.1.2. The system was modified by throttling back the northeastern recovery wells to increase capture from the southwestern recovery wells. While groundwater concentrations of IHSs in Wells GM-15S and MW-3-T9 fell below cleanup levels and were within historic ranges in the fourth quarter of 2013, SVE remains in this adjusted mode of operation to enhance remedial actions by these wells.

Groundwater monitoring data for wells located within the SVE system's capture zone show that the system has improved inland groundwater quality for benzene (Figure 21) and for TPH-G (Figure 22) in this area. Groundwater trends in this area are further discussed in Section 4.1.2.

4. Groundwater Monitoring Activities

Groundwater monitoring activities have been conducted at the Site since 1997 on a network of selected wells (Figures 14 and 23). Monitoring activities were conducted voluntarily from 1997 through 1999. Since 2000, groundwater monitoring has been conducted per the requirements of the Consent Decree's Groundwater Compliance Monitoring and Contingency Program (TechSolv, 1999b) with periodic revisions as noted below.

Groundwater monitoring is conducted in accordance with the methods and procedures described in the Sampling and Analysis Plan (SAP) included with the RI. Groundwater samples are analyzed for selected IHSs including TPH-G, TPH-D, TPH-O, benzene, and cPAHs. Monitoring activities also include monthly inspections for the presence of LNAPL in selected wells. Analytes and selected wells have been periodically deleted from the monitoring program with Ecology's approval, due to analyte concentrations consistently below cleanup levels. A few wells have also been installed and added to the program. Voluntary and performance groundwater monitoring data are included in Tables 7 through 10. The results of groundwater monitoring activities are summarized in the following sections.

4.1. Plant 1 Performance Monitoring

Performance monitoring at Plant 1 has included quarterly groundwater monitoring for TPH-G, TPH-D, TPH-O, benzene, cPAHs, biochemical parameters, groundwater elevations, and the presence of LNAPL. Monitoring results at Plant 1 (Tables 7 through 10) and revisions to the monitoring program are discussed in the following sections.

4.1.1. Plant 1 Monitoring Well Network

The Plant 1 monitoring well network (Figure 14) currently includes Wells AMW-01 through AMW-05, GM-14S, GM-15S, GM-16S, GM-17S, GM-24S, AR-03, and MW-1-T9 through MW-4-T9. The monitoring history and rationale for these wells is based on the following:

- Monitoring Wells AMW-01 through AMW-05 were installed and first sampled in 2000 as compliance wells along the waterfront, per requirements of the Consent Decree. These wells are screened to allow representative sampling in the zone of groundwater discharge located beneath the existing warehouse foundation and Island bulkhead and above the brackish groundwater. These wells are screened deeper than other wells in the monitoring well network utilized to monitor shallower groundwater conditions.

- Monitoring Well GM-14S was added to the monitoring well network in the third quarter of 2007, as requested by Ecology. GM-14S was originally utilized to monitor for sheen presence on groundwater. As sheens are no longer being detected in this well, performance monitoring was initiated to monitor water quality in this area of the Site.

- Well GM-15S is located down-gradient from where excavations took place in Plant 1 as part of the soil remedy (Figure 2) and is located within the Inland SVE system's capture zone. Based upon limited hydrocarbon detections, the monitoring frequency of GM-15S

was reduced, with concurrence from Ecology (Ecology, 2009), from quarterly to semi-annually. Following receipt of first quarter 2013 monitoring results, the monitoring frequency of GM-15S was voluntarily increased to quarterly sampling due to detections of IHSs (TPH-G and benzene) above cleanup levels. While concentrations of IHSs fell to historic levels and below cleanup levels in the fourth quarter of 2013, GM-15S will continue to be monitored quarterly in 2014 to provide additional data from this well.

- Wells GM-16S and GM-17S are hydraulically up-gradient of the Site and monitoring for IHSs was discontinued, with approval from Ecology in 2000 (Ecology, 2000a), as sufficient background data had been collected from these wells. Monitoring for IHSs was resumed in these wells in 2007, as recommended by Ecology, to monitor for IHSs potentially migrating onto the property from up-gradient, off-site sources. The groundwater sampling frequency in these wells was reduced in 2009, with concurrence from Ecology (Ecology, 2009), from quarterly to semi-annually as IHS concentrations have been below cleanup levels since resuming sampling.

- Well GM-24S is located within the Plant 1 soil remedy excavation area.

- Well AR-03 is located just south of the southern property boundary, down-gradient from the Plant 1 soil excavations, and is within the Inland SVE System capture zone.

- Wells MW-1-T9 through MW-4-T9 were installed and added to the monitoring well network in 2005 to further evaluate groundwater quality down-gradient from Plant 1 soil remedy excavations (as discussed in the 2006 Annual Report). These wells are located within the Inland SVE system's capture zone.

4.1.2. Petroleum Hydrocarbon Monitoring

Compliance Monitoring Wells AMW-01 through AMW-05, located along the waterfront, have been below cleanup levels for TPH-G, TPH-D, and TPH-O for all quarterly groundwater monitoring events since installation (Table 7). These wells have also been below cleanup levels for benzene, with the exception of Wells AMW-01 and AMW-02.

Well AMW-01 has exceeded the 71 µg/L cleanup standard for benzene in 39 of 53 quarters since monitoring began in the fourth quarter of 2000. However, over the past 3 years benzene has been below the cleanup level in 7 of 12 quarters and was below the cleanup level in each of the last 3 quarters of 2013.

Well AMW-02 has exceeded the benzene cleanup level in 13 of 28 quarters since benzene was first detected above the cleanup level in the first quarter of 2007. However, benzene was below the cleanup level during all 2013 monitoring events, and was last detected above the cleanup level in the second quarter of 2012.

Efforts made to determine a source of benzene in the area of AMW-01 and AMW-02 have been inconclusive; however, remediation activities have been implemented to mitigate known sources of benzene and these actions appear to have reduced benzene concentrations in these

wells. The Inland SVE system has been in operation since 2008 (Section 3.3) and has improved groundwater quality up-gradient of Wells AMW-01 and AMW-02. Additionally, improvements in shallow groundwater quality above cleanup levels in these wells have been observed due to ongoing waterfront remedial actions (Section 3.1).

In the up-gradient area of Plant 1, IHSs have not been detected at or above cleanup standards in Monitoring Wells GM-16S and GM-17S since monitoring was resumed in 2007. These wells will be monitored semi-annually in the first and third quarters of 2014 to evaluate for the potential migration of IHSs onto the Site from off-site sources.

Well GM-14S has been below cleanup levels for TPH-D, TPH-O, and benzene (Table 7) since sampling resumed in this well in the third quarter of 2007, following the cessation of sheens being observed in the well (Section 3.2). Concentrations of TPH-G have been detected above the cleanup standard in 18 of 26 quarters since monitoring resumed in Well GM-14S in 2007. TPH-G concentrations detected in well GM-14S appear stable and this well is located hydraulically up-gradient from the groundwater/LNAPL recovery system.

Results of groundwater monitoring from wells in and down-gradient of the former soil hot spot area in Plant 1 (Wells GM-24S, AR-03, GM-15S, MW-1-T9, MW-2-T9, MW-3-T9, and MW-4-T9) show that soil removal actions completed in 2000 (Section 3.3) stabilized concentrations of dissolved hydrocarbons in this area. Groundwater quality improved further in this area following installation and startup of the Inland SVE System in 2008, (Section 3.3.1), which was a contingency actions to remediate remaining inaccessible hydrocarbons. Groundwater quality improvements due to SVE operation can be seen in the decreasing concentrations of benzene and TPH-G in monitoring wells located within the SVE capture zone (Figures 21 and 22). Data presented in Table 7 show that concentrations of IHSs in 2013 were below cleanup levels in all wells listed above, except for TPH-G in Wells GM-24S and benzene and TPH-G in well GM-15S.

Concentrations of TPH-G detected in well GM-24S were below the cleanup level in two of four quarters in 2013. The two TPH-G exceedances in 2013 were within historic ranges and overall, TPH-G concentrations detected in this GM-24S appear to be decreasing with time, indicating that biodegradation is occurring in the area of this well. Concentrations of TPH-G detected in Wells hydraulically down-gradient of GM-24S (MW-1-T9, MW-2-T9, and MW-3-T9) were below the cleanup level in all 2013 monitoring events.

Concentrations of benzene and TPH-G had not exceeded their respective cleanup levels in Well GM-15S prior to 2013. TPH-G exceeded the cleanup level in the second quarter and benzene exceeded the cleanup level in the first three quarters of 2013. Concentrations spiked in the second quarter and fell below the TPH-G and benzene cleanup levels in the fourth quarter of 2013. Nearby Well MW-3-T9 had concentrations of benzene detected in excess of the cleanup level in 2012, but fell beneath the cleanup level throughout 2013. MW-3-T9 is approximately 50 feet cross to up-gradient of well GM-15S, indicating the benzene detected in MW-3-T9 in 2012 may have migrated to GM-15S in 2013. The short-term exceedances (a year or less) coincide with several years of relatively high groundwater elevations (Figure 20). A correlation between maximum benzene concentrations and periods of high groundwater

elevation has been established for the Site, and indicates that the source in this area is located in the smear zone at the water table (TechSolv, 2005). As discussed in Section 3.3.1, the Inland SVE system continues to operate in this area and the system was modified to increase vapor capture from portions of the system located closest to Wells GM-15S and MW-3-T9.

With the exception of the limited exceedances listed above, TPH-G and benzene concentrations in groundwater have been reduced in the area of the Inland SVE system and TPH-D concentrations in the area have been below cleanup levels since the third quarter of 2010. Monitoring data will be further evaluated in 2014 and any trends will be discussed in future reports.

4.1.3. cPAH Monitoring

Selected wells at Plant 1 have been monitored for cPAHs. Monitoring for cPAHs was discontinued in 2003, per Ecology's approval (Ecology, 2003b), as historical monitoring rarely detected these compounds (Table 8). Monitoring for cPAHs was voluntarily resumed in compliance monitoring Wells AMW-01 through AMW-05 in 2004 following a recommendation by Ecology and to assist in determining when cleanup objectives have been met. Since resuming monitoring, concentrations of cPAHs have been rarely detected, and occasional detections have often been associated with laboratory quality control deficiencies that affect the validity of reported data. These laboratory issues have been discussed in more detail in previous Annual Site Reports. The limited detections of cPAHs have only slightly exceeded the laboratory detection limit (0.025 µg/L) for these compounds. Based upon these findings, the cPAH sampling frequency was decreased in 2009 to an annual basis, with concurrence from Ecology (Ecology, 2009).

During the most recent December 2013 monitoring event, concentrations of cPAHs were only detected above cleanup levels in AMW-05, and were mainly low level detections (Table 8). Based upon data evaluation of the extensive cPAHs sampling history, the limited low-level detections in AMW-05 in 2013 do not appear to indicate any significant trend. Monitoring for concentrations of cPAHs in these compliance wells will next occur in December 2014.

4.1.4. Biochemical Parameter Monitoring

Monitoring for biochemical parameters has been conducted at the Site to determine the effectiveness of natural attenuation in inaccessible soils containing TPH above cleanup levels. Monitoring of biochemical parameters has been suspended until additional Site cleanup goals are achieved (TechSolv, 2005a). Results of the last biochemical sampling were included in the 2006 Annual Site Report (TechSolv, 2007).

4.1.5. LNAPL Monitoring

The monitoring program includes monthly inspection for LNAPL presence in three monitoring wells in Plant 1 (Wells GM-11S, GM-12S, and GM-13S). Monitoring Well GM-14S (located inside the main Plant 1 tank farm) was removed from the monthly LNAPL monitoring

program in 2004, with concurrence from Ecology (Ecology, 2004b), as this well had been free of LNAPL and sheens since June 1999.

Results of LNAPL monitoring have shown a reduction in LNAPL occurrence in Plant 1 (Table 9). No sheens or LNAPL have ever been detected in Well GM-12S (located up-gradient from the warehouse). Well GM-13S (located inside the southern end of the warehouse) has periodically had sheens over time, but no sheens were observed in this well in 2013.

Measurable LNAPL was detected in Well GM-11S (located outside the northeast end of the warehouse) in 1999 and the well was subsequently converted to an LNAPL recovery well in April 2000. Only a sheen had been detected in this well since being converted to a recovery well. A sheen was detected in GM-11S during four of the twelve monthly gauging events in 2013, continuing the decreasing sheen appearances trend observed since LNAPL monitoring was initiated in this well.

4.1.6. Groundwater Elevation Monitoring

Water table elevations were recorded quarterly in 2013 for Plant 1 (most Plant 2 monitoring has been discontinued as discussed in the following section) and corresponding water table elevation maps were prepared to show overall groundwater flow patterns in 2013 (Table 10, Figures 24 and 25). Monitoring Well MW-06, located in Plant 1 east of the northeast corner of the warehouse, is not part of the groundwater monitoring program but is used to provide water level data in this area. Wells closest to the waterfront that are part of the monitoring program (GM-13S, and AMW-01 through AMW-05) are not used for water table elevation maps due to tidal fluctuations that affect these wells. Additionally, startup testing showed groundwater elevations in Well GM-13S are depressed by groundwater/LNAPL recovery system capture.

Water level data for 2013 show that groundwater elevations and flow patterns are similar to those observed during the RI and in previous years. Groundwater contour maps are no longer required for the Annual Site Report (Ecology, 2009) due to consistent flow patterns from year to year. However, seasonal groundwater elevation maps (Figures 24 and 25) are included voluntarily. Site flow directions can vary seasonally but are generally west towards the waterway, and south to southwest along the southern property boundary. Figure 24 shows an anomalous groundwater high around Monitoring Well GM-24S during the first quarter of 2013. The high groundwater level detected in GM-24S during the first quarter was likely due to high rainfall occurring prior to gauging, as is also discussed in the hydrograph discussion below. Groundwater gradients are similar each year and range from approximately 0.001 feet per foot (ft/ft) from the main tank farm to the waterfront, to 0.01 ft/ft at the southern boundary of Plant 1.

Hydrographs for selected wells in the waterfront area (Figure 26) and in the southern boundary area of Plant 1 (Figure 22) show trends in water table elevations over time for the Site. The data for both areas show seasonal fluctuations of the water table and indicate that all wells are responding to these fluctuations (i.e., none of the wells are screened in groundwater isolated from other wells, such as would occur with “perched” groundwater). Hydrographs

show that higher water table elevations occur during wetter winter and spring months than in drier summer and fall months. Groundwater elevations were near the highest on record during the first quarter of 2013 and appear to have trended upward over the past decade. These variations and trends in water table elevation generally coincide with precipitation data for the area. Groundwater elevation data will continue to be monitored in 2014 to evaluate any ongoing trends.

4.2. Plant 2 Performance Monitoring

Ongoing performance groundwater monitoring results, conducted following soil excavation, showed that cleanup objectives for diesel impacted inland soils at the Plant 2 diesel tank farm had been met (see Section 3.3). However, concentrations of TPH-G and benzene were detected following excavation activities in well GM-19S. Results of a subsequent investigation conducted in 2002 (TechSolv, 2003a) concluded that TPH-G and benzene detected in Well GM-19S was from an unidentified off-site source. Monitoring at Plant 2 was discontinued except for TPH-G and benzene in Monitoring Well GM-19S (Figure 23), as agreed to by Ecology (Ecology, 2004b). Additional details regarding discontinuing Plant 2 monitoring were included in previous reports (e.g. TechSolv, 2009). Well GM-19S continues to be monitored semi-annually for TPH-G and benzene during the first and third quarters, which typically corresponds with the groundwater elevation seasonal high and low, respectively. The results of monitoring for TPH-G and benzene in 2013 are included in Table 7. Benzene concentrations detected in GM-19S were above the cleanup level in the third quarter of 2013, the first exceedance since third quarter 2010. TPH-G concentrations in GM-19S have been below the cleanup level since 2007.

4.3. Data Validation

Laboratory analytical results were reported with associated laboratory quality assurance/quality control data. The analytical reports were reviewed and the data were validated per the requirements of the CAP. Data validation resulted in qualification of some analytical results. Data qualifiers modify the values reported by the laboratory, but do not affect our understanding of the overall conditions of the Site. The data qualifiers are included in Tables 7 and 8. Laboratory reports and additional information regarding the justification for data qualification are retained at the TechSolve and are available upon request. All data qualifiers from the four quarters of 2013 were relatively minimal and were included with quarterly progress reports submitted to Ecology.

5. Additional Activities

In 2010, BP initiated plans to install a new seawall waterward of the existing timber bulkhead. Seawall design details were provided to Ecology and summarized in previous reports (TechSolve 2013). The project is intended to provide a long-term solution to the seismic protection of the Site.

The timeline for installing the northern 325 linear feet of seawall and temporary demolition of a portion of the pier walkway has been delayed until late summer 2015 at the earliest, as the Army Corp of Engineers (ACOE) is yet to approve project permitting. Delays in permitting completion have been attributed to staffing changes within the ACOE and from the negotiation of mitigation requirements for the conversion of approximately 2,150 square feet of aquatic intertidal land to upland. Land conversion will occur as the proposed seawall is designed to be installed 3.4 feet (on average) waterward of and paralleling the existing bulkhead.

A seawall installed waterward of the existing bulkhead was the preferred design alternative, in part, because it benefits ongoing remedial actions by:

- Creating an additional barrier to groundwater migration waterward of the existing seawall.
- Allowing the existing bulkhead to remain intact during construction.
- Allowing for the continued operation of the Groundwater/LNAPL recovery system during construction.

Installing a new seawall inward of the exiting bulkhead was eliminated from consideration early in the evaluation stage. Construction of an inward seawall would damage site infrastructure including existing bulkheads, remediation systems, and monitoring wells. An inward seawall would also require remediation system shutdown during construction and potentially allow contamination waterward of the new seawall to migrate to the Duwamish during construction.

BP is being required to mitigate for land conversion and BP is evaluating mitigation options that satisfy ACOE requirements. These include BP led onsite mitigation and buying credits from a mitigation bank to satisfy compensatory mitigation requirements. The option that appears most preferred by the ACOE is to buy credits from the In-Lieu Fee Program operated under the King County Mitigation Reserves Program. BP is currently working with the King County Mitigation Reserves Program to obtain a legal agreement for securing the required credits.

In 2013, BP continued to prepare for the planned 2014 installation of the northern portion of the seawall. Notable activities conducted in 2013 included the purchase and staging of interlocking steel sheet pile on-site and installation and grouting of a test anchor in the northwest corner of Plant 1. The test anchor was installed to establish and verify the required

bond length for the tieback anchors. The area of the Site where the test anchor was installed and grouted is free of any known environmental impacts and no petroleum impacted soils were reported during drilling. The test anchor was drilled and grouted vertically to depth, less than 20 feet due east of the nested well pair GM-10S and GM-10D (Figure 14). This nested well pair was gauged following installation and grouting of the test anchor to ensure that the pressurized grouting had not affected these nearby monitoring wells. Gauging results indicated that the wells were intact and that grouting material had not flowed into these wells.

BP continues to coordinate with consultants and contractors to ensure that protection will be provided to the Site and the Duwamish Waterway during construction and that the waterfront groundwater/LNAPL recovery system will remain operable.

Seawall designs and construction activities are being reviewed to ensure compliance with Consent Decree and Groundwater Compliance Monitoring and Contingency Program requirements. Ecology will be notified and consulted if modifications or alterations to the monitoring well network or waterfront groundwater/LNAPL recovery system are required.

The construction contractor for the project has been selected and final designs for the northern phase of the installation were included in the 2012 Annual Site Report (TechSolve, 2013). Designs for the southern portion of the seawall have been developed and a final design package will be provided to Ecology when available.

Construction plans have been reviewed and modified to avoid potentially damaging existing remediation systems and monitoring wells. These reviews determined that seven monitoring wells (AMW-01 through AMW-05, GM-10D, and GM-13D) located along the waterfront (Figure 14) could be damaged during tieback drilling and grouting operations. These wells are completed in locations and screened to depths (from 20 feet below ground surface and deeper) where damage from tieback installation may occur. Engineers have designed tiebacks to slope inland to the maximum angle allowable (1.5 vertical to 1 horizontal) in order to avoid most waterfront wells, which are more shallowly screened. Designs were modified to provide maximum protective horizontal spacing between these seven deeper wells and planned tieback installation locations.

Best management practices will be implemented during construction, such as booming waterways during vibratory sheet pile driving and tieback anchor installations, to capture and contain sheens generated by construction activities. Recovery system components located adjacent to the seawall will be inspected for integrity throughout seawall construction will be repaired or replaced, as needed, if damaged.

Installation of the seawall will affect hydrology at the Site and waterfront groundwater/LNAPL recovery system groundwater capture. The new seawall will protect the Duwamish waterway by creating an additional barrier to shallow groundwater discharge from the Site to the Duwamish Waterway, further isolating groundwater behind the seawall. This determination is based upon a detailed review of the construction plans, evaluations of the existing Site Hydrologic model, and review of affects observed at the adjacent Lockheed Martin

property, to the south of the Site, following installation of a shallower seawall of similar design. Preliminary evaluations are being conducted in advance of the seawall installation to estimate the impact of the seawall on hydrology at the Site.

Formal evaluations of the seawall's impact on Site hydrology will be conducted following completion of the seawall installation, as agreed to by Ecology (Ecology, 2012). This evaluation is planned to include a review of hydraulic containment, as recommended by EPA in the Third Five-Year Review Report (EPA, 2010). EPA's recommendation to review hydraulic containment was due to historically elevated benzene concentrations in compliance monitoring Wells AMW-01 and AMW-02. Benzene concentrations in these wells have markedly decreased since the time of the Third Five-Year Review, and were mainly below the benzene cleanup level in 2013 (Section 4.1.2). While the original driver to review hydraulic containment may be eliminated by the time the Seawall is installed, BP will evaluate hydraulic containment following seawall installation to evaluate the effects of the seawall on site hydrology.

6. Summary of Activities/Conclusions

Activities completed at the Site during 2013 and resulting conclusions are summarized below.

- Operation of the groundwater/LNAPL recovery system continues to effectively protect the Duwamish Waterway by removing petroleum hydrocarbons from groundwater. The system provides hydraulic control along the waterfront and is helping to achieve cleanup objectives.

- Maintenance and inspection of the groundwater/LNAPL recovery system indicate the system operates as designed, is intact, and can continue operation. Detailed corrosion evaluations continue to be conducted annually. Field staff continue to conduct routine inspections to ensure system integrity and system components are replaced or upgraded as necessary. Well redevelopment activities are also conducted to maintain groundwater production in wells.

- Recovery systems have removed most recoverable LNAPL from beneath the warehouse and truck loading rack areas. LNAPL was only detected as a sheen or thin film in a few wells and the frequency of sheens observed during monthly monitoring is decreasing.

- Monitoring results show that remediation systems have reduced both dissolved hydrocarbons in groundwater and the frequency of hydrocarbon sheens in the Duwamish Waterway. Concentrations of IHSs have been below cleanup levels in most waterfront recovery wells. All compliance wells have also been below cleanup levels, with the exception of benzene in Wells AMW-01 and AMW-02. The frequency of benzene detections above the cleanup level in these wells has decreased. Well AMW-01 exceeded the benzene standard in only the first quarter of 2013 and AMW-02 last exceeded the standard in the second quarter of 2012, a continuing reduction in both the frequency of benzene exceedances and benzene concentrations in these wells.

- Groundwater data collected in and down-gradient of the former soil hot spot area at Plant 1 indicate that remedial actions have been effective in stabilizing and reducing petroleum hydrocarbons in this area. Some residual hydrocarbons may remain in inaccessible soils in this area, affecting groundwater during seasonal highs, as seen in MW-3-T9 and GM-15S. These residual hydrocarbons are both being captured directly and indirectly degraded by enhanced biodegradation from SVE operation. Since August 2008, operation of the Inland SVE System has recovered 1,287 gallons of TPH-G. SVE has also contributed to the enhanced biodegradation of an estimated 4,355 gallons, for a combined recovery of approximately 5,642 gallons of hydrocarbons. The quantities of hydrocarbons both being captured and biodegraded by the SVE system have greatly reduced over time, indicating that the system has captured or degraded most of the available hydrocarbons in unsaturated soils in this area.

- Groundwater monitoring activities through 2013 at Plant 2 show a continuing reduction in dissolved hydrocarbons detected in Monitoring Well GM-19S, which is impacted by an off-site source. TPH-G and benzene concentrations in groundwater have steadily declined in GM-19S over time. TPH-G concentrations have been below the cleanup level for the past 5 years and benzene concentrations exceeded the cleanup level once in the past 3 years. All other remediation and monitoring activities required for this portion of the Site have been successfully completed.

- A new seawall is proposed to be installed waterward of the existing Island bulkhead along the waterfront at Plant 1 to enhance seismic stability of the Site. The seawall will further protect the Duwamish Waterway by creating an additional barrier between the waterway and shallow groundwater at the Site.

- Seawall designs and construction methods were selected to minimize impacts to ongoing remediation and monitoring activities. Operation of the waterfront groundwater/LNAPL recovery system is not expected to be substantially affected during seawall construction. Installation of the seawall will be scheduled once permit approval is obtained. BP will ensure that best management practices are implemented during construction to protect ongoing remediation activities and to minimize damages to wells and remediation systems.

- Seawall designs and construction activities have been, and will continue to be, reviewed to ensure compliance with the requirements of the Consent Decree and the Groundwater Compliance Monitoring and Contingency Program. Ecology will be notified and consulted if monitoring wells or recovery systems require modification. The effects of the new seawall on the Site hydrology and continuing remedial actions will be fully evaluated following seawall installation, as previously discussed with Ecology.

7. References

Geraghty & Miller, Inc. (Geraghty & Miller). 1994. Remedial Investigation, ARCO Harbor Island Terminal 21T, Seattle, Washington. July 6, 1994.

_____. 1996. Technical Memorandum Summarizing Supplemental Remedial Investigation Activities and Results, ARCO Harbor Island Terminal 21T, Seattle, Washington. June 28, 1996.

_____. 1997. Final Focused Feasibility Study, ARCO Harbor Island Terminal 21T, Seattle, Washington. April 17, 1997.

Moffatt & Nichol. 2010. Bulkhead Replacement Feasibility Study [Final] Memorandum. To C. Hammett, BP Seattle by P. Jain, Moffatt & Nichol. December 16, 2010.

_____. 2011. Bulkhead Replacement and Anchored Wall Constructability Memorandum (Final). To C. Hammett, BP Seattle by P. Jain, Moffatt & Nichol. September 26, 2011.

TechSolv Consulting Group, Inc. (TechSolv) (now TechSolve Environmental Inc. [TechSolve]). 1999a Air Sparging Pilot Test and Groundwater Pumping Test Report, ARCO Harbor Island Terminal 21T, Seattle, Washington. January 1999

_____. 1999b. Groundwater Compliance Monitoring and Contingency Program, ARCO Harbor Island Terminal 21T, Seattle, Washington. November 19, 1999.

_____. 2002. Annual Site Report, BP/ARCO Harbor Island Terminal, 1652 SW Lander Street, Seattle, Washington. April 2002

_____. 2003a. Plant 2 Gasoline Investigation, BP Harbor Island Terminal, Seattle, Washington. January 9, 2003

_____. 2003b. Plant 1 Soil Probing Investigation, BP Harbor Island Terminal, Seattle, Washington. September 16, 2003

_____. 2003c. Groundwater Remedy Final Construction Completion Report, BP West Coast Products Company 21T. September 2003.

_____. 2003d. Final Operations and Maintenance Manual, BP West Coast Products Terminal 21T. December 2003

_____. 2004. Final 2003 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. May 2004

_____. 2005. 2004 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. July 2005

_____. 2006. 2005 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. May 2006.

_____. 2007. 2006 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2007.

_____. 2009. 2008 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2009.

_____. 2010. 2009 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2010.

_____. 2011. 2010 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2011.

_____. 2012. 2011 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2012.

_____. 2013. 2012 Annual Site Report, BP West Coast Products Terminal, 1652 SW Lander Street, Seattle, Washington. April 2012.

TechSolv Consulting Group, Inc. and ARCADIS Geraghty & Miller. (TechSolv and AG&M). 2000a. Engineering Design Report, ARCO Harbor Island Terminal 21T, Seattle, Washington. September 2000.

_____. 2000b. Inland Soils Plans and Specifications, ARCO Harbor Island Terminal 21T, Seattle, Washington. September 2000.

_____. 2001. Excavation Completion Report, ARCO Harbor Island Terminal, Seattle, Washington. March 19, 2001.

U.S. Environmental Protection Agency. (EPA). 1994. Harbor Island Soil and Groundwater Operable Unit Consent Decree. Civil Action No. 95-01495-7. 1994.

_____. 2010. Third Five-Year Review Report Harbor Island Superfund Site Seattle,

Washington, September 2010.

Washington State Department of Ecology. (Ecology). 1992. Final Agreed Order No. DE 92 TC-N158. March 30, 1992.

_____. 1999. Cleanup Action Plan (CAP), ARCO Terminal 21T, Seattle, Washington. November 19, 1999.

_____. 2000a. Meeting with Nnamdi Madakor, Project Manager, Northwest Regional Office. Personal communication to L. Roberts and C. Lybeer, TechSolv Consulting Group, Inc. March 16, 2000.

_____. 2000b. Consent Decree No. 00-2-05714-8SEA. March 24, 2000.

_____. 2003a. Meeting With Roger Nye, Project Manager, Northwest Regional Office. Personal communication to L. Roberts, TechSolv Consulting Group, Inc. February 5, 2003.

_____. 2003b. Meeting with Roger Nye, Project Manager, Northwest Regional Office. Personal communication to L. Roberts, TechSolv Consulting Group, Inc. March 14, 2003.

_____. 2004a. Letter from Roger Nye to Ralph Moran. Certified Mail # 7003-0500-0005-0582-7356. June 8, 2004.

_____. 2004b. Email from Roger Nye to Larry Roberts. Subject: Proposals. June 15, 2004.

_____. 2008. Five-Year Review Meeting with Roger Nye, Project Manager, Northwest Regional Office. Personal communication to D. White, Atlantic Richfield Co. and L. Roberts, S. Larsen, and M. Roberts TechSolv Consulting Group, Inc. October 8, 2008.

_____. 2009. Letter from Roger Nye to Larry E. Roberts. RE: Revisions to Monitoring. April 3, 2009.

_____. 2012. Meeting with Maura O'Brien, Project Manager, Northwest Regional Office. January 10, 2012.

TABLES

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM INFLUENT DATA

Sample Date	Units	Benzene	Diesel	Ethylbenzene	Gasoline	Oil	Toluene	Xylenes
3/21/2000	UG/L	804	3,390	55	4,080	375	781	362
4/14/2000	UG/L	9,920	10,700	4,850	162,000	700	41,700	24,100
6/15/2000	UG/L	167	8,830	224	8,890	885	1,030	1,170
6/29/2000	UG/L	1,170	22,900	634	23,300	1,875	3,440	3,470
7/19/2000	UG/L	2,840	6,580	1,420	52,500	375	8,630	7,280
8/15/2000	UG/L	6,630	19,200	3,980	196,000	750	30,400	20,200
9/27/2000	UG/L	2,080	3,530	1,700	68,300	750	8,910	8,790
10/12/2000	UG/L	2,470	27,700	2,410	96,900	2,250	13,400	12,800
11/15/2000	UG/L	1,610	7,070	1,300	43,300	813	6,370	7,840
1/11/2001	UG/L	3,160	20,800		104,000	1,580		
2/15/2001	UG/L	3,670	49,900	2,340	107,000	3,880	18,300	14,400
3/15/2001	UG/L	3,490	10,200	2,400	117,000	2,025	16,300	15,900
4/30/2001	UG/L	3,600	19,700	2,370	90,800	375	13,600	12,500
5/18/2001	UG/L	4,980	6,090	3,220	104,000	936	19,300	15,000
6/11/2001	UG/L	2,680	5,660	2,100	81,700	764	11,600	12,400
7/24/2001	UG/L	2,770	7,460	2,470	102,000	750	12,400	15,700
8/24/2001	UG/L	394	4,970	458	20,000	750	2,650	2,980
9/6/2001	UG/L	498	5,940	670	29,000	750	3,470	4,570
10/16/2001	UG/L	63	4,500	71.9	7,200	750	149	863
11/15/2001	UG/L	625	33,800	480	24,800	1,280	1,780	2,220
12/10/2001	UG/L	445	6,350	230	13,100	827	464	1,500
1/16/2002	UG/L	983	16,400	332	12,700	750	510	1,740
2/14/2002	UG/L	390	4,600	42.5	7,260	750	96.8	368
3/15/2002	UG/L	300	6,380	272	7,070	750	144	573
4/2/2002	UG/L	NA	NA	NA	NA	NA	NA	NA
9/15/2002	UG/L	NA	NA	NA	NA	NA	NA	NA
10/14/2002	UG/L	352	7,660	115	2,250	750	10.8	199
11/25/2002	UG/L	242	6,570	44.8	1,610	960	18.3	40.1
11/27/2002	UG/L	145	7,090	37.5	1,200	862	15.7	26.9
12/18/2002	UG/L	162	7,940	23.3	2,020	750	23.3	89.1
1/16/2003	UG/L	440	5,690	80.6	2,300	750	71	231
2/13/2003	UG/L	171	5,340	126	4,780	750	38.4	246
3/11/2003	UG/L	174	5,140	25.5	953	753	8.19	58.8
4/15/2003	UG/L	29.8	4,640	7.15	570	750	0.536	4.66
5/15/2003	UG/L	3.56	4,410	3.33	653	750	0.872	5.24
6/17/2003	UG/L	9.96	3,750	7.21	659	750	1.5	5.74
7/15/2003	UG/L	57.4	1,670	10.7	719	750	1.4	35
8/13/2003	UG/L	107	4,610	14.5	831	750	6.1	38.1
9/16/2003	UG/L	103	5,410	36.6	1,080	869	8.71	55.3
10/14/2003	UG/L	153	5,590	40.1	2,050	750	63.7	241
11/19/2003	UG/L	113	5,020	125	4,720	750	57	691
12/17/2003	UG/L	291	8,070	57.8	2,930	750	255	237
1/13/2004	UG/L	222	63,700	377	16,700	750	654	1590
2/10/2004	UG/L	34.2	4,370	17.7	1,040	750	24.9	61.3
3/17/2004	UG/L	64.3	1,010	14	459	750	3.91	31.3
4/15/2004	UG/L	234	2,010	10.5	2,080	750	46.1	2.73
5/25/2004	UG/L	177	7,040	17.7	1,690	766	27.9	116
6/17/2004	UG/L	2.51	9,540	13.3	1,920	833	4.19	57.1
7/13/2004	UG/L	7.82	17,200	190	14,500	750	185	1110
8/13/2004	UG/L	90.3	7,710	156	7,900	788	319	829
9/16/2004	UG/L	149	1,000	48.3	2,170	750	84.5	207
10/13/2004	UG/L	0.61	2,670	12.8	984	750	2.64	73.3
11/19/2004	UG/L	2.46	2,220	19.5	1,300	750	3.84	46.9
12/16/2004	UG/L	0.873	638	1.86	743	750	0.5	4.84
1/13/2005	UG/L	53	9,210	26.7	2,580	2120	15.4	144
2/15/2005	UG/L	8.23	1,480	14.5	1,180	750	20.1	89.2
3/15/2005	UG/L	44	2,300	120	7,910	750	287	1000
4/15/2005	UG/L	233	2,010	170	10,400	750	906	1150
5/20/2005	UG/L	135	10,200	505	32,200	750	1720	3850
6/10/2005	UG/L	204	1,590	521	23,200	750	1750	3680
7/15/2005	UG/L	84.2	1,280	173	11,200	750	740	1530
8/12/2005	UG/L	14.4	1,380	109	7,490	750	377	921
9/15/2005	UG/L	66.7	2,160	201	11,200	750	567	1530
KCDNR DISCHARGE LIMITS		130	100,000	1,400	NA	100,000	1,500	NA

Note: Data presented in this table is included for all data collected following implementation of Consent Decree No. 00-2-05714-8SEA.

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM INFLUENT DATA CONTINUED

Sample Date	Units	Benzene	Diesel	Ethylbenzene	Gasoline	Oil	Toluene	Xylenes
10/14/2005	UG/L	44.6	798	136	7270	721	279	1250
11/17/2005	UG/L	26.2	1,240	13.6	634	773	30.3	84.9
12/19/2005	UG/L	7.59	16,300	60.2	5810	4,810	111	703
1/25/2006	UG/L	43	23,800	221	20400	71,400	350	2120
2/14/2006	UG/L	11.3	689	37.5	3430	714	18.3	343
3/15/2006	UG/L	10	747	11.3	2240	708	25	176
4/14/2006	UG/L	10	3,870	27.9	4180	721	27.5	431
5/17/2006	UG/L	157	2,770	87.3	8150	721	170	897
6/14/2006	UG/L	132	2,140	60.8	6520	765	49.6	786
7/12/2006	UG/L	6.56	563	1.57	2440	556	1.1	79.1
8/16/2006	UG/L	45.6	1,460	17	1720	490	6.58	101
9/13/2006	UG/L	3.02	7,950	3.8	1530	500	0.677	43.8
10/12/2006	UG/L	1.12	545	1.45	330	721	0.5	10.8
11/17/2006	UG/L	12.8	2,780	14.4	4570	532	14.4	620
12/19/2006	UG/L	34.6	1,640	20.8	3820	798	3.92	213
1/19/2007	UG/L	4.9	1,020	5.12	633	743	0.651	24.8
2/16/2007	UG/L	23.7	4,030	18.5	714	833	4.47	87.7
3/16/2007	UG/L	6.08	1,160	0.5	381	742	2.99	21.1
4/19/2007	UG/L	15.5	4,710	15	770	495	0.852	42.4
5/17/2007	UG/L	23.2	577	25.1	691	798	1.83	49.5
6/14/2007	UG/L	0.688	443	0.806	276	526	0.5	1.36
7/13/2007	UG/L	0.5	897	0.5	75	526	0.5	1
8/16/2007	UG/L	10.8	330	5.22	274	490	0.5	3.58
9/10/2007	UG/L	4.07	450	1.95	263	495	0.632	1.76
10/17/2007	UG/L	14.5	253	3.14	366	505	0.5	2.29
11/16/2007	UG/L	0.5	546	0.5	196	526	0.5	1
12/14/2007	UG/L	0.642	255	0.5	239	495	0.5	1
1/22/2008	UG/L	0.5	296	0.5	111	501	0.5	1
2/14/2008	UG/L	56.8	449	38.6	1160	538	2.55	82.1
3/14/2008	UG/L	7.67	552	5.51	225	485	0.5	10.5
4/18/2008	UG/L	3.9	255	2.36	198	510	0.5	5.63
5/16/2008	UG/L	0.809	266	0.5	101	532	0.5	1
6/18/2008	UG/L	0.989	263	0.5	81.4	526	0.5	1
7/16/2008	UG/L	9.19	255	5.69	489	510	0.5	14.6
8/18/2008	UG/L	2.98	352	0.572	167	476	0.5	1.89
9/16/2008	UG/L	3.32	255	0.5	133	510	0.5	1
10/15/2008	UG/L	25.8	243	10	473	485	0.5	5.62
11/14/2008	UG/L	7.21	286	0.583	151	485	0.5	1.84
12/11/2008	UG/L	0.987	339	0.5	89.7	485	0.5	1
1/14/2009	UG/L	1.43	733	0.712	280	500	0.5	1.82
2/18/2009	UG/L	1.56	260	0.5	93.4	512	0.5	1.07
3/17/2009	UG/L	2.04	243	0.5	54.2	485	0.5	1.03
4/16/2009	UG/L	0.5	240	0.5	50	481	0.5	1
5/14/2009	UG/L	0.708	NS	0.5	84.1	NS	0.5	1.11
6/16/2009	UG/L	0.5	NS	0.5	101	NS	0.5	1.07
7/22/2009	UG/L	1	NS	15	1,100	NS	1	100
8/18/2009	UG/L	13	NS	5.8	690	NS	1	7.2
9/15/2009	UG/L	10	NS	5.1	520	NS	1	2.9
10/20/2009	UG/L	1.3	NS	1	170	NS	1	2
11/17/2009	UG/L	30	260	18	1,600	480	1.5	38
12/14/2009	UG/L	0.87	NS	1	140	NS	1	2
1/21/2010	UG/L	6.9	NS	7.2	3,300	NS	1	51
2/17/2010	UG/L	5	NS	3.2	1,100	NS	1	9.1
3/17/2010	UG/L	6.8	NS	4.3	610	NS	*1*	8.2
4/15/2010	UG/L	10	NS	18.0	690	NS	*1*	29.0
5/19/2010	UG/L	1.2	NS	1.6	170	NS	*0.5*	1.9
6/16/2010	UG/L	1.2	NS	*0.5*	140	NS	*0.5*	*1.0*
7/28/2010	UG/L	1.7	NS	*0.5*	200	NS	*0.5*	1.3
8/18/2010	UG/L	*1.0*	NS	*1.0*	*50*	NS	*1*	*3.0*
9/21/2010	UG/L	1.5	NS	*1.0*	112	NS	*1*	*3.0*
10/19/2010	UG/L	1.1	NS	*1.0*	83.5	NS	*1*	*3.0*
11/29/2010	UG/L	*0.5*	NS	*1.0*	*50*	NS	*1*	*3.0*
12/22/2010	UG/L	10.1	NS	42.1	4470	NS	*1*	202
KCDNR DISCHARGE LIMITS		130	100,000	1,400	NA	100,000	1,500	NA

Note: Data presented in this table is included for all data collected following implementation of Consent Decree No. 00-2-05714-8SEA.

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM INFLUENT DATA CONTINUED

Sample Date	Units	Benzene	Diesel	Ethylbenzene	Gasoline	Oil	Toluene	Xylenes
1/19/2011	UG/L	6.4	NS	6.6	1,920	NS	*1*	36.6
2/15/2011	UG/L	6.3	NS	6.3	712	NS	*1*	12.7
3/29/2011	UG/L	0.79	NS	1.0	50	NS	*1*	3.0
4/21/2011	UG/L	4.2	NS	1.9	892	NS	*1*	5.9
5/18/2011	UG/L	1.6	NS	1.5	456	NS	*1*	5.3
6/15/2011	UG/L	*0.5*	NS	1.0	50	NS	*1*	3.0
7/20/2011	UG/L	*0.5*	NS	1.0	50	NS	*1*	3.0
8/17/2011	UG/L	*0.5*	NS	1.0	50	NS	*1*	3.0
9/14/2011	UG/L	*0.5*	NS	1	50	NS	*1*	3.0
10/11/2011	UG/L	*0.5*	NS	1	144	NS	*1*	3.0
11/22/2011	UG/L	4.0	NS	1.2	499	NS	*1*	3.6
12/13/2011	UG/L	12.3	NS	5.3	399	NS	*1*	3.2
1/23/2012	UG/L	4.7	NS	2.6	1,280	NS	*1*	9.5
2/14/2012	UG/L	3.4	NS	2.7	746	NS	*1*	12.3
3/13/2012	UG/L	3.2	NS	1.0	217	NS	*1*	3.0
4/16/2012	UG/L	5.6	NS	1.1	388	NS	*1*	3.7
5/16/2012	UG/L	0.87	NS	1.0	68.5	NS	*1.1*	4.3
6/13/2012	UG/L	0.5	NS	1.3	50	NS	*1*	3.0
7/20/2012	UG/L	0.74	NS	1.0	50	NS	*1*	3.0
8/23/2012	UG/L	0.5	NS	1.0	250	NS	*1*	3.0
9/5/2012	UG/L	0.5	NS	1.0	50	NS	*1*	3.0
10/24/2012	UG/L	1.2	NS	1.0	137	NS	*1*	3.0
12/18/2012	UG/L	18.7	NS	6.7	744	NS	*0.5*	15.1
1/23/2013	UG/L	1.8	NS	0.54	165	NS	*0.5*	1.5
2/21/2013	UG/L	*0.5*	NS	*0.5*	*50*	NS	*0.5*	*0.5*
3/13/2013	UG/L	1.8	NS	1.4	620	NS	*0.5*	2.3
4/17/2013	UG/L	*0.5*	NS	*0.5*	71	NS	*0.5*	*0.5*
5/22/2013	UG/L	0.71	NS	0.7	390	NS	*0.5*	1.8
6/12/2013	UG/L	0.97	NS	*0.5*	220	NS	*0.5*	*0.5*
7/24/2013	UG/L	1.6	NS	4.7	1,200	NS	*0.5*	12.0
8/20/2013	UG/L	1.6	NS	1.5	560	NS	*0.5*	4.5
9/24/2013	UG/L	0.5	NS	*0.5*	120	NS	*0.5*	*0.5*
10/15/2013	UG/L	0.5	NS	*0.5*	61	NS	*0.5*	*1.0*
11/20/2013	UG/L	0.5	NS	*0.5*	310	NS	*0.5*	*1.0*
12/17/2013	UG/L	1.2	NS	*1.0*	510	NS	*1.0*	*3.0*
1/15/2014	UG/L	12	NS	1.9	440	NS	*2.0*	3.5
KCDNR DISCHARGE LIMITS		130	100,000	1,400	NA	100,000	1,500	NA

Data from the final remediation system was first collected in Oct of 2002. The line after April 2002 separates Interim and Final System data.
Influent sample data are representative of groundwater prior to treatment by the Diffused Air Stripper.

Note: Data presented in this table is included for all data collected following implementation of Consent Decree No. 00-2-05714-8SEA.

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM EFFLUENT DATA

Sample Date	Units	Benzene	Diesel	Ethylbenzene	Gasoline	Oil	Toluene	Xylenes
3/21/2000	UG/L	115	3,070	7.19	636	375	116	63.8
4/14/2000	UG/L	**3,090**	18,000	1,190	58,300	1,875	**13,400**	9,670
6/15/2000	UG/L	3.55	8,220	3.57	297	1140	18.2	42.2
6/29/2000	UG/L	0.25	125	0.25	25	375	0.25	0.5
7/19/2000	UG/L	0.25	124	0.25	25	371.5	0.25	0.5
8/15/2000	UG/L	0.25	125	0.25	25	375	0.25	0.5
9/27/2000	UG/L	0.25	125	0.25	25	375	0.25	0.5
10/12/2000	UG/L	0.25	245	0.25	25	735	0.25	0.5
11/15/2000	UG/L	**156**	1,420	2.5	593	375	149	47.5
1/11/2001	UG/L	42.8	125		131	375		
2/15/2001	UG/L	17.4	125	0.25	25	375	5.59	4.78
3/15/2001	UG/L	43	125	0.881	84.4	375	20.8	7.34
4/30/2001	UG/L	35.3	809	0.7	81.5	375	18.2	5
5/18/2001	UG/L	19.8	553	0.25	67.4	375	9.3	3
6/11/2001	UG/L	34.4	354	0.8	82.3	375	18.2	5.4
7/24/2001	UG/L	36.4	543	1	154	375	20.5	6.4
8/24/2001	UG/L	60.1	125	1.1	106	375	27.4	7.3
9/6/2001	UG/L	41.2	125	0.9	104	375	23.1	5.9
10/16/2001	UG/L	18.9	125	0.5	57.9	375	9.2	4.1
11/15/2001	UG/L	18.4	125	0.8	59.2	375	6.9	5.4
12/10/2001	UG/L	95.6	5,670	72.1	4,900	375	110	491
1/16/2002	UG/L	**228**	7,300	63.6	4,750	375	120	486
2/21/2002	UG/L	75.3	1,261	7.53	953	375	12.6	89
3/15/2002	UG/L	81.2	4,990	99.6	3,620	375	44.6	247
4/2/2002	UG/L	NA	NA	NA	NA	NA	NA	NA
9/15/2002	UG/L	NA	NA	NA	NA	NA	NA	NA
10/14/2002	UG/L	1.34	6,770	1.39	NA	750	0.5	2.17
11/25/2002	UG/L	0.5	6,190	0.5	90.2	750	0.69	2.1
11/27/2002	UG/L	0.5	7,050	0.5	95.4	750	0.66	1.7
12/18/2002	UG/L	54.9	8,070	22.3	1,010	966	7.95	33.7
1/16/2003	UG/L	0.5	5,360	0.747	105	799	1.51	4.0
2/13/2003	UG/L	43.5	5,070	38.6	2,190	750	10.5	80.5
3/11/2003	UG/L	38.4	4,010	16.1	477	750	1.88	16.1
4/15/2003	UG/L	5.36	4,200	1.54	199	750	0.5	1.36
5/15/2003	UG/L	0.943	4,380	1.06	253	750	0.5	1.79
6/17/2003	UG/L	5.04	3,370	3.97	397	750	1.16	3.8
7/15/2003	UG/L	32.6	3,640	5.81	451	750	1.17	20.9
8/13/2003	UG/L	4.82	3,760	0.808	215	750	0.5	2.4
9/16/2003	UG/L	29.8	5,320	11.6	487	854	2.41	19.1
10/14/2003	UG/L	25.1	4,970	10.4	571	750	13.3	68.2
11/19/2003	UG/L	42.6	4,300	62	2,520	750	26	378
12/17/2003	UG/L	5.32	7,400	1.92	274	750	5.69	8.04
1/13/2004	UG/L	1.87	47,000	8.43	2,430	750	6.97	33.7
2/10/2004	UG/L	4.18	6,350	3.46	911	750	3.7	17
3/17/2004	UG/L	0.685	972	0.5	55	750	0.5	1
4/15/2004	UG/L	1.04	554	0.5	214	750	0.636	1
5/25/2004	UG/L	7.25	6,510	0.902	194	810	1.57	7.1
6/17/2004	UG/L	0.5	11,800	0.5	659	957	0.5	1.35
7/13/2004	UG/L	0.5	18,100	5.18	1,920	750	1.69	26.5
8/13/2004	UG/L	0.5	7,230	0.71	282	783	0.666	2.7
9/16/2004	UG/L	1.55	940	0.731	152	750	1.3	3.95
10/13/2004	UG/L	0.739	6,080	22	2,360	3750	3.08	133
11/19/2004	UG/L	0.5	1,920	0.632	227	750	0.5	1.8
12/15/2004	UG/L	0.5	804	0.5	60	750	0.5	1
1/13/2005	UG/L	0.5	23,400	1.1	1,170	750	0.5	4.06
2/15/2005	UG/L	0.5	1,190	0.5	50	750	0.5	1.13
3/15/2005	UG/L	0.5	1,020	0.5	115	750	0.5	1
4/15/2005	UG/L	33.6	1,740	26.6	1,710	750	130	194
KCDNR DISCHARGE LIMITS		130	100,000	1,400	NA	100,000	1,500	NA

Note: Data presented in this table is included for all data collected following implementation of Consent Decree No. 00-2-05714-8SEA.

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM EFFLUENT DATA CONTINUED

Sample Date	Units	Benzene	Diesel	Ethylbenzene	Gasoline	Oil	Toluene	Xylenes
5/20/2005	UG/L	68.3	26,400	305	21,300	750	745	2,400
6/10/2005	UG/L	37	1,750	121	6,650	750	373	898
7/15/2005	UG/L	0.5	1,280	0.987	227	750	2.02	8.36
8/12/2005	UG/L	0.5	1,540	17.4	1,640	750	57.2	177
9/15/2005	UG/L	12.5	1,140	39.7	2,790	750	90.8	425
10/14/2005	UG/L	5.34	758	17.8	1,000	750	27.5	167
11/17/2005	UG/L	14.6	627	8.11	697	750	15.8	69.5
12/19/2005	UG/L	0.64	11,000	5.98	1,400	750	8.86	69.5
1/25/2006	UG/L	0.5	9,540	0.5	608	750	0.507	1.88
2/14/2006	UG/L	0.5	670	0.54	250	708	1.53	3.6
3/15/2006	UG/L	0.5	518	0.5	50	708	0.5	1
4/14/2006	UG/L	2.5	1,150	2.5	50	721	2.5	5
5/17/2006	UG/L	0.5	1,180	0.5	65.5	743	0.5	1
6/14/2006	UG/L	0.5	1,490	0.5	50.6	765	0.5	2.77
7/12/2006	UG/L	0.5	269	0.5	50	538	0.5	0.5
8/16/2006	UG/L	0.5	269	0.5	134	476	0.5	1
9/13/2006	UG/L	0.5	7,130	0.5	195	519	0.5	2.77
10/12/2006	UG/L	0.5	245	0.5	50	735	0.5	1.44
11/17/2006	UG/L	0.5	1,870	0.621	218	505	0.5	5.81
12/19/2006	UG/L	6.63	1,760	3.2	703	798	0.887	35.1
1/19/2007	UG/L	0.712	810	1.11	151	743	0.5	4.57
2/16/2007	UG/L	0.503	3,040	0.829	128	833	0.5	4.77
3/16/2007	UG/L	0.5	644	0.5	50	728	0.5	0.5
4/19/2007	UG/L	0.5	2,970	0.5	95.5	495	0.5	1.23
5/17/2007	UG/L	0.946	514	1.18	113	758	0.5	3.01
6/14/2007	UG/L	0.5	408	0.5	50	510	0.5	1
7/13/2007	UG/L	0.5	996	0.5	50	515	0.5	1
8/16/2007	UG/L	0.555	245	0.5	85	490	0.5	1
9/10/2007	UG/L	0.5	399	0.5	75	495	0.5	1
10/17/2007	UG/L	11.2	253	2.65	324	505	0.5	1.86
11/16/2007	UG/L	0.5	339	0.5	205	526	0.5	1
12/14/2007	UG/L	0.5	248	0.5	50	495	0.5	1
1/22/2008	UG/L	0.5	227	0.5	92.6	500	0.5	1
2/14/2008	UG/L	3.77	773	2.71	167	538	0.5	7.69
3/14/2008	UG/L	0.77	293	0.5	64.9	481	0.5	1.28
4/18/2008	UG/L	0.5	255	0.5	51.3	510	0.5	1.12
5/16/2008	UG/L	0.5	255	0.5	50	510	0.5	1
6/18/2008	UG/L	0.5	272	0.5	50	543	0.5	1
7/16/2008	UG/L	0.5	253	0.5	100	505	0.5	1.39
8/18/2008	UG/L	0.5	256	0.5	50	476	0.5	1
9/16/2008	UG/L	0.5	253	0.5	50	505	0.5	1
10/15/2008	UG/L	3.26	242	1.27	132	476	0.5	1.05
11/14/2008	UG/L	0.976	240	0.5	50	481	0.5	1
12/11/2008	UG/L	0.5	240	0.5	50	481	0.5	1
1/14/2009	UG/L	0.5	510	0.5	75.7	500	0.5	1
2/18/2009	UG/L	0.98	250	0.5	77.5	500	0.5	1
3/17/2009	UG/L	0.5	238	0.5	50	476	0.5	1
4/16/2009	UG/L	0.5	240	0.5	50	481	0.5	1
5/14/2009	UG/L	0.5	278	0.5	50	556	0.5	1
6/16/2009	UG/L	0.5	323	0.5	50	476	0.5	1
7/22/2009	UG/L	1	626	9.2	730	481	1	64
8/18/2009	UG/L	2.1	580	1.1	240	480	1	2
9/15/2009	UG/L	0.89	410	1	120	480	1	2
10/20/2009	UG/L	0.51	410	1	53	470	1	2
KCDNR DISCHARGE LIMITS		130	100,000	1,400	NA	100,000	1,500	NA

Note: Data presented in this table is included for all data collected following implementation of Consent Decree No. 00-2-05714-8SEA.

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM EFFLUENT DATA CONTINUED

Sample Date	Units	Benzene	Diesel	Ethylbenzene	Gasoline	Oil	Toluene	Xylenes
11/17/2009	UG/L	4.5	260	3	640	480	1	6.6
12/14/2009	UG/L	0.5	260	1	50	490	1	2
1/21/2010	UG/L	0.5	5,500	1	1,000	480	1	2
2/17/2010	UG/L	0.5	4,700	1	290	480	1	2
3/17/2010	UG/L	0.5	960	1.0	96	*490*	*1.0*	2.0
4/15/2010	UG/L	0.5	1,200	1	120	490	1	2.0
5/19/2010	UG/L	0.5	790	0.5	70	470	0.5	1.0
6/16/2010	UG/L	0.5	950	0.5	57	280	0.5	1.0
7/28/2010	UG/L	0.5	690	0.5	50	250	0.5	1.0
8/18/2010	UG/L	1.0	240	1	50	390	1	3.0
9/21/2010	UG/L	0.5	500	1	50	400	1	3.0
10/19/2010	UG/L	0.5	330	1	50	400	1	3.0
11/29/2010	UG/L	0.5	350	1	50	390	1	3.0
12/22/2010	UG/L	2.3	10,100	10.4	2,150	400	1	57.5
1/19/2011	UG/L	0.5	5,000	1	200	400	1	3.0
2/15/2011	UG/L	0.5	2,300	1	89.6	400	1	3.0
3/29/2011	UG/L	0.5	850	1	50	390	1	3.0
4/21/2011	UG/L	0.5	2,900	1	272	400	1	3.0
5/18/2011	UG/L	0.5	5,200	1	85.6	950	1	3.0
6/15/2011	UG/L	0.5	260	1	50	420	1	3.0
7/20/2011	UG/L	0.5	460	1	50	390	1	3.0
8/17/2011	UG/L	0.5	400	1	50	410	1	3.0
9/14/2011	UG/L	0.5	180	1	50	410	1	3.0
10/11/2011	UG/L	0.5	930	1	74.4	930	1	3.0
11/22/2011	UG/L	0.5	1,400	1	50	410	1	3.0
12/13/2011	UG/L	0.5	690	1	50	390	1	3.0
1/23/2012	UG/L	0.8	7,500	1	543	410	1	3.0
2/14/2012	UG/L	0.5	1,500	1	50	400	1	3.0
3/13/2012	UG/L	0.5	810	1	50	390	1	3.0
4/16/2012	UG/L	0.5	8,800	1	50	640	1	3.0
5/16/2012	UG/L	0.5	1,400	1	50	380	1	3.0
6/13/2012	UG/L	0.5	500	1	50	390	1	3.0
7/20/2012	UG/L	0.5	290	1	50	380	1	3.0
8/23/2012	UG/L	0.5	2,600	1	107	390	1	3.0
9/5/2012	UG/L	0.5	760	1	50	400	1	3.0
10/24/2012	UG/L	0.5	3,300	1	50	820	1	3.0
12/18/2012	UG/L	8.5	3200	3.3	538	2,400	1	7.7
1/23/2013	UG/L	0.51	1,100	0.5	130	450	0.5	1.5
2/21/2013	UG/L	0.5	870	0.5	50	500	0.5	0.5
3/13/2013	UG/L	0.51	2,500	0.5	300	500	0.5	0.7
4/17/2013	UG/L	0.5	350	0.5	50	500	0.5	0.5
5/22/2013	UG/L	0.5	1,300	0.5	120	490	0.5	0.5
6/12/2013	UG/L	0.5	800	0.5	50	500	0.5	0.5
7/24/2013	UG/L	0.5	2,500	0.5	420	500	0.5	1.1
8/20/2013	UG/L	0.5	1,600	0.5	73	490	0.5	1.0
9/24/2013	UG/L	0.5	250	0.5	50	500	0.5	0.5
10/15/2013	UG/L	0.5	130	0.5	50	250	0.5	1.0
11/20/2013	UG/L	0.5	3,100	0.5	93	250	0.5	1.0
12/17/2013	UG/L	1.0	1,500	1.0	98	270	1.0	3.0
1/15/2014	UG/L	0.15	780	0.2	22	160	0.2	0.5
KCDNR DISCHARGE LIMITS		70	100,000	1,700	NA	100,000	1,400	NA
Average of final system data:		30	2,708	13	800	595	95	91

Note: Data presented in this table is included for all data collected following implementation of Consent Decree No. 00-2-05714-8SEA.

Table 1. Waterfront Groundwater System Influent and Effluent Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Notes:
No sampling occurred in November 2012, as the remediation system was shutdown from October through December for repair.
Data from the final remediation system was first collected in Oct of 2002. The line after April 2002 separates Interim and Final System data.
Effluent sample data are representative of the outflow water to metro sewer system.
Values in bold are in excess of KCDNR discharge limits. When excesses were noted KCDNR was immediately notified, the system was shutoff, and actions were taken to remedy the situation.
Influent diesel and oil samples are no longer analyzed, as influent and effluent samples are collected before and after, respectively, a diffused air stripper, which is not intended or effective at removing diesel or oil.
NA- Not Applicable, requirements do not exist for these chemical constituents.
NS-Not Sampled.

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene ug/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes ug/l
RW-10	Nov-03	0.625			1.2	0.892	2.42	3.07
RW-10	Aug-04	0.661	**36.2**	3.46	0.5	0.5	0.653	1.99
RW-10	Feb-05	0.473	1.21	0.75	0.5	0.5	0.5	1.41
RW-10	Nov-05	0.420	13.3	1.63	0.5	0.5	0.5	1
RW-10	Mar-06	0.066	4.14	0.75	0.5	0.5	0.5	1
RW-10	Nov-06	0.930	3.48	1.09	0.5	0.5	0.5	1
RW-10	May-07	0.073	0.255	*0.5*	0.5	0.5	0.5	1
RW-10	Nov-07	0.246	4.65	0.841	0.5	0.5	0.5	1
RW-10	Apr-08	0.235	1.91	*0.515*	0.5	0.5	0.5	1
RW-10	Nov-08	0.347	8.21	0.946	0.5	0.5	0.5	1
RW-10	Apr-09	0.448	5.95	0.804	0.5	0.5	0.5	1.36
RW-10	Nov-09	0.320	5.2	0.78	*0.5*	*1*	*1*	*2*
RW-10	Apr-10	0.460	2.3	*0.49*	*0.5*	*1*	*1*	*2*
RW-10	Nov-10	0.251	2.4	0.65	*0.5*	*1*	*1*	*3*
RW-10	Apr-11	0.6	1.5	0.68	*0.5*	*1*	*1*	*3*
RW-10	Nov-11	0.171	0.22	*0.39*	*0.5*	*1*	*1*	*3*
RW-10	Apr-12	0.366	0.51	0.46	*0.5*	*1*	*1*	*3*
RW-10	Nov-12	*0.1*	*0.11*	*0.11*	*0.5*	*0.5*	*0.5*	*1.5*
RW-10	Apr-13	0.2	0.36	*0.49*	*0.5*	*0.5*	*0.5*	*0.5*
RW-10	Nov-13	0.13	*0.25*	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-10	Average	0.4	4.9	0.8	0.5	0.7	0.8	1.7
RW-9	Nov-03	**13.10**			5	43.2	146	1180
RW-9	Aug-04	**1.24**	**94.9**	2.19	0.5	0.5	1.23	1.64
RW-9	Feb-05	0.907	**22.1**	<15	0.5	0.5	3.64	4.74
RW-9	Nov-05	0.568	4.31	0.708	0.5	0.5	0.968	1.45
RW-9	Mar-06	0.166	1.68	0.75	0.5	0.5	0.5	1
RW-9	Nov-06	0.359	5.98	1.17	0.5	0.5	0.647	1.09
RW-9	May-07	0.402	2.08	*0.5*	5.43	0.5	1.4	1.49
RW-9	Nov-07	0.184	**70.1**	**11.6**	0.5	*0.5*	*0.5*	*1*
RW-9	Apr-08	0.170	**18.2**	2.94	3.21	*0.5*	*0.5*	*1*
RW-9	Nov-08	0.130	**49.5**	8.21	0.5	*0.5*	*0.5*	*1*
RW-9	Apr-09	0.280	**45.1**	6.71	0.5	*0.5*	*0.5*	*1*
RW-9	Nov-09	0.670	**32**	6.8	1.5	*1*	*1*	*2*
RW-9	Apr-10	**6.0**	**110**	**24**	*0.5*	*1*	*1*	*2*
RW-9	Nov-10	0.207	2.0	0.53	*0.5*	*1*	*1*	*3*
RW-9	Apr-11	**1.12**	**276**	**45.9**	*0.5*	*1*	*1*	*3*
RW-9	Nov-11	0.289	2.3	*0.39*	*0.5*	*1*	*1*	*3*
RW-9	Apr-12	0.113	**33.2**	5.3	0.72	*1*	*1*	*3*
RW-9	Nov-12	*0.1*	8.2	8.4	0.5	*0.5*	*0.5*	*1.5*
RW-9	Apr-13	0.1	**44.0**	8.5	*0.5*	*0.5*	*0.5*	*0.5*
RW-9	Nov-13	0.062	**14.0**	2.6	*0.5*	*0.5*	*0.5*	*1*
RW-9	Average	**1.3**	**44.0**	7.6	1.2	2.8	8.2	60.7
RW-8	Nov-03	0.367			0.5	0.5	0.787	2.23
RW-8	Aug-04	0.181	**19.8**	2.19	0.5	0.5	0.53	2.13
RW-8	Feb-05	0.218	2.58	0.75	0.5	0.5	0.564	3.04
RW-8	Nov-05	0.099	0.575	0.721	0.5	0.5	0.5	1
RW-8	Mar-06	0.050	1.44	0.75	0.5	0.5	0.5	1
RW-8	Nov-06	0.050	3.58	0.762	0.5	0.5	0.5	1
RW-8	May-07	0.068	0.273	*0.5*	0.5	0.5	0.5	1
RW-8	Nov-07	0.065	0.29	0.543	0.5	0.5	0.5	1
RW-8	Apr-08	0.067	0.279	*0.529*	0.5	0.5	0.5	1
RW-8	Nov-08	0.088	3.85	0.492	0.5	0.5	0.5	1
RW-8	Apr-09	0.091	0.255	*0.476*	0.5	0.5	0.5	1
RW-8	Nov-09	0.140	1.3	*0.47*	*0.5*	*1*	*1*	*2*
RW-8	Apr-10	0.150	1.1	*0.49*	*0.5*	*1*	*1*	*2*
RW-8	Nov-10	0.105	1.0	*0.39*	*0.5*	*1*	*1*	*3*
RW-8	Apr-11	0.0995	2.6	0.59	*0.5*	*1*	*1*	*3*
RW-8	Nov-11	0.183	1.7	*0.39*	*0.5*	*1*	*1*	*3*
RW-8	Apr-12	*0.05*	1.3	*0.39*	*0.5*	*1*	*1*	*3*
RW-8	Nov-12	0.185	4.0	3.6	*0.5*	*0.5*	*0.5*	*1.5*
RW-8	Apr-13	0.062	2.7	0.52	*0.5*	*0.5*	*0.5*	*0.5*
RW-8	Nov-13	0.1	0.82	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-8	Average	0.1	2.6	0.8	0.5	0.7	0.7	1.7
	Groundwater Cleanup Level	**1.00**	**10.0**	**10.0**	**71.0**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	0.5 ug/l	0.5 ug/l	1.0 ug/l

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene ug/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes ug/l
RW-7	Nov-03	0.148			0.5	0.5	0.518	2.87
RW-7	Aug-04	0.050	7.6	1.2	0.5	0.5	0.5	1.09
RW-7	Feb-05	0.050	1.21	0.75	0.5	0.5	0.5	1
RW-7	Nov-05	0.050	0.35	0.728	0.5	0.5	0.5	1
RW-7	Mar-06	0.050	0.25	0.75	0.5	0.5	0.5	1
RW-7	Nov-06	0.063	3.16	1.34	0.5	0.5	0.5	1
RW-7	May-07	0.414	0.49	*0.515*	0.5	0.5	0.5	1
RW-7	Nov-07	0.187	0.25	*0.5*	0.5	0.5	0.5	1
RW-7	Apr-08	0.063	0.25	*0.5*	0.5	0.5	0.5	1
RW-7	Nov-08	0.071	0.236	*0.472*	0.5	0.5	0.5	1
RW-7	Apr-09	0.123	0.238	*0.476*	0.5	0.5	0.5	1
RW-7	Nov-09	0.075	0.69	*0.47*	*0.5*	*1*	*1*	*2*
RW-7	Apr-10	0.140	0.85	*0.49*	*0.5*	*1*	*1*	*2*
RW-7	Nov-10	0.11	0.46	*0.4*	*0.5*	*1*	*1*	*3*
RW-7	Apr-11	0.207	1.1	*0.41*	*0.5*	*1*	*1*	*3*
RW-7	Nov-11	*0.05*	0.13	*0.4*	*0.5*	*1*	*1*	*3*
RW-7	Apr-12	*0.05*	0.21	*0.42*	*0.5*	*1*	*1*	*3*
RW-7	Nov-12	*0.1*	0.32	0.37	*0.5*	*0.5*	*0.5*	*1.5*
RW-7	Apr-13	0.081	0.63	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
RW-7	Nov-13	*0.05*	0.45	*0.24*	*0.5*	*0.5*	*0.5*	*1*
RW-7	Average	0.1	1.0	0.6	0.5	0.7	0.7	1.6
RW-1	Nov-03	0.858	8.73	1.34	1.03	0.758	2.71	3.39
RW-1	Aug-04	**1.00**	**31.6**	2.08	0.685	0.787	2.1	4.18
RW-1	Feb-05	**1.03**	**18.9**	0.75	10.5	4.66	4.06	20.2
RW-1	Nov-05	0.547	2.19	0.708	0.5	0.5	0.5	1.67
RW-1	Mar-06	0.144	4.78	0.802	0.5	0.5	0.5	1
RW-1	Nov-06	0.173	3.28	*0.487*	0.5	0.5	0.5	1
RW-1	May-07	0.081	0.972	*0.526*	0.5	0.5	0.5	1
RW-1	Nov-07	0.056	0.596	*0.505*	0.5	0.5	0.5	1
RW-1	Apr-08	0.068	0.25	*0.5*	0.5	0.5	0.5	1
RW-1	Nov-08	0.050	0.274	*0.472*	0.5	0.5	0.5	1
RW-1	Apr-09	0.074	0.332	*0.481*	0.5	0.5	0.5	1
RW-1	Nov-09	0.073	0.44	*0.47*	*0.5*	*1*	*1*	*2*
RW-1	Apr-10	0.071	0.31	*0.49*	*0.5*	*1*	*1*	*2*
RW-1	Nov-10	0.143	0.32	*0.39*	*0.5*	*1*	*1*	*3*
RW-1	Apr-11	0.0991	0.95	*0.39*	*0.5*	*1*	*1*	*3*
RW-1	Nov-11	0.14	6.9	1.6	*0.5*	*1*	*1*	*3*
RW-1	Apr-12	0.131	0.86	*0.4*	0.53	*1*	*1*	*3*
RW-1	Nov-12	*0.1*	0.23	0.35	*0.5*	*0.5*	*0.5*	*1.5*
RW-1	Apr-13	0.15	0.47	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
RW-1	Nov-13	0.12	0.4	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-1	Average	0.3	4.1	0.7	1.0	0.9	1.0	2.8
RW-6	Nov-03	**1.81**			**569**	23.1	10	116
RW-6	Aug-04	0.067	0.25	0.75	0.5	0.5	0.5	1
RW-6	Feb-05	0.101	0.25	0.75	0.5	0.5	0.788	1.3
RW-6	Nov-05	**8.19**	**115**	***14.7***	7.62	2.56	53.6	524
RW-6	Mar-06	**31.80**	**560**	**300**	12.7	9.15	96.7	568
RW-6	Nov-06	**1.14**	**26.8**	*1.05*	0.591	0.5	0.636	10
RW-6	May-07	**1.02**	**38.9**	*5.05*	34	1.44	16.6	15.2
RW-6	Nov-07	0.05	1.9	*5.32*	0.5	0.5	0.5	1
RW-6	Apr-08	0.33	5.56	0.542	10.2	1.22	9.56	6.9
RW-6	Nov-08	0.05	0.734	*0.472*	0.5	0.5	0.5	1
RW-6	Apr-09	0.175	1.14	*0.476*	6.93	0.5	3.08	3.32
RW-6	Nov-09	*0.050*	0.73	*0.47*	*0.5*	*1*	*1*	*2*
RW-6	Apr-10	**1.10**	3.2	*0.49*	53	2	9.4	6.7
RW-6	Nov-10	0.266	2.5	*0.39*	*0.5*	*1*	*1*	*3*
RW-6	Apr-11	0.595	*0.37*	*0.41*	15.1	*1*	9.5	6.7
RW-6	Nov-11	*0.05*	0.21	*0.38*	*0.5*	*1*	*1*	*3*
RW-6	Apr-12	*0.05*	0.98	*0.4*	1.1	*1*	*1*	*3*
RW-6	Nov-12	*0.1*	*0.11*	*0.11*	*0.5*	*0.5*	*0.5*	*1.5*
RW-6	Apr-13	0.18	1.1	*0.49*	0.82	*0.5*	*0.5*	0.55
RW-6	Nov-13	0.052	0.29	*0.25*	*0.5*	*0.5*	*0.5*	*1*
RW-6	Average	**2.4**	**40.0**	**17.5**	35.8	2.4	10.8	63.8
	Groundwater Cleanup Level	**1.00**	**10.0**	**10.0**	**71.0**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	0.5 ug/l	0.5 ug/l	1.0 ug/l

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene ug/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes ug/l
RW-5	Nov-03	**2.10**	4.13	0.75	5.21	0.657	83.5	186
RW-5	Aug-04	**7.60**	**14.5**	1.55	1.93	1.67	324	630
RW-5	Feb-05	**3.18**	**17.4**	***15***	**37.8**	40	38.5	287
RW-5	Nov-05	**19.60**	**1240**	***361***	**43.2**	42	66.2	879
RW-5	Mar-06	**1.79**	**13.3**	7.5	1.06	24.2	8.03	129
RW-5	Nov-06	0.741	8	1.67	0.5	0.5	0.732	4.23
RW-5	May-07	**2.920**	**13.9**	2.01	22.1	0.705	16.7	60.1
RW-5	Nov-07	1.430	2.16	0.639	1.08	0.5	1.87	2.07
RW-5	Apr-08	0.240	7.71	2.17	5.64	0.5	1.19	1.48
RW-5	Nov-08	**1.520**	0.916	*0.472*	6.32	0.5	2.85	3.55
RW-5	Apr-09	0.873	**11.7**	2.45	**93.3**	2.42	8.74	16.5
RW-5	Nov-09	0.066	0.4	*0.47*	*0.5*	*1*	*1*	*2*
RW-5	Apr-10	0.570	1.4	*0.49*	7.3	*1*	15	29
RW-5	Nov-10	0.785	0.9	*0.39*	30.5	*1*	2	5.3
RW-5	Apr-11	0.801	1.3	*0.41*	10.3	*1*	3.5	7
RW-5	Nov-11	0.18	1.2	*0.39*	9.2	*1*	5.6	3.9
RW-5	Apr-12	0.746	0.35	*0.41*	14.1	*1*	6.8	26
RW-5	Nov-12	*0.1*	0.38	0.41	1.6	*0.5*	*0.5*	*1.5*
RW-5	Apr-13	0.18	**26**	2.2	0.57	*0.5*	*0.5*	*0.5*
RW-5	Nov-13	0.22	*0.25*	*0.25*	0.83	*0.5*	*0.5*	*1*
RW-5	Average	**2.3**	**68.3**	**20.0**	14.7	6.1	29.4	113.8
RW-4	Nov-03	**4.89**			36.1	44.3	337	281
RW-4	Aug-04	**182.0**	**681**	***150***	**617**	7740	2750	15,200
RW-4	Feb-05	**49.4**	**2,610**	***765***	**347**	2830	834	7,210
RW-4	Nov-05	**77.5**	**3,650**	***1820***	**341**	6940	1100	8,010
RW-4	Mar-06	**26.1**	**440**	**150**	30.2	654	346	3,340
RW-4	Nov-06	**7.23**	**139**	*5.26*	65.2	157	47	1,090
RW-4	May-07	0.82	8.08	*0.543*	3.97	0.547	3.89	77.5
RW-4	Nov-07	**1.29**	0.553	*0.543*	1.97	0.536	3.5	106
RW-4	Apr-08	0.07	2.91	*0.532*	0.5	0.5	0.5	4.57
RW-4	Nov-08	0.73	6.43	*0.472*	6.86	0.5	3.6	28.2
RW-4	Apr-09	0.565	7.93	*0.481*	8.17	0.5	1.43	18.3
RW-4	Nov-09	**5.5**	**25**	1.2	22	1.9	30	310
RW-4	Apr-10	**4.2**	**10**	*0.49*	46	1.6	24	155
RW-4	Nov-10	**2.61**	**20**	0.86	39.9	*1.0*	15	47.9
RW-4	Apr-11	**5.73**	**29.5**	1.2	67.9	1.2	44.8	158
RW-4	Nov-11	**4.51**	**56.2**	1.4	48.5	*1.0*	43.6	98.3
RW-4	Apr-12	**6.24**	**38.1**	1.4	56.8	*1.2*	45.3	106
RW-4	Nov-12	0.771	**10.7**	9.2	7.5	*0.5*	3.9	10.1
RW-4	Apr-13	**1.1**	7.1	*0.5*	16	*0.5*	5.4	2.32
RW-4	Nov-13	0.77	0.63	*0.25*	12	*0.5*	6.2	12
RW-4	Average	**19.1**	**407.5**	**153.1**	**88.7**	918.9	282.3	1813.3
RW-2	Nov-03	**2.07**			**820**	369	34.5	124
RW-2	Aug-04	**7.03**	46	1.41	**2,270**	382	354	1,180
RW-2	Feb-05	**4.65**	1.02	0.75	**1,690**	450	296	752
RW-2	Nov-05	**2.82**	0.76	0.708	**1,540**	299	159	353
RW-2	Mar-06	**2.39**	6.84	3.75	**1,120**	112	138	224
RW-2	Nov-06	**13.10**	**14.3**	1.05	**1,830**	516	410	1,810
RW-2	May-07	**8.25**	6.35	*0.505*	**254**	33.1	237	1,150
RW-2	Nov-07	**3.55**	3.32	*0.538*	**895**	5	79.4	172
RW-2	Apr-08	**2.06**	**10.0**	*0.515*	**245**	5	58	190
RW-2	Nov-08	**1.42**	1.1	*0.481*	**360**	4.04	17.6	40
RW-2	Apr-09	0.497	0.864	*0.476*	49	1.78	9.49	22
RW-2	Nov-09	**2.4**	2.6	*0.48*	**400**	23	150	410
RW-2	Apr-10	**1.5**	1.0	*0.49*	**200**	1.5	66	98
RW-2	Nov-10	0.36	8.1	*0.6*	34.9	*1.0*	7.7	23.3
RW-2	Apr-11	**1.0**	1.5	*0.39*	**146**	1.3	27.8	51.7
RW-2	Nov-11	0.96	0.69	*0.39*	**363**	4.7	36.5	63.8
RW-2	Apr-12	0.57	**13.9**	*0.74*	**139**	*1.0*	13.7	17.4
RW-2	Nov-12	0.71	1.0	*0.91*	**196**	1.2	11.2	8.3
RW-2	Apr-13	0.47	3.0	*0.49*	**230**	2.0	20	6.6
RW-2	Nov-13	0.40	4.6	*0.25*	**80**	2.9	6.2	5.5
RW-2	Average	**2.8**	6.7	0.8	**643.1**	110.8	106.6	335.1
	Groundwater Cleanup Level	**1.00**	**10.0**	**10.0**	**71.0**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	0.5 ug/l	0.5 ug/l	1.0 ug/l

Table 2. Waterfront Groundwater Recovery Wells Petroleum Hydrocarbon History
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well ID	Date	Gasoline mg/l	Diesel mg/l	Oil mg/l	Benzene ug/l	Toluene ug/l	Ethylbenzene ug/l	Xylenes ug/l
GM-11S	Nov-03	**2.28**			**614**	38.3	67.2	141
GM-11S	Aug-04	**2.06**	**57**	3.93	**506**	2.17	49.3	84.1
GM-11S	Feb-05	**2.42**	**25.1**	<15	55.6	0.848	25.5	17.3
GM-11S	Nov-05	**2.15**	**37.4**	<7.14	**124**	3.66	13.7	5.34
GM-11S	Mar-06	**1.41**	**17.8**	7.5	**218**	2.5	24.5	5
GM-11S	Nov-06	0.131	**10.8**	*1.05*	13.5	0.5	2.86	1.59
GM-11S	May-07	**1.68**	1.1	*0.556*	**175**	2.5	81.2	35.1
GM-11S	Nov-07	**2.20**	2.34	*0.505*	56.2	4.16	48.4	34.3
GM-11S	Apr-08	**1.93**	0.319	*0.532*	65.7	1.76	185	132
GM-11S	Nov-08	**1.66**	1.23	*0.472*	**95.3**	1.76	44.5	14.8
GM-11S	Apr-09	**1.26**	0.942	*0.481*	5.34	0.898	19.1	11.1
GM-11S	Aug-09	**1.90**	1.2	*0.48*	71	2.4	37	6.3
GM-11S	Nov-09	**1.50**	3.6	*0.48*	36	1.1	48	24
GM-11S	Apr-10	**3.00**	5	0.5	46	1.6	93	156
GM-11S	Nov-10	**1.39**	1.8	*0.48*	42	1.9	64.9	37.1
GM-11S	Apr-11	**1.42**	0.52	*0.4*	18.4	*1*	26.5	20.1
GM-11S	Nov-11	**2.28**	0.47	*0.38*	30.9	1.7	22.9	10.3
GM-11S	Apr-12	**2.24**	1.1	*0.38*	33	1.7	59.2	40.4
GM-11S	Nov-12	0.671	0.83	0.62	11.4	0.86	44.6	27.9
GM-11S	Apr-13	0.5	0.35	*0.49*	20	0.52	23	9.1
GM-11S	Nov-13	0.33	0.47	0.58	4.1	0.6	10	1
GM-11S	Average	**1.6**	8.5	1.1	**106.7**	3.4	47.2	38.8
	Groundwater Cleanup Level	**1.00**	**10.0**	**10.0**	**71.0**			
Reporting Limits/Units		0.05 mg/l	0.25 mg/l	.750 mg/l	0.5 ug/l	0.5 ug/l	0.5 ug/l	1.0 ug/l

Detection limits for many of the Oil analyses were raised due to sample dilution for diesel analyses.
These samples are listed with a "<" notation.
Values highlighted in bold exceed the cleanup level

Table 3. Waterfront Groundwater System Petroleum Hydrocarbon Recovery Rates
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington

GROUNDWATER SYSTEM EFFICIENCIES

SAMPLE DATE	UNITS	Influent Benzene	Effluent Benzene	% Reduction	Influent Diesel	Effluent Diesel	% Reduction	Influent Ethylbenzene	Effluent Ethylbenzene	% Reduction	Influent Gasoline	Effluent Gasoline	% Reduction	Influent Oil	Effluent Oil	% Reduction	Influent Toluene	Effluent Toluene	% Reduction	Influent Xylenes	Effluent Xylenes	% Reduction
2002 Averages	UG/L	225.3	14.3	91%	7,315	7,020	4%	55.2	6.2	75%	1,770	336	82%	831	804	5%	17.0	2.5	88%	88.8	9.9	87%
2003 Averages	UG/L	137.7	19.5	76%	4,945	4,648	-1%	44.5	12.9	69%	1,854	678	62%	760	763	0%	42.7	5.4	61%	154.1	50.3	68%
2004 Averages	UG/L	93.5	3.2	82%	10,285	9,342	-6%	76.8	4.7	79%	4,383	840	59%	762	1,026	-8%	116.6	2.2	82%	356.6	23.0	75%
2005 Averages	UG/L	76.7	14.5	84%	4,162	5,987	-9%	170.8	45.4	81%	10,090	3,229	70%	864	750	15%	566.9	121.0	84%	1,327.7	367.9	78%
2006 Averages	UG/L	38.9	1.2	89%	11,263	2,174	42%	42.1	0.9	90%	4,944	202	94%	665	666	0%	55.6	0.8	77%	485.1	5.2	96%
2007 Averages	UG/L	8.8	1.5	60%	1,223	906	18%	6.6	0.8	56%	407	115	63%	598	598	0%	1.0	0.5	21%	19.8	1.9	50%
2008 Averages	UG/L	10.0	1.1	70%	540	468	6%	5.5	0.7	39%	279	76	61%	505	504	0%	0.7	0.5	40%	10.6	1.6	65%
2009 Averages	UG/L	5.2	1.0	48%	369	561	8%	4.1	1.6	31%	407	182	46%	497	489	2%	0.8	0.7	44%	15.2	7.4	33%
2010 Averages	UG/L	3.9	0.7	76%		2,193	*NA*	6.8	1.7	78%	915	336	*65%*		*410*	*NA*	*0.9*	*0.9*	*NA*	26	6.7	69%
2011 Averages	UG/L	3.2	0.5	80%		1,714	*NA*	2.4	1.0	53%	439	89	*69%*		*492*	*NA*	*1.0*	*1.0*	*NA*	7	3.0	29%
2012 Averages	UG/L	3.6	1.3	48%		2,787	*NA*	1.9	1.2	37%	362	144	*61%*		*636*	*NA*	*1.0*	*1.0*	*NA*	6	3.4	48%
1/23/2013	UG/L	1.8	0.51	72%		1,100	*NA*	0.54	*0.5*	7%	165	130	*21%*		*450*	*NA*	*0.5*	*0.5*	*NA*	1.5	1.5	NA
2/21/2013	UG/L	*0.5*	*0.5*	0%		870	*NA*	*0.5*	*0.5*	NA	*50*	*50*	*NA*		*500*	*NA*	*0.5*	*0.5*	*NA*	*0.5*	*0.5*	NA
3/13/2013	UG/L	1.8	*0.51*	72%		2,500	*NA*	1.4	*0.5*	NA	620	300	*52%*		*500*	*NA*	*0.5*	*0.5*	*NA*	2.3	0.7	70%
4/17/2013	UG/L	*0.5*	*0.5*	0%		350	*NA*	*0.5*	*0.5*	NA	71	*50*	*30%*		*500*	*NA*	*0.5*	*0.5*	*NA*	*0.5*	*0.5*	NA
5/22/2013	UG/L	0.71	*0.5*	30%		1,300	*NA*	0.7	*0.5*	32%	390	120	*69%*		*490*	*NA*	*0.5*	*0.5*	*NA*	1.8	*0.5*	72%
6/12/2013	UG/L	0.97	*0.5*	48%		800	*NA*	*0.5*	*0.5*	NA	220	*50*	*77%*		*500*	*NA*	*0.5*	*0.5*	*NA*	*0.5*	*0.5*	NA
7/24/2013	UG/L	1.6	*0.5*	69%		2,500	*NA*	4.7	*0.5*	89%	1,200	420	*65%*		*500*	*NA*	*0.5*	*0.5*	*NA*	12.0	1.1	91%
8/20/2013	UG/L	1.6	*0.5*	69%		1,600	*NA*	1.5	*0.5*	67%	560	*73*	*87%*		*490*	*NA*	*0.5*	*0.5*	*NA*	4.5	*1.0*	78%
9/24/2013	UG/L	0.5	*0.5*	NA		*250*	*NA*	*0.5*	*0.5*	NA	120	*50*	*58%*		*500*	*NA*	*0.5*	*0.5*	*NA*	*0.5*	*0.5*	NA
10/15/2013	UG/L	0.5	*0.5*	NA		*130*	*NA*	*0.5*	*0.5*	NA	61	*50*	*18%*		*250*	*NA*	*0.5*	*0.5*	*NA*	*1.0*	*1.0*	NA
11/20/2013	UG/L	0.5	*0.5*	NA		*3,100*	*NA*	*0.5*	*0.5*	NA	310	*93*	*70%*		*250*	*NA*	*0.5*	*0.5*	*NA*	*1.0*	*1.0*	NA
12/17/2013	UG/L	1.2	*1.0*	NA		*1,500*	*NA*	*1.0*	*1.0*	NA	510	*98*	*81%*		*270*	*NA*	*1.0*	*1.0*	*NA*	*3.0*	*3.0*	NA
SURFACE WATER CLEANUP LEVELS		71 ug/L			10,000 ug/L			NA			1,000 ug/L			10,000 ug/L			NA			NA		
KCDNR DISCHARGE LIMITS			70 ug/L			100,000 ug/L			1,700 ug/L			NA			100,000 ug/L			1,400 ug/L			NA	
2013 Averages		1.0 ug/L	.5 ug/L	37%	NA	1,333 ug/L	NA	1.1 ug/L	.5 ug/L	49%	356 ug/L	124 ug/L	57%	NA	433 ug/L	NA	.5 ug/L	.5 ug/L	NA	2.4 ug/L	1.0 ug/L	71%

METRO DISCHARGE DATA

Observation Date	Days Operational since last monitoring reading	Average flow (GPM)	Total Flow Between Observation dates (gallons)	Pounds of Benzene Removed	Pounds of Gasoline Removed	Pounds of Diesel Removed	Pounds of Oil Removed	Pounds of Toluene Removed	Pounds of Ethylbenzene Removed	Pounds of Xylenes Recovered	Total Gallons Gas, Diesel, and Oil
2002 Totals and Averages	65	4.18	322,785	0.62	4.99	19.42	2.30	0.05	0.13	0.22	**3.90**
2003 Totals and Averages	361	8.03	4,114,867	4.43	62.20	169.14	26.05	1.18	1.47	5.05	**37.76**
2004 Totals and Averages	338	9.58	4,570,461	3.54	175.70	419.25	28.95	5.35	3.16	14.66	**92.43**
2005 Totals and Averages	359	11.17	5,827,144	3.43	447.43	155.78	41.55	25.29	7.69	59.98	**100.52**
2006 Totals and Averages	365	6.40	3,220,733	0.80	192.72	663.65	19.09	2.85	1.89	20.04	**128.92**
2007 Totals and Averages	360	3.17	1,599,607	0.15	9.08	18.30	8.40	0.02	0.11	0.48	**5.20**
2008 Totals and Averages	363	3.19	1,645,810	0.14	3.95	7.21	6.95	0.01	0.08	0.15	**2.59**
2009 Totals and Averages	369	2.98	1,569,390	0.07	5.75	7.81	6.40	0.01	0.06	0.22	**2.89**
2010 Totals and Averages	372	2.17	1,185,127	0.04	8.62	18.84	4.26	0.01	0.05	0.19	**4.66**
2011 Totals and Averages	355	1.90	949,880	0.03	5.13	17.55	3.54	0.01	0.03	0.13	**3.81**
2012 Totals and Averages	371	1.89	948,600	0.03	3.97	25.92	3.47	0.01	0.02	0.04	**4.81**
1/23/2013	36	2.04	105,630	0.01	0.40	1.90	1.26	0.00	0.00	0.01	**0.50**
2/21/2013	29	1.46	60,940	0.00	0.05	0.50	0.24	0.00	0.00	0.00	**0.11**
3/13/2013	20	1.36	39,280	0.00	0.11	0.55	0.16	0.00	0.00	0.00	**0.12**
4/17/2013	35	1.15	57,920	0.00	0.17	0.69	0.24	0.00	0.00	0.00	**0.16**
5/22/2013	35	1.11	55,980	0.00	0.11	0.39	0.23	0.00	0.00	0.00	**0.10**
6/12/2013	21	1.35	40,960	0.00	0.10	0.36	0.17	0.00	0.00	0.00	**0.09**
7/24/2013	42	1.20	72,400	0.00	0.43	1.00	0.30	0.00	0.00	0.00	**0.25**
8/20/2013	27	1.32	51,340	0.00	0.38	0.88	0.21	0.00	0.00	0.00	**0.21**
9/24/2013	35	1.28	64,450	0.00	0.18	0.50	0.27	0.00	0.00	0.00	**0.14**
10/15/2013	21	0.93	28,220	0.00	0.02	0.04	0.09	0.00	0.00	0.00	**0.02**
11/20/2013	36	1.24	64,050	0.00	0.10	0.86	0.13	0.00	0.00	0.00	**0.16**
12/18/2013	28	1.47	59,280	0.00	0.20	1.14	0.13	0.00	0.00	0.00	**0.21**
2013 Totals and Averages	365	1.33	700,450	0.01	2.26	8.80	3.43	0.00	0.01	0.02	**2.08**
		TOTALS:	**26,503,304 gal**	**13.29**	**921.79**	**1531.66**	**154.41**	**34.79**	**14.70**	**101.18**	
	Maximum permitted GPM:	**27.8**	**Gallons Gas, Diesel, & Oil Recovered:**	**149.88**	**219.44**	**20.24**			**TOTAL GALLONS RECOVERED:**		**389.56**

Oil Water Separator Data

Observation Date	Monthly LNAPL Recovery (gal)
February-03	19.6
April-03	6.9
May-03	2.5
July-03	2
December-03	20
January-04	25
June-04	35
August-04	50
September-04	8
November-04	10
December-04	3.5
January-05	0
February-05	35
July-05	110
February-06	5
March-06	2
December-06	30
March-08	30
Total Gallons LNAPL Recovered	**395**

TOTAL PETROLEUM RECOVERY	
Total lbs Dissolved Gas, Diesel, and Oil Recovered in Groundwater (2002-Present)	2,608 lbs
Total Gallons Dissolved Gas, Diesel, and Oil Recovered in Groundwater (2002-Present)*	**390 gal**
Total Gallons LNAPL Recovered by Final Recovery System (2002-Present)	**395 gal**
Total Gallons LNAPL Recovered by Interim Recovery System (1992-2002)	**9,312 gal**
Total Gallons of TPH Vapor Recovered by Final SVE System (2003-2008)**	**2,334 gal**
Total Gallons of TPH Vapor Recovered by Interim SVE System (1996-2002)**	**1,248 gal**
Total Gallons TPH Recovered from Final SVE System due to Biodegradation (2003-2008)***	**11,411 gal**
Total Gallons TPH Recovered from Interim SVE System due to Biodegradation (1996-2002)***	**4,664 gal**
Total Gallons Recovered by Final Recovery Systems (2002-Present)	**14,530 gal**
Total Gallons Recovered by Interim Recovery Systems (1992-2002)	**15,223 gal**
Total Gallons of Petroleum Removed (1992-Present)	**29,753 gal**

Definitions:

gal - gallons
GPM - Gallons per minute
NA - Not available
LNAPL - Light non-aqueous phase liquid (oil)
SVE - Soil vapor extraction
TPH - Total petroleum hydrocarbons
ug/L - micrograms per liter

Notes:

LNAPL Recovery is recorded periodically when sufficient product has been accumulated to be transported off-site for disposal.
Influent diesel and oil samples are no longer analyzed, as influent and effluent samples are collected before and after, respectively, a diffused air stripper, which is not intended or effective at removing diesel or oil.
Effluent sample data are representative of the outflow water to metro sanitary sewer system.
The average ppm between the preceding month and the month of reference are used when calculating the recovered product .
If the influent concentrations are below the laboratories method reporting limit, the percent reduction is calculated using the method reporting limit. The actual percent reduction is ≥ the reported value.

* Calculation of lbs of Recovered Product:
To convert ug/L to lbs/gallon - (ug/l)x(3.785l/gal)=ug/gal, (ug/gal)x(ug/(2.2046x10-9lbs))=lbs/gal
lbs/gal of chemical constituent x total gallons recovered =lbs of chemical recovered
Density of Gasoline utilized for conversions from pounds to gallons is 6.15 lbs/gal
Density of Diesel utilized for conversions from pounds to gallons 6.98 lbs/gal
Density of Oil utilized for conversions from pounds to gallons 7.63 lbs/gal
Benzene, toluene, ethylbenzene, and xylenes are not added independently and are assumed to be incorporated as part of the TPH as gasoline

** / *** SVE Recovery Calculations for TPH and Biodegradation, which are maintained in separate tables.

C = Average Influent TPH concentration (ppmv)
Q = Influent Flow Rate (SCFM)
Mc = Molecular wt. of Carbon Dioxide = 44
Mg = Molecular wt. of Gasoline = 87
Density of Gasoline for conversions is 6.15 lbs/gal

** TPH recovered by SVE system was calculated in lbs/hr = C x Q x Mg x 1.583 x 10^{-7}
1.583 x 10^{-7} is a constant and is derived as follows:
10^{-6} ppmv x 60min/1hr x 1 lb Mole/379 cu.ft.
SVE TPH recovery calculations are based on TPH concentrations in the SVE stream, SVE hrs of operation, and SVE measured flow rates.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
9-Aug-92	0.0	NA	0	NA	NA	NA	0
10-Aug-92	1.2	NA	1	NA	NA	NA	1
11-Aug-92	27.4	NA	29	NA	NA	NA	29
19-Aug-92	43.6	NA	72	NA	NA	NA	72
25-Aug-92	7.3	NA	80	NA	NA	NA	80
26-Aug-92	19.0	NA	99	NA	NA	NA	99
27-Aug-92	19.4	NA	118	NA	NA	NA	118
11-Sep-92	5.4	NA	123	NA	NA	NA	123
13-Sep-92	31.8	NA	155	NA	NA	NA	155
18-Dec-92	17.8	NA	173	NA	NA	NA	173
4-Jan-93	45.0	NA	218	NA	NA	NA	218
3-Feb-93	120.3	NA	338	NA	NA	NA	338
4-Feb-93	11.1	NA	349	NA	NA	NA	349
5-Feb-93	14.8	NA	364	NA	NA	NA	364
8-Feb-93	38.9	NA	403	NA	NA	NA	403
16-Feb-93	72.7	NA	476	NA	NA	NA	476
18-Feb-93	23.5	NA	499	NA	NA	NA	499
1-Mar-93	89.4	NA	589	NA	NA	NA	589
15-Mar-93	253.8	NA	842	NA	NA	NA	842
16-Mar-93	20.2	NA	863	NA	NA	NA	863
25-Mar-93	98.0	NA	961	NA	NA	NA	961
31-Mar-93	52.1	NA	1,013	NA	NA	NA	1,013
8-Apr-93	108.6	NA	1,121	NA	NA	NA	1,121
12-Apr-93	86.5	NA	1,208	NA	NA	NA	1,208
14-Apr-93	37.5	NA	1,245	NA	NA	NA	1,245
15-Apr-93	21.8	NA	1,267	NA	NA	NA	1,267
29-Apr-93	114.0	NA	1,381	NA	NA	NA	1,381
5-May-93	57.9	NA	1,439	NA	NA	NA	1,439
10-May-93	128.9	NA	1,568	NA	NA	NA	1,568
14-May-93	175.4	NA	1,743	NA	NA	NA	1,743
19-May-93	236.7	NA	1,980	NA	NA	NA	1,980
28-May-93	279.7	NA	2,260	NA	NA	NA	2,260
3-Jun-93	2.4	NA	2,262	NA	NA	NA	2,262
4-Jun-93	78.0	NA	2,340	NA	NA	NA	2,340
11-Jun-93	40.5	NA	2,380	NA	NA	NA	2,380
25-Jun-93	216.6	NA	2,597	NA	NA	NA	2,597
6-Jul-93	167.9	NA	2,765	NA	NA	NA	2,765
9-Jul-93	15.1	NA	2,780	NA	NA	NA	2,780
16-Jul-93	3.3	NA	2,783	NA	NA	NA	2,783
29-Jul-93	9.2	NA	2,792	NA	NA	NA	2,792
30-Oct-93	1007.6	NA	3,800	NA	NA	NA	3,800
15-Mar-94	900.0	NA	4,700	NA	NA	NA	4,700
30-Jun-94	900.0	NA	5,600	NA	NA	NA	5,600
28-Sep-94	300.0	NA	5,900	NA	NA	NA	5,900
27-Dec-94	300.0	NA	6,200	NA	NA	NA	6,200
27-Mar-95	300.0	NA	6,500	NA	NA	NA	6,500
25-Jun-95	300.0	NA	6,800	NA	NA	NA	6,800
23-Sep-95	100.0	NA	6,900	NA	NA	NA	6,900
22-Dec-95	98.0	NA	6,998	NA	NA	NA	6,998
1-Jan-96	103.0	NA	7,101	11.4	24.8	36	7,137
28-Feb-96	140.0	NA	7,241	22.7	49.6	108	7,349

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
28-Mar-96	229.0	NA	7,470	88.5	155.4	352	7,822
24-Apr-96	60.5	NA	7,531	64.9	126.4	544	8,074
31-May-96	56.0	NA	7,586	54.4	150.8	749	8,335
26-Jun-96	61.0	NA	7,648	60.7	139.8	949	8,597
17-Jul-96	201.9	NA	7,849	62.9	158.0	1,170	9,020
16-Aug-96	312.9	NA	8,162	85.3	242.3	1,498	9,660
18-Sep-96	216.2	NA	8,379	23.8	74.8	1,596	9,975
16-Oct-96	120.5	NA	8,499	72.9	248.3	1,918	10,417
20-Nov-96	99.3	NA	8,598	30.8	155.2	2,104	10,702
12-Dec-96	17.2	NA	8,615	8.4	79.5	2,192	10,807
16-Jan-97	38.9	NA	8,654	8.3	75.8	2,276	10,930
14-Feb-97	2.3	NA	8,657	6.4	53.8	2,336	10,993
13-Mar-97	23.1	NA	8,680	7.5	42.4	2,386	11,066
14-Apr-97	86.6	NA	8,766	14.3	16.3	2,417	11,183
15-May-97	164.9	NA	8,931	18.2	42.0	2,477	11,408
24-Jun-97	70.2	NA	9,001	0.0	0.0	2,477	11,478
24-Jul-97	41.1	NA	9,043	2.7	13.9	2,493	11,536
24-Aug-97	0.0	NA	9,043	1.9	9.6	2,505	11,547
30-Sep-97	6.26	NA	9,049	2.2	11.4	2,518	11,567
31-Oct-97	23.68	NA	9,072	0.0	0.0	2,518	11,591
30-Nov-97	9.04	NA	9,081	0.0	0.0	2,518	11,600
15-Dec-97	7.19	NA	9,089	0.5	2.5	2,521	11,610
14-Jan-98	10.29	NA	9,099	1.0	5.0	2,527	11,626
13-Feb-98	6.5	NA	9,105	3.4	17.5	2,548	11,654
16-Mar-98	5.72	NA	9,111	2.4	12.2	2,563	11,674
14-Apr-98	0.01	NA	9,111	4.1	20.9	2,588	11,699
19-May-98	0.0	NA	9,111	5.1	25.9	2,619	11,730
15-Jun-98	0.0	NA	9,111	0.6	3.1	2,622	11,734
15-Jul-98	0.0	NA	9,111	0.0	0.0	2,622	11,734
15-Aug-98	0.0	NA	9,111	0.0	0.0	2,622	11,734
15-Sep-98	0.0	NA	9,111	0.0	0.0	2,622	11,734
15-Oct-98	7.7	NA	9,119	2.6	13.1	2,638	11,757
18-Nov-98	0.33	NA	9,119	4.8	24.5	2,667	11,787
13-Dec-98	0.0	NA	9,119	3.5	18.0	2,689	11,808
14-Jan-99	0.08	NA	9,119	3.3	16.9	2,709	11,828
17-Feb-99	0.0	NA	9,119	4.6	23.8	2,737	11,857
15-Mar-99	0.0	NA	9,119	3.8	19.4	2,761	11,880
15-Apr-99	0.0	NA	9,119	4.0	20.6	2,785	11,905
13-May-99	0.0	NA	9,119	3.9	20.2	2,809	11,929
15-Jun-99	0.0	NA	9,119	3.9	19.7	2,833	11,952
15-Jul-99	0.0	NA	9,119	4.1	21.2	2,858	11,978
17-Aug-99	0.0	NA	9,119	4.0	20.6	2,883	12,002
16-Sep-99	0.0	NA	9,119	3.9	19.8	2,907	12,026
20-Oct-99	0.0	NA	9,119	4.1	20.8	2,932	12,051
19-Nov-99	0.0	NA	9,119	3.7	18.8	2,954	12,073
21-Dec-99	0.0	NA	9,119	3.7	18.9	2,977	12,096
21-Jan-00	0.0	NA	9,119	3.5	18.1	2,998	12,118
16-Feb-00	0.0	NA	9,119	3.2	16.6	3,018	12,137
21-Mar-00	0.0	NA	9,119	4.4	22.6	3,045	12,164
14-Apr-00	0.0	NA	9,119	4.5	23.2	3,073	12,192
15-May-00	0.0	NA	9,119	2.6	13.5	3,089	12,208

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
15-Jun-00	0.1	NA	9,119	4.2	21.3	3,114	12,234
19-Jul-00	0.0	NA	9,119	3.9	20.2	3,138	12,258
18-Aug-00	0.1	NA	9,119	1.5	7.7	3,148	12,267
20-Sep-00	7.3	NA	9,127	2.8	14.1	3,165	12,291
12-Oct-00	0.0	NA	9,127	2.4	12.3	3,179	12,306
14-Nov-00	32.9	NA	9,160	2.9	14.8	3,197	12,357
14-Dec-00	20.1	NA	9,180	2.6	13.5	3,213	12,393
11-Jan-01	0.9	NA	9,181	2.5	12.6	3,228	12,409
15-Feb-01	0.0	NA	9,181	0.5	2.5	3,231	12,412
15-Mar-01	0.2	NA	9,181	0.0	0.0	3,231	12,412
20-Apr-01	0.0	NA	9,181	0.0	0.1	3,231	12,412
18-May-01	0.0	NA	9,181	6.8	35.0	3,273	12,454
11-Jun-01	0.8	NA	9,182	10.8	55.1	3,339	12,520
24-Jul-01	0.1	NA	9,182	43.9	224.4	3,607	12,789
21-Aug-01	0.3	NA	9,182	0.0	0.0	3,607	12,789
6-Sep-01	0.1	NA	9,182	0.0	0.0	3,607	12,789
19-Oct-01	0.0	NA	9,182	13.5	69.2	3,690	12,872
15-Nov-01	106.9	NA	9,289	33.7	172.2	3,896	13,185
10-Dec-01	17.5	NA	9,306	0.0	0.0	3,896	13,202
16-Jan-02	5.6	NA	9,312	34.6	177.0	4,107	13,419
21-Feb-02	0.0	NA	9,312	39.5	202.1	4,349	13,661
15-Mar-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Apr-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-May-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Jun-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Jul-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Aug-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
24-Sep-02	0.0	NA	9,312	0.0	0.0	4,349	13,661
15-Oct-02	0.0	0.0	9,312	68.5	254.2	4,672	13,984
26-Nov-02	0.0	1.2	9,313	137.6	525.5	5,335	14,648
26-Dec-02	0.0	2.7	9,316	94.0	482.8	5,912	15,227
16-Jan-03	19.6	2.6	9,338	49.5	451.8	6,413	15,751
20-Feb-03	0.0	3.7	9,342	33.5	320.1	6,766	16,108
11-Mar-03	0.0	4.6	9,346	27.5	328.1	7,122	16,468
15-Apr-03	6.9	3.9	9,357	15.4	423.1	7,560	16,918
15-May-03	2.5	2.8	9,362	18.3	346.5	7,925	17,288
17-Jun-03	0.0	1.8	9,364	18.6	353.4	8,297	17,661
15-Jul-03	2.0	1.3	9,367	32.4	290.4	8,620	17,987
13-Aug-03	0.0	2.4	9,370	49.2	295.0	8,964	18,334
16-Sep-03	0.0	2.6	9,373	26.5	364.0	9,355	18,727
14-Oct-03	0.0	2.5	9,375	23.0	316.1	9,694	19,069
19-Nov-03	0.0	3.2	9,378	36.6	404.9	10,135	19,514
17-Dec-03	20.0	6.4	9,405	12.0	317.3	10,465	19,869
13-Jan-04	25.0	31.3	9,461	2.8	293.2	10,761	20,222
10-Feb-04	0.0	19.7	9,481	3.8	186.1	10,951	20,431
17-Mar-04	0.0	1.5	9,482	5.2	297.0	11,253	20,735
15-Apr-04	0.0	0.8	9,483	11.0	198.0	11,462	20,945
25-May-04	0.0	3.0	9,486	40.4	356.7	11,859	21,345
17-Jun-04	35.0	2.7	9,524	57.1	103.2	12,019	21,543
13-Jul-04	0.0	8.2	9,532	64.7	260.4	12,344	21,876
13-Aug-04	50.0	11.9	9,594	22.1	233.1	12,599	22,193

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
16-Sep-04	8.0	6.3	9,608	32.0	147.8	12,779	22,387
13-Oct-04	0.0	1.8	9,610	62.2	117.5	12,959	22,568
19-Nov-04	10.0	3.1	9,623	118.5	156.7	13,234	22,856
15-Dec-04	3.5	2.0	9,629	84.4	124.7	13,443	23,071
13-Jan-05	0.0	3.7	9,632	80.6	90.3	13,614	23,245
15-Feb-05	35.0	5.3	9,673	83.4	128.0	13,825	23,494
15-Mar-05	0.0	2.7	9,675	121.9	162.7	14,110	23,781
15-Apr-05	0.0	6.2	9,681	136.0	170.8	14,417	24,094
20-May-05	0.0	13.6	9,695	83.0	156.7	14,656	24,347
16-Jun-05	0.0	13.6	9,709	61.6	106.7	14,825	24,529
15-Jul-05	110.0	15.9	9,835	86.0	168.1	15,079	24,909
12-Aug-05	0.0	7.9	9,842	100.3	142.0	15,321	25,159
15-Sep-05	0.0	10.2	9,853	96.4	145.9	15,564	25,412
14-Oct-05	0.0	7.7	9,860	66.3	179.5	15,809	25,671
17-Nov-05	0.0	5.8	9,866	92.2	188.9	16,090	25,958
19-Dec-05	0.0	7.8	9,874	49.2	104.0	16,244	26,119
25-Jan-06	0.0	77.0	9,951	83.8	152.8	16,480	26,433
14-Feb-06	5.0	35.5	9,992	40.3	74.2	16,595	26,629
15-Mar-06	2.0	3.1	9,997	59.4	112.3	16,766	26,838
14-Apr-06	0.0	4.0	10,001	47.3	116.2	16,930	27,005
17-May-06	0.0	4.9	10,005	37.9	132.2	17,100	27,179
14-Jun-06	0.0	1.1	10,007	20.7	93.2	17,214	27,298
12-Jul-06	0.0	0.2	10,007	13.8	76.5	17,304	27,389
08-Aug-06	0.0	0.0	10,007	9.2	28.7	17,342	27,427
16-Aug-06	0.0	0.2	10,007	2.4	20.9	17,365	27,451
13-Sep-06	0.0	0.7	10,008	6.4	70.7	17,442	27,528
12-Oct-06	0.0	0.5	10,008	5.2	71.9	17,519	27,606
17-Nov-06	0.0	0.6	10,009	2.8	100.3	17,622	27,710
19-Dec-06	30.0	1.1	10,040	0.6	97.3	17,720	27,839
19-Jan-07	0.0	1.2	10,041	0.0	93.0	17,813	27,933
16-Feb-07	0.0	0.7	10,042	0.8	81.7	17,896	28,016
16-Mar-07	0.0	0.5	10,042	1.8	89.2	17,987	28,108
19-Apr-07	0.0	0.8	10,043	2.8	123.9	18,113	28,235
03-May-07	0.0	0.0	10,043	1.9	52.2	18,168	28,289
17-May-07	0.0	0.7	10,044	2.6	47.2	18,217	28,286
14-Jun-07	0.0	0.4	10,044	7.8	96.2	18,321	28,390
13-Jul-07	0.0	0.3	10,044	7.3	107.5	18,436	28,505
16-Aug-07	0.0	0.2	10,045	5.2	139.9	18,581	28,650
10-Sep-07	0.0	0.1	10,045	4.4	116.7	18,703	28,772
17-Oct-07	0.0	0.1	10,045	6.4	160.4	18,869	28,939
16-Nov-07	0.0	0.2	10,045	5.1	112.7	18,987	29,056
14-Dec-07	0.0	0.1	10,045	12.6	103.2	19,103	29,172
22-Jan-08	0.0	0.4	10,046	22.0	143.0	19,268	29,337
14-Feb-08	0.0	0.4	10,046	5.9	83.5	19,357	29,427
14-Mar-08	30.0	0.3	10,076	5.1	86.1	19,448	29,518
18-Apr-08	0.0	0.2	10,076	5.4	111.5	19,565	29,642
16-May-08	0.0	0.1	10,077	4.1	88.0	19,657	29,734
18-Jun-08	0.0	0.1	10,077	0.0	0.0	19,657	29,734
16-Jul-08	0.0	0.2	10,077	0.0	0.0	19,657	29,734
18-Aug-08	0.0	0.2	10,077	0.0	0.0	19,657	29,735
16-Sep-08	0.0	0.1	10,077	0.0	0.0	19,657	29,735

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
15-Oct-08	0.0	0.1	10,077	0.0	0.0	19,657	29,735
14-Nov-08	0.0	0.2	10,078	0.0	0.0	19,657	29,735
11-Dec-08	0.0	0.1	10,078	0.0	0.0	19,657	29,735
14-Jan-09	0.0	0.2	10,078	0.0	0.0	19,657	29,735
18-Feb-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
17-Mar-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
16-Apr-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
14-May-09	0.0	0.1	10,078	0.0	0.0	19,657	29,736
16-Jun-09	0.0	0.1	10,079	0.0	0.0	19,657	29,736
22-Jul-09	0.0	0.3	10,079	0.0	0.0	19,657	29,736
17-Aug-09	0.0	0.4	10,079	0.0	0.0	19,657	29,737
14-Sep-09	0.0	0.3	10,080	0.0	0.0	19,657	29,737
20-Oct-09	0.0	0.2	10,080	0.0	0.0	19,657	29,737
18-Nov-09	0.0	0.6	10,080	0.0	0.0	19,657	29,738
15-Dec-09	0.0	0.3	10,081	0.0	0.0	19,657	29,738
21-Jan-10	0.0	1.7	10,082	0.0	0.0	19,657	29,740
17-Feb-10	0.0	0.8	10,083	0.0	0.0	19,657	29,740
17-Mar-10	0.0	0.4	10,084	0.0	0.0	19,657	29,741
15-Apr-10	0.0	0.3	10,084	0.0	0.0	19,657	29,741
19-May-10	0.0	0.3	10,084	0.0	0.0	19,657	29,741
16-Jun-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
28-Jul-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
18-Aug-10	0.0	0.0	10,084	0.0	0.0	19,657	29,742
21-Sep-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
19-Oct-10	0.0	0.1	10,084	0.0	0.0	19,657	29,742
29-Nov-10	0.0	0.1	10,085	0.0	0.0	19,657	29,742
22-Dec-10	0.0	0.7	10,085	0.0	0.0	19,657	29,743
19-Jan-11	0.0	1.2	10,087	0.0	0.0	19,657	29,744
15-Feb-11	0.0	0.5	10,087	0.0	0.0	19,657	29,744
29-Mar-11	0.0	0.5	10,088	0.0	0.0	19,657	29,745
21-Apr-11	0.0	0.2	10,088	0.0	0.0	19,657	29,745
18-May-11	0.0	0.5	10,088	0.0	0.0	19,657	29,746
14-Jun-11	0.0	0.3	10,088	0.0	0.0	19,657	29,746
20-Jul-11	0.0	0.1	10,089	0.0	0.0	19,657	29,746
17-Aug-11	0.0	0.0	10,089	0.0	0.0	19,657	29,746
14-Sep-11	0.0	0.0	10,089	0.0	0.0	19,657	29,746
11-Oct-11	0.0	0.1	10,089	0.0	0.0	19,657	29,746
22-Nov-11	0.0	0.3	10,089	0.0	0.0	19,657	29,746
13-Dec-11	0.0	0.1	10,089	0.0	0.0	19,657	29,747
23-Jan-12	0.0	1.8	10,091	0.0	0.0	19,657	29,748
14-Feb-12	0.0	0.9	10,092	0.0	0.0	19,657	29,749
13-Mar-12	0.0	0.2	10,092	0.0	0.0	19,657	29,749
16-Apr-12	0.0	0.8	10,093	0.0	0.0	19,657	29,750
16-May-12	0.0	0.5	10,093	0.0	0.0	19,657	29,751
13-Jun-12	0.0	0.1	10,093	0.0	0.0	19,657	29,751
20-Jul-12	0.0	0.1	10,093	0.0	0.0	19,657	29,751
23-Aug-12	0.0	0.2	10,094	0.0	0.0	19,657	29,751
5-Sep-12	0.0	0.1	10,094	0.0	0.0	19,657	29,751
24-Oct-12	0.0	0.2	10,094	0.0	0.0	19,657	29,751
18-Dec-12	0.0	0.0	10,094	0.0	0.0	19,657	29,751
23-Jan-13	0.0	0.5	10,094	0.0	0.0	19,657	29,752

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Total Gallonage of Recovered Petroleum Hydrocarbons

Date	Monthly LNAPL Recovery	Dissolved LNAPL Recovery*	Cumulative LNAPL Recovery	Monthly SVE Recovery (Vapor Phase)	Monthly SVE Recovery (Biodegredation)	Cumulative SVE Recovery	Total Recovery
21-Feb-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
13-Mar-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
17-Apr-13	0.0	0.2	10,095	0.0	0.0	19,657	29,752
22-May-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
12-Jun-13	0.0	0.1	10,095	0.0	0.0	19,657	29,752
24-Jul-13	0.0	0.3	10,095	0.0	0.0	19,657	29,753
20-Aug-13	0.0	0.2	10,095	0.0	0.0	19,657	29,753
24-Sep-13	0.0	0.1	10,096	0.0	0.0	19,657	29,753
15-Oct-13	0.0	0.0	10,096	0.0	0.0	19,657	29,753
20-Nov-13	0.0	0.2	10,096	0.0	0.0	19,657	29,753
18-Dec-13	0.0	0.2	10,096	0.0	0.0	19,657	29,753

Total LNAPL Recovery (gal)	Total Dissolved LNAPL Recovery* (gal)	Total LNAPL Recovery (gal)	Total SVE Recovery (vapor phase) (gal)	Total SVE Recovery (biodegredation) (gal)	Total SVE Recovery (gal)	Total Recovery (gal)
9,706	390	10,096	3,582	16,075	19,657	29,753

Note: NA - The soil vapor extraction system was not brought online until January of 1996
* - Dissolved LNAPL recovery was not recorded until completion of the final remediation system in Oct 2002.

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
1/11/2000	medium	1	no	0.0	**yes**	1.0
1/21/2000	high	2	no	0.0	no	0.0
2/16/2000	medium	1	no	0.0	no	0.0
2/22/2000	high	2	no	0.0	no	0.0
2/23/2000	medium	1	no	0.0	no	0.0
2/24/2000	low	0	no	0.0	no	0.0
3/15/2000	medium	1	no	0.0	no	0.0
3/16/2000	medium	1	no	0.0	no	0.0
3/21/2000	low	0	no	0.0	**yes**	**1.0**
4/14/2000	medium	1	no	0.0	**yes**	**1.0**
6/15/2000	low	0	no	0.0	no	0.0
6/28/2000	low	0	**yes**	**1.0**	no	0.0
6/29/2000	low	0	no	0.0	no	0.0
7/11/2000	high	2	no	0.0	no	0.0
7/19/2000	low	0	no	0.0	no	0.0
8/15/2000	low	0	no	0.0	no	0.0
10/12/2000	low	0	no	0.0	no	0.0
11/14/2000	medium	1	no	0.0	no	0.0
12/14/2000	high	2	no	0.0	no	0.0
1/11/2001	medium	1	no	0.0	no	0.0
2/15/2001	medium	1	no	0.0	no	0.0
4/12/2001	medium	1	**yes**	**1.0**	no	0.0
4/13/2001	medium	1	no	0.0	no	0.0
5/16/2001	low	0	no	0.0	no	0.0
5/17/2001	low	0	no	0.0	no	0.0
5/18/2001	low	0	no	0.0	no	0.0
5/21/2001	low	0	no	0.0	no	0.0
5/23/2001	low	0	no	0.0	no	0.0
5/29/2001	low	0	no	0.0	no	0.0
6/11/2001	medium	1	no	0.0	no	0.0
7/23/2001	low	0	no	0.0	no	0.0
8/21/2001	medium	1	no	0.0	no	0.0
9/6/2001	high	2	no	0.0	no	0.0
10/16/2001	low	0	no	0.0	no	0.0
11/15/2001	medium	1	no	0.0	no	0.0
12/10/2001	medium	1	no	0.0	no	0.0
1/4/2002	high	2	no	0.0	no	0.0
1/9/2002	medium	1	no	0.0	**yes**	**1.0**
1/11/2002	medium	1	no	0.0	**yes**	**1.0**
1/16/2002	high	2	no	0.0	**yes**	**1.0**

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
1/22/2002	medium	1	no	0.0	**yes**	**1.0**
1/23/2002	low	0	no	0.0	**yes**	**1.0**
2/4/2002	high	2	no	0.0	no	0.0
2/18/2002	medium	1	**yes**	**1.0**	no	0.0
2/21/2002	medium	1	no	0.0	**yes**	**2.0**
3/21/2002	medium	1	no	0.0	**yes**	**1.0**
3/25/2002	medium	1	no	0.0	no	0.0
3/26/2002	medium	1	no	0.0	no	0.0
3/27/2002	medium	1	no	0.0	**yes**	2.0
4/4/2002	high	2	no	0.0	no	0.0
5/3/2002	low	0	no	0.0	no	0.0
5/7/2002	medium	1	**yes**	**1.0**	no	0.0
5/21/2002	medium	1	**yes**	**1.0**	**yes**	**1.0**
6/6/2002	medium	1	**yes**	**1.0**	no	0.0
6/18/2002	low	0	no	0.0	no	0.0
6/27/2002	high	2	**yes**	**1.0**	**yes**	**1.0**
7/10/2002	medium	1	**yes**	**1.0**	**yes**	**1.0**
7/29/2002	medium	1	**yes**	**1.0**	no	0.0
8/21/2002	low	0	no	0.0	no	0.0
9/9/2002	high	2	**yes**	**1.0**	**yes**	**1.0**
9/20/2002	medium	1	**yes**	**1.0**	no	0.0
10/9/2002	high	2	no	0.0	no	0.0
11/25/2002	high	2	no	0.0	no	0.0
11/27/2002	high	2	no	0.0	no	0.0
12/19/2002	medium	1	no	0.0	no	0.0
12/20/2002	high	2	no	0.0	no	0.0
1/16/2003	medium	1	no	0.0	no	0.0
2/3/2003	medium	1	no	0.0	no	0.0
2/10/2003	medium	1	no	0.0	no	0.0
2/10/2003	low	0	no	0.0	no	0.0
2/11/2003	medium	1	no	0.0	no	0.0
2/11/2003	high	2	no	0.0	no	0.0
2/11/2003	low	0	no	0.0	no	0.0
2/12/2003	medium	1	no	0.0	no	0.0
2/13/2003	high	2	no	0.0	no	0.0
2/13/2003	medium	1	no	0.0	no	0.0
2/14/2003	high	2	no	0.0	no	0.0
2/20/2003	high	2	no	0.0	no	0.0
2/20/2003	medium	1	no	0.0	no	0.0
2/20/2003	low	0	no	0.0	no	0.0
2/21/2003	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
2/21/2003	medium	1	no	0.0	no	0.0
3/3/2003	medium	1	no	0.0	no	0.0
3/10/2003	medium	1	no	0.0	no	0.0
3/11/2003	high	2	no	0.0	no	0.0
3/18/2003	medium	1	no	0.0	no	0.0
4/1/2003	low	0	no	0.0	no	0.0
4/8/2003	high	2	no	0.0	**yes**	**2.0**
4/15/2003	low	0	no	0.0	**yes**	**2.0**
4/21/2003	high	2	no	0.0	no	0.0
5/15/2003	low	0	no	0.0	no	0.0
5/20/2003	medium	1	no	0.0	no	0.0
5/21/2003	medium	1	no	0.0	no	0.0
5/27/2003	low	0	no	0.0	no	0.0
6/3/2003	medium	1	no	0.0	no	0.0
6/17/2003	medium	1	no	0.0	no	0.0
7/15/2003	medium	1	no	0.0	no	0.0
7/21/2003	low	0	no	0.0	no	0.0
8/7/2003	low	0	no	0.0	no	0.0
8/13/2003	medium	1	no	0.0	no	0.0
9/15/2003	high	2	no	0.0	no	0.0
9/16/2003	high	2	no	0.0	no	0.0
9/17/2003	medium	1	no	0.0	no	0.0
9/19/2003	medium	1	no	0.0	no	0.0
10/9/2003	medium	1	**yes**	**1.0**	no	0.0
10/14/2003	high	2	no	0.0	no	0.0
11/12/2003	high	2	no	0.0	no	0.0
11/19/2003	high	2	no	0.0	no	0.0
12/17/2003	medium	1	no	0.0	no	0.0
12/23/2003	medium	1	no	0.0	no	0.0
1/13/2004	medium	1	no	0.0	**yes**	**1.0**
1/24/2004	high	2	no	0.0	no	0.0
2/10/2004	medium	1	no	0.0	**yes**	**1.0**
2/23/2004	medium	1	**yes**	**1.0**	no	0.0
3/17/2004	medium	1	no	0.0	no	0.0
3/19/2004	medium	1	no	0.0	no	0.0
4/15/2004	medium	1	**yes**	**1.0**	no	0.0
4/19/2004	medium	1	no	0.0	no	0.0
4/22/2004	medium	1	no	0.0	no	0.0
5/24/2004	medium	1	no	0.0	no	0.0
5/25/2004	medium	1	no	0.0	no	0.0
6/14/2004	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
6/15/2004	low	0	no	0.0	no	0.0
6/23/2004	high	2	no	0.0	no	0.0
6/28/2004	low	0	no	0.0	no	0.0
6/29/2004	medium	1	no	0.0	no	0.0
6/30/2004	medium	1	no	0.0	no	0.0
7/12/2004	low	0	no	0.0	no	0.0
7/13/2004	low	0	no	0.0	no	0.0
8/11/2004	high	2	no	0.0	no	0.0
8/12/2004	low	0	no	0.0	no	0.0
8/24/2004	medium	1	no	0.0	no	0.0
9/2/2004	high	2	no	0.0	no	0.0
9/3/2004	high	2	no	0.0	no	0.0
9/7/2004	medium	1	no	0.0	no	0.0
9/10/2004	low	0	no	0.0	no	0.0
9/16/2004	high	2	no	0.0	no	0.0
9/21/2004	medium	1	no	0.0	no	0.0
9/22/2004	medium	1	no	0.0	no	0.0
9/23/2004	medium	1	no	0.0	no	0.0
10/5/2004	medium	1	no	0.0	no	0.0
10/13/2004	medium	1	**yes**	**1.0**	no	0.0
10/15/2004	high	2	no	0.0	no	0.0
10/18/2004	high	2	no	0.0	no	0.0
10/25/2004	low	0	no	0.0	no	0.0
11/4/2004	medium	1	no	0.0	no	0.0
11/18/2004	high	2	no	0.0	no	0.0
11/23/2004	medium	1	no	0.0	no	0.0
12/3/2004	low	0	no	0.0	no	0.0
12/15/2004	high	2	no	0.0	no	0.0
12/23/2004	medium	1	no	0.0	no	0.0
1/4/2005	high	2	no	0.0	no	0.0
1/13/2005	high	2	no	0.0	no	0.0
1/21/2005	low	0	no	0.0	no	0.0
2/1/2005	high	**2**	**no**	**0.0**	**yes**	**1.0**
2/2/2005	high	**2**	**no**	**0.0**	**yes**	**2.0**
2/3/2005	medium	**1**	**no**	**0.0**	**yes**	**1.0**
2/4/2005	medium	**1**	**no**	**0.0**	**yes**	**1.0**
2/7/2005	low	**0**	**no**	**0.0**	**yes**	**1.0**
2/8/2005	low	0	no	0.0	no	0.0
2/15/2005	high	2	no	0.0	no	0.0
2/25/2005	high	2	no	0.0	no	0.0
3/2/2005	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
3/8/2005	low	0	no	0.0	no	0.0
3/15/2005	high	2	no	0.0	no	0.0
4/4/2005	low	0	no	0.0	no	0.0
4/11/2015	high	**2**	**no**	**0.0**	**yes**	**1.0**
4/13/2005	medium	**1**	**no**	**0.0**	**yes**	**2.0**
4/14/2005	high	**2**	**no**	**0.0**	**yes**	**1.0**
4/15/2005	medium	**1**	**no**	**0.0**	**yes**	**2.0**
4/18/2005	low	0	no	0.0	no	0.0
4/25/2005	medium	1	no	0.0	no	0.0
5/2/2005	low	0	no	0.0	no	0.0
5/9/2005	medium	1	no	0.0	no	0.0
5/16/2005	low	0	no	0.0	no	0.0
5/20/2005	low	0	no	0.0	no	0.0
5/23/2005	medium	1	no	0.0	no	0.0
5/30/2005	medium	1	no	0.0	no	0.0
6/6/2005	medium	1	no	0.0	no	0.0
6/10/2005	medium	1	no	0.0	no	0.0
6/13/2005	high	2	no	0.0	no	0.0
6/20/2005	low	0	no	0.0	no	0.0
6/27/2005	high	2	no	0.0	no	0.0
7/4/2005	medium	1	no	0.0	no	0.0
7/11/2005	high	**2**	no	0.0	**yes**	**1.0**
7/15/2005	medium	1	no	0.0	no	0.0
7/18/2005	low	0	no	0.0	no	0.0
7/25/2005	high	2	no	0.0	no	0.0
8/1/2005	low	0	no	0.0	no	0.0
8/8/2005	high	2	no	0.0	no	0.0
8/12/2005	medium	1	no	0.0	no	0.0
8/15/2005	low	0	no	0.0	no	0.0
8/22/2005	medium	1	no	0.0	no	0.0
8/29/2005	low	0	no	0.0	no	0.0
9/5/2005	medium	1	no	0.0	no	0.0
9/12/2005	medium	1	no	0.0	no	0.0
9/14/2005	low	0	no	0.0	no	0.0
9/19/2005	medium	1	no	0.0	no	0.0
9/26/2005	low	0	no	0.0	no	0.0
10/3/2005	medium	1	no	0.0	no	0.0
10/10/2005	medium	1	no	0.0	no	0.0
10/14/2005	low	0	no	0.0	no	0.0
10/17/2005	medium	1	no	0.0	no	0.0
10/24/2005	medium	1	no	0.0	no	0.0
10/31/2005	low	0	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
11/7/2005	high	2	no	0.0	no	0.0
11/14/2005	low	0	no	0.0	no	0.0
11/21/2005	high	2	no	0.0	no	0.0
11/23/2005	medium	1	no	0.0	no	0.0
11/28/2005	low	0	no	0.0	no	0.0
11/29/2005	medium	1	no	0.0	no	0.0
11/30/2005	medium	1	no	0.0	no	0.0
12/1/2005	high	2	no	0.0	no	0.0
12/2/2005	high	2	no	0.0	no	0.0
12/5/2005	high	2	no	0.0	no	0.0
12/6/2005	medium	1	no	0.0	no	0.0
12/7/2005	high	2	no	0.0	no	0.0
12/9/2005	high	2	no	0.0	no	0.0
12/15/2005	high	**2**	no	0.0	**yes**	**1.0**
12/19/2005	high	**2**	no	0.0	**yes**	**1.0**
1/25/2006	low	0	**yes**	**2.0**	**yes**	**2.0**
2/8/2006			no	0.0	**yes**	**1.0**
2/9/2006			no	0.0	**yes**	**1.0**
2/10/2006			no	0.0	**yes**	**1.0**
2/13/2006	medium	1	no	0.0	**yes**	**1.0**
2/14/2006	medium	1	no	0.0	**yes**	**1.0**
3/15/2006	low	0	no	0.0	no	0.0
3/17/2006	low	0	no	0.0	no	0.0
3/21/2006	high	2	no	0.0	no	0.0
3/27/2006	low	0	no	0.0	no	0.0
4/3/2006	high	2	no	0.0	no	0.0
4/11/2006	medium	1	no	0.0	no	0.0
4/14/2006	medium	1	no	0.0	no	0.0
4/17/2006	high	2	no	0.0	no	0.0
4/24/2006	low	0	no	0.0	no	0.0
4/25/2006	medium	1	no	0.0	no	0.0
4/26/2006	medium	1	no	0.0	no	0.0
4/27/2006	medium	1	no	0.0	no	0.0
4/28/2006	medium	1	no	0.0	no	0.0
5/1/2006	medium	1	no	0.0	no	0.0
5/9/2006	low	0	no	0.0	no	0.0
5/17/2006	high	2	no	0.0	no	0.0
5/18/2006	high	2	no	0.0	no	0.0
5/22/2006	low	0	no	0.0	no	0.0
5/30/2006	medium	1	no	0.0	no	0.0
5/31/2006	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
6/1/2006	high	2	no	0.0	no	0.0
6/5/2006	medium	1	**yes**	**0.5**	no	0.0
6/12/2006	low	0	no	0.0	no	0.0
6/14/2006	medium	1	no	0.0	no	0.0
7/12/2006	low	0	no	0.0	no	0.0
7/19/2006	medium	1	**yes**	**1.0**	no	0.0
7/24/2006	high	2	no	0.0	no	0.0
7/25/2006	low	0	**yes**	**1.0**	no	0.0
7/31/2006	high	2	no	0.0	**yes**	**1.0**
8/2/2006	high	2	no	0.0	no	0.0
8/8/2006	high	2	no	0.0	no	0.0
8/14/2006	high	2	**yes**	**1.0**	**yes**	**1.0**
8/16/2006	medium	1	**yes**	**2.0**	**yes**	**1.0**
8/21/2006	low	0	no	0.0	no	0.0
8/25/2006	high	2	**yes**	**0.5**	**yes**	**0.5**
8/28/2006	high	2	**yes**	**0.5**	no	0.0
8/29/2006	high	2	no	0.0	no	0.0
9/1/2006	medium	1	no	0.0	no	0.0
9/5/2006	low	0	no	0.0	no	0.0
9/6/2006	low	0	no	0.0	no	0.0
9/11/2006	high	2	no	0.0	no	0.0
9/13/2006	high	2	**yes**	**1.0**	**yes**	**1.0**
9/18/2006	low	0	no	0.0	**yes**	**1.0**
9/19/2006	low	0	**yes**	**2.0**	no	0.0
9/22/2006	high	2	no	0.0	no	0.0
9/25/2006	high	2	no	0.0	**yes**	**1.0**
9/27/2006	high	2	no	0.0	no	0.0
10/2/2006	medium	1	no	0.0	no	0.0
10/5/2006	low	0	no	0.0	no	0.0
10/6/2006	high	2	no	0.0	no	0.0
10/9/2006	high	2	no	0.0	no	0.0
10/12/2006	high	2	no	0.0	no	0.0
10/16/2006	medium	1	no	0.0	no	0.0
10/17/2006	high	2	**yes**	**1.0**	no	0.0
10/23/2006	high	2	no	0.0	no	0.0
10/25/2006	high	2	no	0.0	no	0.0
10/30/2006	high	2	no	0.0	no	0.0
10/31/2006	high	2	**yes**	**1.0**	no	0.0
11/1/2006	medium	1	no	0.0	no	0.0
11/6/2006	high	2	no	0.0	no	0.0
11/7/2006	high	2	no	0.0	no	0.0
11/8/2006	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
11/9/2006	high	2	no	0.0	no	0.0
11/13/2006	high	2	no	0.0	**yes**	**1.0**
11/17/2006	medium	1	no	0.0	no	0.0
11/20/2006	high	2	no	0.0	no	0.0
11/27/2006	high	2	no	0.0	no	0.0
11/30/2006	high	2	no	0.0	no	0.0
12/4/2006	medium	1	no	0.0	**yes**	**1.0**
12/5/2006	high	2	**yes**	**1.0**	no	0.0
12/11/2006	high	2	no	0.0	no	0.0
12/12/2006	medium	1	no	0.0	no	0.0
12/13/2006	high	2	no	0.0	no	0.0
12/14/2006	high	2	no	0.0	no	0.0
12/15/2006	medium	1	**yes**	**1.0**	no	0.0
12/16/2006	medium	1	no	0.0	no	0.0
12/18/2006	medium	1	no	0.0	no	0.0
12/19/2006	high	2	no	0.0	**yes**	**1.0**
12/21/2006	high	2	no	0.0	no	0.0
12/22/2006	high	2	no	0.0	no	0.0
1/2/2007	high	2	no	0.0	no	0.0
1/5/2007	high	2	no	0.0	no	0.0
1/8/2007	high	2	no	0.0	no	0.0
1/9/2007	high	2	no	0.0	no	0.0
1/10/2007	high	2	no	0.0	no	0.0
1/15/2007	high	2	no	0.0	no	0.0
1/19/2007	high	2	no	0.0	**yes**	**1.0**
1/22/2007	high	2	no	0.0	**yes**	**0.5**
1/29/2007	high	2	no	0.0	**yes**	**1.0**
1/31/2007	high	2	**yes**	**1.0**	no	0.0
2/2/2007	high	2	no	0.0	no	0.0
2/5/2007	high	2	no	0.0	no	0.0
2/6/2007	high	2	no	0.0	no	0.0
2/7/2007	high	2	no	0.0	no	0.0
2/12/2007	high	2	no	0.0	no	0.0
2/14/2007	high	2	no	0.0	no	0.0
2/16/2007	high	2	no	0.0	no	0.0
2/20/2007	high	2	no	0.0	no	0.0
2/26/2007	high	2	no	0.0	no	0.0
3/5/2007	medium	1	no	0.0	no	0.0
3/7/2007	medium	1	no	0.0	no	0.0
3/13/2007	high	2	no	0.0	no	0.0
3/16/2007	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
3/19/2007	low	0	no	0.0	no	0.0
3/20/2007	medium	1	no	0.0	no	0.0
3/21/2007	high	2	no	0.0	no	0.0
3/22/2007	high	2	no	0.0	no	0.0
3/26/2007	high	2	no	0.0	no	0.0
3/30/2007	medium	1	no	0.0	no	0.0
4/2/2007	high	2	no	0.0	no	0.0
4/6/2007	high	2	**yes**	**1.0**	no	0.0
4/9/2007	high	2	no	0.0	no	0.0
4/12/2007	high	2	no	0.0	no	0.0
4/13/2007	medium	1	no	0.0	no	0.0
4/16/2007	low	0	no	0.0	no	0.0
4/19/2007	medium	1	no	0.0	no	0.0
4/23/2007	high	2	no	0.0	no	0.0
4/24/2007	high	2	**yes**	**1.0**	no	0.0
4/26/2007	medium	1	no	0.0	no	0.0
4/27/2007	high	2	no	0.0	no	0.0
4/30/2007	low	0	no	0.0	no	0.0
5/3/2007	medium	1	no	0.0	no	0.0
5/8/2007	high	2	no	0.0	no	0.0
5/9/2007	high	2	no	0.0	no	0.0
5/14/2007	low	0	no	0.0	no	0.0
5/17/2007	medium	1	no	0.0	no	0.0
5/21/2007	high	2	no	0.0	no	0.0
5/23/2007	medium	1	no	0.0	no	0.0
6/1/2007	medium	1	no	0.0	no	0.0
6/4/2007	high	2	**yes**	**1.0**	**yes**	**1.0**
6/6/2007	high	2	no	0.0	no	0.0
6/7/2007	medium	1	**yes**	**1.0**	no	0.0
6/11/2007	low	0	no	0.0	no	0.0
6/13/2007	low	0	no	0.0	no	0.0
6/14/2007	low	0	no	0.0	no	0.0
6/18/2007	medium	1	no	0.0	no	0.0
6/19/2007	high	2	no	0.0	no	0.0
6/25/2007	low	0	no	0.0	no	0.0
7/2/2007	high	2	**yes**	**2.0**	no	0.0
7/9/2007	low	0	no	0.0	no	0.0
7/13/2007	low	0	no	0.0	no	0.0
7/16/2007	low	0	no	0.0	no	0.0
7/23/2007	low	0	no	0.0	no	0.0
7/30/2007	medium	1	no	0.0	no	0.0
7/31/2007	high	2	**yes**	**1.0**	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
8/6/2007	medium	1	no	0.0	no	0.0
8/8/2007	low	0	no	0.0	no	0.0
8/13/2007	medium	1	no	0.0	no	0.0
8/16/2007	high	2	no	0.0	no	0.0
8/20/2007	high	2	no	0.0	no	0.0
8/22/2007	medium	1	no	0.0	no	0.0
8/23/2007	medium	1	no	0.0	no	0.0
8/24/2007	low	0	no	0.0	no	0.0
8/27/2007	low	0	no	0.0	no	0.0
8/30/2007	low	0	no	0.0	no	0.0
9/4/2007	medium	1	no	0.0	no	0.0
9/10/2007	medium	1	no	0.0	no	0.0
9/13/2007	medium	1	no	0.0	no	0.0
9/14/2007	high	2	no	0.0	no	0.0
9/17/2007	high	2	no	0.0	no	0.0
9/18/2007	high	2	no	0.0	no	0.0
9/19/2007	high	2	no	0.0	no	0.0
9/20/2007	medium	1	no	0.0	no	0.0
9/24/2007	low	0	no	0.0	no	0.0
10/1/2007	high	2	no	0.0	no	0.0
10/2/2007	high	2	no	0.0	no	0.0
10/3/2007	medium	1	no	0.0	no	0.0
10/5/2007	low	0	no	0.0	no	0.0
10/8/2007	medium	1	no	0.0	no	0.0
10/9/2007	high	2	no	0.0	no	0.0
10/11/2007	high	2	no	0.0	no	0.0
10/15/2007	high	2	no	0.0	no	0.0
10/17/2007	medium	1	no	0.0	no	0.0
10/22/2007	low	0	no	0.0	no	0.0
10/24/2007	medium	1	no	0.0	no	0.0
10/25/2007	high	2	no	0.0	no	0.0
10/29/2007	high	2	no	0.0	no	0.0
10/31/2007	low	0	no	0.0	no	0.0
11/1/2007	low	0	no	0.0	no	0.0
11/2/2007	low	0	no	0.0	no	0.0
11/5/2007	low	0	no	0.0	no	0.0
11/6/2007	low	0	no	0.0	no	0.0
11/12/2007	high	2	no	0.0	no	0.0
11/13/2007	high	2	no	0.0	no	0.0
11/15/2007	high	2	no	0.0	no	0.0
11/16/2007	high	2	no	0.0	no	0.0
11/19/2007	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
11/26/2007	high	2	no	0.0	no	0.0
11/27/2007	high	2	**yes**	**0.5**	no	0.0
12/3/2007	high	2	no	0.0	no	0.0
12/10/2007	high	2	no	0.0	no	0.0
12/11/2007	high	2	no	0.0	no	0.0
12/14/2007	high	2	no	0.0	no	0.0
12/17/2007	high	2	no	0.0	no	0.0
12/19/2007	high	2	no	0.0	no	0.0
12/20/2007	high	2	no	0.0	no	0.0
12/24/2007	medium	1	no	0.0	no	0.0
1/2/2008	high	2	no	0.0	yes	1.0
1/7/2008	high	2	no	0.0	no	0.0
1/11/2008	high	2	no	0.0	no	0.0
1/14/2008	high	2	no	0.0	no	0.0
1/21/2008	high	2	no	0.0	no	0.0
1/22/2008	high	2	no	0.0	no	0.0
1/28/2008	high	2	no	0.0	no	0.0
1/29/2008	high	2	no	0.0	no	0.0
2/4/2008	high	2	**yes**	**0.5**	no	0.0
2/11/2008	medium	1	no	0.0	no	0.0
2/12/2008	high	2	no	0.0	no	0.0
2/14/2008	high	2	no	0.0	no	0.0
2/19/2008	high	2	no	0.0	no	0.0
2/20/2008	high	2	no	0.0	no	0.0
2/25/2008	high	2	no	0.0	no	0.0
2/28/2008	high	2	no	0.0	no	0.0
3/3/2008	medium	1	no	0.0	no	0.0
3/4/2008	medium	1	no	0.0	no	0.0
3/10/2008	high	2	no	0.0	no	0.0
3/11/2008	high	2	no	0.0	no	0.0
3/12/2008	high	2	no	0.0	no	0.0
3/14/2008	high	2	no	0.0	no	0.0
3/17/2008	medium	1	no	0.0	no	0.0
3/24/2008	high	2	no	0.0	no	0.0
3/26/2008	high	2	no	0.0	no	0.0
3/31/2008	medium	1	no	0.0	no	0.0
4/1/2008	medium	1	no	0.0	no	0.0
4/7/2008	high	2	no	0.0	no	0.0
4/10/2008	medium	1	**yes**	**0.5**	no	0.0
4/11/2008	medium	1	no	0.0	no	0.0
4/15/2008	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
4/16/2008	low	0	no	0.0	no	0.0
4/18/2008	low	0	no	0.0	no	0.0
4/21/2008	medium	1	no	0.0	no	0.0
4/22/2008	medium	1	no	0.0	no	0.0
4/28/2008	medium	1	no	0.0	no	0.0
5/2/2008	low	0	no	0.0	no	0.0
5/5/2008	medium	1	no	0.0	no	0.0
5/12/2008	medium	1	no	0.0	no	0.0
5/16/2008	medium	1	no	0.0	no	0.0
5/19/2008	low	0	no	0.0	no	0.0
5/21/2008	low	0	no	0.0	no	0.0
5/23/2008	high	2	no	0.0	no	0.0
5/27/2008	medium	1	**yes**	**0.5**	no	0.0
5/29/2008	medium	1	no	0.0	no	0.0
6/2/2008	low	0	no	0.0	no	0.0
6/9/2008	medium	1	no	0.0	no	0.0
6/12/2008	medium	1	no	0.0	no	0.0
6/17/2008	low	0	no	0.0	no	0.0
6/18/2008	low	0	no	0.0	no	0.0
6/19/2008	medium	1	no	0.0	no	0.0
6/23/2008	high	2	yes	1.0	no	0.0
6/25/2008	medium	1	no	0.0	no	0.0
6/26/2008	medium	1	no	0.0	no	0.0
6/27/2008	low	0	no	0.0	no	0.0
6/30/2008	low	0	no	0.0	no	0.0
7/7/2008	high	2	no	0.0	no	0.0
7/8/2008	high	2	no	0.0	no	0.0
7/14/2008	low	0	no	0.0	no	0.0
7/16/2008	medium	1	**yes**	**1.0**	**yes**	**1.0**
7/21/2008	high	2	no	0.0	no	0.0
7/22/2008	high	2	no	0.0	no	0.0
7/23/2008	high	2	no	0.0	no	0.0
7/28/2008	low	0	no	0.0	no	0.0
7/30/2008	low	0	no	0.0	no	0.0
7/31/2008	low	0	no	0.0	no	0.0
8/4/2008	high	2	no	0.0	no	0.0
8/5/2008	high	2	no	0.0	no	0.0
8/6/2008	high	2	no	0.0	no	0.0
8/7/2008	high	2	no	0.0	no	0.0
8/8/2008	medium	1	no	0.0	no	0.0
8/11/2008	low	0	no	0.0	no	0.0
8/12/2008	low	0	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
8/13/2008	low	0	no	0.0	no	0.0
8/18/2008	medium	1	no	0.0	no	0.0
8/19/2008	high	2	yes	1.0	no	0.0
8/20/2008	high	2	no	0.0	no	0.0
8/21/2008	high	2	no	0.0	no	0.0
8/25/2008	medium	1	no	0.0	no	0.0
8/27/2008	low	0	no	0.0	no	0.0
9/2/2008	medium	1	no	0.0	no	0.0
9/8/2008	medium	1	no	0.0	no	0.0
9/16/2008	medium	1	no	0.0	no	0.0
9/17/2008	high	2	no	0.0	no	0.0
9/18/2008	high	2	no	0.0	no	0.0
9/19/2008	high	2	no	0.0	no	0.0
9/22/2008	high	2	no	0.0	no	0.0
9/23/2008	medium	1	no	0.0	no	0.0
9/24/2008	low	0	no	0.0	no	0.0
9/29/2008	high	2	no	0.0	no	0.0
9/30/2008	high	2	no	0.0	no	0.0
10/1/2008	high	2	no	0.0	no	0.0
10/2/2008	high	2	no	0.0	no	0.0
10/6/2008	high	2	no	0.0	no	0.0
10/13/2008	medium	1	no	0.0	no	0.0
10/15/2008	medium	1	no	0.0	no	0.0
10/17/2008	high	2	no	0.0	no	0.0
10/20/2008	high	2	no	0.0	no	0.0
10/21/2008	high	2	no	0.0	no	0.0
10/24/2008	low	0	no	0.0	no	0.0
10/25/2008	medium	1	no	0.0	no	0.0
10/27/2008	high	2	no	0.0	no	0.0
11/3/2008	high	2	no	0.0	no	0.0
11/6/2008	high	2	no	0.0	no	0.0
11/10/2008	medium	1	no	0.0	no	0.0
11/14/2008	high	2	no	0.0	no	0.0
11/17/2008	high	2	no	0.0	no	0.0
11/18/2008	high	2	no	0.0	no	0.0
11/21/2008	medium	1	no	0.0	no	0.0
11/24/2008	medium	1	no	0.0	no	0.0
11/25/2008	high	2	no	0.0	no	0.0
12/1/2008	high	2	no	0.0	no	0.0
12/2/2008	high	2	no	0.0	no	0.0
12/3/2008	high	2	no	0.0	no	0.0
12/8/2008	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
12/11/2008	high	2	no	0.0	no	0.0
12/12/2008	high	2	no	0.0	no	0.0
12/15/2008	high	2	no	0.0	no	0.0
12/16/2008	high	2	no	0.0	no	0.0
12/17/2008	high	2	no	0.0	no	0.0
12/23/2008	high	2	no	0.0	no	0.0
12/29/2008	high	2	no	0.0	no	0.0
1/5/2009	high	2	no	0.0	no	0.0
1/12/2009	high	2	no	0.0	no	0.0
1/14/2009	high	2	no	0.0	no	0.0
1/15/2009	high	2	no	0.0	no	0.0
1/16/2009	high	2	no	0.0	no	0.0
1/20/2009	high	2	no	0.0	no	0.0
1/22/2009	high	2	no	0.0	no	0.0
1/26/2009	medium	1	no	0.0	no	0.0
1/27/2009	high	2	no	0.0	no	0.0
1/28/2009	medium	1	no	0.0	no	0.0
1/29/2009	medium	1	no	0.0	no	0.0
1/30/2009	medium	1	no	0.0	no	0.0
2/2/2009	high	2	no	0.0	no	0.0
2/5/2009	high	2	no	0.0	**yes**	**0.5**
2/9/2009	high	2	no	0.0	no	0.0
2/11/2009	medium	1	no	0.0	no	0.0
2/17/2009	high	2	**yes**	**0.5**	no	0.0
2/18/2009	high	2	no	0.0	no	0.0
2/23/2009	high	2	no	0.0	no	0.0
2/26/2009	medium	1	no	0.0	no	0.0
3/3/2009	high	2	no	0.0	no	0.0
3/9/2009	medium	1	no	0.0	no	0.0
3/11/2009	medium	1	no	0.0	no	0.0
3/16/2009	medium	1	no	0.0	no	0.0
3/17/2009	high	2	no	0.0	no	0.0
3/18/2009	high	2	no	0.0	no	0.0
3/23/2009	medium	1	no	0.0	no	0.0
3/30/2009	high	2	no	0.0	no	0.0
3/31/2009	high	2	no	0.0	no	0.0
4/6/2009	medium	1	no	0.0	no	0.0
4/7/2009	medium	1	no	0.0	no	0.0
4/13/2009	high	2	no	0.0	no	0.0
4/15/2009	high	2	no	0.0	no	0.0
4/16/2009	low	0	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
4/21/2009	low	0	no	0.0	no	0.0
4/27/2009	medium	1	no	0.0	no	0.0
4/28/2009	high	2	no	0.0	no	0.0
4/29/2009	high	2	no	0.0	no	0.0
5/4/2009	low	0	no	0.0	no	0.0
5/11/2009	medium	1	no	0.0	no	0.0
5/14/0009	high	2	no	0.0	no	0.0
5/15/2009	high	2	no	0.0	no	0.0
5/18/2009	medium	1	no	0.0	no	0.0
5/26/2009	medium	1	no	0.0	no	0.0
5/27/2009	medium	1	no	0.0	no	0.0
6/1/2009	medium	1	no	0.0	no	0.0
6/2/2009	medium	1	no	0.0	no	0.0
6/4/2009	low	0	no	0.0	no	0.0
6/8/2009	medium	1	no	0.0	no	0.0
6/10/2009	high	2	no	0.0	no	0.0
6/11/2009	medium	1	no	0.0	no	0.0
6/15/2009	high	2	no	0.0	no	0.0
6/16/2009	medium	1	no	0.0	no	0.0
6/19/2009	high	2	no	0.0	no	0.0
6/22/2009	low	0	no	0.0	no	0.0
6/25/2009	high	2	no	0.0	no	0.0
6/29/2009	high	2	no	0.0	no	0.0
7/6/2009	low	0	no	0.0	no	0.0
7/13/2009	high	2	no	0.0	no	0.0
7/15/2009	high	2	no	0.0	no	0.0
7/16/2009	low	0	no	0.0	no	0.0
7/20/2009	low	0	no	0.0	no	0.0
7/22/2009	low	0	no	0.0	no	0.0
7/27/2009	high	2	no	0.0	no	0.0
8/3/2009	low	0	no	0.0	no	0.0
8/10/2009	high	2	**yes**	**0.5**	no	0.0
8/14/2009	low	0	no	0.0	no	0.0
8/17/2009	low	0	no	0.0	no	0.0
8/18/2009	low	0	no	0.0	no	0.0
8/24/2009	high	2	no	0.0	no	0.0
8/31/2009	low	0	no	0.0	no	0.0
9/1/2009	medium	1	no	0.0	no	0.0
9/8/2009	high	2	no	0.0	no	0.0
9/11/2009	high	2	no	0.0	no	0.0
9/14/2009	medium	1	no	0.0	no	0.0
9/16/2009	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
9/17/2009	medium	1	no	0.0	no	0.0
9/18/2009	high	2	no	0.0	no	0.0
9/21/2009	high	2	no	0.0	no	0.0
9/28/2009	low	0	no	0.0	no	0.0
10/1/2009	medium	1	no	0.0	no	0.0
10/7/2009	high	2	no	0.0	no	0.0
10/12/2009	medium	1	no	0.0	no	0.0
10/20/2009	high	2	**yes**	**0.5**	no	0.0
10/21/2009	high	2	no	0.0	no	0.0
10/26/2009	medium	1	no	0.0	no	0.0
10/27/2009	medium	1	no	0.0	no	0.0
11/2/2009	medium	1	no	0.0	no	0.0
11/3/2009	high	2	no	0.0	no	0.0
11/10/2009	medium	1	no	0.0	no	0.0
11/16/2009	high	2	no	0.0	no	0.0
11/17/2009	high	2	no	0.0	no	0.0
11/18/2009	high	2	no	0.0	no	0.0
11/23/2009	high	2	no	0.0	no	0.0
11/24/2009	high	2	no	0.0	no	0.0
11/30/2009	high	2	no	0.0	no	0.0
12/3/2009	high	2	no	0.0	no	0.0
12/4/2009	high	2	no	0.0	no	0.0
12/7/2009	high	2	no	0.0	no	0.0
12/8/2009	high	2	no	0.0	no	0.0
12/9/2009	high	2	no	0.0	no	0.0
12/10/2009	medium	1	no	0.0	no	0.0
12/11/2009	high	2	no	0.0	no	0.0
12/14/2009	high	2	**yes**	**1.0**	no	0.0
12/15/2009	high	2	no	0.0	no	0.0
12/16/2009	high	2	no	0.0	no	0.0
12/17/2009	high	2	no	0.0	no	0.0
12/21/2009	high	2	no	0.0	no	0.0
12/28/2009	high	2	no	0.0	no	0.0
1/4/2010	high	2	no	0.0	no	0.0
1/5/2010	high	2	no	0.0	no	0.0
1/6/2010	high	2	no	0.0	no	0.0
1/7/2010	high	2	no	0.0	no	0.0
1/11/2010	high	2	no	0.0	no	0.0
1/14/2010	high	2	no	0.0	no	0.0
1/19/2010	high	2	no	0.0	no	0.0
1/20/2010	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
1/21/2010	high	2	no	0.0	no	0.0
1/25/2010	high	2	no	0.0	no	0.0
1/27/2010	high	2	no	0.0	no	0.0
2/1/2010	high	2	no	0.0	no	0.0
2/2/2010	high	2	no	0.0	no	0.0
2/8/2010	high	2	no	0.0	no	0.0
2/9/2010	high	2	no	0.0	no	0.0
2/16/2010	high	2	no	0.0	no	0.0
2/17/2010	high	2	no	0.0	no	0.0
2/18/2010	high	2	no	0.0	no	0.0
2/19/2010	high	2	no	0.0	no	0.0
2/22/2010	high	2	no	0.0	no	0.0
3/1/2010	high	2	**yes**	**1.0**	no	0.0
3/8/2010	high	2	no	0.0	no	0.0
3/12/2010	high	2	no	0.0	no	0.0
3/16/2010	high	2	no	0.0	no	0.0
3/17/2010	medium	1	no	0.0	no	0.0
3/19/2010	high	2	no	0.0	no	0.0
3/22/2010	high	2	no	0.0	no	0.0
3/25/2010	high	2	no	0.0	no	0.0
3/30/2010	high	2	no	0.0	no	0.0
3/31/2010	high	2	no	0.0	no	0.0
4/1/2010	high	2	no	0.0	no	0.0
4/2/2010	high	2	no	0.0	no	0.0
4/5/2010	high	2	no	0.0	no	0.0
4/6/2010	high	2	no	0.0	no	0.0
4/9/2010	medium	1	no	0.0	no	0.0
4/12/2010	medium	1	no	0.0	no	0.0
4/14/2010	medium	1	no	0.0	no	0.0
4/15/2010	medium	1	no	0.0	no	0.0
4/16/2010	medium	1	no	0.0	no	0.0
4/19/2010	high	2	no	0.0	no	0.0
4/20/2010	high	2	no	0.0	no	0.0
4/27/2010	high	2	no	0.0	no	0.0
4/28/2010	high	2	no	0.0	no	0.0
4/29/2010	high	2	no	0.0	no	0.0
5/3/2010	high	2	no	0.0	no	0.0
5/5/2010	medium	1	no	0.0	no	0.0
5/6/2010	medium	1	no	0.0	no	0.0
5/7/2010	medium	1	no	0.0	no	0.0
5/10/2010	medium	1	no	0.0	no	0.0
5/17/2010	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
5/18/2010	high	2	no	0.0	no	0.0
5/24/2010	low	0	no	0.0	no	0.0
6/1/2010	medium	1	no	0.0	no	0.0
6/7/2010	low	0	no	0.0	no	0.0
6/9/2010	low	0	no	0.0	no	0.0
6/10/2010	low	0	no	0.0	no	0.0
6/14/2010	high	2	no	0.0	no	0.0
6/16/2010	high	2	no	0.0	no	0.0
6/17/2010	medium	1	no	0.0	no	0.0
6/21/2010	low	0	no	0.0	no	0.0
6/24/2010	low	0	no	0.0	no	0.0
6/28/2010	high	2	no	0.0	no	0.0
7/6/2010	low	0	no	0.0	no	0.0
7/8/2010	low	0	no	0.0	no	0.0
7/12/2010	medium	1	no	0.0	no	0.0
7/13/2010	medium	1	no	0.0	no	0.0
7/14/2010	medium	1	no	0.0	no	0.0
7/15/2010	high	2	no	0.0	no	0.0
7/16/2010	high	2	no	0.0	no	0.0
7/19/2010	low	0	**yes**	**1.0**	no	0.0
7/20/2010	medium	1	**yes**	**1.0**	no	0.0
7/21/2010	low	0	no	0.0	no	0.0
7/22/2010	low	0	no	0.0	no	0.0
7/26/2010	high	1	no	0.0	no	0.0
7/28/2010	medium	1	no	0.0	no	0.0
7/29/2010	medium	1	no	0.0	no	0.0
8/2/2010	medium	1	no	0.0	no	0.0
8/3/2010	low	0	no	0.0	no	0.0
8/9/2010	medium	1	no	0.0	no	0.0
8/11/2010	high	2	no	0.0	no	0.0
8/16/2010	medium	1	no	0.0	no	0.0
8/18/2010	low	0	no	0.0	no	0.0
8/19/2010	low	0	no	0.0	no	0.0
8/23/2010	medium	1	no	0.0	no	0.0
8/24/2010	high	2	no	0.0	no	0.0
8/30/2010	high	2	no	0.0	no	0.0
8/31/2010	high	2	no	0.0	no	0.0
9/1/2010	high	2	no	0.0	no	0.0
9/2/2010	low	0	no	0.0	no	0.0
9/3/2010	low	0	no	0.0	no	0.0
9/7/2010	low	0	no	0.0	no	0.0
9/14/2010	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
9/15/2010	low	0	no	0.0	no	0.0
9/16/2010	low	0	no	0.0	no	0.0
9/20/2010	medium	1	no	0.0	no	0.0
9/21/2010	medium	1	no	0.0	no	0.0
9/22/2010	medium	1	no	0.0	no	0.0
9/27/2010	high	2	no	0.0	no	0.0
9/30/2010	high	2	no	0.0	no	0.0
10/4/2010	low	0	no	0.0	no	0.0
10/7/2010	medium	1	no	0.0	no	0.0
10/11/2010	high	2	no	0.0	no	0.0
10/14/2010	medium	1	no	0.0	no	0.0
10/18/2010	medium	1	no	0.0	no	0.0
10/19/2010	medium	1	no	0.0	no	0.0
10/20/2010	medium	1	no	0.0	no	0.0
10/21/2010	medium	1	no	0.0	no	0.0
10/25/2010	high	2	no	0.0	no	0.0
10/29/2010	high	2	no	0.0	no	0.0
11/1/2010	low	0	no	0.0	no	0.0
11/2/2010	medium	1	no	0.0	no	0.0
11/8/2010	high	2	no	0.0	no	0.0
11/11/2010	high	2	no	0.0	no	0.0
11/15/2010	medium	1	no	0.0	no	0.0
11/16/2010	medium	1	no	0.0	no	0.0
11/17/2010	medium	1	no	0.0	no	0.0
11/18/2010	medium	1	no	0.0	no	0.0
11/22/2010	high	2	no	0.0	no	0.0
11/29/2010	high	2	no	0.0	no	0.0
11/30/2010	medium	1	no	0.0	no	0.0
12/1/2010	medium	1	no	0.0	no	0.0
12/2/2010	medium	1	no	0.0	no	0.0
12/3/2010	medium	1	no	0.0	no	0.0
12/6/2010	high	2	no	0.0	no	0.0
12/7/2010	high	2	no	0.0	no	0.0
12/8/2010	high	2	no	0.0	no	0.0
12/13/2010	high	2	no	0.0	no	0.0
12/14/2010	high	2	no	0.0	no	0.0
12/15/2010	high	2	no	0.0	no	0.0
12/16/2010	high	2	no	0.0	no	0.0
12/20/2010	high	2	no	0.0	no	0.0
12/22/2010	high	2	no	0.0	no	0.0
12/23/2010	high	2	no	0.0	no	0.0
12/24/2010	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
12/27/2010	high	2	no	0.0	no	0.0
1/3/2011	high	2	no	0.0	no	0.0
1/10/2011	high	2	no	0.0	no	0.0
1/17/2011	high	2	no	0.0	no	0.0
1/18/2011	high	2	no	0.0	no	0.0
1/19/2011	high	2	no	0.0	no	0.0
1/24/2011	high	2	no	0.0	no	0.0
1/27/2011	high	2	no	0.0	no	0.0
1/31/2011	high	2	no	0.0	no	0.0
2/4/2011	high	2	no	0.0	no	0.0
2/7/2011	high	2	no	0.0	no	0.0
2/8/2011	high	2	no	0.0	no	0.0
2/14/2011	high	2	no	0.0	no	0.0
2/15/2011	high	2	no	0.0	no	0.0
2/16/2011	high	2	no	0.0	no	0.0
2/22/2011	high	2	no	0.0	no	0.0
2/25/2011	high	2	no	0.0	no	0.0
2/28/2011	high	2	no	0.0	no	0.0
3/2/2011	high	2	no	0.0	no	0.0
3/9/2011	high	2	no	0.0	no	0.0
3/10/2011	high	2	no	0.0	no	0.0
3/11/2011	high	2	no	0.0	no	0.0
3/14/2011	high	2	no	0.0	no	0.0
3/21/2011	high	2	no	0.0	no	0.0
3/22/2011	high	2	no	0.0	no	0.0
3/23/2011	high	2	no	0.0	no	0.0
3/24/2011	high	2	no	0.0	no	0.0
3/28/2011	high	2	no	0.0	no	0.0
3/29/2011	high	2	no	0.0	no	0.0
4/4/2011	high	2	no	0.0	no	0.0
4/5/2011	high	2	no	0.0	no	0.0
4/11/2011	high	2	no	0.0	no	0.0
4/12/2011	high	2	no	0.0	no	0.0
4/13/2011	high	2	no	0.0	no	0.0
4/19/2011	high	2	no	0.0	no	0.0
4/20/2011	high	2	no	0.0	no	0.0
4/21/2011	high	2	no	0.0	no	0.0
4/22/2011	high	2	no	0.0	no	0.0
4/25/2011	medium	1	no	0.0	no	0.0
4/27/2011	medium	1	**yes**	**1.0**	no	0.0
5/2/2011	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
5/9/2011	high	2	no	0.0	no	0.0
5/16/2011	medium	1	no	0.0	no	0.0
5/18/2011	high	2	no	0.0	no	0.0
5/19/2011	high	2	no	0.0	no	0.0
5/23/2011	high	2	no	0.0	no	0.0
6/1/2011	medium	1	no	0.0	no	0.0
6/6/2011	high	2	no	0.0	no	0.0
6/10/2011	medium	1	**yes**	**1.0**	no	0.0
6/13/2011	low	0	no	0.0	no	0.0
6/14/2011	low	0	no	0.0	no	0.0
6/15/2011	low	0	no	0.0	no	0.0
6/20/2011	high	2	no	0.0	no	0.0
6/22/2011	medium	1	**yes**	**0.5**	no	0.0
6/23/2011	medium	1	no	0.0	no	0.0
6/27/2011	low	0	no	0.0	no	0.0
6/30/2011	medium	1	no	0.0	no	0.0
7/6/2011	high	2	no	0.0	no	0.0
7/11/2011	low	0	no	0.0	no	0.0
7/18/2011	high	2	no	0.0	no	0.0
7/19/2011	high	2	no	0.0	no	0.0
7/20/2011	high	2	no	0.0	no	0.0
7/25/2011	low	0	no	0.0	no	0.0
7/29/2011	medium	1	no	0.0	no	0.0
8/1/2011	high	2	no	0.0	no	0.0
8/8/2011	low	0	no	0.0	no	0.0
8/15/2011	high	2	no	0.0	no	0.0
8/16/2011	high	2	no	0.0	no	0.0
8/17/2011	high	2	no	0.0	no	0.0
8/22/2011	low	0	no	0.0	no	0.0
8/24/2011	high	2	no	0.0	no	0.0
8/29/2011	medium	1	no	0.0	no	0.0
8/31/2011	medium	1	no	0.0	no	0.0
9/6/2011	medium	1	no	0.0	no	0.0
9/12/2011	high	2	no	0.0	no	0.0
9/13/2011	high	2	no	0.0	no	0.0
9/14/2011	high	2	no	0.0	no	0.0
9/20/2011	medium	1	no	0.0	no	0.0
9/26/2011	medium	1	no	0.0	no	0.0
9/27/2011	high	2	no	0.0	no	0.0
9/28/2011	high	2	no	0.0	no	0.0
9/29/2011	high	2	no	0.0	no	0.0
10/3/2011	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
10/10/2011	high	2	no	0.0	no	0.0
10/11/2011	high	2	no	0.0	no	0.0
10/12/2011	high	2	no	0.0	no	0.0
10/17/2011	high	2	no	0.0	no	0.0
10/18/2011	high	2	no	0.0	no	0.0
10/19/2011	high	2	no	0.0	no	0.0
10/20/2011	high	2	no	0.0	no	0.0
10/24/2011	medium	1	no	0.0	no	0.0
10/31/2011	high	2	no	0.0	no	0.0
11/8/2011	medium	1	no	0.0	no	0.0
11/14/2011	high	2	no	0.0	no	0.0
11/21/2011	medium	1	no	0.0	no	0.0
11/22/2011	high	2	no	0.0	no	0.0
11/23/2011	high	2	no	0.0	no	0.0
11/28/2011	high	2	no	0.0	no	0.0
11/29/2011	high	2	no	0.0	no	0.0
12/5/2011	medium	1	no	0.0	no	0.0
12/12/2011	high	2	no	0.0	no	0.0
12/13/2011	high	2	no	0.0	no	0.0
12/14/2011	high	2	no	0.0	no	0.0
12/19/2011	high	2	no	0.0	no	0.0
12/20/2011	high	2	no	0.0	no	0.0
12/21/2011	high	2	no	0.0	no	0.0
12/27/2011	high	2	no	0.0	no	0.0
1/3/2012	high	2	no	0.0	no	0.0
1/9/2012	high	2	no	0.0	no	0.0
1/17/2012	high	2	no	0.0	no	0.0
1/23/2012	high	2	no	0.0	no	0.0
1/24/2012	high	2	no	0.0	no	0.0
1/25/2012	high	2	no	0.0	no	0.0
1/27/2012	high	2	no	0.0	no	0.0
1/30/2012	high	2	no	0.0	no	0.0
2/6/2012	high	2	no	0.0	no	0.0
2/13/2012	high	2	no	0.0	no	0.0
2/21/2012	medium	1	no	0.0	no	0.0
2/27/2012	high	2	no	0.0	no	0.0
2/24/2012	high	2	no	0.0	no	0.0
3/1/2012	medium	1	no	0.0	no	0.0
3/2/2012	high	2	no	0.0	no	0.0
3/5/2012	high	2	no	0.0	no	0.0
3/12/2012	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
3/13/2012	high	2	no	0.0	no	0.0
3/14/2012	medium	1	no	0.0	no	0.0
3/15/2012	high	2	no	0.0	no	0.0
3/19/2012	high	2	no	0.0	no	0.0
3/20/2012	high	2	no	0.0	no	0.0
.3/21/2012	high	2	no	0.0	no	0.0
3/22/2012	high	2	no	0.0	no	0.0
3/26/2012	high	2	no	0.0	no	0.0
3/28/2012	high	2	no	0.0	no	0.0
4/2/2012	medium	1	no	0.0	no	0.0
4/5/2012	medium	1	no	0.0	no	0.0
4/9/2012	high	2	no	0.0	no	0.0
4/16/2012	medium	1	no	0.0	no	0.0
4/17/2012	medium	1	no	0.0	no	0.0
4/18/2012	high	2	no	0.0	no	0.0
4/19/2012	medium	1	no	0.0	no	0.0
4/23/2012	medium	1	no	0.0	no	0.0
4/30/2012	medium	1	no	0.0	no	0.0
5/2/2012	medium	1	no	0.0	no	0.0
5/7/2012	high	2	no	0.0	no	0.0
5/8/2012	high	2	no	0.0	no	0.0
5/14/2012	medium	1	no	0.0	no	0.0
5/15/2012	low	0	no	0.0	no	0.0
5/16/2012	medium	1	no	0.0	no	0.0
5/21/2012	high	2	no	0.0	no	0.0
5/22/2012	high	2	no	0.0	no	0.0
5/23/2012	high	2	no	0.0	no	0.0
5/24/2012	high	2	no	0.0	no	0.0
5/29/2012	high	2	no	0.0	no	0.0
5/31/2012	low	0	no	0.0	no	0.0
6/4/2012	medium	1	no	0.0	no	0.0
6/11/2012	medium	1	no	0.0	no	0.0
6/12/2012	medium	1	no	0.0	no	0.0
6/13/2012	medium	1	no	0.0	no	0.0
6/20/2012	high	2	no	0.0	no	0.0
6/25/2012	medium	1	no	0.0	no	0.0
7/2/2012	low	0	no	0.0	no	0.0
7/9/2012	medium	1	**yes**	**0.5**	no	0.0
7/10/2012	high	2	no	0.0	no	0.0
7/11/2012	high	2	no	0.0	no	0.0
7/12/2012	high	2	**yes**	**0.5**	no	0.0
7/16/2012	low	0	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
7/17/2012	low	0	no	0.0	no	0.0
7/19/2012	low	0	no	0.0	no	0.0
7/20/2012	low	0	no	0.0	no	0.0
7/23/2012	high	2	no	0.0	no	0.0
7/30/2012	low	0	no	0.0	no	0.0
8/6/2012	high	2	no	0.0	no	0.0
8/7/2012	medium	1	no	0.0	no	0.0
8/10/2012	medium	1	no	0.0	no	0.0
8/13/2012	low	0	no	0.0	no	0.0
8/14/2012	low	0	no	0.0	no	0.0
8/15/2012	low	0	no	0.0	no	0.0
8/20/2012	high	2	no	0.0	no	0.0
8/23/2012	high	2	no	0.0	no	0.0
8/28/2012	low	0	no	0.0	no	0.0
8/29/2012	low	0	no	0.0	no	0.0
9/4/2012	high	2	no	0.0	no	0.0
9/5/2012	high	2	no	0.0	no	0.0
9/7/2012	high	2	no	0.0	no	0.0
9/10/2012	low	0	no	0.0	no	0.0
9/11/2012	low	0	no	0.0	no	0.0
9/17/2012	high	2	no	0.0	no	0.0
9/18/2012	high	2	no	0.0	no	0.0
9/19/2012	high	2	no	0.0	no	0.0
9/20/2012	high	2	no	0.0	no	0.0
9/21/2012	high	2	no	0.0	no	0.0
9/25/2102	low	0	no	0.0	no	0.0
9/26/2012	low	0	no	0.0	no	0.0
9/27/2012	low	0	no	0.0	no	0.0
10/1/2012	high	2	no	0.0	no	0.0
10/9/2012	low	0	no	0.0	no	0.0
10/15/2012	high	2	no	0.0	no	0.0
10/16/2012	high	2	no	0.0	no	0.0
10/22/2012	high	2	no	0.0	no	0.0
10/23/2012	high	2	no	0.0	no	0.0
10/24/2012	high	2	no	0.0	no	0.0
10/25/2012	high	2	no	0.0	no	0.0
10/26/2012	high	2	no	0.0	no	0.0
10/29/2012	high	2	no	0.0	no	0.0
11/7/2012	high	2	**yes**	**0.5**	no	0.0
11/12/2012	high	2	no	0.0	no	0.0
11/13/2012	medium	1	no	0.0	no	0.0
11/19/2012	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
11/27/2012	high	2	**yes**	**0.5**	no	0.0
11/28/2012	high	2	no	0.0	no	0.0
12/5/2012	high	2	no	0.0	no	0.0
12/6/2012	high	2	**yes**	**0.5**	no	0.0
12/7/2012	high	2	no	0.0	no	0.0
12/12/2012	medium	1	**yes**	**0.5**	no	0.0
12/13/2012	medium	1	no	0.0	no	0.0
12/14/2012	medium	1	no	0.0	no	0.0
12/17/2012	high	2	no	0.0	no	0.0
12/18/2012	high	2	no	0.0	no	0.0
12/19/2012	high	2	no	0.0	no	0.0
12/20/2012	high	2	no	0.0	no	0.0
12/24/2012	high	2	no	0.0	no	0.0
1/2/2013	high	2	no	0.0	no	0.0
1/3/2013	high	2	no	0.0	no	0.0
1/7/2013	high	2	no	0.0	no	0.0
1/14/2013	high	2	no	0.0	no	0.0
1/22/2013	high	2	no	0.0	no	0.0
1/23/2013	high	2	no	0.0	no	0.0
1/28/2013	high	2	no	0.0	no	0.0
1/30/2013	high	2	no	0.0	no	0.0
1/31/2013	high	2	no	0.0	no	0.0
2/1/2013	high	2	no	0.0	no	0.0
2/4/2013	high	2	no	0.0	no	0.0
2/11/2013	high	2	no	0.0	no	0.0
2/19/2013	high	2	no	0.0	no	0.0
2/20/2013	high	2	no	0.0	no	0.0
2/21/2013	high	2	no	0.0	no	0.0
2/25/2013	high	2	no	0.0	no	0.0
3/5/2013	high	2	no	0.0	no	0.0
3/6/2013	medium	1	no	0.0	no	0.0
3/11/2013	medium	1	no	0.0	no	0.0
3/12/2013	high	2	no	0.0	no	0.0
3/13/2013	high	2	no	0.0	no	0.0
3/18/2013	high	2	no	0.0	no	0.0
3/25/2013	high	2	no	0.0	no	0.0
4/1/2013	high	2	no	0.0	no	0.0
4/2/2013	high	2	no	0.0	no	0.0
4/8/2013	medium	1	no	0.0	no	0.0
4/9/2013	medium	1	no	0.0	no	0.0
4/10/2013	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
4/15/2013	high	2	no	0.0	no	0.0
4/16/2013	high	2	no	0.0	no	0.0
4/18/2013	high	2	no	0.0	no	0.0
4/22/2013	medium	1	no	0.0	no	0.0
4/23/2013	medium	1	no	0.0	no	0.0
4/24/2013	low	0	no	0.0	no	0.0
4/25/2013	medium	1	no	0.0	no	0.0
4/29/2013	high	2	no	0.0	no	0.0
4/30/2013	high	2	no	0.0	no	0.0
5/6/2013	low	0	no	0.0	no	0.0
5/7/2013	medium	1	no	0.0	no	0.0
5/13/2013	high	2	no	0.0	no	0.0
5/17/2013	medium	1	no	0.0	no	0.0
5/20/2013	medium	1	no	0.0	no	0.0
5/21/2013	medium	1	no	0.0	no	0.0
5/22/2013	medium	1	no	0.0	no	0.0
5/23/2013	medium	1	no	0.0	no	0.0
5/28/2013	high	2	no	0.0	no	0.0
6/3/2013	medium	1	no	0.0	no	0.0
6/5/2013	low	0	no	0.0	no	0.0
6/10/2013	high	2	no	0.0	no	0.0
6/11/2013	high	2	no	0.0	no	0.0
6/12/2013	high	2	no	0.0	no	0.0
6/17/2013	medium	1	no	0.0	no	0.0
6/18/2013	medium	1	no	0.0	no	0.0
6/19/2013	medium	1	no	0.0	no	0.0
6/24/2013	high	2	no	0.0	no	0.0
6/25/2013	high	2	no	0.0	no	0.0
6/26/2013	high	2	no	0.0	no	0.0
7/1/2013	medium	1	no	0.0	no	0.0
7/8/2013	medium	1	no	0.0	no	0.0
7/15/2013	medium	1	no	0.0	no	0.0
7/18/2013	high	2	no	0.0	no	0.0
7/22/2013	medium	1	no	0.0	no	0.0
7/23/2013	medium	1	no	0.0	no	0.0
7/24/2013	high	2	no	0.0	no	0.0
7/29/2013	medium	1	no	0.0	no	0.0
8/5/2013	medium	1	no	0.0	no	0.0
8/12/2013	high	2	no	0.0	no	0.0
8/19/2013	low	0	no	0.0	no	0.0
8/20/2013	medium	1	no	0.0	no	0.0
8/21/2013	high	2	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)
8/26/2013	high	2	no	0.0	no	0.0
8/27/2013	medium	1	no	0.0	no	0.0
9/3/2013	medium	1	no	0.0	no	0.0
9/9/2013	high	2	no	0.0	no	0.0
9/10/2013	high	2	no	0.0	no	0.0
9/11/2013	medium	1	no	0.0	no	0.0
9/12/2013	medium	1	no	0.0	no	0.0
9/16/2013	low	0	no	0.0	no	0.0
9/17/2013	medium	1	no	0.0	no	0.0
9/23/2013	high	2	no	0.0	no	0.0
9/24/2013	high	2	**yes**	**0.5**	no	0.0
9/25/2013	high	2	no	0.0	no	0.0
9/27/2013	high	2	no	0.0	no	0.0
9/30/2013	medium	1	no	0.0	no	0.0
10/2/2013	medium	1	no	0.0	no	0.0
10/7/2013	high	2	no	0.0	no	0.0
10/9/2013	high	2	no	0.0	no	0.0
10/14/2013	low	0	no	0.0	no	0.0
10/15/2013	low	0	no	0.0	no	0.0
10/21/2013	high	2	no	0.0	no	0.0
10/28/2013	high	2	no	0.0	no	0.0
10/29/2013	medium	1	no	0.0	no	0.0
10/30/2013	medium	1	**yes**	**0.5**	no	0.0
10/31/2013	medium	1	no	0.0	no	0.0
11/4/2013	high	2	no	0.0	no	0.0
11/11/2013	high	2	no	0.0	no	0.0
11/13/2013	medium	1	**yes**	**0.5**	no	0.0
11/18/2013	medium	1	no	0.0	no	0.0
11/19/2013	high	2	no	0.0	no	0.0
11/20/2013	high	2	no	0.0	no	0.0
11/25/2013	high	2	no	0.0	no	0.0
12/2/2013	high	2	no	0.0	no	0.0
12/3/2013	high	2	no	0.0	no	0.0
12/9/2013	high	2	no	0.0	no	0.0
12/16/2013	high	2	no	0.0	no	0.0
12/17/2013	high	2	no	0.0	no	0.0
12/18/2013	high	2	no	0.0	no	0.0
12/23/2013	high	2	no	0.0	no	0.0
12/30/2013	medium	1	no	0.0	no	0.0

Table 5. Containment Boom Sheen Monitoring
BP West Coast Products Terminal 21T, Harbor Island, Seattle

Date	Tide		Warehouse Area		Loading Rack Area	
	Status (low, Medium, high, ebb, flood)	Measurement	Sheen (yes or No)	Appearance of Sheen (See Note)	Sheen (yes or No)	Appearance of Sheen (See Note)

Notes:

* Sheen Appearance is rated from 0.0 to 3.0 using criteria below;

0.0 No sheen present

1.0 Light sheen visible in one location

2.0 Sheen visible in several locations and is brightly colored

3.0 Sheen covers large areas of boom and is outside boom and/or is thick dark liquid floating on surface

** Tide Level is rated from 0.0 to 4.0 using the criteria below;

0.0 Low Tide

1.0 Medium Tide

2.0 High Tide

3.0 Ebb Tide

4.0 Flood Stage

on* North of warehouse wells were not operational

Table 6. Inland SVE System Petroleum Hydrocarbon Recovery Rates
BP West Coast Products Terminal 21T, Seattle, Washington

Date	Total Hours of Operation	Hours Operated Over Period	Total HSVE Flow Rate from wells (SCFM)	Influent Gasoline Range Organics (GRO) (mg/m^3)	GRO Recovered Over Period (lbs)	Cumulative GRO recovery (lbs)	GRO avg lbs/day over period	Influent Benzene (mg/m^3)	Benzene Recovered Over Period (lbs)	Cumulative Benzene Recovery (lbs)	Avg % CO_2 - Atmospheric concentration (0.04%)	Pounds GRO Destruction From Enhanced Biodegradation Over Period (lbs)	Cumulative GRO Destruction From Enhanced Biodegradation (gal)
2008 Averages & Totals	2,690	2,677	175	4,400	6,072	6,928	58.8	8.78	7.0	7.8	0.38	2,989	486
2009 Averages & Totals	11,245	8,555	258	59.0	551	7,479	1.55	*0.11*	1.1	8.9	0.23	11,748	2,396
2010 Averages & Totals	19,872	8,628	257	9.1	71	7,550	0.20	*0.36*	2.2	11.1	0.18	9,233	3,898
2011 Averages & Totals	23,503	3,583	247	25.5	117	7,667	0.78	*0.56*	1.9	13.0	0.18	2,748	4,344
2012 Averages & Totals	31,631	8,128	246	12.6	87	7,754	0.26	*0.54*	4.1	17.1	0.00	66	4,355
System shutdown due to high groundwater elevation on 11/28/2012. System was restarted 4/15/13 as groundwater elevation had fallen to a safe level for system operation.													
April 17, 2013	31,764	133	268	*22.0*	2.8	7,757	0.5	NA	0.03	17.1	0.00	0.00	4,355
May 17, 2013	32,484	721	271	*37.0*	21.4	7,778	0.7	*0.00076*	0.19	17.3	0.00	0.00	4,355
June 12, 2013	33,106	621	258	*28.0*	20.0	7,798	0.8	*0.00079*	0.0005	17.3	0.00	0.00	4,355
July 24, 2013	34,114	1,009	237	*24.0*	24.3	7,823	0.6	*0.00013*	0.0004	17.3	0.00	0.00	4,355
August 21, 2013	34,786	672	266	*35.0*	18.7	7,841	0.7	*0.00097*	0.0003	17.3	0.00	0.00	4,355
September 25, 2013	35,625	839	261	*27.0*	21.1	7862.3	0.6	0.00075	*0.00071*	17.3	0.00	0.00	4355
October 15, 2013	36103.6	479	258.7	*35.0*	14.4	7876.7	0.7	0.00097	*0.00040*	17.3	0.00	0.00	4355
November 20, 2013	36967	863	259.2	*27.0*	26.0	7902.7	0.7	0.00074	*0.00072*	17.3	0.00	0.00	4355
December 18, 2013	37,638	671	234	4.4	9.7	7,912	0.3	0.040	0.0126	17.3	0.0	0.00	4,355
Total Combined Recovery lbs (Bio+GRO): 34,700				**Total lbs of Gasoline (GRO): 7,917**					**Total lbs Benzene: 17.59**			**Total lbs from Biodegradation: 26,783**	
Total Combined Recovery gal (Bio+GRO): 5,642				**Total gal of Gasoline (GRO): 1,287**					**Total gal of Benzene: 2.40**			**Total gal from Biodegradation: 4,355**	

Notes:

Samples are collected from the SVE influent vapor stream (air) for all analyses.
Samples are analyzed for concentrations of gasoline range organics (GRO) and benzene, toluene, ethylbenzene, & xylenes (BTEX) at an accredited lab.
Samples analysis methodologies utilized include TO-3 or NWTPH-Gx for GRO and TO-15, TO-3, or 8021b for BTEX.
Pounds of gasoline are converted to gallons by assuming that 6.15 lbs equals 1.0 gallons.
Pounds of benzene are converted to gallons by assuming that 7.33 lbs equals 1.0 gallons.
Total pounds of recovered gasoline starts at 839 pounds, as this was the amount recovered during pilot testing.
Total pounds of recovered benzene starts at 0.80 pounds, as this was the amount recovered during pilot testing.
Benzene and Gasoline recovery are biased high, as recoveries are calculated assuming analytes are present at associated detection limits. This provides a protective estimate of analyte concentrations below detection limits.
Analytes were not detected from analyses for all values listed in *italic* . The associated detection limits for the analyses are the value listed in *italic* .
The SVE system was shutdown from December 2010 through June 2011 and November 2012 through April 2013 due to high groundwater elevations that submerged horizontal SVE screens. The SVE system was restarted once the groundwater elevation had fallen to a save level for system operation.
Due to a laboratory oversight, benzene concentrations could not be quantified for the April 17, 2013 air sample. The May 17, 2013 air sample was analyzed for benzene using EPA Method TO-15, which generated data to a much lower detection limit than historically reported. No benzene was detected in this sample.

Definitions:

Avg - average
Bio - biodegradation of petroleum hydrocarbons
CO_2 - carbon dioxide
gal - gallons
GRO - gasoline range organics (gasoline range petroleum hydrocarbons)
hr - hour
HSVE - horizontal soil vapor extraction
lbs - pounds
mg/m^3 - milligrams per cubic meter
NA - not available (see reasons above)
SCFM - standard cubic feet per minute
SVE - soil vapor extraction
TPH - total petroleum hydrocarbons

Enhanced Biodegradation Calculations:

C = Average Influent CO_2 concentration (%)
Q = Influent Flow Rate (SCFM)
Mc = Molecular wt. of Carbon Dioxide = 44
CO_2 recovery (lbs/hr) = C x Q x Mc x 5.277 x 10-4
5.277 x 10-4 is a constant and is derived as follows:
1/100% x 60min/1hr x 1 lb Mole/379 cu.ft. x 1/3
Note: SVE TPH as CO_2 recovery rates were calculated by assuming that for every 3 lbs of CO_2 detected, 1 lb of TPH is metabolized, and that all CO_2 present in vapor stream above background atmospheric concentrations (0.04%) is attributable to microbial degradation of hydrocarbons in soil.

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1					
AMW-01	12/21/2000	ND	1,310	ND	14.0
AMW-01	3/28/2001	59.3	2,600	ND	69.6
AMW-01	6/13/2001	105 U	944	ND	**470**
AMW-01	10/4/2001	ND	851	ND	**152**
AMW-01	12/12/2001	ND	1700 J	ND UJ	**1,260**
AMW-01	3/7/2002	153	1,410	ND	**1,410**
AMW-01	6/12/2002	143 J	2,100	ND	**1,680**
AMW-01	9/19/2002	139 J	571 J	ND UJ	**1,180**
AMW-01	12/17/2002	196	2,190	ND	**74.6**
AMW-01	3/26/2003	101	2,100	ND	**933**
AMW-01	6/27/2003	ND	2,090	ND	**1,260**
AMW-01	9/18/2003	55	2,140	ND	48.5
AMW-01	12/22/2003	136	1750 J	ND	**571**
AMW-01	3/8/2004	ND UJ	ND	ND	**961**
AMW-01	6/16/2004	138	386	ND	**1,540**
AMW-01	9/28/2004	83	ND	ND	**292**
AMW-01	12/6/2004	103	ND	ND	**411**
AMW-01	3/10/2005	113	ND	ND	**812**
AMW-01	6/21/2005	129	ND	ND	**1,130**
AMW-01	9/27/2005	77	ND UJ	ND	**181 J**
AMW-01	12/13/2005	ND UJ	342	ND	**132**
AMW-01	3/21/2006	88	ND	ND	**363**
AMW-01	7/6/2006	ND UJ	ND	ND	**912**
AMW-01	9/18/2006	91.7	ND	ND	7.38
AMW-01	12/12/2006	**1,650 J**	ND UJ	ND UJ	**539 J**
AMW-01	3/21/2007	89.9	ND	ND	**457**
AMW-01	6/6/2007	61	ND	ND	**486**
AMW-01	9/12/2007	65	ND	ND	**157**
AMW-01	12/18/2007	ND	ND	ND	10.6 J
AMW-01	3/25/2008	ND	ND	ND	**76**
AMW-01	6/25/2008	64.9	ND	ND	**370**
AMW-01	9/17/2008	55.0	ND	ND	**162**
AMW-01	12/16/2008	ND	ND	ND	**330**
AMW-01	3/11/2009	ND	ND	ND	**374**
AMW-01	6/10/2009	ND	R	R	**240 J**
AMW-01	9/16/2009	ND	ND	ND	7.4
AMW-01	12/16/2009	ND	ND	ND	**280**
AMW-01	3/30/2010	ND	ND	ND	**310**
AMW-01	6/9/2010	ND	720	ND	**280**
AMW-01	9/14/2010	ND	ND	ND	69.7
AMW-01	12/14/2010	ND	ND	ND	**282**
AMW-01	3/22/2011	ND	ND	ND	**247**
AMW-01	6/22/2011	ND	300 J	ND	39.6
AMW-01	9/27/2011	ND	ND	ND	22.2
AMW-01	12/20/2011	ND	ND	ND	**151**
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-01	3/20/2012	ND	ND	ND	**178**
AMW-01	6/21/2012	ND	ND	ND	**77**
AMW-01	9/10/2012	ND	ND	ND	38.7 J
AMW-01	12/19/2012	ND	ND	ND	61.2
AMW-01	3/19/2013	ND	ND	ND	**110**
AMW-01	6/25/2013	ND	ND	ND	12
AMW-01	9/10/2013	ND	ND	ND	17
AMW-01	12/10/2013	ND	ND	ND	17
AMW-02	12/21/2000	ND	803	ND	3.14
AMW-02	3/28/2001	Not accessible due to earthquake damage to warehouse.			
AMW-02	6/13/2001	ND	999	ND	3.88 U
AMW-02	10/4/2001	ND	1,200	ND	10.90
AMW-02	12/12/2001	ND	1,500 J	ND UJ	5.47
AMW-02	3/7/2002	Not accessible due to repair of earthquake damage to warehouse.			
AMW-02	6/12/2002	ND	2,420	ND	1.49
AMW-02	9/19/2002	ND UJ	495 J	ND UJ	1.61
AMW-02	12/17/2002	ND	1,890	ND	4.08
AMW-02	3/26/2003	ND	2,200	ND	5.23
AMW-02	6/27/2003	ND	1,680	ND	1.11
AMW-02	9/18/2003	ND	2,430	790	2.01
AMW-02	12/22/2003	ND	1,880 J	ND	ND
AMW-02	3/8/2004	ND	ND	ND	ND
AMW-02	6/16/2004	ND	ND	ND	2.40
AMW-02	9/28/2004	ND	ND	ND	0.85
AMW-02	12/8/2004	ND	ND	ND	23.2
AMW-02	3/10/2005	ND	ND	ND	38.4
AMW-02	6/21/2005	ND	ND	ND	16.1
AMW-02	9/27/2005	ND	ND	ND	9.04
AMW-02	12/13/2005	ND	366	ND	7.26
AMW-02	3/21/2006	ND	ND	ND	2.16
AMW-02	7/6/2006	ND	ND	ND	41.1
AMW-02	9/18/2006	ND	ND	ND	3.18
AMW-02	12/12/2006	84.5 UJ	ND UJ	ND UJ	25.8 J
AMW-02	3/21/2007	ND	ND	ND	**92.2**
AMW-02	6/6/2007	ND	ND	ND	**442**
AMW-02	9/12/2007	ND	ND	ND	4.03 J
AMW-02	12/18/2007	ND	ND	ND	66.2
AMW-02	3/25/2008	75.9	ND	ND	**343**
AMW-02	6/25/2008	ND	ND	ND	**125**
AMW-02	9/17/2008	ND	ND	ND	30.7
AMW-02	12/16/2008	ND	ND	ND	**189**
AMW-02	3/11/2009	ND	ND	ND	**421**
AMW-02	6/10/2009	ND	R	R	**100**
AMW-02	9/14/2010	ND	ND	ND	22.6
AMW-02	12/14/2010	ND	ND	ND	**96.2**
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-02	9/16/2009	ND	ND	ND	12
AMW-02	12/16/2009	ND	ND	ND	**110**
AMW-02	3/30/2010	ND	1,000	ND	**210**
AMW-02	6/9/2010	ND	1,000	260	**130**
AMW-02	3/22/2011	ND	ND	ND	**149**
AMW-02	6/22/2011	ND	ND	ND	20.0
AMW-02	9/27/2011	ND	ND	ND	6.5
AMW-02	12/20/2011	ND	ND	ND	12.2
AMW-02	3/20/2012	ND	ND	ND	31.6
AMW-02	6/21/2012	ND	ND	ND	**82.5**
AMW-02	9/10/2012	ND	ND	ND	12.7 J
AMW-02	12/19/2012	ND	ND	ND	12.4
AMW-02	3/19/2013	ND	ND	ND	9.3
AMW-02	6/25/2015	ND	ND	ND	13.0
AMW-02	9/10/2013	ND	ND	ND	8.1
AMW-02	12/10/2013	ND	ND	ND	5.7
AMW-03	12/21/2000	127	1,420	ND	ND
AMW-03	3/28/2001	Not accessible due to earthquake damage to warehouse.			
AMW-03	6/13/2001	ND	745	ND	ND
AMW-03	10/4/2001	ND	1,210	ND	ND
AMW-03	12/12/2001	ND	1,080 J	ND UJ	ND
AMW-03	3/7/2002	Not accessible due to earthquake damage to warehouse.			
AMW-03	6/12/2002	ND	1,070	ND	ND
AMW-03	9/19/2002	ND UJ	643 J	ND UJ	ND UJ
AMW-03	12/17/2002	ND	1,160	ND	ND
AMW-03	3/26/2003	ND	1,240	ND	ND
AMW-03	6/27/2003	ND	713	ND	ND
AMW-03	9/18/2003	ND	1,050	ND	ND
AMW-03	12/22/2003	ND	374 J	ND	ND
AMW-03	3/8/2004	ND	ND	ND	ND
AMW-03	6/16/2004	ND	ND	ND	1.02
AMW-03	9/28/2004	ND	ND	ND	ND
AMW-03	12/8/2004	ND	ND UJ	ND UJ	ND
AMW-03	3/10/2005	ND	ND	ND	1.56
AMW-03	6/21/2005	ND	ND	ND	0.99
AMW-03	9/27/2005	ND	ND UJ	ND	0.997
AMW-03	12/13/2005	ND	ND	ND	0.828
AMW-03	3/21/2006	ND	ND	ND	2.770
AMW-03	7/6/2006	ND	ND	ND	2.28
AMW-03	9/18/2006	ND	ND	ND	ND
AMW-03	12/12/2006	ND UJ	ND UJ	ND UJ	0.974 J
AMW-03	3/21/2007	ND	ND	ND	ND
AMW-03	6/6/2007	ND	ND	ND	ND
AMW-03	9/12/2007	ND	ND	ND	ND UJ
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-03	12/18/2007	ND	ND	ND	ND
AMW-03	3/25/2008	ND	ND	ND	ND
AMW-03	6/25/2008	ND	ND	ND	ND
AMW-03	9/17/2008	ND	ND	ND	ND
AMW-03	12/16/2008	ND	ND	ND	ND
AMW-03	3/11/2009	ND	ND	ND	ND
AMW-03	6/10/2009	ND	R	R	ND
AMW-03	9/16/2009	ND	ND	ND	ND
AMW-03	12/16/2009	ND	ND	ND	ND
AMW-03	3/30/2010	ND	400	ND	ND
AMW-03	6/9/2010	ND	230	ND	ND
AMW-03	9/14/2010	ND	ND	ND	ND
AMW-03	12/14/2010	ND	ND	ND	ND
AMW-03	3/22/2011	ND	ND	ND	0.54
AMW-03	6/22/2011	ND	ND	ND	ND
AMW-03	9/27/2011	ND	ND	ND	ND
AMW-03	12/20/2011	ND	ND	ND	ND
AMW-03	3/20/2012	ND	ND	ND	0.52
AMW-03	6/21/2012	ND	ND	ND	ND
AMW-03	9/10/2012	ND	ND	ND	ND
AMW-03	12/19/2012	ND	ND	ND	ND
AMW-03	3/19/2013	ND	ND	ND	ND
AMW-03	6/25/2013	ND	ND	ND	ND
AMW-03	9/10/2013	ND	ND	ND	ND
AMW-03	12/10/2013	ND	ND	ND	ND
AMW-04	12/21/2000	ND	1,570	ND	0.66
AMW-04	3/28/2001	ND	1,660	ND	0.766
AMW-04	6/13/2001	ND	987	ND	ND
AMW-04	10/4/2001	ND	379	ND	ND
AMW-04	12/12/2001	ND	930 J	ND UJ	ND
AMW-04	3/7/2002	ND	519	ND	2.94
AMW-04	6/12/2002	ND	1,200	ND	0.63
AMW-04	9/19/2002	ND UJ	760 J	ND UJ	1.45 J
AMW-04	12/17/2002	ND	1,070	ND	ND
AMW-04	3/26/2003	ND	1,240	ND	0.84
AMW-04	6/27/2003	ND	875	ND	ND
AMW-04	9/18/2003	ND	1,660	ND	ND
AMW-04	12/22/2003	ND	686 J	ND	1.73
AMW-04	3/8/2004	ND	ND	ND	ND
AMW-04	6/16/2004	ND	ND	ND	ND
AMW-04	9/27/2004	ND	ND	ND	ND
AMW-04	12/6/2004	ND	ND	ND	ND
AMW-04	3/10/2005	ND	ND	ND	ND
AMW-04	6/21/2005	ND	ND	ND	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-04	9/27/2005	ND	ND UJ	ND	ND
AMW-04	12/13/2005	ND UJ	ND	ND	ND UJ
AMW-04	3/21/2006	ND	ND	ND	0.65
AMW-04	7/6/2006	ND UJ	ND	ND	ND UJ
AMW-04	9/18/2006	ND	ND	ND	ND
AMW-04	12/12/2006	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	3/21/2007	ND	ND	ND	0.64
AMW-04	6/6/2007	ND	ND	ND	ND
AMW-04	9/12/2007	ND	ND	ND	ND UJ
AMW-04	12/18/2007	ND	ND	ND	ND
AMW-04	3/26/2008	ND	ND	ND	ND
AMW-04	6/25/2008	ND	ND	ND	ND
AMW-04	9/17/2008	ND	ND	ND	ND
AMW-04	12/16/2008	ND	ND	ND	0.63
AMW-04	3/11/2009	ND	ND	ND	ND
AMW-04	6/10/2009	ND	R	R	ND
AMW-04	9/16/2009	ND	ND	ND	ND
AMW-04	12/16/2009	ND UJ	ND	ND	ND
AMW-04	3/30/2010	ND	610	ND	0.57
AMW-04	6/9/2010	ND	430	ND	ND
AMW-04	9/14/2010	ND	ND	ND	ND
AMW-04	12/14/2010	ND	ND	ND	ND
AMW-04	3/22/2011	ND	ND	ND	ND
AMW-04	6/22/2011	ND	ND	ND	ND
AMW-04	9/27/2011	ND	ND	ND	ND
AMW-04	12/27/2011	ND	ND	ND	ND
AMW-04	3/20/2012	ND	ND	ND	ND
AMW-04	6/21/2012	ND	ND	ND	ND
AMW-04	9/10/2012	ND	ND	ND	ND
AMW-04	12/19/2012	ND	ND	ND	ND
AMW-04	3/19/2013	ND	ND	ND	ND
AMW-04	6/25/2013	ND	ND	ND	ND
AMW-04	9/10/2013	ND	ND	ND	ND
AMW-04	12/10/2013	ND	ND	ND	ND
AMW-05	12/21/2000	ND	1,450	ND	ND
AMW-05	3/28/2001	ND	1,360	ND	ND
AMW-05	6/13/2001	ND	440	ND	ND
AMW-05	10/4/2001	71.4 U	318	ND	ND
AMW-05	12/12/2001	ND	940 J	ND UJ	ND
AMW-05	3/7/2002	ND	1,100	ND	2.12
AMW-05	6/12/2002	78	1,180	ND	0.701
AMW-05	9/19/2002	ND UJ	760 J	ND UJ	1.45 J
AMW-05	12/17/2002	ND	1,820	ND	ND
AMW-05	3/26/2003	ND	1,900	ND	0.577
AMW-05	3/27/2003	ND	381 J	ND UJ	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AMW-05	9/19/2003	ND	2,150	ND	ND
AMW-05	12/22/2003	ND	1,420 J	ND	0.833
AMW-05	3/8/2004	ND	ND	ND	ND
AMW-05	6/16/2004	ND	ND	ND	ND
AMW-05	9/27/2004	ND	ND	ND	ND
AMW-05	12/6/2004	ND	ND	ND	ND
AMW-05	3/10/2005	ND	ND	ND	ND
AMW-05	6/21/2005	ND	ND	ND	ND
AMW-05	9/27/2005	ND	ND UJ	ND	ND
AMW-05	12/13/2005	ND	ND	ND	0.727
AMW-05	3/21/2006	ND	ND	ND	0.692
AMW-05	7/6/2006	ND	ND	ND	ND
AMW-05	9/18/2006	ND	ND	ND	ND
AMW-05	12/12/2006	ND UJ	ND UJ	ND UJ	0.565 J
AMW-05	3/21/2007	ND	ND	ND	1.11
AMW-05	6/6/2007	ND	ND	ND	ND
AMW-05	9/12/2007	ND	ND	ND	ND UJ
AMW-05	12/18/2007	ND	ND	ND	ND
AMW-05	3/26/2008	ND	ND	ND	ND
AMW-05	6/25/2008	ND	ND	ND UJ	ND
AMW-05	9/17/2008	ND	ND	ND UJ	ND
AMW-05	12/16/2008	ND	ND	ND	0.768
AMW-05	3/11/2009	ND	ND	ND	0.885
AMW-05	6/10/2009	ND	R	R	ND
AMW-05	9/16/2009	54	ND	ND	ND
AMW-05	12/16/2009	ND UJ	ND	ND	ND
AMW-05	3/30/2010	ND	890	ND	1.3
AMW-05	6/9/2010	ND	640	ND	ND
AMW-05	9/14/2010	ND	ND	ND	ND
AMW-05	12/14/2010	ND	ND	ND	ND
AMW-05	3/22/2011	ND	ND	ND	ND
AMW-05	6/22/2011	ND	ND	ND	ND
AMW-05	9/27/2011	ND	ND	ND	ND
AMW-05	12/20/2011	ND	ND	ND	ND
AMW-05	3/20/2012	ND	ND	ND	ND
AMW-05	6/21/2012	ND	ND	ND	ND
AMW-05	9/10/2012	ND	ND	ND	ND
AMW-05	12/19/2012	ND	ND	ND	ND
AMW-05	3/19/2013	ND	ND	ND	ND
AMW-05	6/25/2013	ND	ND	ND	ND
AMW-05	9/10/2013	ND	ND	ND	ND
AMW-05	12/10/2013	ND	ND	ND	ND
GM-11S	4/10/1997	**3,910**	2,210	1,230	**616 J**
GM-11S	7/8/1997	960 J	1,090	ND	46.9 J
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-11S	10/21/1997	**1,570**	1,260	ND	**126**
GM-11S	1/21/1998	390	788	ND	**250**
GM-11S	3/11/1998	**1,800**	776	ND	**640**
GM-11S	7/6/1998	680	470 J	ND	41
GM-11S	10/20/1998	260	584	ND	27
GM-11S	12/15/1998	**1,300**	1,090	ND	**500**
GM-11S	3/26/1999	**1,100**	779	ND	**220**
GM-11S	6/23/1999	710	520	ND	**92**
GM-11S	CONVERTED TO RECOVERY WELL - SAMPLING DISCONTINUED				
GM-12S	4/10/1997	140	4,500	2,720	42.9
GM-12S	7/8/1997	160	4,590	3,450	ND
GM-12S	10/20/1997	ND	600	1,630	ND
GM-12S	1/21/1998	ND	1,210	2,040	ND
GM-12S	3/10/1998	ND	2,040	ND	ND
GM-12S	7/6/1998	140	2,830	1,980	0.8
GM-12S	10/20/1998	77	1,200	775	ND
GM-12S	3/26/1999	280	2,080 J	1,100 J	0.5
GM-12S	6/23/1999	260	1,530	ND	ND
GM-12S	WELL DELETED FROM MONITORING PROGRAM				
GM-14S	9/13/2007	608	1020	ND	0.97
GM-14S	12/20/2007	389	341	ND	1.02
GM-14S	3/27/2008	172	ND	ND	0.538
GM-14S	6/27/2008	**2,680 J**	577	ND	2.5 J
GM-14S	9/19/2008	**1,440**	719	ND	1.32
GM-14S	12/17/2008	**1,630 J**	963	ND	1.6
GM-14S	3/12/2009	**1,300**	562	ND	7.98
GM-14S	6/11/2009	**2,500**	R	R	ND
GM-14S	9/18/2009	**2,300**	1,600	ND	ND
GM-14S	12/17/2009	750	870	ND	ND
GM-14S	4/1/2010	**2,000**	880	ND	ND
GM-14S	6/10/2010	**1,900 J**	3,200	560	11 J
GM-14S	9/16/2010	**2,070**	690	ND	ND
GM-14S	12/15/2010	245	400	ND	ND
GM-14S	3/23/2011	748	350	ND	ND
GM-14S	6/23/2011	**2,190**	590	ND	ND
GM-14S	9/28/2011	**3,660**	840	ND	ND
GM-14S	12/21/2011	**3,150**	1,200	ND	ND
GM-14S	3/21/2012	903	480	ND	ND
GM-14S	6/22/2012	**3,050**	500	ND	ND
GM-14S	9/11/2012	**3,330**	920	ND	ND
GM-14S	12/20/2012	464	480	ND	ND
GM-14S	3/20/2013	**1,400**	340	ND	ND
GM-14S	6/26/2013	**2,200**	770	ND	1.3
GM-14S	9/11/2013	**1,700**	810	ND	0.77
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-14S	12/11/2013	**3,300**	570	ND	ND
GM-15S	4/9/1997	ND	290	ND	ND
GM-15S	7/8/1997	170	800	ND	1.4
GM-15S	10/21/1997	ND	ND	ND	ND
GM-15S	1/21/1998	ND	293	ND	ND
GM-15S	3/11/1998	ND	ND	ND	ND
GM-15S	7/7/1998	54	253	ND	ND
GM-15S	10/21/1998	310	550	ND	ND
GM-15S	12/15/1998	120	342	ND	ND
GM-15S	3/25/1999	ND	ND	ND	ND
GM-15S	6/23/1999	76	ND	ND	ND
GM-15S	9/27/1999	NS	NS	NS	NS
GM-15S	12/14/1999	160 U	316	ND	ND
GM-15S	3/24/2000	ND	451	ND	ND
GM-15S	6/30/2000	167	1,200	ND	ND
GM-15S	9/27/2000	355 J	1,130 J	ND	ND UJ
GM-15S	12/21/2000	801	1,990	ND	ND
GM-15S	3/27/2001	548	2,810	ND	0.747 J
GM-15S	6/12/2001	909	1,040	ND	2.58 U
GM-15S	10/3/2001	955	1,220	ND	10.9 J
GM-15S	12/11/2001	578	1,100	ND	9.62
GM-15S	3/6/2002	434	1,430	ND	12.1
GM-15S	6/10/2002	786	2,530	ND	14.7
GM-15S	9/18/2002	825 J	1,320 J	ND UJ	9.38 J
GM-15S	12/16/2002	738	1,690 J	ND	4.16
GM-15S	3/25/2003	833 J	2,920	ND	3.57 J
GM-15S	6/26/2003	616	2,940 J	ND	2.49 J
GM-15S	9/19/2003	636	1,530	ND	1.58
GM-15S	12/22/2003	672	647 J	ND	1.47 J
GM-15S	3/8/2004	458 J	ND	ND	2.83 J
GM-15S	6/17/2004	836 J	356	ND	1.26
GM-15S	9/28/2004	655	ND	ND	1.62 J
GM-15S	12/8/2004	847	ND	ND	1.53
GM-15S	3/11/2005	587	ND	ND	1.07 J
GM-15S	6/22/2005	984 J	ND	ND	0.682
GM-15S	9/28/2005	840	ND	ND	1.43 J
GM-15S	12/14/2005	702	ND	ND	1.27
GM-15S	3/22/2006	317	ND	ND	0.614
GM-15S	7/7/2006	647	ND	ND	0.767
GM-15S	9/19/2006	533	ND	ND	0.836
GM-15S	12/13/2006	494 J	ND UJ	ND UJ	ND UJ
GM-15S	3/22/2007	420	ND	ND	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-15S	6/7/2007	404	ND	ND	0.505
GM-15S	9/13/2007	180	ND	ND	ND UJ
GM-15S	12/19/2007	549	ND	ND	0.943
GM-15S	3/26/2008	404	ND	ND	0.613
GM-15S	6/26/2008	480	ND	ND	0.665
GM-15S	9/18/2008	445	ND	ND	0.599
GM-15S	12/17/2008	Well not sampled, sampling reduced to a semi-annual event			
GM-15S	3/12/2009	695	ND	ND	19.6
GM-15S	9/16/2009	390	ND	ND	ND
GM-15S	3/30/2010	670	520	ND	1.1
GM-15S	9/15/2010	269	ND	ND	6.6
GM-15S	3/23/2011	ND	ND	ND	ND
GM-15S	9/27/2011	427	ND	ND	0.79
GM-15S	3/20/2012	143	ND	ND	ND
GM-15S	9/10/2012	ND	ND	ND	ND
GM-15S	3/19/2013	92	ND	ND	**100**
GM-15S	6/25/2013	**1,300**	ND	ND	**400**
GM-15S	9/10/2013	270	ND	ND	**110**
GM-15S	12/11/2013	320	ND	ND	1.3
GM-16S	4/9/1997	ND	3,980	1,630	
GM-16S	7/8/1997	ND	3,890	1,710	ND
GM-16S	10/21/1997	ND	720	ND	ND
GM-16S	1/21/1998	ND	1,390	ND	ND
GM-16S	3/12/1998	ND	5,780	1,620	ND
GM-16S	7/7/1998	ND	1,310	ND	ND
GM-16S	10/20/1998	ND	ND	ND	ND
GM-16S	12/17/1998	ND	2,170	871	ND
GM-16S	3/26/1999	NS	1,990	960	NS
GM-16S	6/28/1999	NS	480	ND	NS
GM-16S	WELL DELETED FROM MONITORING PROGRAM / REINITIATED 3RD QUARTER 2007				
GM-16S	9/13/2007	ND	ND	ND	ND UJ
GM-16S	12/20/2007	ND	ND	ND	ND
GM-16S	3/27/2008	65.3	ND	ND	ND
GM-16S	6/27/2008	81.1	ND	ND	ND
GM-16S	9/19/2008	72.7	ND	ND	ND
GM-16S	12/17/2008	Well not sampled, sampling has been reduced to a semi-annual event			
GM-16S	3/12/2009	ND	456	ND	ND
GM-16S	9/18/2009	300	750	ND	ND
GM-16S	3/31/2010	390	1800	ND	ND
GM-16S	9/16/2010	263	490	ND	ND
GM-16S	3/23/2011	193	350	ND	ND
GM-16S	9/28/2011	377	400	ND	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-16S	3/21/2012	ND	290	ND	ND
GM-16S	9/11/2012	ND	ND	ND	ND
GM-16S	3/20/2013	79	ND	ND	ND
GM-16S	9/11/2013	62	ND	ND	ND
GM-17S	4/9/1997	ND	1,720	900	ND
GM-17S	7/9/1997	ND	720	ND	ND
GM-17S	10/21/1997	ND	ND	ND	ND
GM-17S	1/22/1998	ND	320	ND	ND
GM-17S	3/11/1998	ND	926	ND	ND
GM-17S	7/7/1998	52 J	410 J	ND UJ	ND UJ
GM-17S	10/21/1998	ND	ND	ND	ND
GM-17S	12/15/1998	ND	1,060	ND	ND
GM-17S	3/26/1999	NS	851	ND	NS
GM-17S	6/28/1999	NS	393	ND	NS
GM-17S	WELL DELETED FROM MONITORING PROGRAM / REINITIATED 3RD QUARTER 2007				
GM-17S	9/13/2007	ND	ND	ND	ND UJ
GM-17S	12/20/2007	ND	ND	ND	ND
GM-17S	3/27/2008	ND	ND	ND	ND
GM-17S	6/27/2008	ND	ND	ND	ND
GM-17S	9/19/2008	ND	ND	ND	ND
GM-17S	12/17/2008	Well not sampled, sampling has been reduced to a semi-annual event			
GM-17S	3/12/2009	ND	ND	ND	ND
GM-17S	9/18/2009	53	ND	ND	ND
GM-17S	3/31/2010	ND	ND	ND	ND
GM-17S	9/16/2010	ND	ND	ND	ND
GM-17S	3/23/2011	ND	ND	ND	ND
GM-17S	9/28/2011	ND	ND	ND	ND
GM-17S	3/21/2012	ND	ND	ND	ND
GM-17S	9/11/2012	ND	ND	ND	ND
GM-17S	3/20/2013	ND	ND	ND	ND
GM-17S	9/11/2013	ND	ND	ND	ND
GM-24S	4/9/1997	970	2,180	1,070	ND
GM-24S	7/9/1997	**4,040**	1,200	ND	ND
GM-24S	10/22/1997	**2,760**	710	ND	1.1
GM-24S	1/22/1998	**1,300**	841	ND	2.1
GM-24S	3/11/1998	370	765	ND	ND
GM-24S	7/7/1998	**1,500 J**	762 J	ND UJ	ND UJ
GM-24S	10/20/1998	800	929	ND	1.6
GM-24S	12/17/1998	**1,100**	867	ND	ND
GM-24S	3/26/1999	**3,500**	1,470	ND	ND
GM-24S	6/28/1999	**2,600**	1,390	ND	**2,600**
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-24S	9/29/1999	**2,200**	1,030	ND	0.8
GM-24S	12/14/1999	**1,900**	857	ND	1.3 U
GM-24S	3/24/2000	**2,860**	1,230	ND	ND
GM-24S	6/30/2000	**4,570**	2,110	ND	ND
GM-24S	9/27/2000	**3,080 J**	2,690 J	ND	ND UJ
GM-24S	12/21/2000	**3,420**	4,100	947	ND
GM-24S	3/27/2001	**2,570**	3,120	884	0.704 J
GM-24S	6/12/2001	Tank Farm was inaccessible to sampling activities			
GM-24S	10/3/2001	**2,820**	1,800	ND	3.88 J
GM-24S	12/11/2001	**1,560**	2,250	ND	1.13 J
GM-24S	3/6/2002	**2,180**	2,170	ND	12.1
GM-24S	6/10/2002	**2,230**	1,800	ND	2.2 J
GM-24S	9/18/2002	**1,930 J**	1,130 J	ND UJ	3.79 J
GM-24S	12/16/2002	**1,330**	4,250	949	2.32
GM-24S	3/25/2003	**1,510**	1,930	850	0.667 J
GM-24S	6/25/2003	**3,510 J**	ND UJ	ND UJ	3.38 J
GM-24S	9/19/2003	**2,490**	1,610	ND	3.49
GM-24S	12/23/2003	**2,890**	2,220 J	ND	1.66 J
GM-24S	3/9/2004	**2,850**	345	ND	0.928 J
GM-24S	6/17/2004	**2,800**	567	ND	1.66
GM-24S	9/29/2004	**2,190**	0.365	ND	2.25
GM-24S	12/9/2004	**1,910**	ND	ND	2.34
GM-24S	3/11/2005	**2,670**	0.365	ND	1.61
GM-24S	6/22/2005	**3,990**	261	ND	3.68
GM-24S	9/28/2005	**4,190**	296	ND	3.23 J
GM-24S	12/14/2005	**2,430**	293	ND	2.79
GM-24S	3/22/2006	**2,310**	303	ND	1.95 J
GM-24S	7/7/2006	**2,700**	ND	ND	1.82
GM-24S	9/19/2006	**2,480**	535	ND	2.03
GM-24S	12/14/2006	**1,070 J**	ND UJ	ND UJ	ND UJ
GM-24S	3/22/2007	**2,750 J**	427 J	ND	2.97 J
GM-24S	6/7/2007	**2,600 J**	429	ND	2.25
GM-24S	9/13/2007	**1,390 J**	346 J	ND	1.16 J
GM-24S	12/20/2007	**ND UJ**	ND	ND	ND
GM-24S	3/27/2008	578	ND	ND	0.59
GM-24S	6/26/2008	**1,980**	439	ND	2.13
GM-24S	9/19/2008	**1,210**	252	ND	1.34
GM-24S	12/17/2008	**1,260**	ND	ND	1.32 J
GM-24S	3/12/2009	**1,260**	309	ND	1.35
GM-24S	6/11/2009	**1,200**	R	R	ND
GM-24S	9/17/2009	**1,600 J**	850	ND	ND
GM-24S	12/17/2009	620 J	430	ND	ND
GM-24S	4/1/2010	990 J	370	ND	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
GM-24S	6/10/2010	**1,200**	760 J	ND	2.9 J
GM-24S	9/16/2010	**1,480 J**	460 J	ND	ND
GM-24S	12/15/2010	448	ND	ND	ND
GM-24S	3/23/2011	**2,260**	350	ND	ND
GM-24S	6/23/2011	**1,140 J**	380	ND	ND
GM-24S	9/28/2011	806 J	710 J	ND	ND
GM-24S	12/21/2011	**2,080**	260	ND	ND
GM-24S	3/21/2012	462 J	260	ND	ND
GM-24S	6/22/2012	**1,220**	270	ND	ND
GM-24S	9/11/2012	**2,460**	550	ND	ND
GM-24S	12/20/2012	244	ND	ND	ND
GM-24S	3/20/2013	**1,100**	270	ND	ND
GM-24S	6/26/2013	850 J	390	ND	ND
GM-24S	9/11/2013	500 J	470	ND	ND UJ
GM-24S	12/11/2013	**1,700**	450 J	ND	ND
AR-03	4/9/1997	**4,560**	5,890 J	1,070 J	**2,780 J**
AR-03	7/8/1997	**2,690**	7,600	1,640	**311**
AR-03	10/21/1997	**2,460**	730	ND	**204**
AR-03	1/21/1998	570	1,740	ND	41
AR-03	3/10/1998	**2,800**	2,490	ND	**850**
AR-03	7/6/1998	**2,900**	2,030	ND	35
AR-03	10/20/1998	990	2,230	ND	ND
AR-03	12/15/1998	780	1,200	ND	50
AR-03	3/25/1999	**3,800**	2,480	ND	**1,600**
AR-03	6/23/1999	**3,300**	2,390	ND	**290**
AR-03	9/29/1999	**3,400**	2,570	ND	10
AR-03	12/14/1999	**2,400**	1,390	ND	**340**
AR-03	3/24/2000	**1,380**	3,600	ND	**574**
AR-03	6/30/2000	**3,230**	7,980	1,040	**523**
AR-03	9/27/2000	**2,320 J**	3,700 J	772	ND UJ
AR-03	12/21/2000	**2,480**	5,140	ND	41.9
AR-03	3/27/2001	**2,050**	3,500	812	**583**
AR-03	6/14/2001	**1,330 J**	2,220	ND	1.59 R
AR-03	10/3/2001	533	1,640	ND	ND
AR-03	12/11/2001	**1,870**	1,790	ND	**661**
AR-03	3/6/2002	**2,890**	4,520	ND	**1800**
AR-03	6/10/2002	**2280 J**	5,590	794	**160 J**
AR-03	9/18/2002	484 J	1,890 J	ND UJ	6.01 J
AR-03	12/16/2002	321	2,830	ND	ND
AR-03	3/26/2003	**2,090**	6,190	ND	**1070 J**
AR-03	6/26/2003	610 J	2,790	ND	28.1
AR-03	9/19/2003	297	1,630	ND	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
AR-03	12/23/2003	918	1640 J	ND	**228**
AR-03	3/9/2004	**2,350**	ND	ND	**659**
AR-03	6/17/2004	769 J	675	ND	34.3
AR-03	9/29/2004	332	ND	ND	ND
AR-03	12/8/2004	344	ND	ND	6.65
AR-03	3/11/2005	454	ND	ND	12.6
AR-03	6/22/2005	288	ND	ND	1.47
AR-03	9/28/2005	389	ND	ND	ND
AR-03	12/14/2005	520	408	ND	32.7
AR-03	3/22/2006	**2,450**	947	ND	**451**
AR-03	7/7/2006	860	ND	ND	67.3
AR-03	9/19/2006	323	ND	ND	ND
AR-03	12/13/2006	**1,210 J**	ND UJ	ND UJ	**134 J**
AR-03	3/22/2007	**1,880 J**	518	ND	**304**
AR-03	6/7/2007	**1,503**	ND	ND	**148**
AR-03	9/13/2007	186	ND	ND	ND
AR-03	12/19/2007	317	ND	ND	1.59
AR-03	3/26/2008	**2,010**	263	ND	172
AR-03	6/26/2008	**2,580**	ND	ND	**72.0**
AR-03	9/17/2008	758	ND	ND	0.79
AR-03	12/17/2008	**1,030 J**	384	ND	0.94
AR-03	3/13/2009	157	462	ND	ND
AR-03	6/11/2009	940	R	R	3.30
AR-03	9/17/2009	**1,200**	590	ND	ND
AR-03	12/16/2009	160	1,100	ND	ND
AR-03	3/31/2010	230	3,700	ND	ND
AR-03	6/10/2010	810	**14,000**	930	ND
AR-03	9/15/2010	676	180	ND	ND
AR-03	12/15/2010	ND	130	ND	ND
AR-03	3/24/2011	ND	390	ND	ND
AR-03	6/23/2011	297	380	ND	ND
AR-03	9/28/2011	821	270	ND	ND
AR-03	12/21/2011	940	170	ND	ND
AR-03	3/21/2012	ND	ND	ND	ND
AR-03	6/21/2012	ND	340	ND	ND
AR-03	9/10/2012	815 J	650 J	ND	ND
AR-03	12/20/2012	ND	460	ND	ND
AR-03	3/20/2013	78	ND	ND	ND
AR-03	6/26/2013	370	ND	ND	ND
AR-03	9/11/2013	540	280	ND	ND
AR-03	12/11/2013	390	560	ND	ND
MW-1-T9	12/15/2005	434	785	ND	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
MW-1-T9	3/22/2006	**1,600**	214	ND	**78.9**
MW-1-T9	7/7/2006	816	ND	ND	0.852
MW-1-T9	9/19/2006	236	ND	ND	ND
MW-1-T9	12/13/2006	307 J	ND UJ	ND UJ	ND UJ
MW-1-T9	3/22/2007	922 J	510	ND	15.8 J
MW-1-T9	6/7/2007	**1,130**	428	ND	0.779
MW-1-T9	9/14/2007	536	ND	ND	ND
MW-1-T9	12/19/2007	120	ND	ND	ND
MW-1-T9	3/26/2008	879	467	ND	18.3
MW-1-T9	6/26/2008	**1,050 J**	ND	ND	7.02
MW-1-T9	9/18/2008	919	ND	ND	0.5
MW-1-T9	12/17/2008	374	ND	ND	ND
MW-1-T9	3/13/2009	377	445	ND	0.666
MW-1-T9	6/11/2009	**1,000**	R	R	1.7
MW-1-T9	9/17/2009	980	770	ND	0.5
MW-1-T9	12/17/2009	98	590	ND	ND
MW-1-T9	3/31/2010	**1,300 J**	**11,000**	ND	1.4
MW-1-T9	6/10/2010	820	**14,000**	1,200	0.7
MW-1-T9	9/15/2010	473	160	ND	ND
MW-1-T9	12/15/2010	147	120	ND	ND
MW-1-T9	3/24/2011	256	440	ND	ND
MW-1-T9	6/22/2011	437	370	ND	ND
MW-1-T9	9/29/2011	338	ND	ND	ND
MW-1-T9	12/21/2011	438	110	ND	ND
MW-1-T9	3/22/2012	121	ND	ND	ND
MW-1-T9	6/22/2012	268	260	ND	ND
MW-1-T9	9/10/2012	338	580	ND	ND
MW-1-T9	12/20/2012	170	530	ND	ND
MW-1-T9	3/20/2013	300	ND	ND	ND
MW-1-T9	6/26/2013	380	ND	ND	ND
MW-1-T9	9/11/2013	270	ND	ND	ND
MW-1-T9	12/11/2013	560	160	ND	ND
MW-2-T9	12/15/2005	**7,870**	2,270	ND	63.9
MW-2-T9	3/22/2006	**8,070**	212	ND	49.6
MW-2-T9	7/7/2006	**2,670 J**	ND	ND	17.8
MW-2-T9	9/19/2006	**1,280**	ND	ND	13.4
MW-2-T9	12/13/2006	**1,980 J**	ND UJ	ND UJ	7.17 J
MW-2-T9	3/22/2007	**3,700 J**	ND	ND	24.1 J
MW-2-T9	6/7/2007	**2830 J**	0.261	ND	16.6 J
MW-2-T9	9/14/2007	748	ND	ND	4.69 J
MW-2-T9	12/19/2007	869	ND	ND	3.82
MW-2-T9	3/26/2008	**3,420**	ND	ND	21.5
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
MW-2-T9	6/26/2008	**1,170 J**	ND	ND	7.1
MW-2-T9	9/18/2008	**1,100**	ND	ND	1.62
MW-2-T9	12/17/2008	**1,110**	ND	ND	1.93
MW-2-T9	3/13/2009	**1,140**	ND	ND	2.92
MW-2-T9	6/11/2009	**2,200**	R	R	0.75
MW-2-T9	9/17/2009	940	370	ND	ND
MW-2-T9	12/17/2009	**1,200**	1,500	ND	ND
MW-2-T9	3/31/2010	**2,200 J**	1,100	ND	0.75
MW-2-T9	6/10/2010	**1500 J**	3,100	340	1.5
MW-2-T9	9/15/2010	683	ND	ND	ND
MW-2-T9	12/15/2010	**1,810**	390	ND	0.53
MW-2-T9	3/24/2011	**2,000**	430	ND	ND
MW-2-T9	6/23/2011	**1,400**	250	ND	ND
MW-2-T9	9/29/2011	962	320	ND	ND
MW-2-T9	12/21/2011	**1,280**	120	ND	ND
MW-2-T9	3/22/2012	426	ND	ND	ND
MW-2-T9	6/22/2012	766	270	ND	ND
MW-2-T9	9/10/2012	**1,710**	460	ND	ND
MW-2-T9	12/20/2012	513	ND UJ	ND UJ	ND
MW-2-T9	3/20/2013	580	ND	ND	ND
MW-2-T9	6/26/2013	650	ND	ND	ND
MW-2-T9	9/10/2013	700	ND	ND	ND
MW-2-T9	12/11/2013	700	240	ND	ND
MW-3-T9	12/15/2005	509	860	ND	2.08
MW-3-T9	3/22/2006	572	543	ND	2.67
MW-3-T9	7/7/2006	749	ND	ND	3.48
MW-3-T9	9/19/2006	609	317	ND	1.48
MW-3-T9	9/14/2007	536	ND	ND	1.68 J
MW-3-T9	12/19/2007	578	ND	ND	1.61
MW-3-T9	3/26/2008	522	ND	ND	1.36
MW-3-T9	6/26/2008	711	ND	ND	4.78
MW-3-T9	9/17/2008	502	ND	ND	0.585
MW-3-T9	12/17/2008	668	ND	ND	5.35
MW-3-T9	3/13/2009	275	ND	ND	0.553
MW-3-T9	6/11/2009	630	2,400	1,800	7
MW-3-T9	9/17/2009	490	ND	ND	ND
MW-3-T9	12/17/2009	580	1,000	ND	ND
MW-3-T9	3/31/2010	690 J	790	ND	5.1
MW-3-T9	6/10/2010	500	2,500	ND	5.2
MW-3-T9	9/15/2010	331	ND	ND	3.8
MW-3-T9	12/15/2010	449	ND	ND	15
MW-3-T9	3/24/2011	826	270	ND	**87.7**
MW-3-T9	6/23/2011	632	ND	ND	69.6
MW-3-T9	9/29/2011	468	ND	ND	40.1
MW-3-T9	12/21/2011	788	ND	ND	58.2
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 1, continued					
MW-3-T9	3/22/2012	825	ND	ND	**191**
MW-3-T9	6/21/2012	596	ND	ND	**113**
MW-3-T9	9/10/2012	679	ND	ND	**94.9**
MW-3-T9	12/20/2012	617	760	ND	**172**
MW-3-T9	3/20/2013	700	ND	ND	68
MW-3-T9	6/26/2013	520	ND	ND	55
MW-3-T9	9/10/2013	490	ND	ND	39
MW-3-T9	12/11/2013	980	ND	ND	39
MW-4-T9	12/15/2005	ND	ND	ND	1.26
MW-4-T9	3/22/2006	ND	ND	ND	0.836
MW-4-T9	7/7/2006	ND	ND	ND	0.745
MW-4-T9	9/19/2006	ND	ND	ND	1.53
MW-4-T9	12/13/2006	ND UJ	ND UJ	ND UJ	1.46
MW-4-T9	3/22/2007	ND	ND	ND	0.625
MW-4-T9	6/7/2007	81	ND	ND	ND
MW-4-T9	9/14/2007	ND	ND	ND	0.599 J
MW-4-T9	12/19/2007	ND	ND	ND	1.55
MW-4-T9	3/26/2008	ND	ND	ND	ND
MW-4-T9	6/26/2008	ND	ND	ND	ND
MW-4-T9	9/18/2008	ND	ND	ND	0.92
MW-4-T9	12/17/2008	ND	ND	ND	1.1
MW-4-T9	3/13/2009	ND	ND	ND	0.506
MW-4-T9	6/11/2009	ND	R	R	ND
MW-4-T9	9/17/2009	60	ND	ND	ND
MW-4-T9	12/16/2009	ND	ND	ND	ND
MW-4-T9	3/31/2010	ND	ND	ND	ND
MW-4-T9	6/10/2010	ND	210	ND	ND
MW-4-T9	9/15/2010	ND	ND	ND	ND
MW-4-T9	12/15/2010	ND	ND	ND	ND
MW-4-T9	3/24/2011	ND	ND	ND	ND
MW-4-T9	6/23/2011	ND	ND	ND	ND
MW-4-T9	9/28/2011	ND	ND	ND	ND
MW-4-T9	12/21/2011	ND	ND	ND	ND
MW-4-T9	3/21/2012	ND	ND	ND	ND
MW-4-T9	6/21/2012	ND	ND	ND	ND
MW-4-T9	9/10/2012	ND	ND	ND	ND
MW-4-T9	12/20/2012	ND	ND	ND	ND
MW-4-T9	3/20/2013	ND	ND	ND	ND
MW-4-T9	6/26/2013	ND	ND	ND	ND
MW-4-T9	9/10/2013	ND	ND	ND	ND
MW-4-T9	12/11/2013	ND	ND	ND	ND
Plant 2					
GM-19S	4/10/1997	**1,070**	4,260	1,840	1.3
GM-19S	7/9/1997	**1,030**	1,840	1,150	0.9 J
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-19S	10/22/1997	800	370	ND	3.6
GM-19S	1/22/1998	400 J	1,320	ND	1.8
GM-19S	3/12/1998	180	1,860	ND	ND
GM-19S	7/8/1998	**1,000 J**	1,660 J	ND UJ	ND UJ
GM-19S	10/21/1998	570	1,260	ND	2.5
GM-19S	12/17/1998	650	1,970	ND	0.9
GM-19S	3/25/1999	72	1,420	793	ND
GM-19S	6/22/1999	**1,600**	1,100	ND	1.5
GM-19S	9/27/1999	**1,900 J**	NS	NS	44 J
GM-19S	12/13/1999	**1,500 J**	1,160	ND	**470**
GM-19S	3/24/2000	ND	1,530	ND	**955**
GM-19S	7/3/2000	771	1,380	ND	**2,330 J**
GM-19S	9/29/2000	ND UJ	2,290 J	776 J	**4,010 J**
GM-19S	12/21/2000	ND	3,150	806	**2,660**
GM-19S	3/28/2001	**2,940**	2,320	994	**1,730**
GM-19S	6/15/2001	**3,270**	1,230	ND	**3,390**
GM-19S	10/5/2001	Not accessible due to island redevelopment activities			
GM-19S	12/13/2001	**5,140**	2,350	985	**1,990**
GM-19S	3/8/2002	**11,000**	1,940	NS	**723**
GM-19S	6/11/2002	**2,720 J**	3,210	810	**710 J**
GM-19S	9/18/2002	**1,320 J**	2,430 J	ND UJ	**1,960 J**
GM-19S	12/16/2002	730	4590 J	1,770	**2,320 J**
GM-19S	3/25/2003	**9,540**	3,350	960	**1,960**
GM-19S	6/25/2003	**3,640**	3,740 J	1,380 J	**596**
GM-19S	9/19/2003	**1,290**	2,010	ND	**469**
GM-19S	12/23/2003	**1,070 J**	2,190 J	ND	**496**
GM-19S	3/9/2004	**1,450**	ND	ND	**832**
GM-19S	6/17/2004	**1,150**	498	ND	**307**
GM-19S	9/29/2004	679 J	NS	NS	**87.8**
GM-19S	12/9/2004	501	NS	NS	47
GM-19S	3/11/2005	649	NS	NS	**210.0**
GM-19S	6/22/2005	NS	NS	NS	**99.7**
GM-19S	9/28/2005	467	NS	NS	43.9
GM-19S	12/14/2005	581	NS	NS	**508**
GM-19S	3/22/2006	**1,710**	NR	NR	**853**
GM-19S	7/7/2006	850	NR	NR	**426**
GM-19S	9/19/2006	389	NS	NS	63
GM-19S	12/13/2006	445 J	NS	NS	**167 J**
GM-19S	3/22/2007	**1,070 J**	NS	NS	**1,400**
GM-19S	6/7/2007	200 J	NS	NS	15
GM-19S	9/13/2007	484	NS	NS	**956**
GM-19S	12/19/2007	88	NS	NS	**140**
GM-19S	3/27/2008	560	NS	NS	**869**
GM-19S	6/26/2008	958	NS	NS	**164**
GM-19S	9/19/2008	530	NS	NS	**178**
GM-19S	12/18/2008	Well not sampled, sampling has been reduced to a semi-annual event			
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-19S	3/12/2009	261	NS	NS	**186**
GM-19S	9/17/2009	510	NS	NS	**140**
GM-19S	3/31/2010	220	NS	NS	**110**
GM-19S	9/15/2010	372	NS	NS	**111**
GM-19S	3/23/2011	56.5	NS	NS	26.9
GM-19S	9/28/2011	709	NS	NS	31.0
GM-19S	3/21/2012	355	NS	NS	8.4
GM-19S	9/11/2012	312	NS	NS	47.0
GM-19S	3/20/2013	330	NR	NR	38.0
GM-19S	9/11/2013	750	NR	NR	**160**
GM-19D	4/10/1997	ND	6,680	2,050	**234**
GM-19D	7/9/1997	ND	5,910	1,780	**330**
GM-19D	10/22/1997	70	ND	ND	**263**
GM-19D	1/22/1998	ND	1,820	ND	**260**
GM-19D	3/12/1998	ND	2,630	ND	**140**
GM-19D	7/8/1998	ND UJ	2,120 J	ND UJ	**360 J**
GM-19D	10/21/1998	ND	1,930	ND	**180**
GM-19D	12/17/1998	ND	2,260	ND	**170**
GM-19D	3/25/1999	57	2,280	ND	**150**
GM-19D	6/22/1999	150	1,520	ND	**150**
GM-19D	9/27/1999	75 J	2,460 J	ND UJ	**120 J**
GM-19D	12/13/1999	550 J	1,930	ND	**170**
GM-19D	3/22/2000	ND	2,490	ND	**208**
GM-19D	7/3/2000	ND	5,260	1,280	**225**
GM-19D	9/29/2000	ND UJ	6,490 J	1,470 J	**210 J**
GM-19D	12/21/2000	ND	8,700	984	**225**
GM-19D	3/28/2001	ND	8,100	1,990	**163**
GM-19D	6/12/2001	ND	2,650	ND	**278**
GM-19D	10/5/2001	Not accessible due to island redevelopment activities			
GM-19D	12/13/2001	ND	7,830	1,880	**265**
GM-19D	3/8/2002	ND	3,400	ND	**281**
GM-19D	6/11/2002	63	7,810	1,470	**220**
GM-19D	9/18/2002	59.8 J	1,960 UJ	ND UJ	**215**
GM-19D	12/16/2002	52 J	6880 J	1,020	**263**
GM-19D	3/26/2003	ND	2,880	ND UJ	**270**
GM-19D	6/25/2003	ND	6,930	1,770	**222**
GM-19D	9/19/2003	ND	2,300	ND	**241**
GM-19D	12/23/2003	ND	7710 J	1,140	**261**
GM-19D	3/9/2004	82	ND	ND	**173**
GM-19D	6/17/2004	56.1	3,430	ND	**169**
GM-19D		WELL DELETED FROM MONITORING PROGRAM			
GM-21S	4/10/1997	ND	4,640	2,960	ND
GM-21S	7/9/1997	ND	5,080	2,420	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-21S	10/23/1997	ND	ND	ND	ND
GM-21S	1/23/1998	ND	1,710	ND	ND
GM-21S	3/12/1998	ND	615	ND	ND
GM-21S	7/9/1998	ND	2,190	ND	ND
GM-21S	10/21/1998	ND	694	ND	ND
GM-21S	12/17/1998	ND	1,050	ND	ND
GM-21S	3/25/1999	NS	793	ND	NS
GM-21S	6/22/1999	NS	875	ND	NS
GM-21S	9/27/1999	NS	3,330 J	ND UJ	NS
GM-21S	12/13/1999	NS	648	ND	NS
GM-21S	3/23/2000	ND	1,480	ND	ND
GM-21S	7/6/2000	ND	3,020	ND	ND
GM-21S	9/29/2000	ND UJ	3,310 J	924 J	ND UJ
GM-21S	12/21/2000	NS	NS	NS	NS
GM-21S	3/28/2001	Not accessible due to island redevelopment activities			
GM-21S	6/12/2001	Not accessible due to island redevelopment activities			
GM-21S	10/5/2001	Not accessible due to island redevelopment activities			
GM-21S	12/13/2001	Not accessible due to island redevelopment activities			
GM-21S	3/6/2002	ND	454	ND	ND
GM-21S		WELL DELETED FROM MONITORING PROGRAM			
GM-21D	4/10/1997	ND	1,730 J	810 J	ND
GM-21D	7/9/1997	ND	1,860	ND	ND
GM-21D	10/23/1997	ND	ND	ND	ND
GM-21D	1/23/1998	ND	744	ND	ND
GM-21D	3/12/1998	ND	1,830	ND	ND
GM-21D	7/9/1998	ND	1,030 J	ND UJ	ND
GM-21D	10/21/1998	ND	684	ND	ND
GM-21D	12/17/1998	ND	926	ND	ND
GM-21D	6/22/1999	NS	1,100	ND	NS
GM-21D	9/27/1999	NS	2,330 J	ND UJ	NS
GM-21D	12/13/1999	NS	986	ND	NS
GM-21D		WELL DELETED FROM MONITORING PROGRAM			
GM-22S		WELL NOT SAMPLED BETWEEN 1997 AND 2000			
GM-22S	3/23/2000	ND	5,060	841	0.538
GM-22S	7/6/2000	ND	8,930	1,050	ND
GM-22S	9/29/2000	ND UJ	3,130 J	1,620 J	2.04 J
GM-22S	12/21/2000	ND	5,070	1,720	ND
GM-22S	3/28/2001	ND	5,430	2,500	ND
GM-22S	6/15/2001	ND	3,110	ND	ND
GM-22S	10/5/2001	Not accessible due to island redevelopment activities			
GM-22S	12/13/2001	55.3	4,780	2,320	ND
GM-22S	3/8/2002	ND	2,710	831	ND
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)
Plant 2, continued					
GM-22S		WELL DELETED FROM MONITORING PROGRAM			
GM-23S	4/10/1997	NS	NS	NS	NS
GM-23S	7/9/1997	750	1,830	1,010	ND
GM-23S	10/22/1997	400	ND	ND	ND
GM-23S	1/23/1998	NS	NS	NS	NS
GM-23S	3/12/1998	NS	NS	NS	NS
GM-23S	7/8/1998	480 J	467 J	ND UJ	ND UJ
GM-23S	10/21/1998	500	1,250	ND	ND
GM-23S	12/17/1998	NS	NS	NS	NS
GM-23S	3/25/1999	NS	NS	NS	NS
GM-23S	6/22/1999	680	801	ND	ND
GM-23S	9/28/1999	940	682	ND	ND
GM-23S		WELL DELETED FROM MONITORING PROGRAM			
T-18-1	6/14/2001	ND	1,670	ND	ND
T-18-1	10/5/2001	ND	1,270	ND	ND
T-18-1	12/13/2001	ND	365	ND	ND
T-18-1	3/6/2002	ND	357	ND	ND
T-18-1		WELL DELETED FROM MONITORING PROGRAM			
T-18-2a	6/14/2001	ND	385	ND	ND
T-18-2a	10/5/2001	ND	339	ND	ND
T-18-2a	12/13/2001	ND	323	ND	ND
T-18-2a	3/6/2002	ND	256	ND	ND
T-18-2a		WELL DELETED FROM MONITORING PROGRAM			
MW-03R	6/11/2002	NS	**20,700**	ND	NS
MW-03R	9/18/2002	NS	9,690 J	1,990 J	NS
MW-03R	12/16/2002	NS	NS	NS	NS
MW-03R	3/25/2003	NS	ND	ND UJ	NS
MW-03R	6/26/2006	NS	**10,200**	2,500	NS
MW-03R	9/19/2003	NS	831	ND	NS
MW-03R	12/23/2003	NS	472 J	ND	NS
MW-03R	3/9/2004	NR	645	ND	NS
MW-03R	6/17/2004	NR	935	ND	NS
MW-03R		WELL DELETED FROM MONITORING PROGRAM			
Cleanup Level		1,000	10,000	10,000	71

Table 7. Groundwater Monitoring Analytical Results for TPH and Benzene
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TPH-G WTPH-G (µg/L)	TPH-D WTPH-DX (µg/L)	TPH-O WTPH-DX (µg/L)	Benzene EPA 8021 & 8260 (µg/L)

Note: Values in **bold** exceed the cleanup level.

J Estimated value.
µg/L Micrograms per liter.
NA Not analyzed.
ND Constituent not detected above reporting limit.
NS Not sampled.
TPH Total petroleum hydrocarbons.
TPH-D Total petroleum hydrocarbons as diesel.
TPH-G Total petroleum hydrocarbons as gasoline.
TPH-O Total petroleum hydrocarbons as oil.
U Undetected.
WTPH-DX Washington State Method for Analysis of Diesel and Oil in Water - Extended.
WTPH-G Washington State Method for Analysis of Gasoline in Water.
EPA 8021 or EPA 9260 - EPA Methods for Analysis of Benzene in Water.

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1								
GM-11S	4/10/1997	ND	ND	ND	ND	0.01	ND	ND
GM-11S	7/8/1997	ND	ND	ND	ND	0.01 J	ND	0.01 J
GM-11S	10/21/1997	0.02	0.01	0.02	0.01	0.02	0.01	0.01
GM-11S	1/21/1998	ND	ND	ND	ND	0.01 U	ND	ND
GM-11S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-12S	4/10/1997	0.02	0.03	**0.04**	**0.04**	**0.06**	ND	**0.04**
GM-12S	7/8/1997	**0.06 J**	**0.07 J**	**0.11 J**	**0.09 J**	**0.13 J**	0.01 J	**0.06 J**
GM-12S	10/20/1997	**0.07 J**	**0.06 J**	**0.1 J**	**0.09 J**	**0.15 J**	0.01	**0.08 J**
GM-12S	1/21/1998	0.1 U	**0.11**	**0.12**	**0.12 U**	**0.16 U**	**0.04**	**0.11**
GM-12S	3/10/1998	**0.05**	**0.06**	**0.1**	**0.07**	**0.12**	0.02	**0.09**
GM-12S	7/6/1998	0.01	0.01	0.03	0.02	**0.04**	ND	0.03
GM-12S	10/20/1998	0.03	0.03	**0.05**	**0.04**	**0.07 J**	0.01	**0.05**
GM-12S	12/15/1998	NS	NS	NS	NS	NS	NS	NS
GM-12S	3/26/1999	0.01	0.01	0.02	0.02	0.02	ND	0.02 U
GM-12S	6/23/1999	ND	0.01	0.01	0.01	0.01	ND	0.01
GM-12S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-15S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-15S	7/8/1997	ND	0.01 J	0.02 J	0.01 J	ND	ND	0.01 J
GM-15S	10/21/1997	ND	ND	ND	ND	ND	ND	ND
GM-15S	1/21/1998	ND	ND	ND	ND	ND	ND	ND
GM-15S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-16S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-16S	7/8/1997	ND	ND	ND	ND	ND	ND	ND
GM-16S	10/21/1997	ND	ND	ND	ND	ND	ND	ND
GM-16S	1/21/1998	ND	ND	ND	ND	ND	ND	ND
GM-16S				WELL DELETED FROM cPAH MONITORING PROGRAM				
GM-17S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-17S	7/9/1997	0.01 J	ND	0.01 J	0.01 J	0.02 J	0.01 J	0.01 J
GM-17S	10/21/1997	ND	ND	ND	ND	ND	ND	ND
GM-17S	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-17S				WELL DELETED FROM cPAH MONITORING PROGRAM				
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
GM-24S	4/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-24S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-24S	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-24S	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-24S				WELL DELETED FROM cPAH MONITORING PROGRAM				
AR-03	4/9/1997	ND R	ND R	ND R	ND R	ND R	ND R	ND R
AR-03	7/8/1997	ND	ND	ND	ND	ND	ND	ND
AR-03	10/21/1997	ND	ND	ND	ND	ND	ND	ND
AR-03	1/21/1998	ND	ND	ND	ND	ND	ND	ND
AR-03				WELL DELETED FROM cPAH MONITORING PROGRAM				
AMW-01	12/21/2000	ND	ND	0.116	ND	ND	ND	ND
AMW-01	3/28/2001	**0.0372 J**	**0.0821 J**	**0.04585 * J**	**0.04585 * J**	**0.0347 J**	ND UJ	ND UJ
AMW-01	6/13/2001	ND	ND	ND *	ND *	ND	**0.052**	ND
AMW-01	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	3/7/2002	ND	ND	ND	ND	ND	ND	ND
AMW-01	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/17/2002	0.0292 J	ND	ND	ND	ND	ND	ND
AMW-01	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/28/2004	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/6/2004	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	3/10/2005	U	U	**0.0509**	U	**0.0637**	**0.0483**	**0.0506**
AMW-01	6/21/2005	0.024	ND	**0.0411**	**0.0502**	**0.0322**	ND	0.0222
AMW-01	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-01	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/12/2006	ND R	ND R	ND R	ND R	ND R	NDR	ND R
AMW-01	3/21/2007	**0.212 J**	**0.177 J**	**0.22 J**	**0.29 J**	**0.215 J**	**0.237 J**	**0.229 J**
AMW-01	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-01	9/12/2007	0.0124 J	ND UJ	ND UJ	ND UJ	0.0133 J	ND UJ	ND UJ
AMW-01	12/18/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-01	3/25/2008	ND	ND	ND	ND	ND	ND	ND
AMW-01	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-01	12/16/2008	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/14/2010	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-01	12/21/2011	ND	ND	0.018	ND	ND	ND	ND
AMW-01	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-01	12/10/2013	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/28/2001	Warehouse not accessible due to earthquake damage.						
AMW-02	6/13/2001	ND UJ	ND UJ	ND UJ *	ND UJ *	ND UJ	**0.052 J**	ND UJ
AMW-02	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	3/7/2002	NS	NS	NS	NS	NS	NS	NS
AMW-02	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/17/2002	ND	ND	ND	ND	ND	ND	ND
AMW-02	6/16/2004	ND	ND	ND	ND	**0.0322**	ND	ND
AMW-02	9/28/2004	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/8/2004	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/10/2005	U	U	0.136	U	U	0.0153	0.0143
AMW-02	6/21/2005	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/12/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	NDUJ
AMW-02	3/21/2007	**0.201**	**0.191**	**0.207**	**0.237**	**0.215**	**0.226**	**0.232**
AMW-02	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-02	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	0.0117 J	ND UJ	ND UJ
AMW-02	12/18/2008	ND	ND	ND	ND	ND	ND	ND
AMW-02	3/25/2008	ND	ND	ND	ND	ND	ND	ND
AMW-02	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-02	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/14/2010	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-02	12/21/2011	ND	ND	ND	0.017	ND	ND	ND
AMW-02	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-02	12/10/2013	0.016	ND	ND	ND	ND	ND	ND
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-03	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/28/2001	Warehouse not accessible due to earthquake damage.						
AMW-03	6/13/2001	ND	ND	ND *	ND *	ND	**0.051**	ND
AMW-03	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	3/7/2002	NS	NS	NS	NS	NS	NS	NS
AMW-03	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/17/2002	ND	ND	ND	ND	ND	ND	ND
AMW-03	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/28/2004	ND	ND	ND	ND	ND	ND	ND
AMW-03	1/20/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/10/2005	U	ND	0.142	U	U	ND	ND
AMW-03	6/21/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/12/2006	**0.0835J**	NDUJ	0.157J	**0.0387J**	**0.0784J**	**0.116J**	**0.125J**
AMW-03	3/21/2007	**0.0714**	**0.0689**	**0.0583**	**0.0773**	**0.0851**	**0.0823**	**0.0752**
AMW-03	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-03	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-03	12/18/2007	ND	ND	ND	ND	ND	ND	ND
AMW-03	3/25/2008	ND	ND	ND	ND	ND	ND	ND
AMW-03	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-03	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/16/2009	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/14/2010	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/21/2011	0.017	0.028	**0.051**	0.017	0.030	ND	0.030
AMW-03	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-03	12/10/2013	ND	ND	ND	0.019	0.016	ND	ND
AMW-04	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/28/2001	**0.0497**	**0.0762 J**	**0.04325 * J**	**0.04325 * J**	**0.0451 J**	ND UJ	ND UJ
AMW-04	6/13/2001	ND	ND	ND *	ND *	ND	**0.054**	ND
AMW-04	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-04	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	3/7/2002	0.0264	ND	0.0276	ND	**0.0350**	ND	ND
AMW-04	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/17/2002	**0.0396 J**	ND	ND	ND	ND	ND	ND
AMW-04	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/27/2004	**0.0338**	ND	0.0116	0.0152	**0.0343**	ND	ND
AMW-04	12/6/2004	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/10/2005	ND	ND	ND	ND	ND	ND	ND
AMW-04	6/21/2005	ND R	ND R	ND R	ND R	ND R	ND R	ND R
AMW-04	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/18/2006	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/12/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	3/21/2007	ND	ND	ND	ND	ND	ND	ND
AMW-04	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-04	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/18/2007	ND	ND	ND	ND	ND	ND	ND
AMW-04	3/26/2008	ND	ND	ND	ND	ND	ND	ND
AMW-04	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-04	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/14/2010	**0.031 J**	0.23 J	**0.034 J**	**0.044 J**	**0.043 J**	**0.085 J**	**0.076 J**
AMW-04	12/21/2011	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-04	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-04	12/10/2013	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/21/2000	ND	ND	ND	ND	ND	ND	ND
AMW-05	3/28/2001	0.0280 J	**0.0750 J**	**0.0431 * J**	**0.0431 * J**	0.0301 J	ND UJ	ND UJ
AMW-05	6/13/2001	ND UJ	ND UJ	ND UJ *	ND UJ *	ND UJ	ND UJ	ND UJ
AMW-05	10/4/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/12/2001	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	3/7/2002	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/12/2002	ND	ND	ND	ND	ND	ND	ND
AMW-05	9/19/2002	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/17/2002	ND	ND	ND	ND	ND	ND	ND
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 1, continued								
AMW-05	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/16/2004	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/6/2004	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	3/10/2005	ND	ND	ND	ND	ND	ND	ND
AMW-05	6/21/2005	0.0132	ND	0.0189	0.0185	0.0178	ND	0.0142
AMW-05	9/27/2005	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/13/2005	ND	ND	ND	ND	ND	ND	ND
AMW-05	3/21/2006	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	7/6/2006	ND	ND	ND	ND	ND	ND	ND
AMW-05	9/18/2006	ND	ND	ND	ND	**0.0832 J**	ND	ND
AMW-05	12/12/2006	**0.0771J**	**NDUJ**	**0.157J**	**0.0397J**	**0.0768J**	**0.121J**	**0.129J**
AMW-05	3/21/2007	**0.0499**	**0.0534**	**0.0551**	**0.51**	**0.0562**	**0.051**	**0.0633**
AMW-05	6/6/2007	ND	ND	ND	ND	ND	ND	ND
AMW-05	9/12/2007	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/18/2007	ND	ND	ND	ND	ND	ND	ND
AMW-05	3/26/2008	0.0159	ND	ND	ND	0.0116	ND	ND
AMW-05	6/25/2008	cPAH Sampling Reduced to an Annual Event						
AMW-05	12/16/2008	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/16/2009	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ	ND UJ
AMW-05	12/14/2010	0.019 J	0.018 J	0.021 J	0.020 J	0.025 J	ND UJ	ND UJ
AMW-05	12/21/2011	ND	ND	0.018	ND	ND	ND	ND
AMW-05	12/19/2012	ND	ND	ND	ND	ND	ND	ND
AMW-05	12/10/2013	**0.037**	**0.031**	**0.053**	ND	**0.051**	ND	0.030
Plant 2								
GM-19S	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-19S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-19S	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-19S	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-19S	WELL DELETED FROM cPAH MONITORING PROGRAM							
GM-19D	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-19D	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-19D	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-19D	1/22/1998	ND	ND	ND	ND	ND	ND	ND
GM-19D	WELL DELETED FROM cPAH MONITORING PROGRAM							
GM-21S	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-21S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Table 8. Groundwater Monitoring Analytical Results for cPAHs
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Benz(a)anthracene (µg/L)	Benzo(a)pyrene (µg/L)	Benzo(b)fluoranthene (µg/L)	Benzo(k)fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a,h)anthracene (µg/L)	Indeno(1,2,3,-cd)pyrene (µg/L)
Plant 2, continued								
GM-21S	10/23/1997	ND	ND	ND	ND	ND	ND	ND
GM-21S	1/23/1998	ND	ND	ND	ND	ND	ND	ND
GM-21S		WELL DELETED FROM cPAH MONITORING PROGRAM						
GM-21D	4/10/1997	ND	ND	ND	ND	ND	ND	ND
GM-21D	7/9/1997	0.01 J	0.01 J	0.02 J	0.02 J	0.02 UJ	ND	0.01 J
GM-21D	10/23/1997	ND	ND	ND	ND	ND	ND	ND
GM-21D	1/23/1998	ND	ND	ND	ND	ND	ND	ND
GM-21D		WELL DELETED FROM cPAH MONITORING PROGRAM						
GM-23S	4/10/1997	NS	NS	NS	NS	NS	NS	NS
GM-23S	7/9/1997	ND	ND	ND	ND	ND	ND	ND
GM-23S	10/22/1997	ND	ND	ND	ND	ND	ND	ND
GM-23S	1/23/1998	NS	NS	NS	NS	NS	NS	NS
GM-23S		WELL DELETED FROM cPAH MONITORING PROGRAM						
Cleanup Level		0.031	0.031	0.031	0.031	0.031	0.031	0.031

Note: Values in **bold** exceed the cleanup level.

cPAHs Carcinogenic polynuclear aromatic hydrocarbons.
J Estimated value.
µg/L Micrograms per liter.
NA Not analyzed.
ND Constituent not detected above reporting limit.
R Rejected; the presence or absence of the constituent cannot be verified.
U Undetected.

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1		
GM-11S	9/29/1999	**~0.29 foot**
GM-11S	10/19/1999	**~0.59 foot**
GM-11S	11/19/1999	**~0.51 foot**
GM-11S	12/28/1999	**~0.10 foot**
GM-11S	1/21/2000	**~0.01 foot**
GM-11S	2/16/2000	**~0.01 foot**
GM-11S	3/27/2000	**~0.01 foot**
GM-11S	4/14/2000	**~0.01 foot**
GM-11S	5/15/2000	**~0.34 foot**
GM-11S	6/26/2000	**~0.07 foot**
GM-11S	7/19/2000	None
GM-11S	8/15/2000	None
GM-11S	9/29/2000	**Sheen**
GM-11S	10/12/2000	None
GM-11S	11/14/2000	**~0.03 foot**
GM-11S	12/14/2000	None
GM-11S	1/11/2001	**~0.01 foot**
GM-11S	2/15/2001	None
GM-11S	3/15/2001	None
GM-11S	4/13/2001	None
GM-11S	5/16/2001	**~0.13 foot**
GM-11S	6/11/2001	None
GM-11S	7/24/2001	None
GM-11S	8/21/2001	None
GM-11S	9/6/2001	**Sheen**
GM-11S	10/19/2001	None
GM-11S	11/15/2001	**Sheen**
GM-11S	12/10/2001	**Sheen**
GM-11S	1/16/2002	**Sheen**
GM-11S	2/21/2002	**Sheen**
GM-11S	3/18/2002	**Sheen**
GM-11S	4/18/2002	**Sheen**
GM-11S	5/20/2002	**Sheen**
GM-11S	6/19/2002	**Sheen**
GM-11S	7/15/2002	**Sheen**
GM-11S	8/20/2002	**Sheen**
GM-11S	9/20/2002	**Sheen**
GM-11S	10/15/2002	**Sheen**
GM-11S	11/27/2002	**Sheen**
GM-11S	12/18/2002	**Sheen**
GM-11S	1/16/2003	**Sheen**
GM-11S	2/11/2003	**Sheen**
GM-11S	3/11/2003	**Sheen**
GM-11S	4/15/2003	**Sheen**
GM-11S	5/15/2003	**Sheen**
GM-11S	6/17/2003	**Sheen**
GM-11S	7/15/2003	**Sheen**
GM-11S	8/13/2003	**Sheen**
GM-11S	9/16/2003	**Sheen**
GM-11S	10/14/2003	**Sheen**
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-11S	11/19/2003	**Sheen**
GM-11S	12/17/2003	**Sheen**
GM-11S	1/13/2004	**Sheen**
GM-11S	2/10/2004	**Sheen**
GM-11S	3/17/2004	**Sheen**
GM-11S	4/15/2004	**Sheen**
GM-11S	5/25/2004	**Sheen**
GM-11S	6/13/2004	**Sheen**
GM-11S	7/13/2004	**Sheen**
GM-11S	8/12/2004	**Sheen**
GM-11S	9/16/2004	**Sheen**
GM-11S	10/13/2004	**Sheen**
GM-11S	11/18/2004	**Sheen**
GM-11S	12/16/2004	**Sheen**
GM-11S	1/13/2005	**Sheen**
GM-11S	2/15/2005	**Sheen**
GM-11S	3/15/2005	**Sheen**
GM-11S	4/15/2005	**Sheen**
GM-11S	5/20/2005	**Sheen**
GM-11S	6/10/2005	**Sheen**
GM-11S	7/15/2005	**Sheen**
GM-11S	8/12/2005	**Sheen**
GM-11S	9/14/2005	**Sheen**
GM-11S	10/14/2005	**Sheen**
GM-11S	11/23/2005	**Sheen**
GM-11S	12/19/2005	**Sheen**
GM-11S	1/25/2006	**Sheen**
GM-11S	2/14/2006	**Sheen**
GM-11S	3/15/2006	**Sheen**
GM-11S	4/14/2006	**Sheen**
GM-11S	5/17/2006	**Sheen**
GM-11S	6/14/2006	**Sheen**
GM-11S	7/12/2006	**Sheen**
GM-11S	8/16/2006	**Sheen**
GM-11S	9/13/2006	**Sheen**
GM-11S	10/12/2006	**Sheen**
GM-11S	11/17/2006	**Sheen**
GM-11S	12/19/2006	**Sheen**
GM-11S	1/19/2007	**Sheen**
GM-11S	2/16/2007	**Sheen**
GM-11S	3/19/2007	**Sheen**
GM-11S	4/19/2007	**Sheen**
GM-11S	5/17/2007	**Sheen**
GM-11S	6/14/2007	**Sheen**
GM-11S	7/13/2007	**Sheen**
GM-11S	8/16/2007	**Sheen**
GM-11S	9/10/2007	**Sheen**
GM-11S	10/17/2007	**Sheen**
GM-11S	11/16/2007	**Sheen**
GM-11S	12/14/2007	**Sheen**
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1, continued		
GM-11S	1/22/2008	**Sheen**
GM-11S	2/14/2008	**Sheen**
GM-11S	3/14/2008	**Sheen**
GM-11S	4/18/2008	**Sheen**
GM-11S	5/16/2008	**Sheen**
GM-11S	6/18/2008	**Sheen**
GM-11S	7/16/2008	**Sheen**
GM-11S	8/18/2008	**Sheen**
GM-11S	9/16/2008	**Sheen**
GM-11S	10/15/2008	**Sheen**
GM-11S	11/14/2008	**Sheen**
GM-11S	12/11/2008	**Sheen**
GM-11S	1/14/2009	**Sheen**
GM-11S	2/18/2009	**Sheen**
GM-11S	3/17/2009	**Sheen**
GM-11S	4/16/2009	None
GM-11S	5/14/2009	None
GM-11S	6/16/2009	None
GM-11S	7/22/2009	**Sheen**
GM-11S	8/18/2009	**Sheen**
GM-11S	9/14/2009	**Sheen**
GM-11S	10/20/2009	**Sheen**
GM-11S	11/18/2009	None
GM-11S	12/15/2009	None
GM-11S	1/21/2010	**Sheen**
GM-11S	2/17/2010	**Sheen**
GM-11S	3/16/2010	**Sheen**
GM-11S	4/15/2010	None
GM-11S	5/18/2010	**Sheen**
GM-11S	6/17/2010	**Sheen**
GM-11S	7/29/2010	**Sheen**
GM-11S	8/19/2010	**Sheen**
GM-11S	9/22/2010	**Sheen**
GM-11S	10/20/2010	**Sheen**
GM-11S	11/30/2010	**Sheen**
GM-11S	12/23/2010	**Sheen**
GM-11S	1/19/2011	**Sheen**
GM-11S	2/16/2011	**Sheen**
GM-11S	3/29/2011	**Sheen**
GM-11S	4/21/2011	**Sheen**
GM-11S	5/19/2011	**Sheen**
GM-11S	6/15/2011	**Sheen**
GM-11S	7/20/2011	None
GM-11S	8/17/2011	None
GM-11S	9/14/2011	None
GM-11S	10/12/2011	None
GM-11S	11/23/2011	None
GM-11S	12/14/2011	None
GM-11S	1/24/2012	None
GM-11S	2/15/2012	None
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1, continued		
GM-11S	3/16/2012	None
GM-11S	4/18/2012	None
GM-11S	5/16/2012	None
GM-11S	6/13/2012	None
GM-11S	7/20/2012	None
GM-11S	8/15/2012	None
GM-11S	9/6/2012	None
GM-11S	10/24/2012	None
GM-11S	11/28/2012	None
GM-11S	12/18/2012	None
GM-11S	1/23/2013	**Sheen**
GM-11S	2/21/2013	**Sheen**
GM-11S	3/13/2013	None
GM-11S	4/17/2013	None
GM-11S	5/22/2013	None
GM-11S	6/12/2013	None
GM-11S	7/24/2013	**Sheen**
GM-11S	8/21/2013	None
GM-11S	9/25/2013	**Sheen**
GM-11S	10/15/2013	None
GM-11S	11/20/2013	None
GM-11S	12/18/2013	None
GM-11S	1/15/2014	None
GM-11S	2/12/2014	None
GM-12S	4/14/2000	None
GM-12S	5/15/2000	NM
GM-12S	6/15/2000	NM
GM-12S	7/19/2000	NM
GM-12S	8/15/2000	NM
GM-12S	9/29/2000	None
GM-12S	10/12/2000	None
GM-12S	11/14/2000	None
GM-12S	12/14/2000	None
GM-12S	1/11/2001	None
GM-12S	2/15/2001	None
GM-12S	3/15/2001	None
GM-12S	4/13/2001	None
GM-12S	5/16/2001	None
GM-12S	6/11/2001	None
GM-12S	7/24/2001	None
GM-12S	8/21/2001	None
GM-12S	9/6/2001	None
GM-12S	10/19/2001	None
GM-12S	11/15/2001	None
GM-12S	12/10/2001	None
GM-12S	1/16/2002	NM
GM-12S	2/21/2002	None
GM-12S	3/18/2002	None
GM-12S	4/18/2002	None
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1, continued		
GM-12S	5/20/2002	None
GM-12S	6/19/2002	None
GM-12S	7/15/2002	None
GM-12S	8/20/2002	None
GM-12S	9/20/2002	None
GM-12S	10/15/2002	None
GM-12S	11/27/2002	None
GM-12S	12/18/2002	None
GM-12S	1/16/2003	None
GM-12S	2/11/2003	None
GM-12S	3/11/2003	None
GM-12S	4/15/2003	None
GM-12S	5/15/2003	None
GM-12S	6/17/2003	None
GM-12S	7/15/2003	None
GM-12S	8/13/2003	None
GM-12S	9/16/2003	None
GM-12S	10/14/2003	None
GM-12S	11/19/2003	None
GM-12S	12/17/2003	None
GM-12S	1/13/2004	None
GM-12S	2/10/2004	None
GM-12S	3/17/2004	None
GM-12S	4/15/2004	None
GM-12S	5/25/2004	None
GM-12S	6/13/2004	None
GM-12S	7/13/2004	None
GM-12S	8/12/2004	None
GM-12S	9/16/2004	None
GM-12S	10/13/2004	None
GM-12S	11/18/2004	None
GM-12S	12/16/2004	None
GM-12S	1/13/2005	None
GM-12S	2/15/2005	None
GM-12S	3/15/2005	None
GM-12S	4/15/2005	None
GM-12S	5/20/2005	None
GM-12S	6/10/2005	None
GM-12S	7/15/2005	None
GM-12S	8/12/2005	None
GM-12S	9/14/2005	None
GM-12S	10/14/2005	None
GM-12S	11/23/2005	None
GM-12S	12/19/2005	None
GM-12S	1/25/2006	None
GM-12S	2/14/2006	None
GM-12S	3/15/2006	None
GM-12S	4/14/2006	None
GM-12S	5/17/2006	None
GM-12S	6/14/2006	None
GM-12S	7/12/2006	None
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1, continued		
GM-12S	8/16/2006	None
GM-12S	9/13/2006	None
GM-12S	10/12/2006	None
GM-12S	11/17/2006	None
GM-12S	12/19/2006	None
GM-12S	1/19/2007	None
GM-12S	2/16/2007	None
GM-12S	3/19/2007	None
GM-12S	4/19/2007	None
GM-12S	5/17/2007	None
GM-12S	6/14/2007	None
GM-12S	7/13/2007	None
GM-12S	8/16/2007	None
GM-12S	9/10/2007	None
GM-12S	10/17/2007	None
GM-12S	11/16/2007	None
GM-12S	12/14/2007	None
GM-12S	1/22/2008	None
GM-12S	2/14/2008	None
GM-12S	3/14/2008	None
GM-12S	4/18/2008	None
GM-12S	5/16/2008	None
GM-12S	6/18/2008	None
GM-12S	7/16/2008	None
GM-12S	8/18/2008	None
GM-12S	9/16/2008	None
GM-12S	10/15/2008	None
GM-12S	11/14/2008	None
GM-12S	12/11/2008	None
GM-12S	1/14/2009	None
GM-12S	2/18/2009	None
GM-12S	3/17/2009	None
GM-12S	4/16/2009	None
GM-12S	5/14/2009	None
GM-12S	6/16/2009	None
GM-12S	7/22/2009	None
GM-12S	8/18/2009	None
GM-12S	9/14/2009	None
GM-12S	10/20/2009	None
GM-12S	11/18/2009	None
GM-12S	12/15/2009	None
GM-12S	1/21/2010	None
GM-12S	2/17/2010	None
GM-12S	3/16/2010	None
GM-12S	4/15/2010	None
GM-12S	5/18/2010	None
GM-12S	6/17/2010	None
GM-12S	7/29/2010	None
GM-12S	8/19/2010	None
GM-12S	9/22/2010	None
GM-12S	10/20/2010	None
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1, continued		
GM-12S	11/30/2010	None
GM-12S	12/23/2010	None
GM-12S	1/19/2011	None
GM-12S	2/16/2011	None
GM-12S	3/29/2011	None
GM-12S	4/21/2011	None
GM-12S	5/19/2011	None
GM-12S	6/15/2011	None
GM-12S	7/20/2011	None
GM-12S	8/17/2011	None
GM-12S	9/14/2011	None
GM-12S	10/12/2011	None
GM-12S	11/23/2011	None
GM-12S	12/14/2011	None
GM-12S	1/24/2012	None
GM-12S	2/15/2012	None
GM-12S	3/16/2012	None
GM-12S	4/18/2012	None
GM-12S	5/16/2012	None
GM-12S	6/13/2012	None
GM-12S	7/20/2012	None
GM-12S	8/15/2012	None
GM-12S	9/6/2012	None
GM-12S	10/24/2012	None
GM-12S	11/28/2012	None
GM-12S	12/18/2012	None
GM-12S	1/23/2012	None
GM-12S	2/21/2013	None
GM-12S	3/13/2013	None
GM-12S	4/17/2013	None
GM-12S	5/22/2013	None
GM-12S	6/12/2013	None
GM-12S	7/24/2013	None
GM-12S	8/21/2013	None
GM-12S	9/25/2013	None
GM-12S	10/15/2013	None
GM-12S	11/20/2013	None
GM-12S	12/18/2013	None
GM-12S	1/15/2014	None
GM-12S	2/12/2014	None
GM-13S	7/6/1998	**Yes***
GM-13S	10/20/1998	**~0.08 foot**
GM-13S	11/18/1998	**~0.08 foot**
GM-13S	12/15/1998	**~0.01 foot**
GM-13S	2/17/1999	**~0.08 foot**
GM-13S	3/15/1999	**~0.34 foot**
GM-13S	4/14/1999	**~0.20 foot**
GM-13S	5/13/1999	**~0.44 foot**
GM-13S	6/15/1999	**~0.35 foot**
GM-13S	7/15/1999	**~0.31 foot**
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-13S	8/17/1999	**~0.19 foot**
GM-13S	9/16/1999	**~0.09 foot**
GM-13S	10/19/1999	**~0.10 foot**
GM-13S	11/19/1999	**~0.11 foot**
GM-13S	12/28/1999	**~0.12 foot**
GM-13S	1/21/2000	**~0.11 foot**
GM-13S	2/16/2000	
GM-13S	3/21/2000	**~0.11 foot**
GM-13S	4/14/2000	**~0.13 foot**
GM-13S	5/15/2000	**~0.10 foot**
GM-13S	6/16/2000	**Sheen**
GM-13S	7/19/2000	**Sheen**
GM-13S	8/15/2000	**Sheen**
GM-13S	9/29/2000	None
GM-13S	10/12/2000	**Sheen**
GM-13S	11/14/2000	**~0.01 foot**
GM-13S	12/14/2000	NM
GM-13S	1/11/2001	NM
GM-13S	2/15/2001	NM
GM-13S	3/15/2001	NM
GM-13S	4/13/2001	NM
GM-13S	5/16/2001	None
GM-13S	6/11/2001	None
GM-13S	7/24/2001	None
GM-13S	8/21/2001	None
GM-13S	9/6/2001	**Sheen**
GM-13S	10/19/2001	None
GM-13S	11/15/2001	None
GM-13S	12/10/2001	**Sheen**
GM-13S	1/16/2002	**Sheen**
GM-13S	2/21/2002	NM
GM-13S	3/18/2002	None
GM-13S	4/18/2002	None
GM-13S	5/20/2002	None
GM-13S	6/19/2002	None
GM-13S	7/15/2002	None
GM-13S	8/20/2002	None
GM-13S	9/20/2002	None
GM-13S	10/15/2002	None
GM-13S	11/27/2002	None
GM-13S	12/18/2002	None
GM-13S	1/16/2003	None
GM-13S	2/11/2003	None
GM-13S	3/11/2003	**Sheen**
GM-13S	4/15/2003	**Sheen**
GM-13S	5/15/2003	**Sheen**
GM-13S	6/17/2003	None
GM-13S	7/15/2003	None
GM-13S	8/13/2003	None
GM-13S	9/16/2003	None
GM-13S	10/14/2003	None
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-13S	11/19/2003	None
GM-13S	12/17/2003	None
GM-13S	1/13/2004	None
GM-13S	2/10/2004	None
GM-13S	3/17/2004	None
GM-13S	4/15/2004	None
GM-13S	5/25/2004	**Sheen**
GM-13S	6/13/2004	**Sheen**
GM-13S	7/13/2004	**Sheen**
GM-13S	8/12/2004	None
GM-13S	9/16/2004	None
GM-13S	10/13/2004	None
GM-13S	11/18/2004	None
GM-13S	12/16/2004	None
GM-13S	1/13/2005	None
GM-13S	2/15/2005	None
GM-13S	3/15/2005	None
GM-13S	4/15/2005	None
GM-13S	5/20/2005	None
GM-13S	6/10/2005	None
GM-13S	7/15/2005	None
GM-13S	8/12/2005	None
GM-13S	9/14/2005	None
GM-13S	10/14/2005	None
GM-13S	11/23/2005	None
GM-13S	12/19/2005	None
GM-13S	1/25/2006	None
GM-13S	2/14/2006	None
GM-13S	3/15/2006	None
GM-13S	4/14/2006	None
GM-13S	5/17/2006	None
GM-13S	6/14/2006	None
GM-13S	7/12/2006	None
GM-13S	8/16/2006	**Sheen**
GM-13S	9/13/2006	**Sheen**
GM-13S	10/12/2006	None
GM-13S	11/17/2006	None
GM-13S	12/19/2006	None
GM-13S	1/19/2007	None
GM-13S	2/16/2007	None
GM-13S	3/19/2007	**Sheen**
GM-13S	4/19/2007	None
GM-13S	5/17/2007	None
GM-13S	6/14/2007	None
GM-13S	7/13/2007	None
GM-13S	8/16/2007	None
GM-13S	9/10/2007	None
GM-13S	10/17/2007	None
GM-13S	11/16/2007	None
GM-13S	12/14/2007	None
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-13S	1/22/2008	None
GM-13S	2/14/2008	None
GM-13S	3/14/2008	None
GM-13S	4/18/2008	None
GM-13S	5/16/2008	None
GM-13S	6/18/2008	None
GM-13S	7/16/2008	None
GM-13S	8/18/2008	None
GM-13S	9/16/2008	None
GM-13S	10/15/2008	None
GM-13S	11/14/2008	None
GM-13S	12/11/2008	None
GM-13S	1/14/2009	None
GM-13S	2/18/2009	None
GM-13S	3/17/2009	None
GM-13S	4/16/2009	None
GM-13S	5/14/2009	None
GM-13S	6/16/2009	None
GM-13S	7/22/2009	None
GM-13S	8/18/2009	None
GM-13S	9/14/2009	None
GM-13S	10/20/2009	None
GM-13S	11/18/2009	None
GM-13S	12/15/2009	None
GM-13S	1/21/2010	None
GM-13S	2/17/2010	**Sheen**
GM-13S	3/16/2010	**Film**
GM-13S	4/15/2010	**Film**
GM-13S	5/18/2010	**Film**
GM-13S	6/17/2010	**Film**
GM-13S	7/29/2010	**Sheen**
GM-13S	8/19/2010	None
GM-13S	9/22/2010	**Film**
GM-13S	10/20/2010	None
GM-13S	11/30/2010	None
GM-13S	12/23/2010	None
GM-13S	1/19/2011	None
GM-13S	2/16/2011	None
GM-13S	3/29/2011	**Film**
GM-13S	4/21/2011	**~0.01 foot**
GM-13S	5/19/2011	**Film**
GM-13S	6/15/2011	None
GM-13S	7/20/2011	**Film**
GM-13S	8/17/2011	None
GM-13S	9/14/2011	None
GM-13S	10/12/2011	None
GM-13S	11/23/2011	None
GM-13S	12/14/2011	None
GM-13S	1/24/2012	None
GM-13S	2/15/2012	None
Cleanup Level		No Sheen

Well	Date	Free Product
Plant 1, continued		
GM-13S	3/16/2012	None
GM-13S	4/18/2012	None
GM-13S	5/16/2012	None
GM-13S	6/13/2012	None
GM-13S	7/20/2012	**Film**
GM-13S	8/15/2012	**Film**
GM-13S	9/6/2012	**Film**
GM-13S	10/24/2012	**Film**
GM-13S	11/28/2012	**Film**
GM-13S	12/18/2012	None
GM-13S	1/23/2013	None
GM-13S	2/21/2013	None
GM-13S	3/13/2013	None
GM-13S	4/17/2013	None
GM-13S	5/22/2013	None
GM-13S	6/13/2013	None
GM-13S	7/24/2013	None
GM-13S	8/21/2013	None
GM-13S	9/25/213	None
GM-13S	10/15/2013	None
GM-13S	11/20/2013	None
GM-13S	12/18/2013	None
GM-13S	1/15/2014	None
GM-13S	2/12/2014	None
GM-14S	4/9/1997	**Sheen**
GM-14S	7/9/1997	**Sheen**
GM-14S	10/22/1997	**Sheen**
GM-14S	1/22/1998	**Sheen**
GM-14S	3/12/1998	**Sheen**
GM-14S	7/6/1998	**Sheen**
GM-14S	10/20/1998	**Sheen**
GM-14S	12/15/1998	**Sheen**
GM-14S	3/26/1999	**Sheen**
GM-14S	6/28/1999	**Sheen**
GM-14S	9/28/1999	None
GM-14S	8/15/2000	None
GM-14S	9/29/2000	None
GM-14S	10/12/2000	None
GM-14S	11/14/2000	None
GM-14S	12/14/2000	None
GM-14S	1/11/2001	None
GM-14S	2/15/2001	None
GM-14S	3/15/2001	None
GM-14S	4/13/2001	None
GM-14S	5/16/2001	None
GM-14S	6/11/2001	None
GM-14S	7/24/2001	None
GM-14S	8/21/2001	None
GM-14S	9/6/2001	None
GM-14S	10/19/2001	None
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 1, continued		
GM-14S	11/15/2001	None
GM-14S	12/10/2001	None
GM-14S	1/16/2002	None
GM-14S	2/21/2002	None
GM-14S	3/18/2002	None
GM-14S	4/18/2002	None
GM-14S	5/20/2002	None
GM-14S	6/19/2002	None
GM-14S	7/15/2002	None
GM-14S	8/20/2002	None
GM-14S	9/20/2002	None
GM-14S	10/15/2002	None
GM-14S	11/27/2002	None
GM-14S	12/18/2002	None
GM-14S	1/16/2003	None
GM-14S	2/11/2003	None
GM-14S	3/11/2003	None
GM-14S	4/15/2003	None
GM-14S	5/15/2003	None
GM-14S	6/17/2003	None
GM-14S	7/15/2003	None
GM-14S	8/13/2003	None
GM-14S	9/16/2003	None
GM-14S	10/14/2003	None
GM-14S	11/19/2003	None
GM-14S	12/17/2003	None
GM-14S	1/13/2004	None
GM-14S	2/10/2004	None
GM-14S	3/17/2004	None
GM-14S	4/15/2004	None
GM-14S	5/25/2004	None
	Deleted from Monitoring	
Plant 2		
MW-03	1/25/1999	NM
MW-03	2/17/1999	None
MW-03	3/15/1999	None
MW-03	4/15/1999	NM
MW-03	5/13/1999	None
MW-03	6/15/1999	NM
MW-03	7/15/1999	NM
MW-03	8/17/1999	**~0.43 foot**
MW-03	9/16/1999	**~0.50 foot**
MW-03	10/19/1999	**~0.42 foot**
MW-03	11/19/1999	**~0.49 foot**
MW-03	12/28/1999	**~0.34 foot**
MW-03	1/21/2000	**~0.02 foot**
MW-03	2/16/2000	**~0.02 foot**
MW-03	3/27/2000	**~0.03 foot**
MW-03	4/14/2000	**~0.04 foot**
	Abandoned	
Cleanup Level		No Sheen

Table 9. Monthly Groundwater LNAPL and Sheen Monitoring
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	Free Product
Plant 2, continued		
MW-03R	8/21/2001	None
MW-03R	9/16/2001	NM
MW-03R	10/19/2001	NM
MW-03R	11/15/2001	NM
MW-03R	12/10/2001	NM
MW-03R	1/16/2002	NM
MW-03R	2/21/2002	NM
MW-03R	3/18/2002	None
MW-03R	4/18/2002	None
MW-03R	5/20/2002	None
MW-03R	6/19/2002	None
MW-03R	7/15/2002	None
MW-03R	8/20/2002	None
MW-03R	9/20/2002	None
MW-03R	10/15/2002	None
MW-03R	11/27/2002	None
MW-03R	12/18/2002	NM
MW-03R	1/16/2003	NM
MW-03R	2/11/2003	NM
MW-03R	3/11/2003	NM
MW-03R	3/25/2003	None
MW-03R	4/15/2003	None
MW-03R	5/15/2003	None
MW-03R	6/17/2003	None
MW-03R	7/15/2003	None
MW-03R	8/13/2003	None
MW-03R	9/16/2003	None
MW-03R	10/14/2003	None
MW-03R	11/19/2003	None
MW-03R	12/17/2003	None
MW-03R	1/13/2004	None
MW-03R	2/10/2004	None
MW-03R	3/17/2004	None
MW-03R	4/15/2004	None
MW-03R	5/25/2004	None
MW-03R	6/13/2004	None
MW-03R	7/13/2004	None
MW-03R	8/12/2004	Deleted from Monitoring
Cleanup Level		No Sheen

Notes: Values in **bold** exceed the cleanup level.

Due to maintenance of a sorbent "sock" placed in GM-13S and MW-03, these measurements do not necessarily reflect actual product thicknesses in the wells.

Active product recovery from GM-11S began in April 2000. Product thickness recorded in GM-11S after that date is not representative of static conditions.

MW-03 was destroyed during Island redevelopment activities and was replaced by MW-03R.

* Free product present, thickness not measured.

~ Approximately.

NM Not measured due to inaccessibility.

Table 10. 2013 Quarterly Performance Monitoring Groundwater Elevations
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TOC Elevation (ft msl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft msl)
Plant 1				
GM-14S	3/20/2013	8.57	3.97	4.60
GM-14S	6/26/2013		4.67	3.90
GM-14S	9/11/2013		4.97	3.60
GM-14S	12/11/2013		5.10	3.47
GM-15S	3/19/2013	8.92	5.13	3.79
GM-15S	6/25/2013		5.57	3.35
GM-15S	9/10/2013		5.73	3.19
GM-15S	12/11/2013		5.85	3.07
GM-16S	3/20/2013	8.53	4.33	4.20
GM-16S	6/26/2013		4.60	3.93
GM-16S	9/11/2013		5.10	3.43
GM-16S	12/11/2013		5.34	3.19
GM-17S	3/20/2013	9.19	4.29	4.90
GM-17S	6/26/2013		5.03	4.16
GM-17S	9/11/2013		5.44	3.75
GM-17S	12/11/2013		5.53	3.66
GM-24S	3/20/2013	7.62	2.55	5.07
GM-24S	6/26/2013		3.45	4.17
GM-24S	9/11/2013		4.02	3.60
GM-24S	12/11/2013		4.17	3.45
AR-03	3/20/2013	9.35	5.71	3.64
AR-03	6/26/2013		6.24	3.11
AR-03	9/11/2013		6.43	2.92
AR-03	12/11/2013		6.50	2.85
AMW-01	3/19/2013	8.88	5.74	3.14
AMW-01	6/25/2013		6.76	2.12
AMW-01	9/10/2013		5.57	3.31
AMW-01	12/10/2013		4.75	4.13
AMW-02	3/19/2013	12.14	9.37	2.77
AMW-02	6/25/2013		8.10	4.04
AMW-02	9/10/2013		9.25	2.89
AMW-02	12/10/2013		9.20	2.94
AMW-03	3/19/2013	12.07	9.42	2.65
AMW-03	6/25/2013		7.62	4.45
AMW-03	9/10/2013		9.67	2.40
AMW-03	12/10/2013		9.98	2.09
AMW-04	3/19/2013	8.00	6.25	1.75
AMW-04	6/25/2013		12.55	-4.55
AMW-04	9/10/2013		5.11	2.89
AMW-04	12/10/2013		4.55	3.45

Table 10. 2013 Quarterly Performance Monitoring Groundwater Elevations
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

Well	Date	TOC Elevation (ft msl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft msl)
Plant 1 Continued				
AMW-05	3/19/2013	8.14	5.67	2.47
AMW-05	6/25/2013		9.14	-1.00
AMW-05	9/10/2013		4.77	3.37
AMW-05	12/10/2013		3.77	4.37
GM-13S	3/13/2013	11.90	8.26	3.64
GM-13S	6/12/2013		8.71	3.19
GM-13S	9/25/2013		8.54	3.36
GM-13S	12/18/2013		8.74	3.16
GM-12S	3/13/2013	8.32	4.70	3.62
GM-12S	6/12/2013		5.00	3.32
GM-12S	9/25/2013		5.09	3.23
GM-12S	12/18/2013		5.03	3.29
MW-06	3/19/2013	8.03	4.75	3.28
MW-06	6/25/2013		4.90	3.13
MW-06	9/10/2013		5.12	2.91
MW-06	12/10/2013		5.22	2.81
MW-1-T9	3/20/2013	9.07	5.41	3.66
MW-1-T9	6/26/2013		5.87	3.20
MW-1-T9	9/11/2013		6.13	2.94
MW-1-T9	12/11/2013		6.21	2.86
MW-2-T9	3/20/2013	9.23	5.22	4.01
MW-2-T9	6/26/2013		5.42	3.81
MW-2-T9	9/10/2013		5.88	3.35
MW-2-T9	12/11/2013		5.96	3.27
MW-3-T9	3/20/2013	8.73	4.87	3.86
MW-3-T9	6/26/2013		5.35	3.38
MW-3-T9	9/11/2013		5.56	3.17
MW-3-T9	12/11/2013		5.64	3.09
MW-4-T9	3/20/2013	10.65	7.06	3.59
MW-4-T9	6/26/2013		7.51	3.14
MW-4-T9	9/10/2013		7.76	2.89
MW-4-T9	12/11/2013		7.90	2.75
Plant 2				
GM-19S	3/20/2013	7.68	3.18	4.50
GM-19S	9/11/2013		4.36	3.32

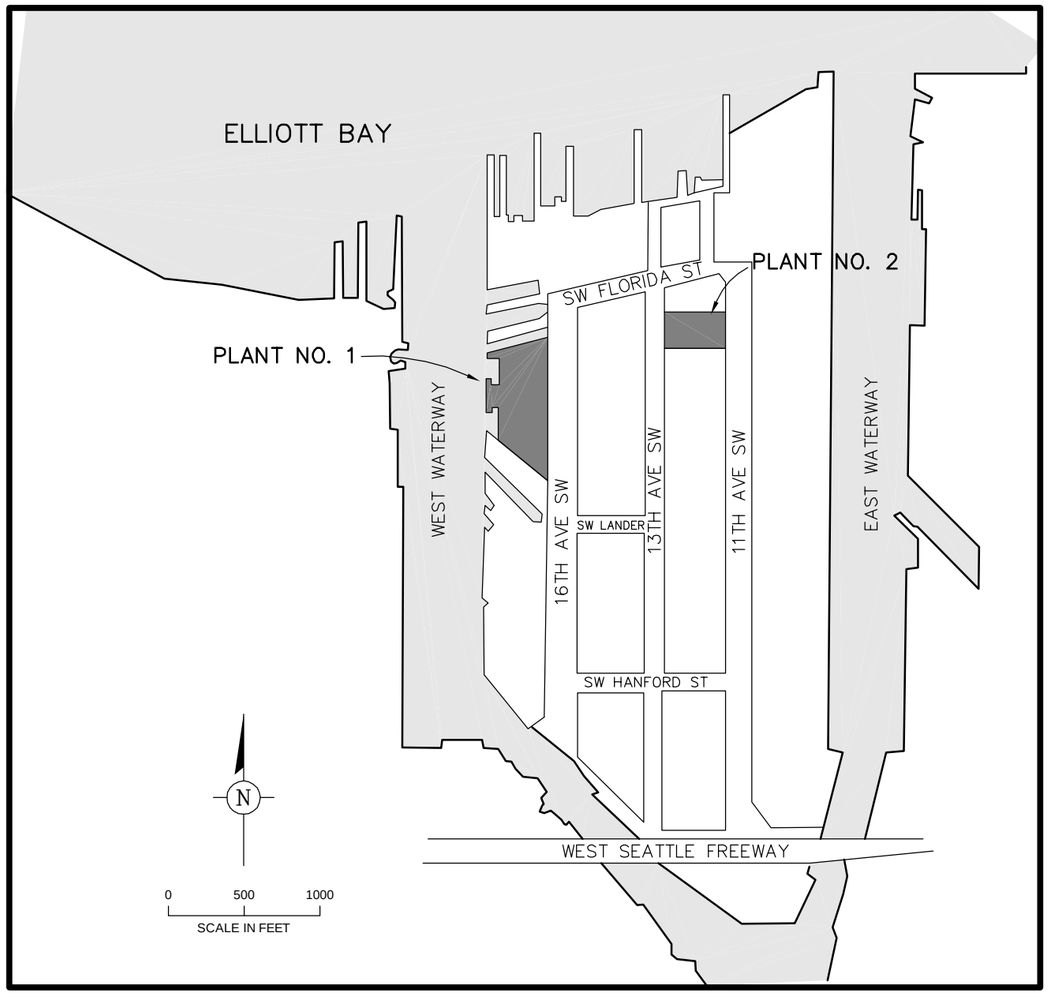
ft Feet

msl Mean sea level in National Geodetic Vertical Datum of 1929 (NGVD29).

TOC Top of casing

FIGURES

AREA PLAN



SITE PLAN

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore WA 98028
(425) 402-8277 FAX (425) 402-7917

Site Location Map

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
1

16 TH AVE. S. W.

TANK FARM 2

TANK FARM 1

SW FLORIDA STREET

SW LANDER STREET

PLANT 1 SOIL EXCAVATION AREA

ESTIMATED AREA OF PRODUCT OR TPH > 10,000 mg/kg
THIS AREA IS INACCESSIBLE FOR SOIL EXCAVATION

Northern Storm Sewer Outfall
(Florida Street)

WAREHOUSE/
TRUCK LOADING
RACK AREA

Southern Storm Sewer Outfall
(Lander Street)

ESTIMATED AREA OF PRODUCT OR TPH > 10,000 mg/kg
THIS AREA IS INACCESSIBLE FOR SOIL EXCAVATION
AND WILL BE ADDRESSED AS PART OF THE GROUNDWATER REMEDY.

LEGEND

ESTIMATED AREA WITH PRODUCT
OR TPH > 20,000 ppm

EXCAVATED REMEDIATION AREAS

N

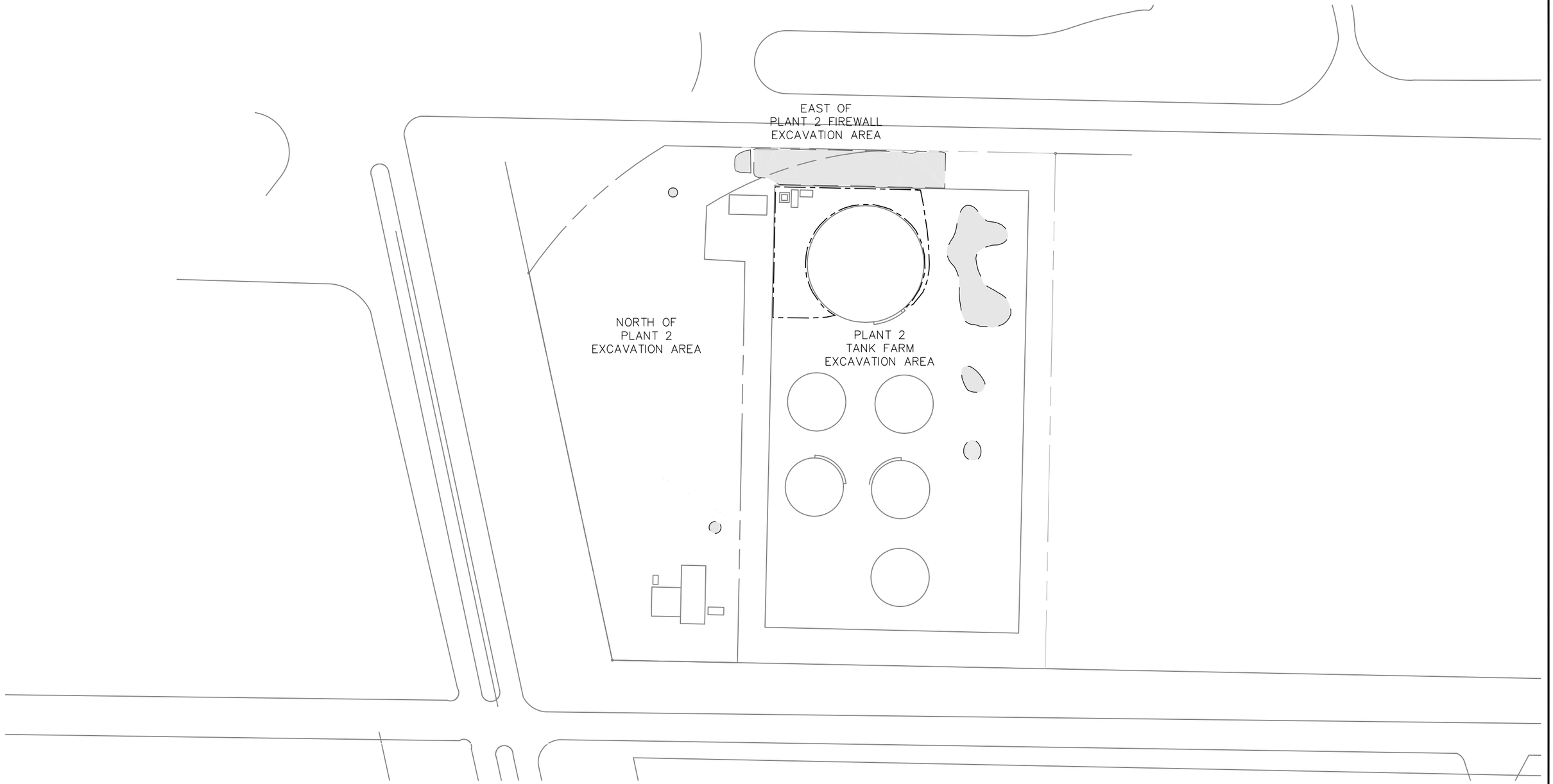
0 50 100
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA
(425)402-8277 Fax:(425)402-7917

Areas of Remediation - Plant 1

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
2



LEGEND

ESTIMATED AREA WITH PRODUCT OR TPH > 20,000 ppm

EXCAVATED REMEDIATION AREAS

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA 98028
(425)402-8277 Fax:(425)402-7917

Areas of Remediation - Plant 2

BP West Coast Products Terminal 21T
2406 13th Avenue SW
Seattle, WA 98134

FIGURE 3

C:\Data\CAD\LDB2 Projects\TechSolv - ARCO 21T.dwg\ARCO21a.dwg << Plant 1 Remediation System >> DEC 10 2003 00:03:06 (bCAD)

TANK 20

ARCO 21T PLANT 1 TANK FARM

RECOVERED LNAPL LINE

ASPHALT

LIFT STATION

SVEH-2

PUMPS

LOADING RACKS

GM-11S

SVEH-2

REMEDIATION SYSTEM TREATMENT AREA

ARCO OFFICE

OFFICES

WAREHOUSE

CONCRETE

ASPHALT

AMW-05

RW-2

RW-4

AS-3

AMW-04

AS-4

RW-5

AS-5

RW-6

RW-1

AS-6

AMW-03

AS-7

RW-7

AS-8

AS-9

RW-8

AMW-02

AS-10

AS-11

RW-9

AS-12

GM-13D

GM-13S

AS-14

AS-1

AS-2

AS-13

RW-10

AMW-01

PRIMARY PIPE RACK

WALKWAY

SECONDARY PIPE RACK

RIP RAP

Northern Boom

PIER

SEAWALL/BULKHEAD

Duwamish Waterway

Southern Boom

RIP RAP

LEGEND

RW-5	GROUNDWATER RECOVERY WELL
	HORIZONTAL SOIL VAPOR EXTRACTION WELL SCREEN
MW-2	GROUNDWATER MONITORING WELL
AS-1	AIR SPARGE WELL
AMW-04	PERFORMANCE/CONFIRMATION WELL
	LNAPL LINE TO TANK 20
	AIR SPARE LINES

0 20 40

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA 98028
(425) 402-8277 FAX (425) 402-7917

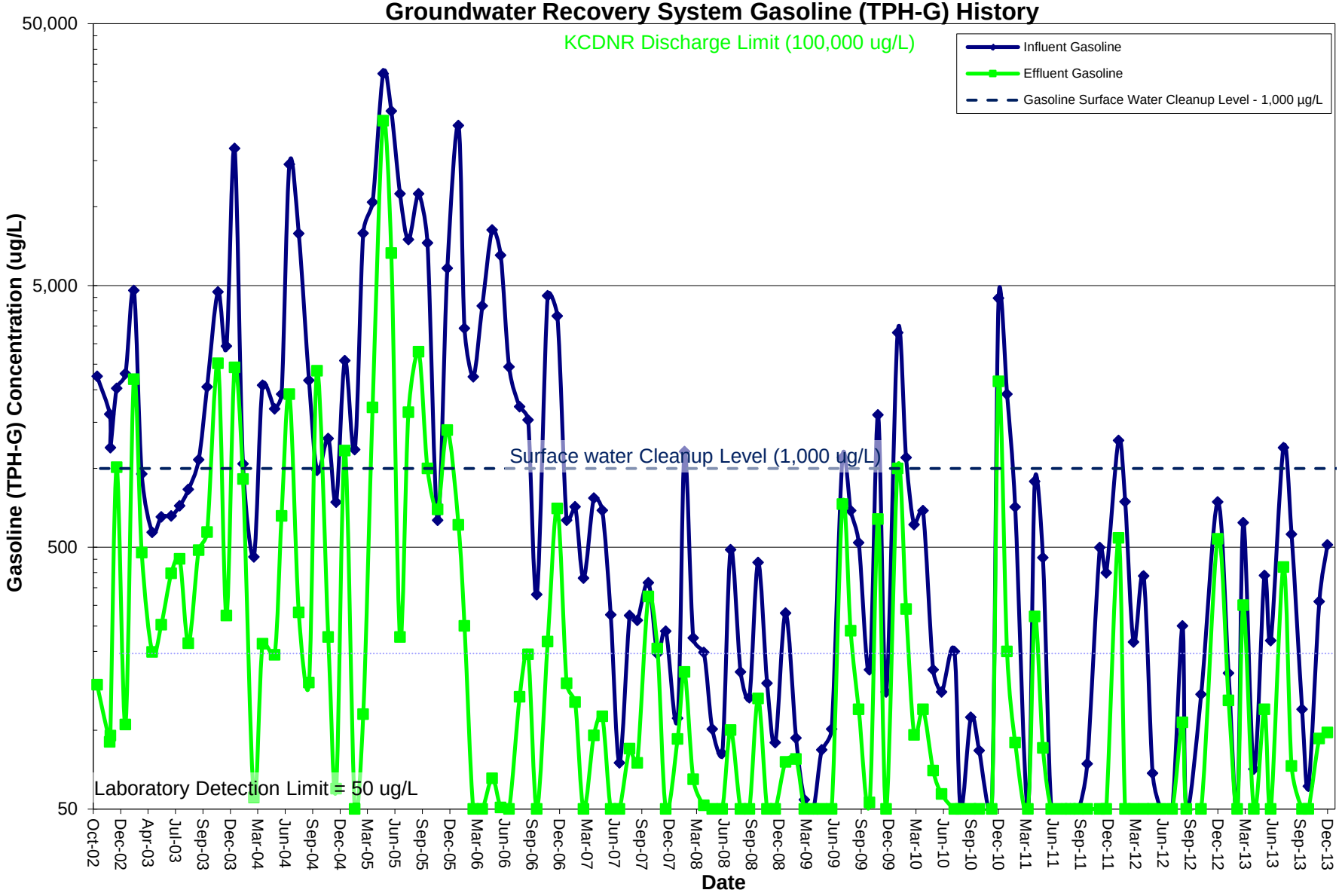
Plant 1 Remediation System

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE

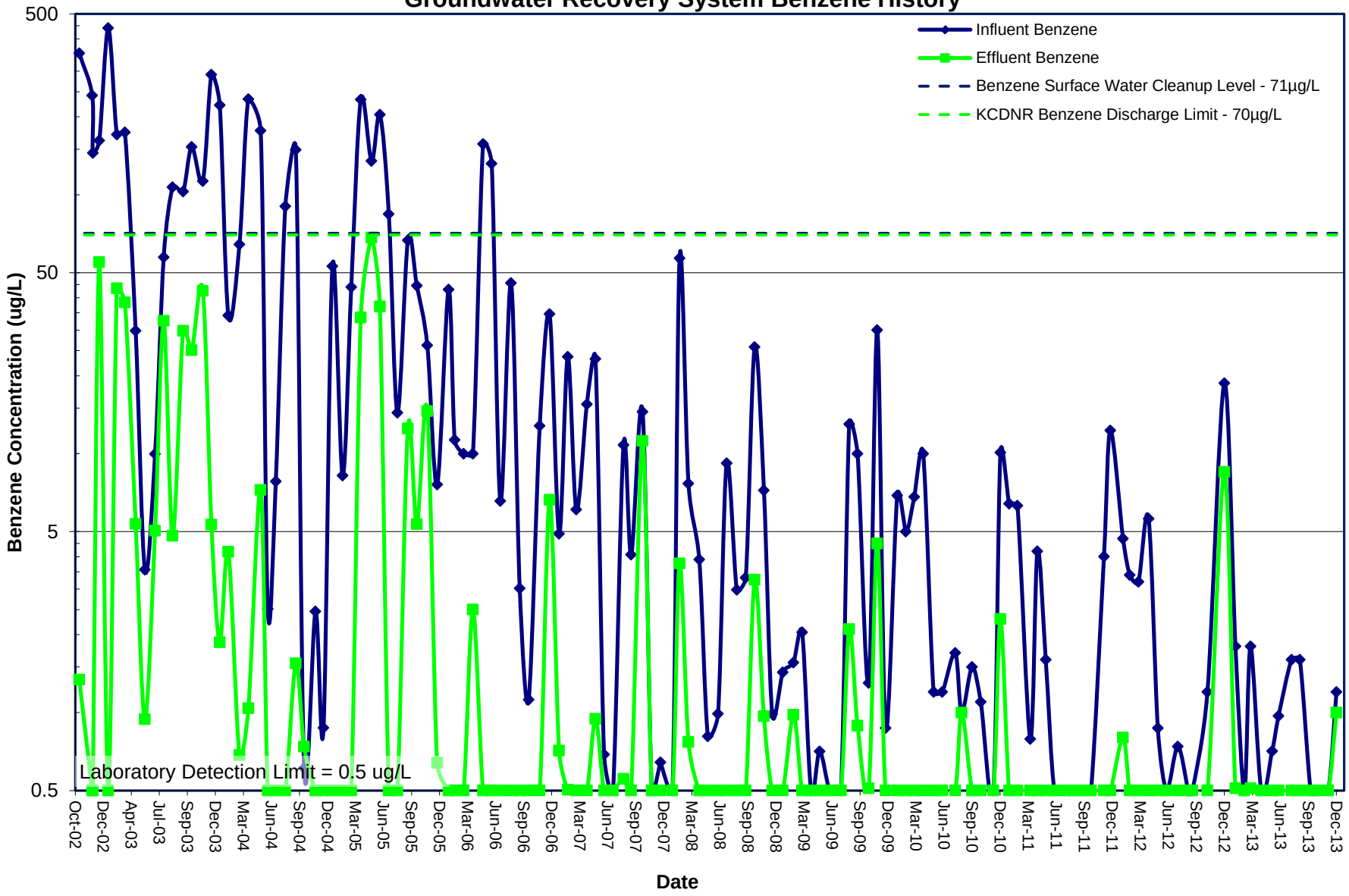
4

Figure 5. Final System Influent vs. Effluent Groundwater Gasoline Concentrations
October 2002 through December 2013
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington



Note: Data is included since the startup of the final groundwater/product recovery system in October 2002.

Figure 6. Final System Influent vs. Effluent Groundwater Benzene Concentrations
October 2002 through December 2013
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington
Groundwater Recovery System Benzene History



Note: Data is included since the startup of the final groundwater/product recovery system in October 2002.

Figure 7: System Influent vs. Effluent Diesel Groundwater Concentrations
October 2002 through December 2013
BP West Coast Products Terminal 21T, Seattle, Washington

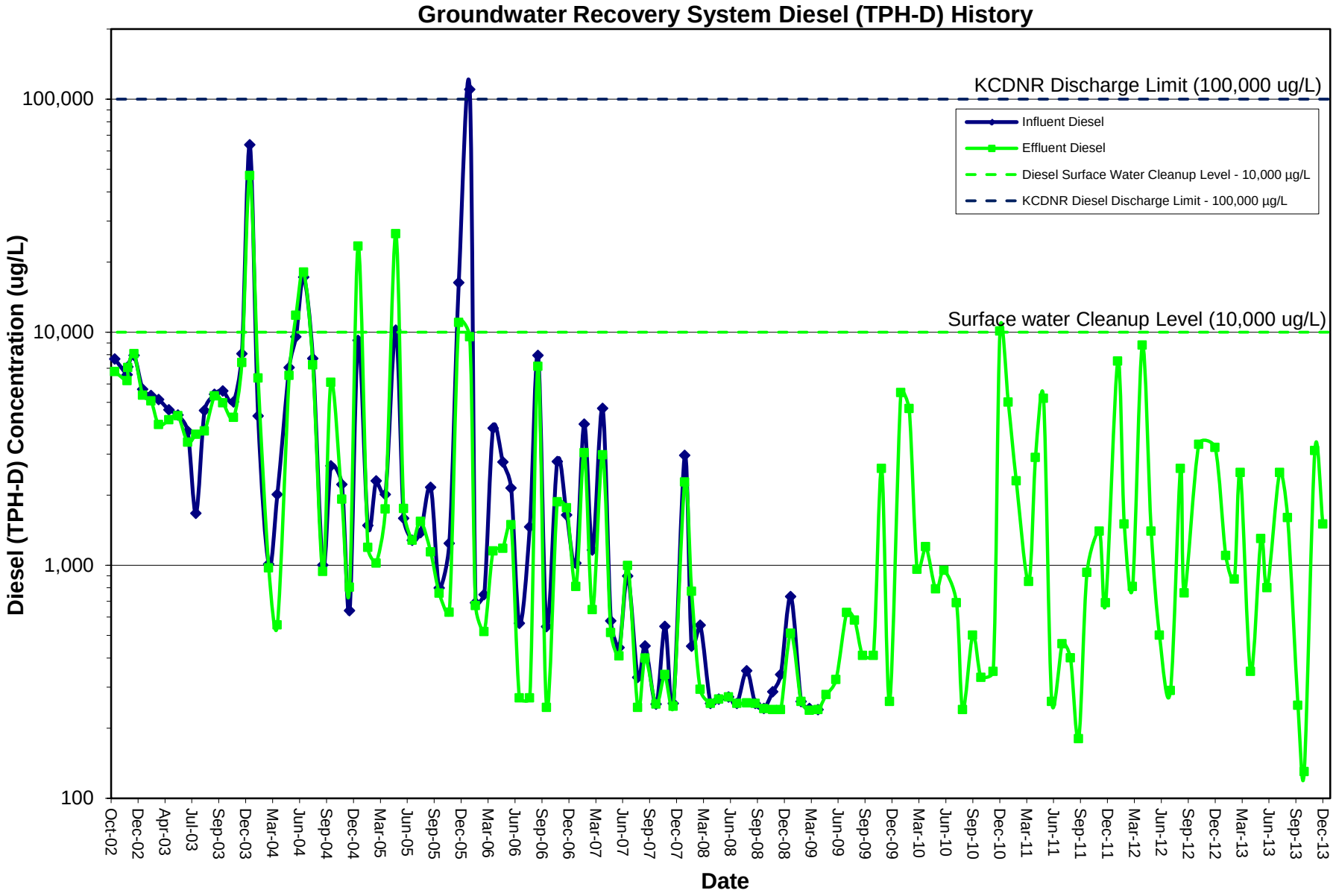
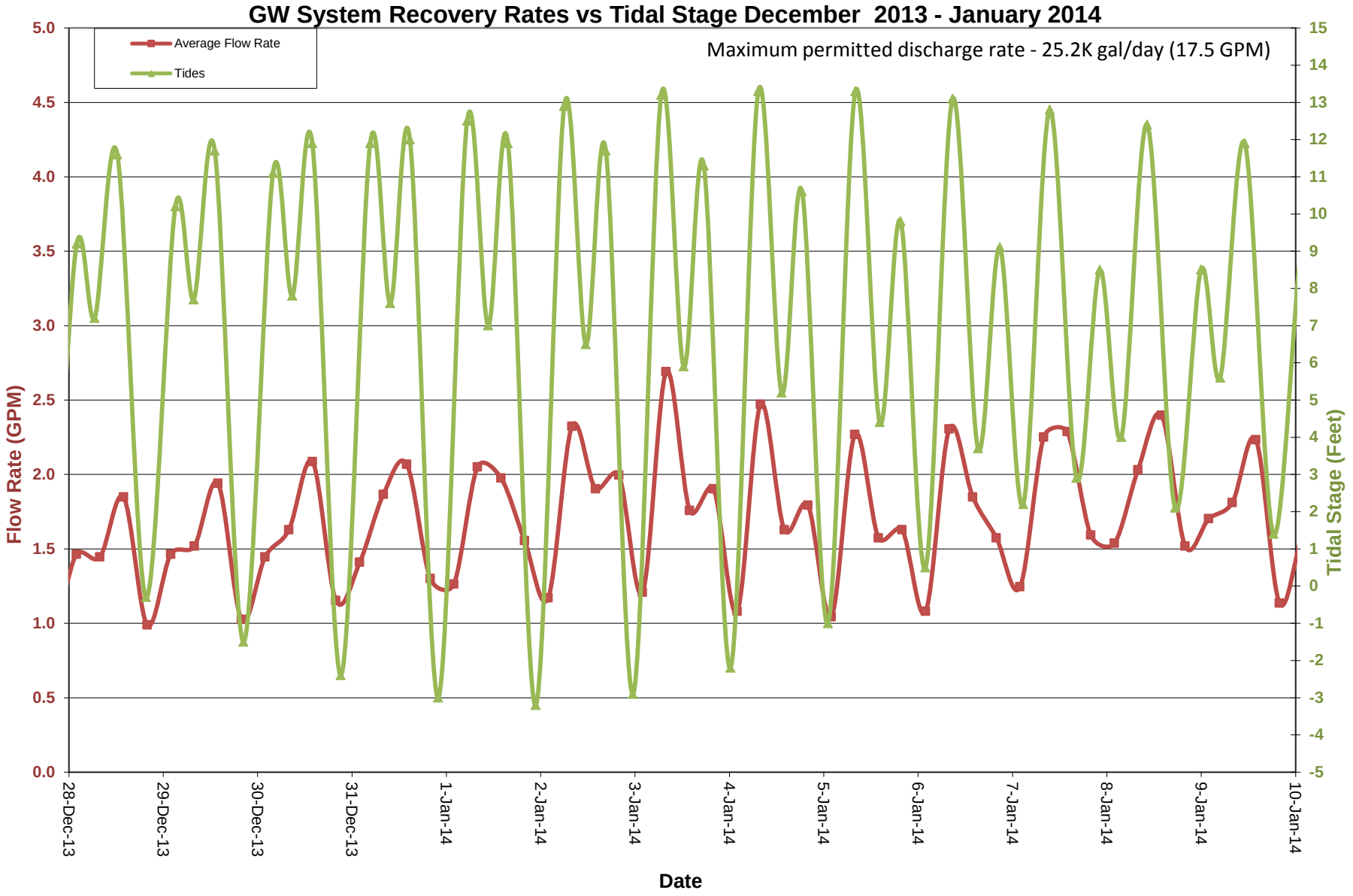
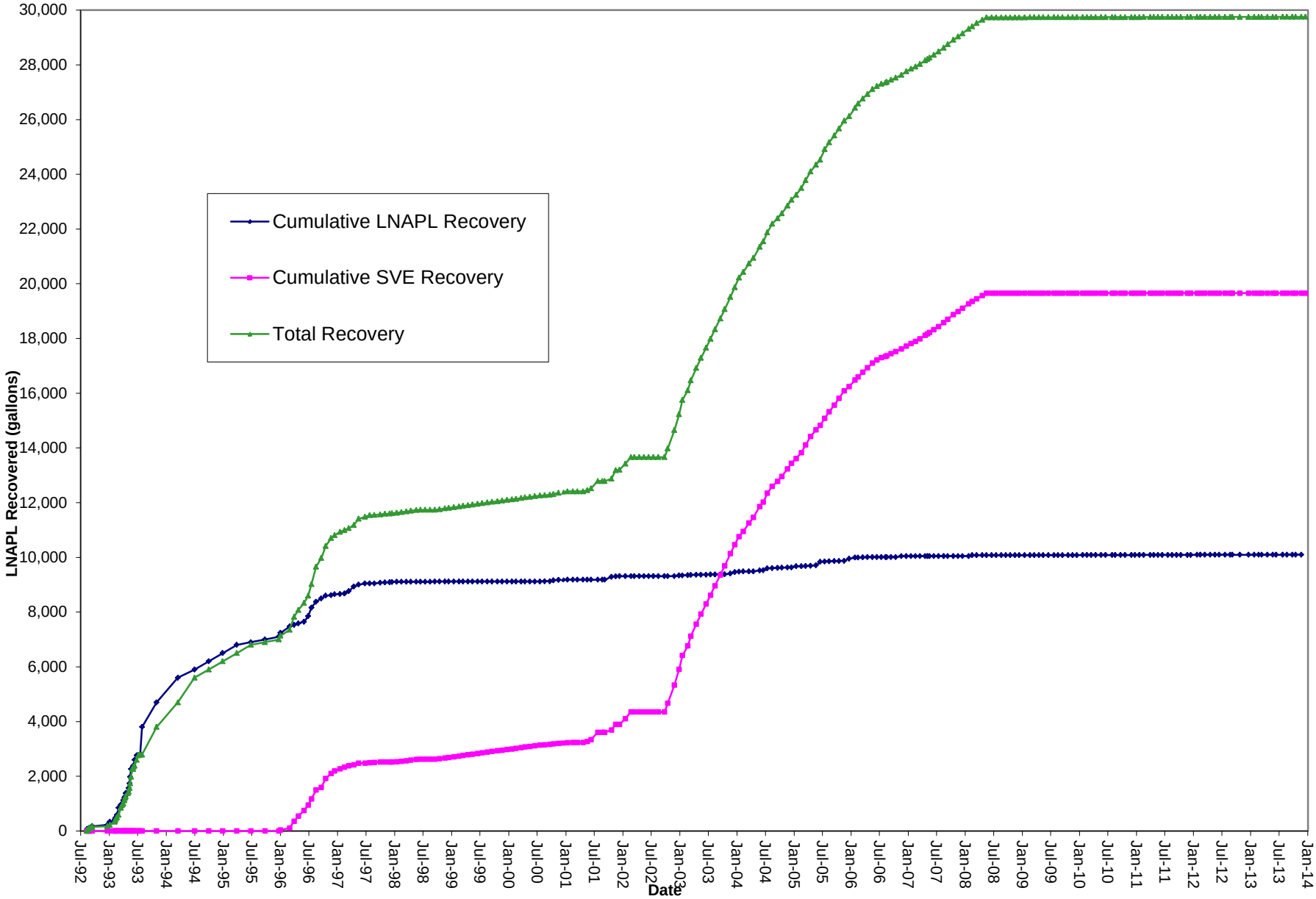


Figure 8. Groundwater Recovery Rates vs. Tidal Stage
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington



Note: Tidal elevations are from NOAA tidal predictions for Lockheed Shipyard, Harbor Island, WA Station 9447110
Presented data shows the effect of tidal fluctuations on pumping rates. It represents a portion of data collected to date.

Figure 9. **Cumulative LNAPL Recovery Through December 2013**
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington



Note: Soil Vapor Extraction recovery began in January, 1996

Figure 10. **2013 Sheen Observations - Loading Rack**
BP West Coast Products Terminal 21T, Harbor Island, Seattle

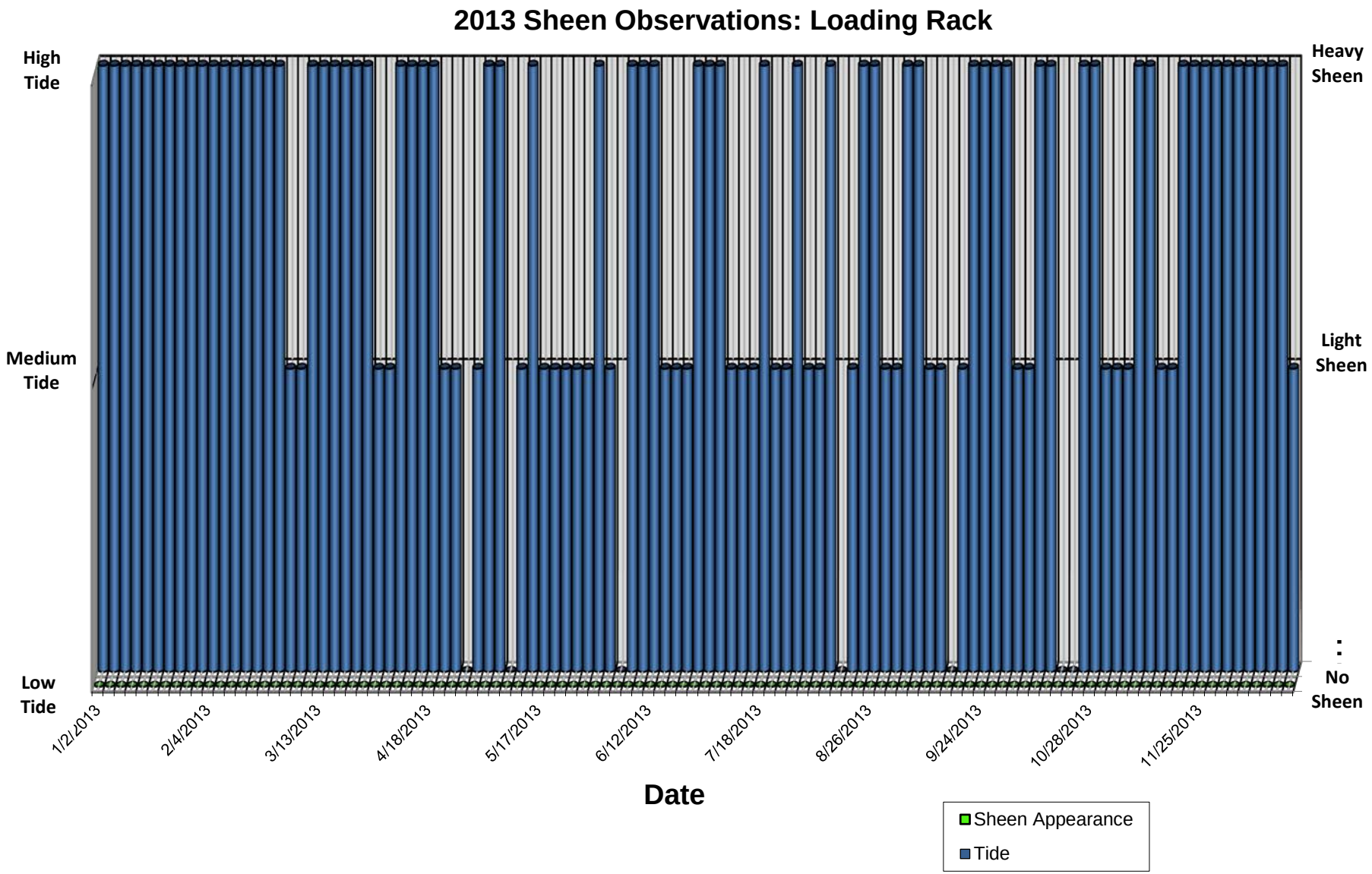
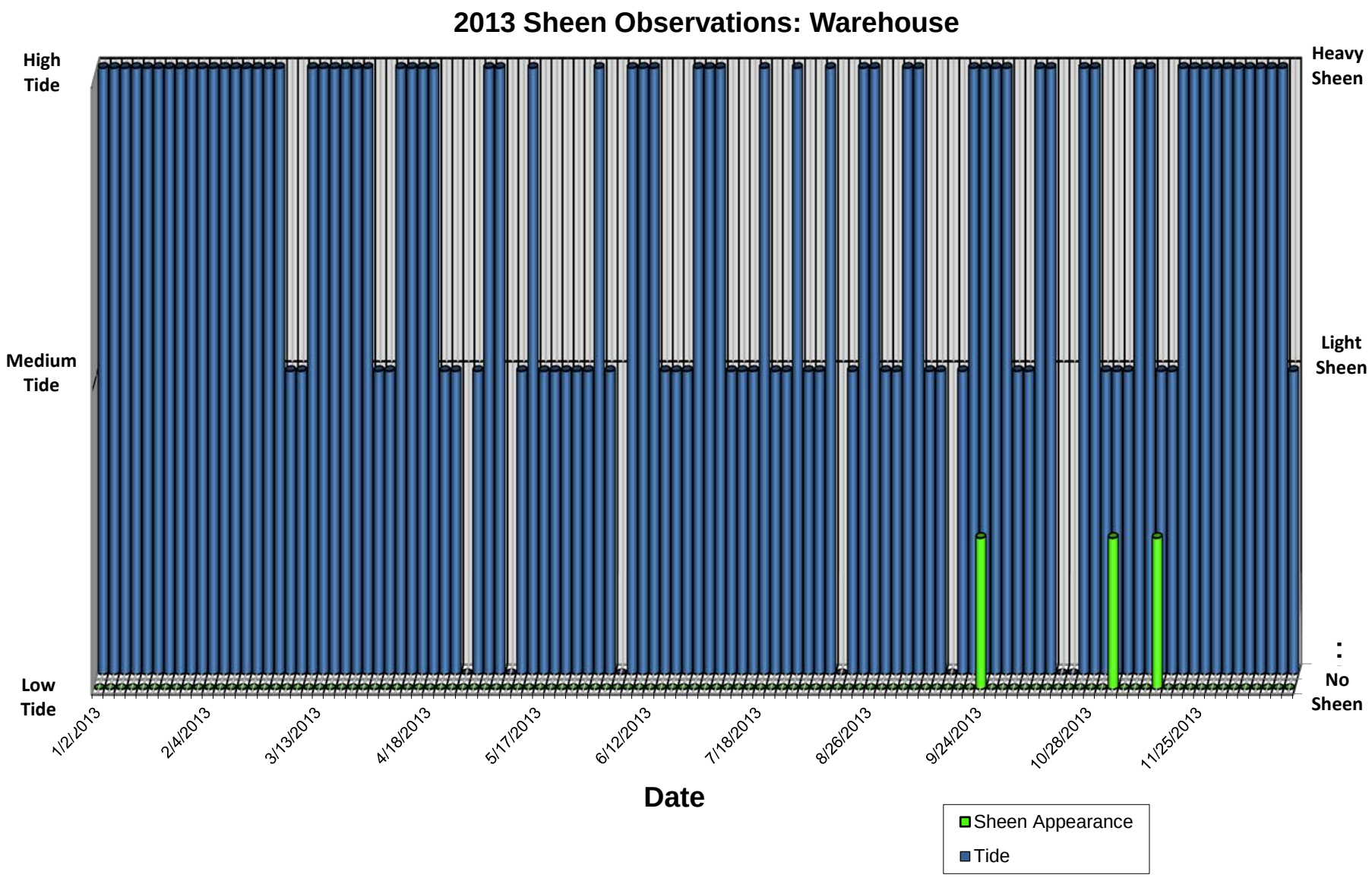
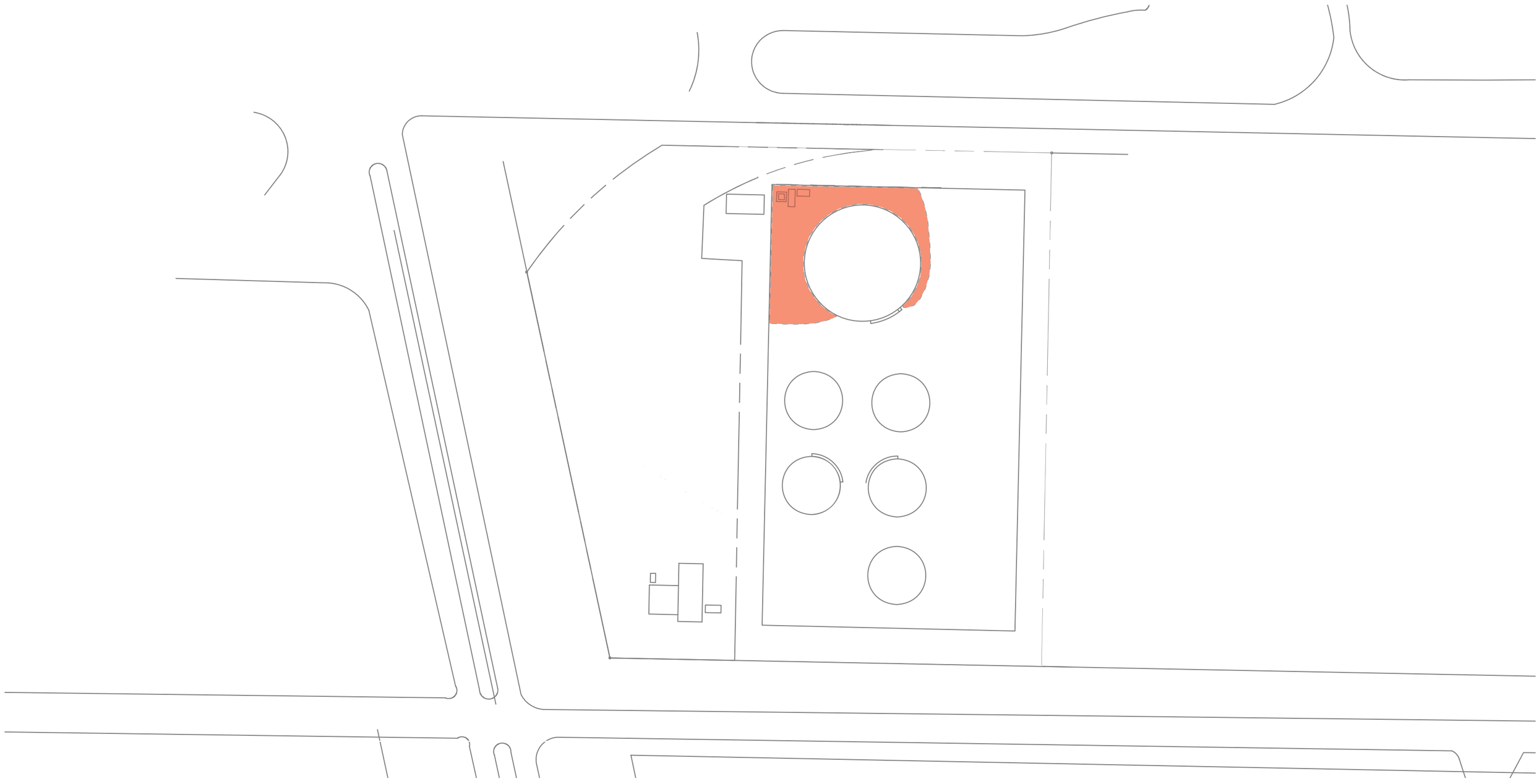


Figure 11. **2013 Sheen Observations - Warehouse**
BP West Coast Products Terminal 21T, Harbor Island, Seattle





LEGEND

Areas where construction or soil excavation activities are regulated by the Restrictive Covenant of the Consent Decree due to total petroleum hydrocarbons potentially above cleanup levels.

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA 98028
(425) 402-8277 FAX: (425) 402-7917

Areas of Restriction - Plant 2

BP West Coast Products Terminal 21T
2406 13th Avenue SW
Seattle, WA 98134

FIGURE
12

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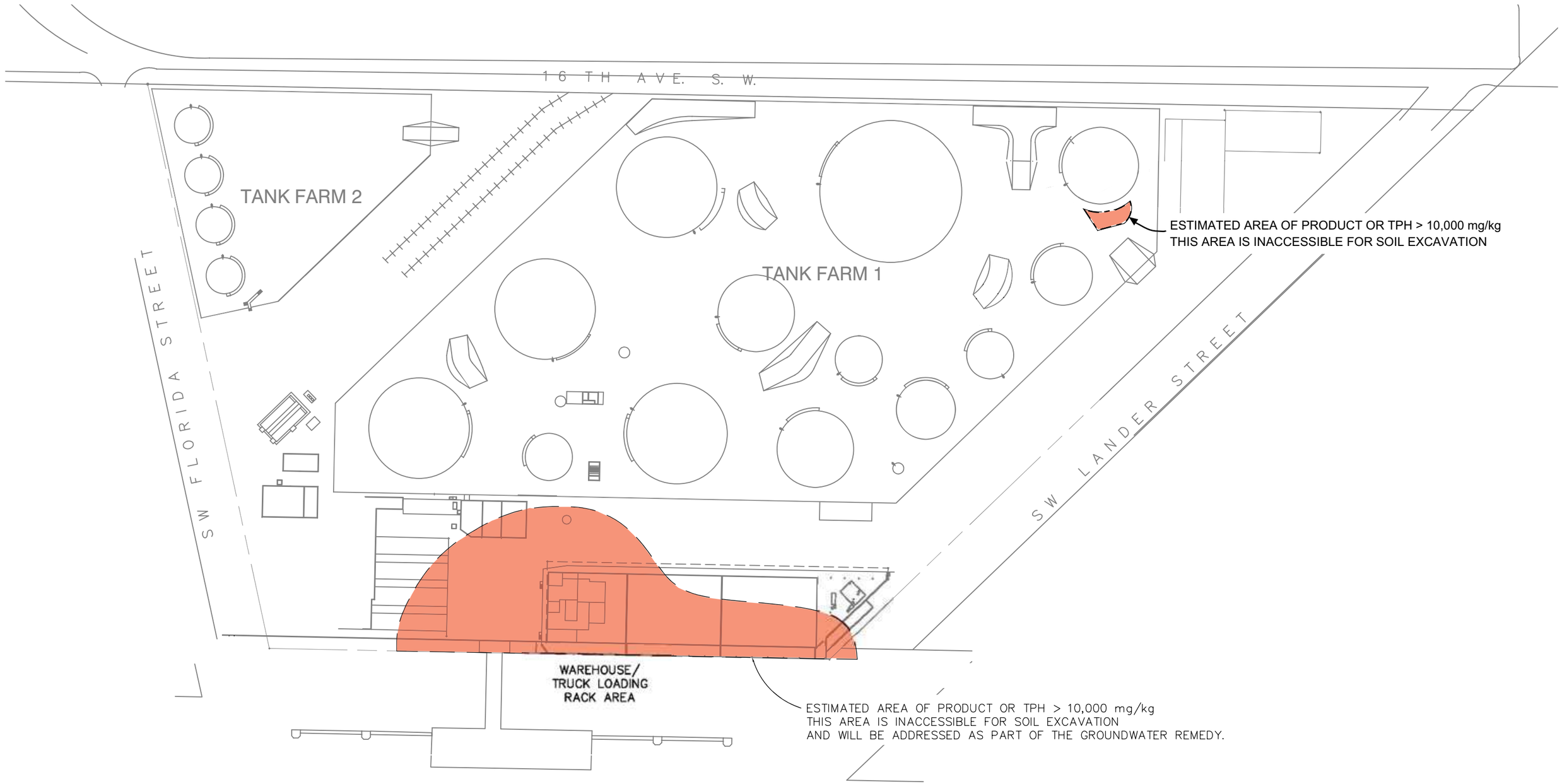


LEGEND

Areas where construction or soil excavation activities are regulated by the Restrictive Covenant of the Consent Decree due to total petroleum hydrocarbons potentially above cleanup levels.

N

0 50 100

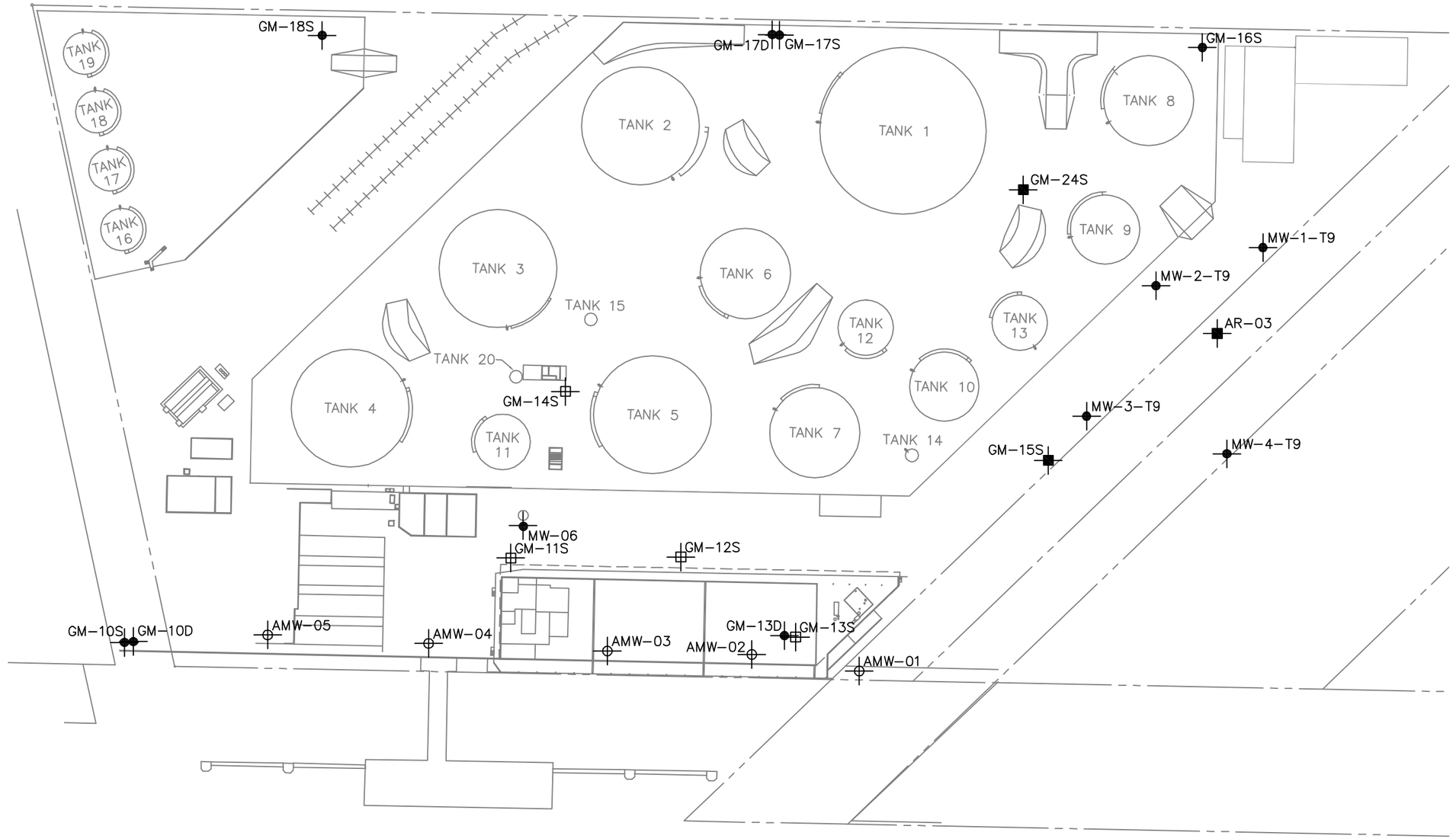
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore, WA 98028
(425) 402-8277 FAX (425) 402-7917

Areas of Restriction - Plant 1

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
13



LEGEND

GM-16S	MONITORING WELL
AMW-01	PERFORMANCE/CONFIRMATION WELL
GM-13D	PERFORMANCE WELL
GM-13S	PRODUCT PERFORMANCE WELL

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore WA 98028
(425) 402-8277 FAX (425) 402-7917

Plant 1 Monitoring Well Network

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
14

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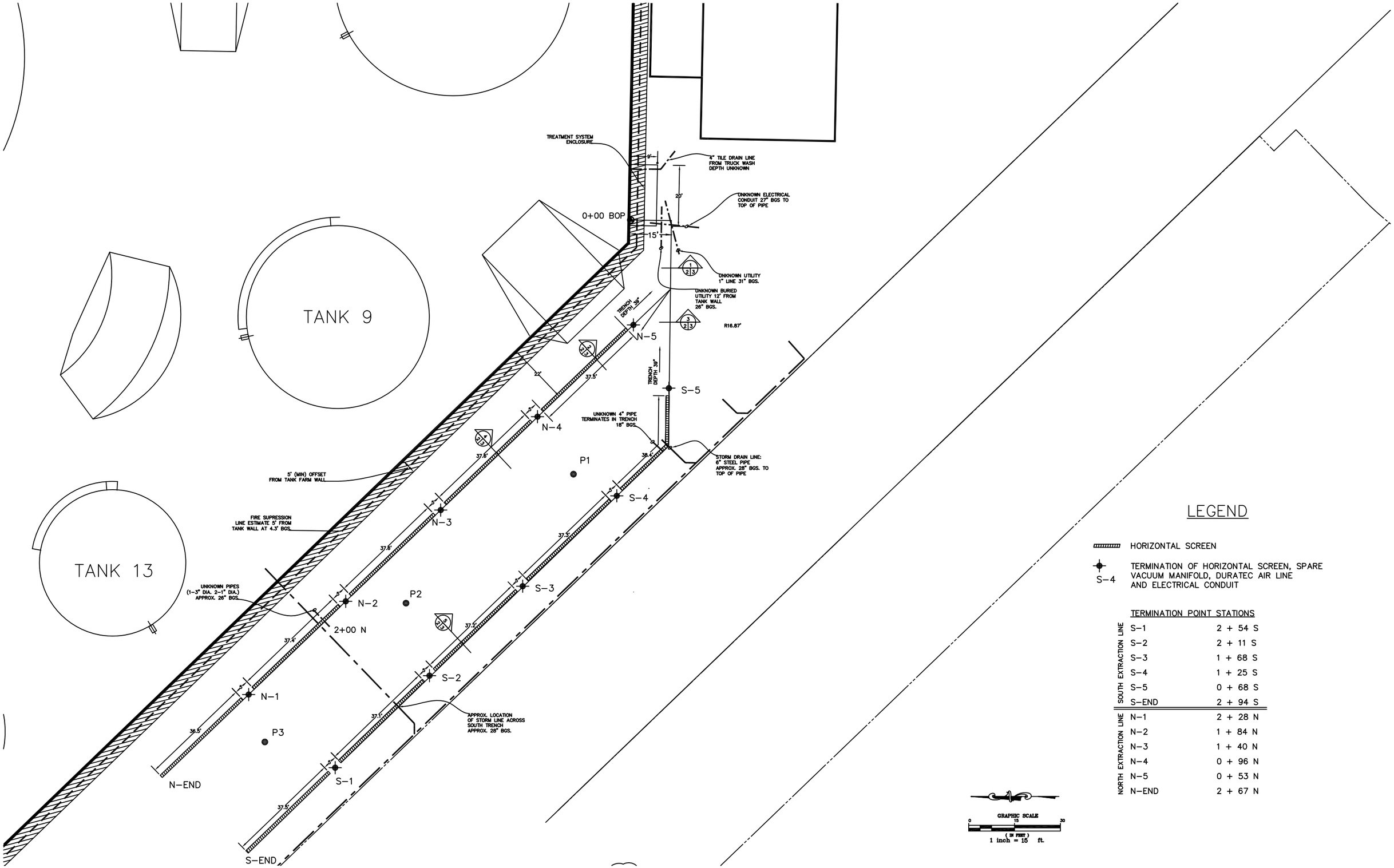


LEGEND

HORIZONTAL SCREEN

S-4 — TERMINATION OF HORIZONTAL SCREEN, SPARE VACUUM MANIFOLD, DURATEC AIR LINE AND ELECTRICAL CONDUIT

TERMINATION POINT STATIONS

SOUTH EXTRACTION LINE	S-1	2 + 54 S
	S-2	2 + 11 S
	S-3	1 + 68 S
	S-4	1 + 25 S
	S-5	0 + 68 S
	S-END	2 + 94 S
NORTH EXTRACTION LINE	N-1	2 + 28 N
	N-2	1 + 84 N
	N-3	1 + 40 N
	N-4	0 + 96 N
	N-5	0 + 53 N
	N-END	2 + 67 N

GRAPHIC SCALE
0 15 30
(IN FEET)
1 inch = 15 ft.

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street
Kenmore, WA 98028
(425) 402-8277 FAX (425) 402-7917

SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING
USE TO VERIFY FIGURE REPRODUCTION SCALE

REV. NO.	DATE	DESCRIPTION	BY	APPR.
1	MAR.07	ADDED ELECTRICAL CONDUITS FOR FUTURE USE	DK	LR
2	SEPT.07	RELOCATED NORTH TRENCH AND REDUCED TRENCH DEPTH	DK	LR
3	SEPT.08	AS-BUILT	DK	LR

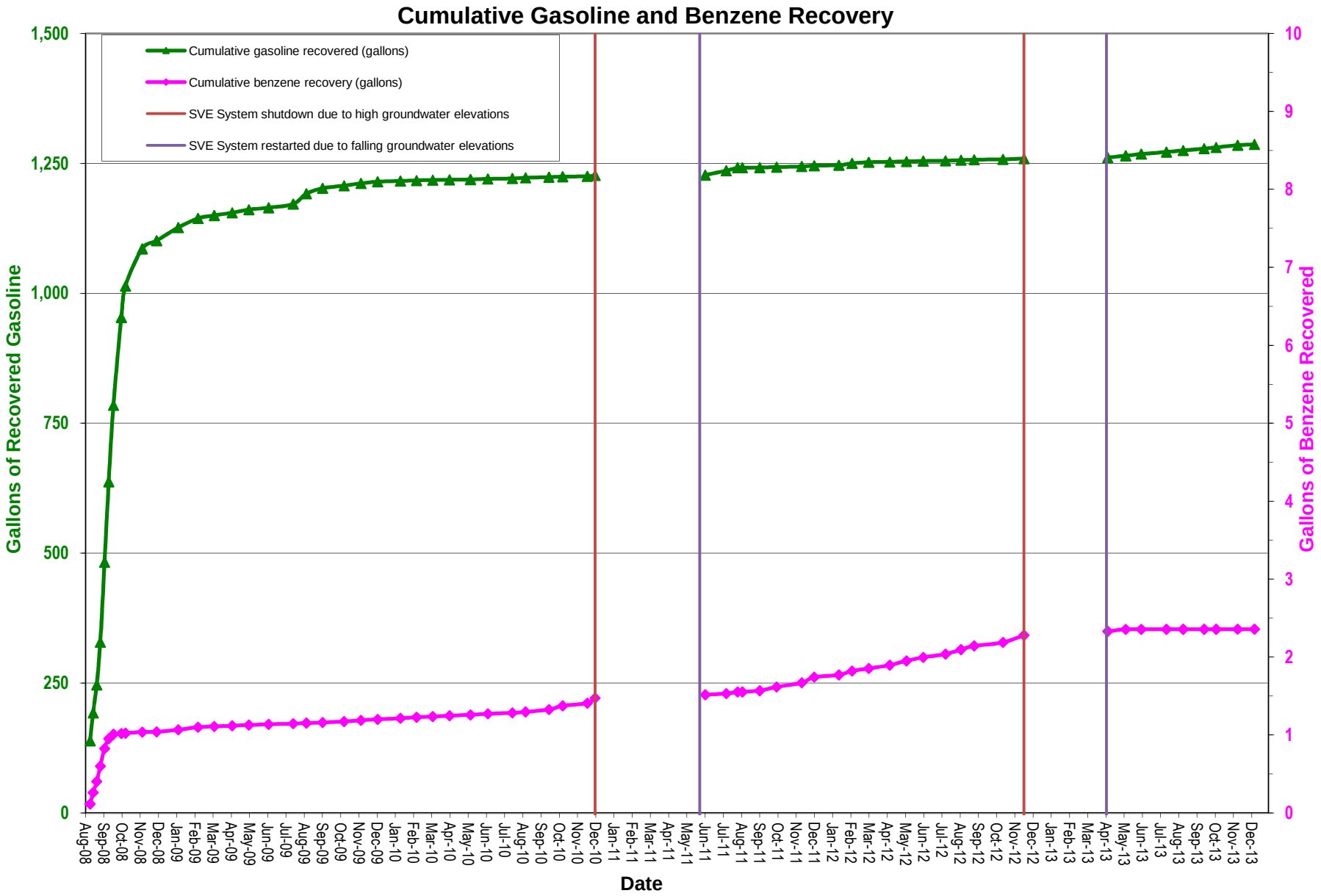
DWG DATE: 4/24/08
PROJCT NO.: ATR10066.02.G
DRAWING: SVEDESIGN-AS-BUILT.DWG
CHECKED: ROBERTS
APPROVED: D.WHITE/J.KIRKPATRICK
DESIGNER: KIDD

Inland SVE Remediation System Layout

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

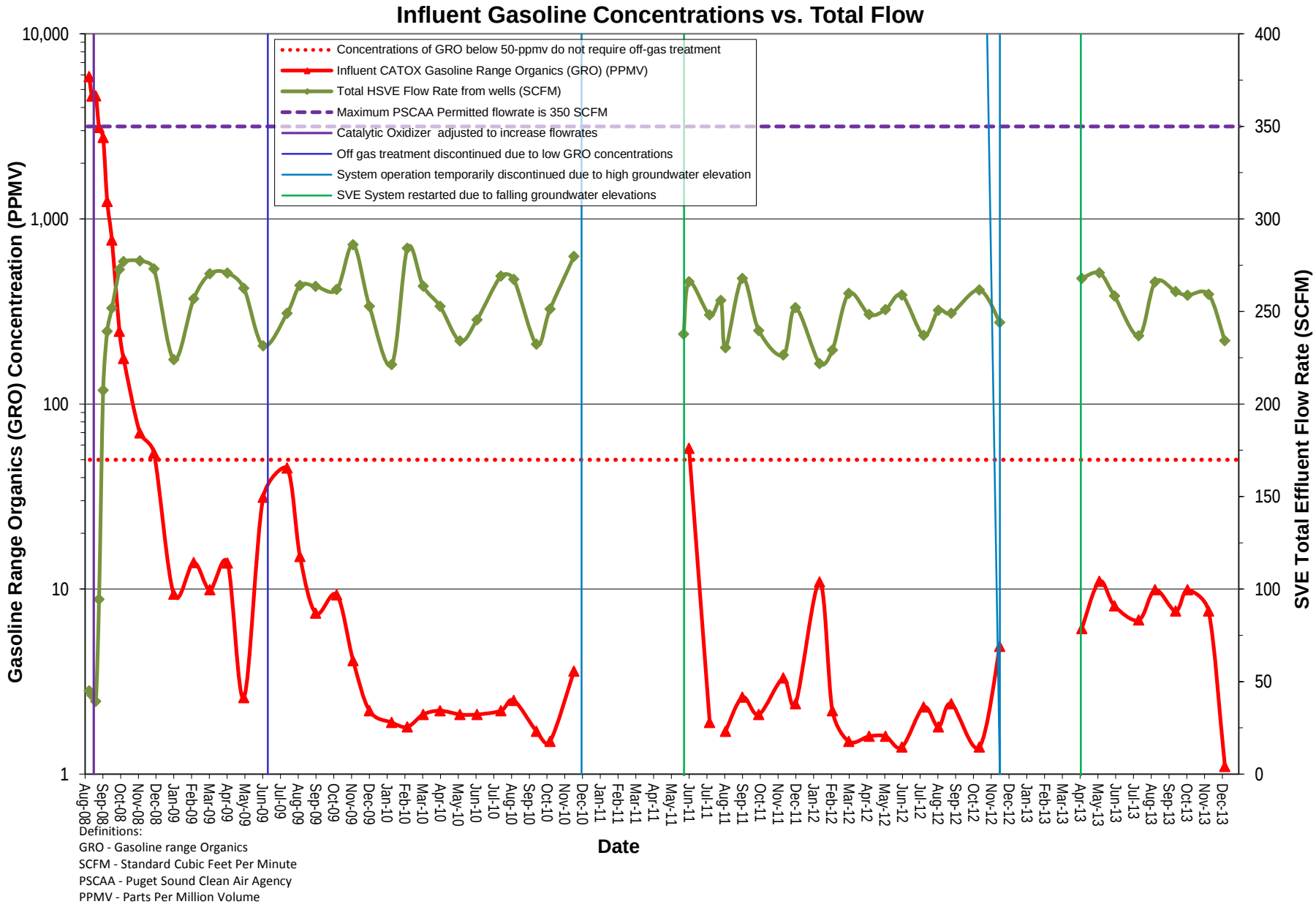
FIGURE
15

Figure 16. Inland SVE System Cumulative Hydrocarbon Recovery
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington



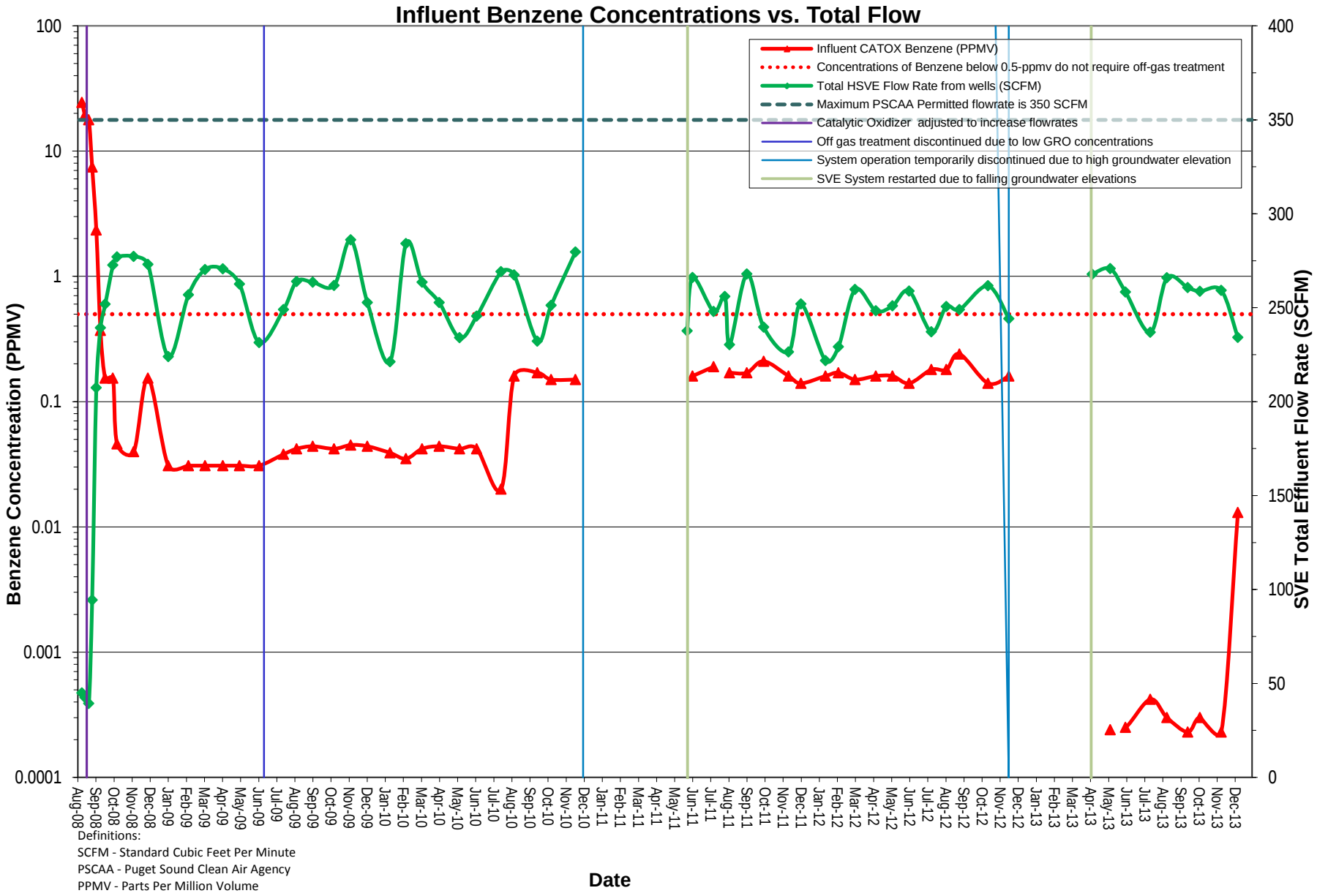
Note: Benzene and gasoline recovery are biased high as recovery is calculated assuming that benzene and gasoline are present at the laboratory decection limit for all samples reported as non detections from the laboratory.

Figure 17. Inland SVE System Gasoline History
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington



Note: Laboratory non-detects are reported at associated detection levels to provide conservative concentration estimates. Variability in concentrations below 10ppm are due to changes in lab detection limits and not actual gasoline concentrations.

Figure 18. Inland SVE System Benzene History
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington



Note: Laboratory non-detects are reported at associated detection levels to provide conservative concentration estimates. Variability in concentrations below 0.2 ppm are due to changes in lab detection limits and not actual benzene concentrations.

Figure 19. Inland SVE Biodegradation and Vapor Recovery
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington

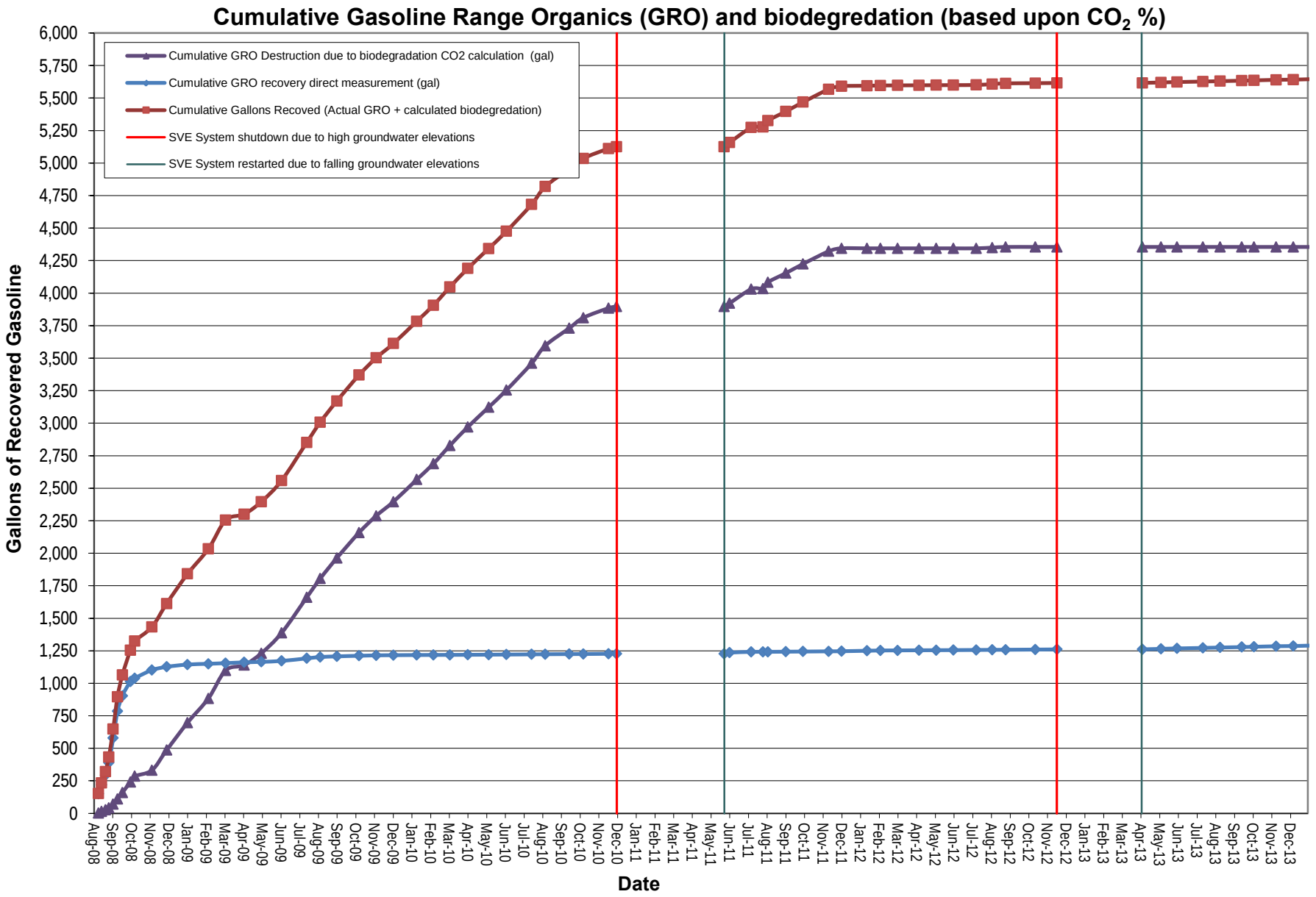


Figure 20 - Inland SVE System Capture Zone Area Hydrograph
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

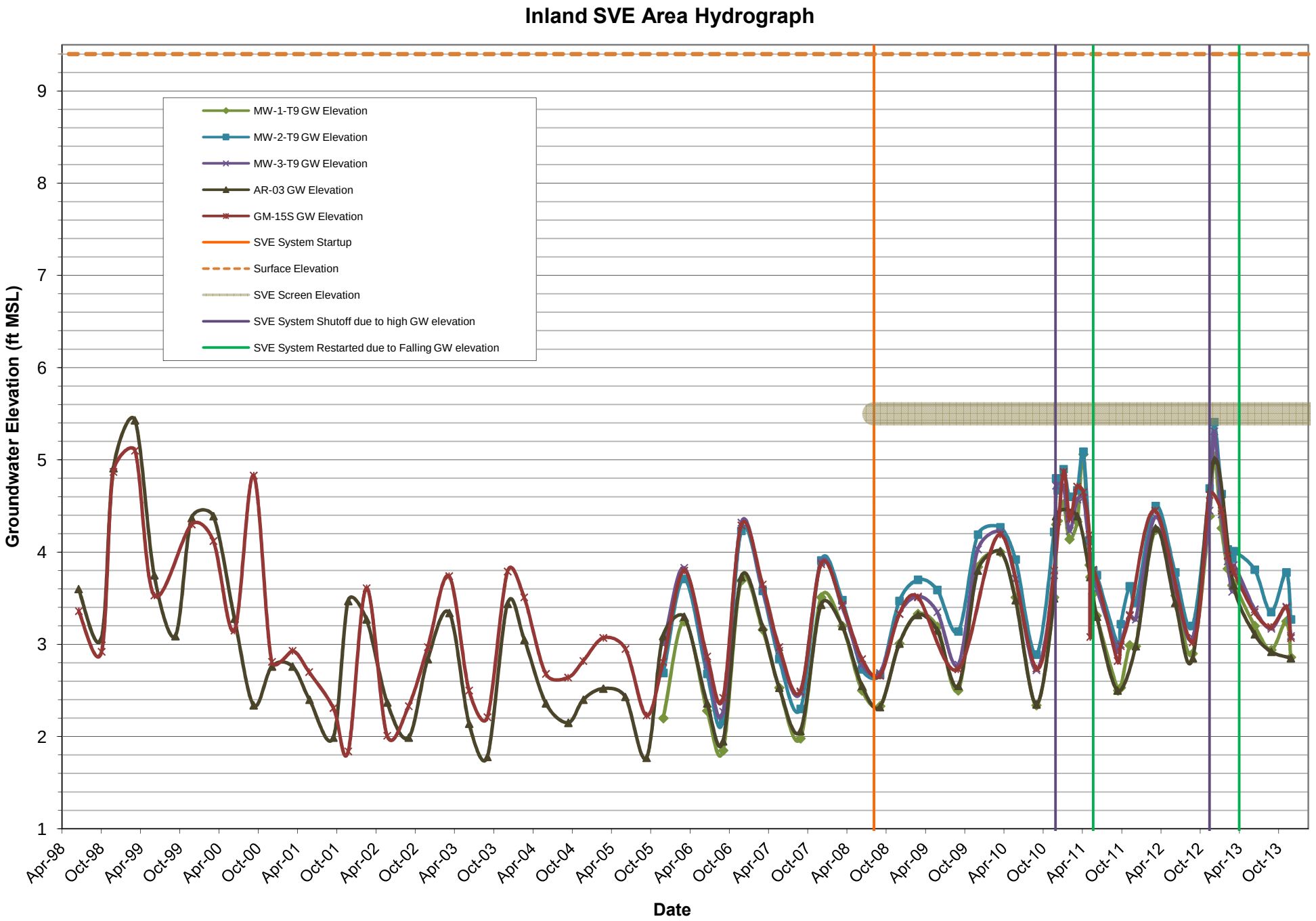


Figure 21. Benzene History from Wells Within Inland SVE System Capture Zone
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington

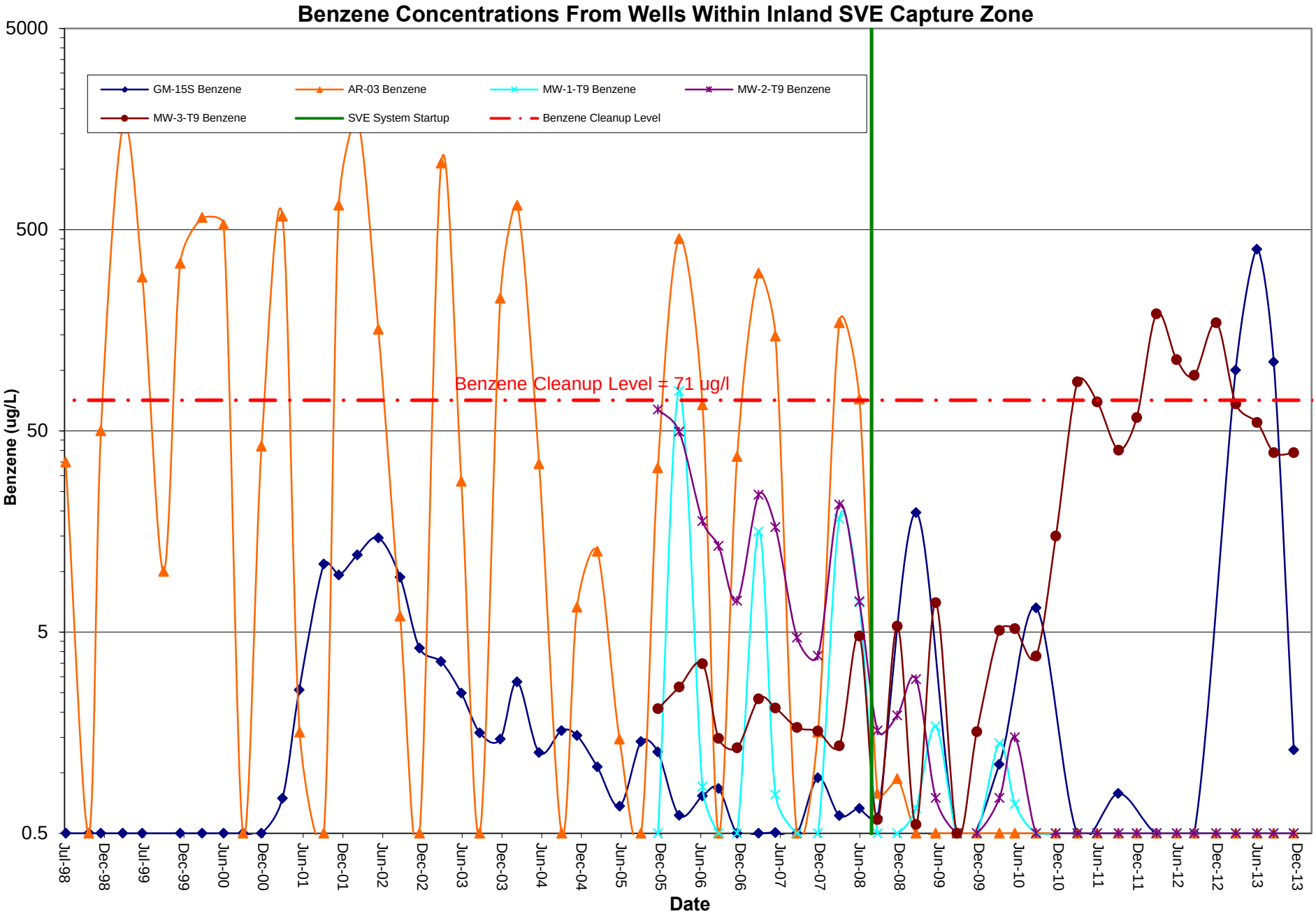
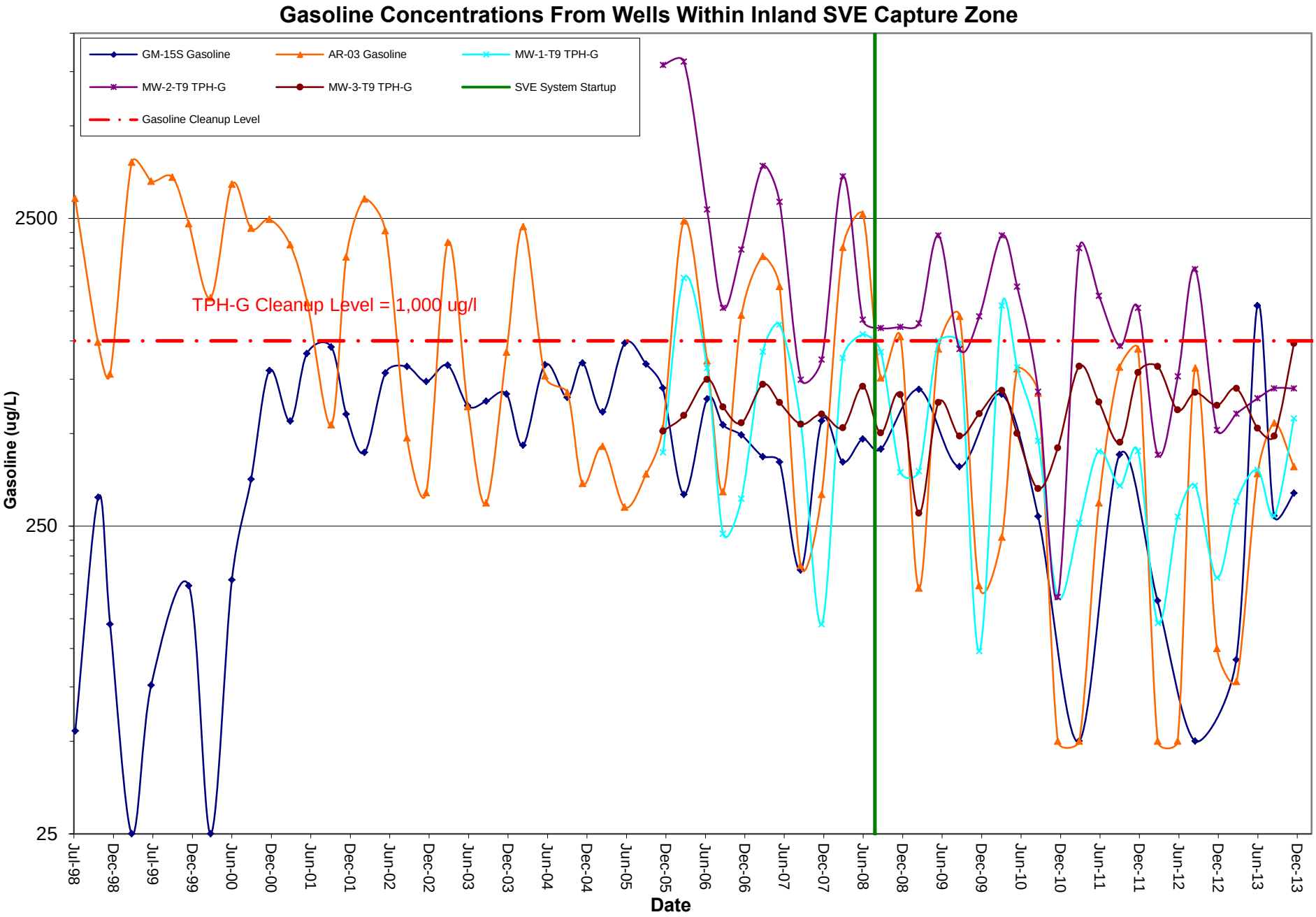
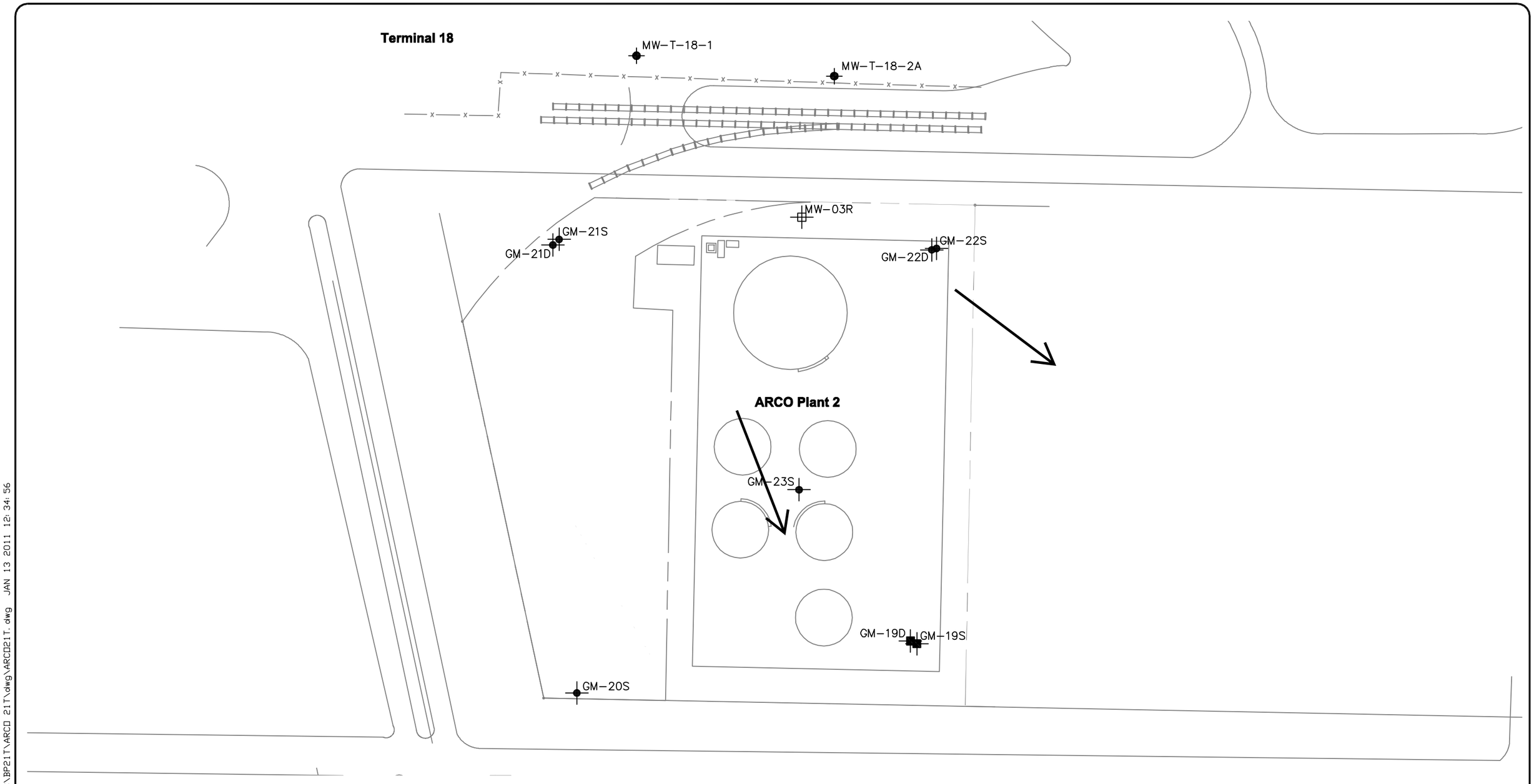


Figure 22. Gasoline History from Wells Within Inland SVE System Capture Zone
BP West Coast Products, Terminal 21T, Harbor Island, Seattle, Washington





LEGEND

- GROUNDWATER MONITORING WELL
- PRODUCT PERFORMANCE WELL
- PERFORMANCE WELL

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore WA 98028
(425) 402-8277 FAX (425) 402-7917

Plant 2 Monitoring Well Network

BP West Coast Products Terminal 21T
2406 13th Avenue SW
Seattle, WA 98134

FIGURE

23

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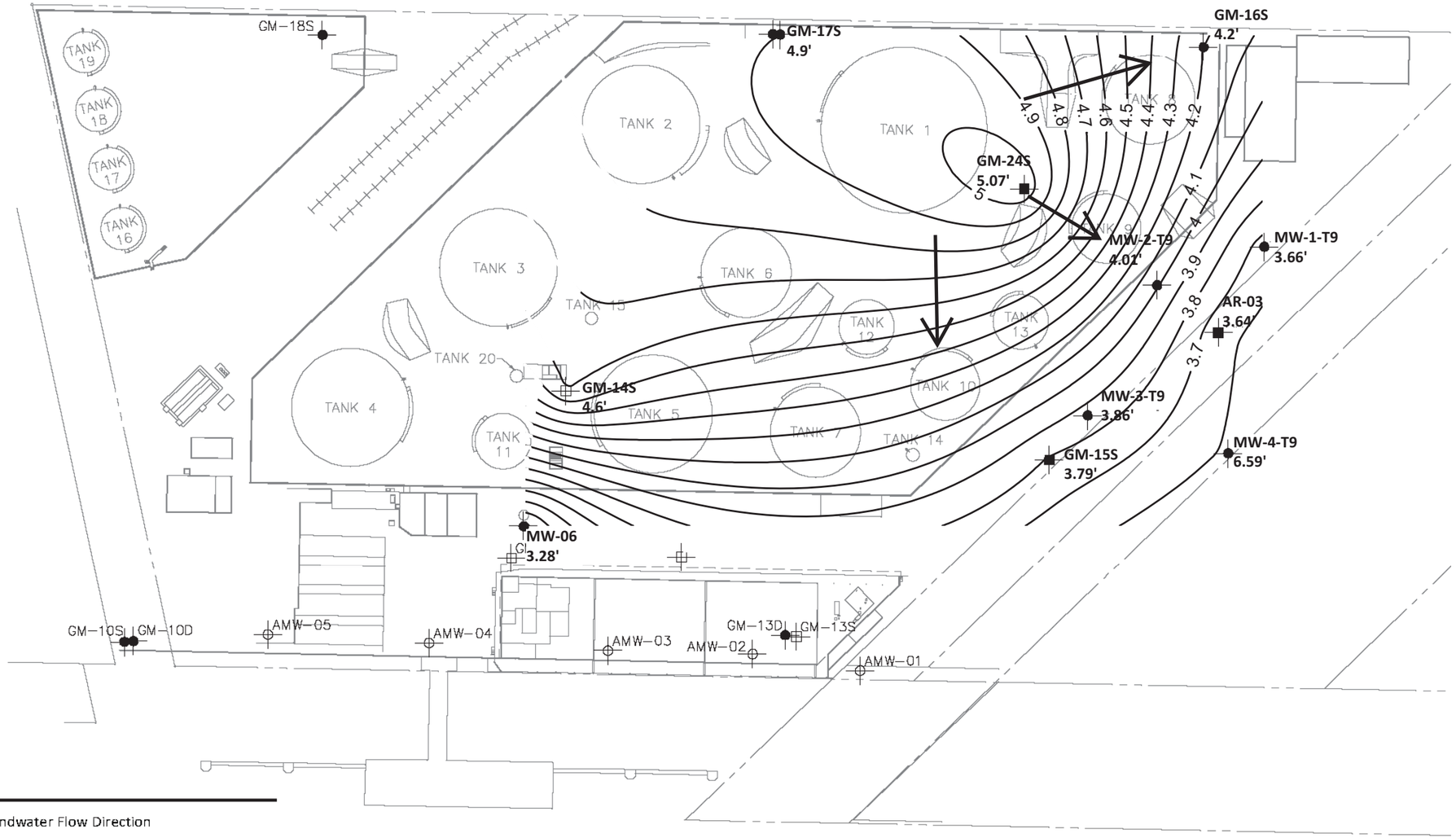

LEGEND

- Groundwater Flow Direction
- 3.2' — Groundwater Contour Interval (Feet Above Mean Sea Level)
- GM–16S — Monitoring Well
- AMW–01 — Performance/Confirmation Well
- GM–13D — Performance Well
- GM–13S — Product Performance Well

N

0 50 100
SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore WA 98028
(425) 402-8277 FAX (425) 402-7917

First Quarter 2013 Groundwater Elevation Map

BP West Coast Products Terminal 21T
1652 Southwest Lander Street
Seattle, WA 98134

FIGURE
24

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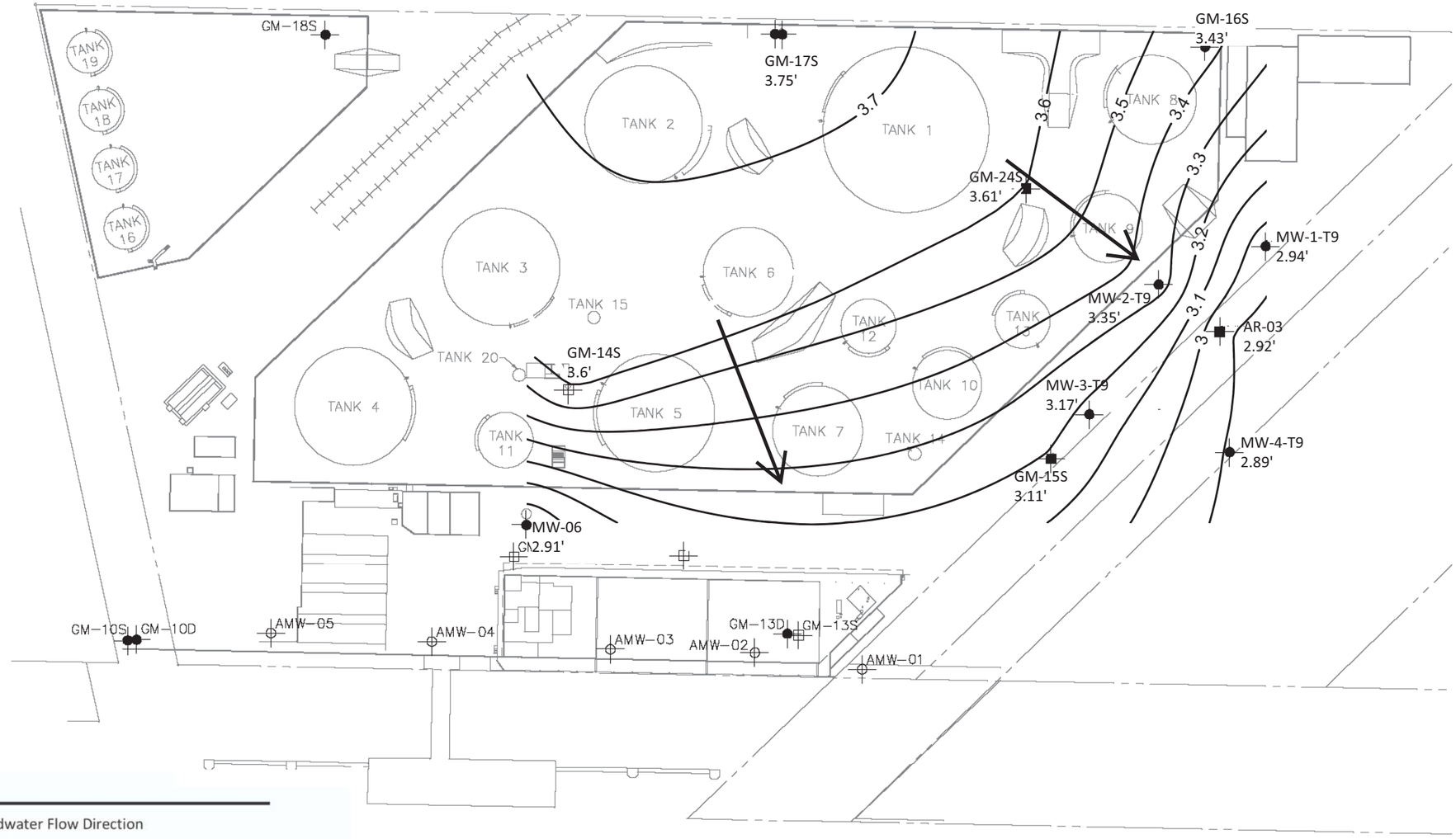

LEGEND

- Groundwater Flow Direction
- 3.2' Groundwater Contour Interval (Feet Above Mean Sea Level)
- GM-16S Monitoring Well
- AMW-01 Performance/Confirmation Wel
- GM-13D Performance Well
- GM-13S Product Performance Well

N

0 50 100

SCALE IN FEET

TECHSOLVE ENVIRONMENTAL
7518 NE 169th Street, Kenmore WA 98028
(425) 402-8277 FAX (425) 402-7917

Third Quarter 2013 Groundwater Elevation Map

BP West Coast Products Terminal 21T
1652 SW Lander Street
Seattle,WA 98134

FIGURE **25**

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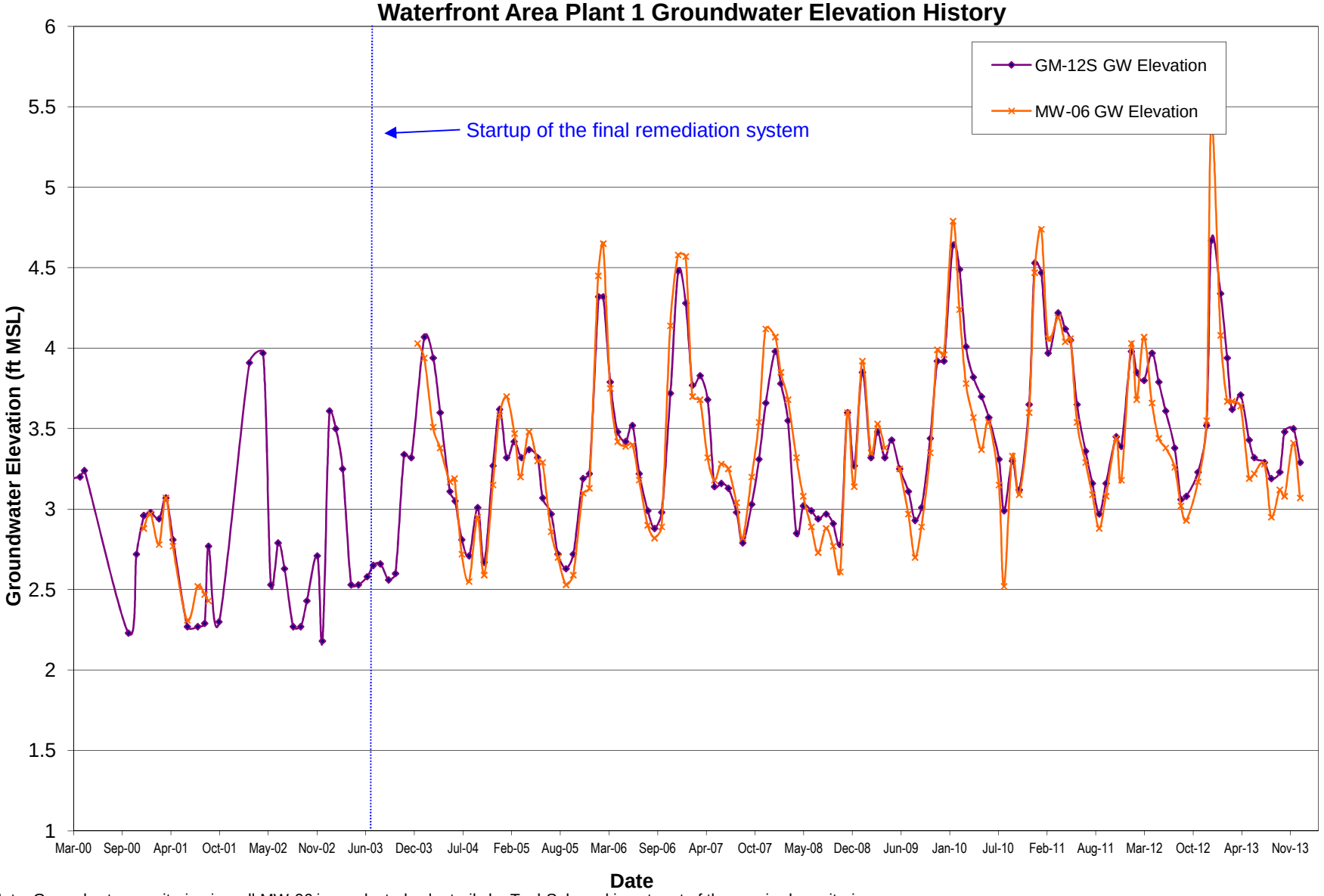
Figure 26. Plant 1 Waterfront Hydrograph
March 2000 through December 2013
BP West Coast Products Terminal 21T, Harbor Island, Seattle, Washington



Note: Groundwater monitoring in well MW-06 is conducted voluntarily by TechSolv and is not part of the required monitoring program.

APPENDIX A

Discharge Monitoring Reports and Data

Industrial Waste Semi-Annual Self-Monitoring Report

King County

Mail or FAX to: King County Industrial Waste
130 Nickerson Street, Suite 200
Seattle, WA 98109-1658
Phone 206-263-3000 / FAX 206-263-3001

Company Name: BP West Coast Products LLC (co TechSolve)

This form is available at www.kingcounty.gov/industrialwaste.

Please specify year: **2013** **Semi-Annual Report for Semester 1** **Sample Site No.:** A43262 **Permit/DA No.:** 7592-04

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Benzene	Toluene	Ethyl-benzene	Silver	Arsenic	Cadmium	Non-polar fats, oils & grease (FOG) (Record average of 3 grabs only)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
Semester 1	Jan/23	G	0.00051	<0.0005	<0.0005				TPH-D – 1.1 TPH-O – <0.45	2,300	105,630
	Feb/21	G	<0.0005	<0.0005	<0.0005				TPH-D – 0.87 TPH-O – <0.5	1,620	60,940
	Mar/13	G	0.00051	<0.0005	<0.0005				TPH-D – 2.5 TPH-O – <0.5	2,120	39,280
	Apr/17	G & C for FOG	<0.0005	<0.0005	<0.0005	<0.004	<0.01	<0.001	<2.5 [TPH (1664A)]	1,520	57,920
	May/22	G	<0.0005	<0.0005	<0.0005				TPH-D – 1.3 TPH-O – <0.49	1,400	55,980
	Jun/12	G	<0.0005	<0.0005	<0.0005				TPH-D – 0.8 TPH-O – <0.5	1,770	40,960

—► Total Volume Semester 1: 360,710 gallons

—► Maximum daily flow from Semester 1: **4,310 gallons.** Date on which maximum daily flow occurred: **1/9/2013**

NOTES: **Page 1 of 2. Daily discharge volumes reported based upon flowmeter readings sent from telemetry unit. All analyses referenced in this report were performed by ALS's Kelso Washington Laboratory. All laboratory reports are retained by TechSolve Environmental, Inc..**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

6/28/2013
Date

Signature of Principal Executive or Authorized Agent

Due Date: Semi-annual report for Semester 1 is due by July 15 of each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least 3 years.

Industrial Waste Semi-Annual Self-Monitoring Report

King County

Mail or FAX to: King County Industrial Waste
130 Nickerson Street, Suite 200
Seattle, WA 98109-1658
Phone 206-263-3000 / FAX 206-263-3001

Company Name: BP West Coast Products LLC (co TechSolve)

This form is available at www.kingcounty.gov/industrialwaste.

Please specify year: **2013** **Semi-Annual Report for Semester 1** **Sample Site No.:** A43262 **Permit/DA No.:** 7592-04

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Chromium	Copper	Mercury	Nickel	Lead	Zinc	Cyanide	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
Semester 1	Jan/23	G								2,300	105,630
	Feb/21	G								1,620	60,940
	Mar/13	G								2,120	39,280
	Apr/17	G & C for FOG	<0.004	0.0199	<0.0002	<0.004	<0.01	0.0625	0.013	1,520	57,920
	May/22	G								1,400	55,980
	Jun/12	G								1,770	40,960

—► Total Volume Semester 1: 360,710 gallons

—► Maximum daily flow from Semester 1: **4,310 gallons.** Date on which maximum daily flow occurred: **1/9/2013**

NOTES: **Page 2 of 2. Daily discharge volumes reported based upon flowmeter readings sent from telemetry unit. All analyses referenced in this report were performed by ALS's Kelso Washington Laboratory. All laboratory reports are retained by TechSolve Environmental, Inc..**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

6/28/2013
Date

Signature of Principal Executive or Authorized Agent

Due Date: Semi-annual report for Semester 1 is due by July 15 of each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least 3 years.

King County

Industrial Waste Semi-Annual Self-Monitoring Report

Mail or FAX to: King County Industrial Waste
130 Nickerson Street, Suite 200
Seattle, WA 98109-1658
Phone 206-263-3000 / FAX 206-263-3001

Company Name: BP West Coast Products LLC (co TechSolve)

This form is available at www.kingcounty.gov/industrialwaste.

Please specify year: **2013** **Semi-Annual Report for Semester 2** **Sample Site No.:** A43262 **Permit/DA No.:** 7592-04

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Benzene	Toluene	Ethyl-benzene	Silver	Arsenic	Cadmium	Non-polar fats, oils & grease (FOG) (Record average of 3 grabs only)	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
Semester 2	Jul/23	G	<0.0005	<0.0005	<0.0005				TPH-D – 2.5 TPH-O – <0..5	1,940	72,400
	Aug/20	G	<0.0005	<0.0005	<0.0005				TPH-D – 1.6 TPH-O – <0.49	1,790	51,340
	Sep/24	G	<0.0005	<0.0005	<0.0005				TPH-D – <0.25 TPH-O – <0.5	1,020	64,450
	Oct/14	G	<0.0005	<0.0005	<0.0005				TPH-D – <0.13 TPH-O – <0.25	1,140	28,220
	Nov/20	G & C for FOG	<0.0005	<0.0005	<0.0005	0.00006	0.004	0.00002	<5.0 [TPH (1664A)]	2,290	64,050
	Dec/17	G	<0.001	<0.001	<0.001				TPH-D – 1.5 TPH-O – 0.12	1,580	59,280

—► Total Volume Semester 2: 339,740 gallons

—► Maximum daily flow from Semester 2: **2,770 gallons.** Date on which maximum daily flow occurred: **12/3/2013**

NOTES: **Page 1 of 2. Daily discharge volumes reported based upon flowmeter readings sent from telemetry unit. All analyses referenced in this report were performed by ALS's Kelso Washington Laboratory and Test America's Tacoma Laboratory. All laboratory reports are retained by TechSolve Environmental, Inc.**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

1/3/2014
Date

Signature of Principal Executive or Authorized Agent

Due Date: Semi-annual report for Semester 2 is due by January 15 of each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least 3 years.

King County

Industrial Waste Semi-Annual Self-Monitoring Report

Mail or FAX to: King County Industrial Waste
130 Nickerson Street, Suite 200
Seattle, WA 98109-1658
Phone 206-263-3000 / FAX 206-263-3001

Company Name: BP West Coast Products LLC (co TechSolve)

This form is available at www.kingcounty.gov/industrialwaste.

Please specify year: **2013** **Semi-Annual Report for Semester 2** **Sample Site No.:** A43262 **Permit/DA No.:** 7592-04

All units are mg/l unless otherwise noted. Note: Write in self-monitoring parameters, if not provided, e.g. Silver (Ag) or settleable solids (ml/L).

	Sample Date month/day	Sample Type C (Composite) G (Grab) BC (Batch)	Chromium	Copper	Mercury	Nickel	Lead	Zinc	Cyanide	Discharge Volume on sample day (gallons)	Total Monthly Flow (gallons)
Semester 2	Jul/23	G								1,940	72,400
	Aug/20	G								1,790	51,340
	Sep/24	G								1,020	64,450
	Oct/14	G								1,140	28,220
	Nov/20	G & C for FOG	0.001	0.0086	<0.0002	0.0043	0.0009	0.0314	<0.010	2,290	64,050
	Dec/17	G								1,580	59,280

—► Total Volume Semester 2: 339,740 gallons

—► Maximum daily flow from Semester 2: 2,770 gallons. Date on which maximum daily flow occurred: 12/3/2013

NOTES: **Page 2 of 2. Daily discharge volumes reported based upon flowmeter readings sent from telemetry unit. All analyses referenced in this report were performed by ALS's Kelso Washington Laboratory and Test America's Tacoma Laboratory. All laboratory reports are retained by TechSolve Environmental, Inc.**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further certify that all data requiring a laboratory analysis were analyzed by a Washington State Department of Ecology accredited laboratory for each parameter tested.

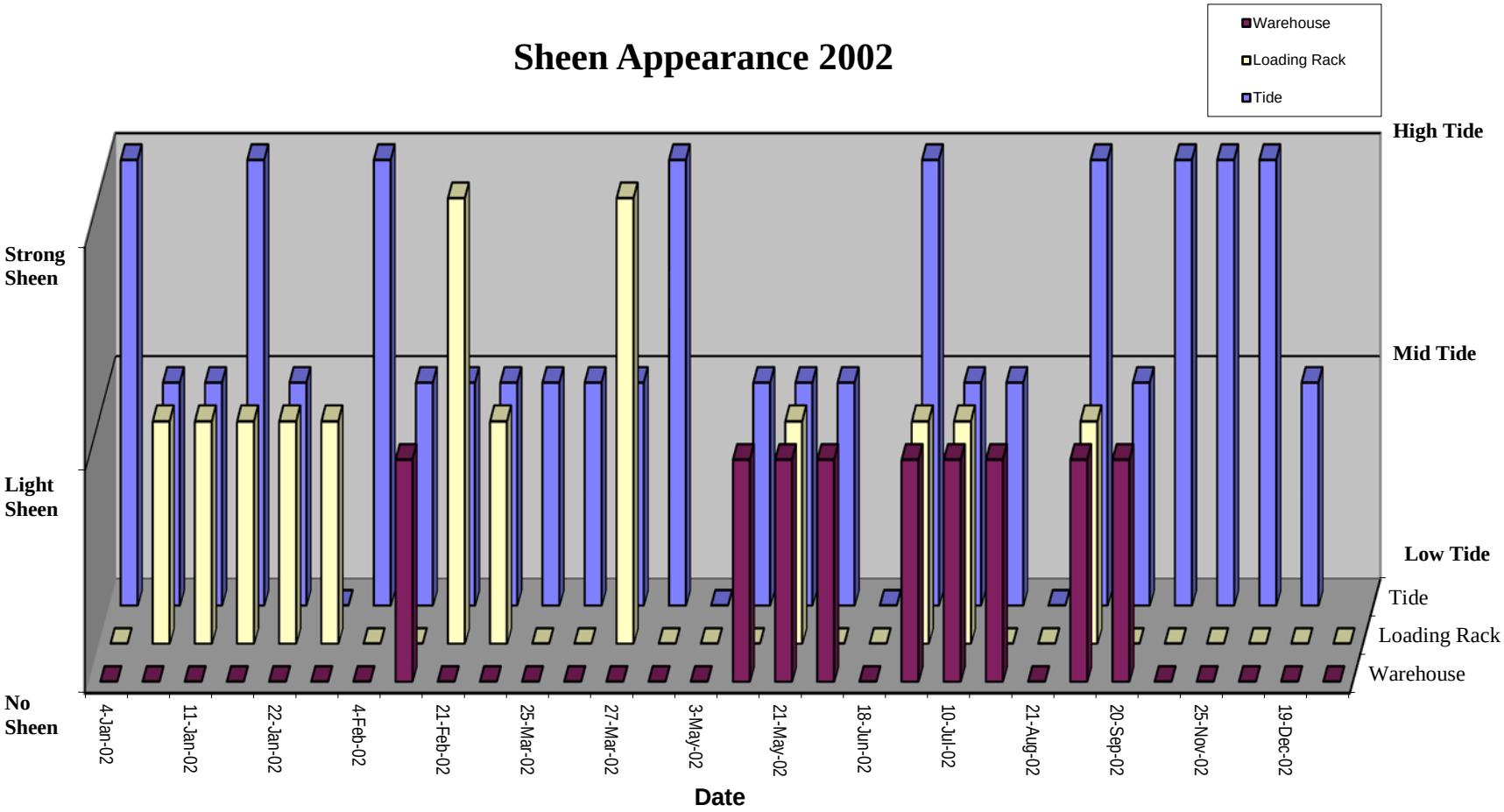
1/3/2014
Date

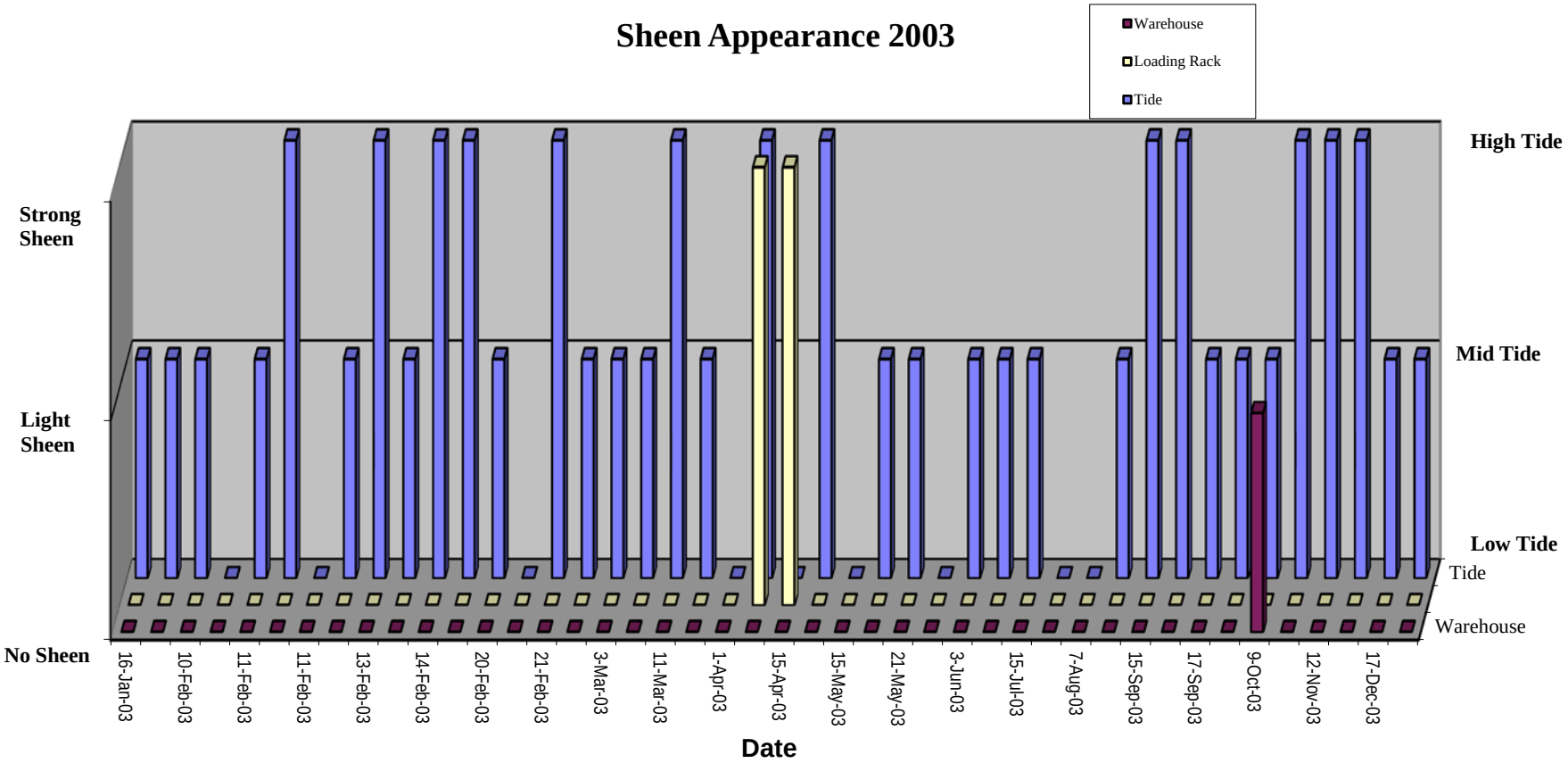
Signature of Principal Executive or Authorized Agent

Due Date: Semi-annual report for Semester 2 is due by January 15 of each year. **Please Note:** Do not include original laboratory reports with this form unless otherwise requested. Keep the original laboratory reports on file and available for inspection for at least 3 years.

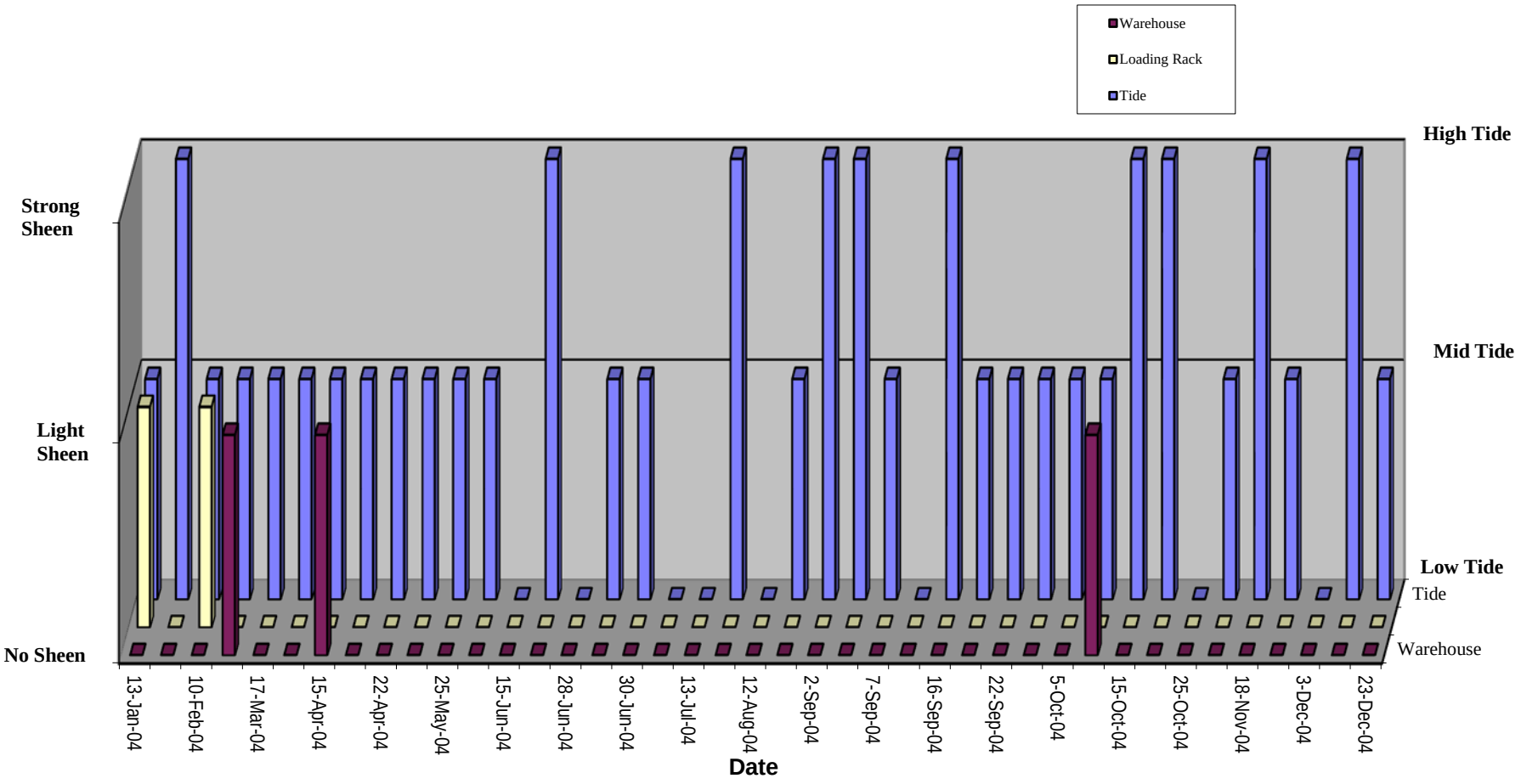
APPENDIX B

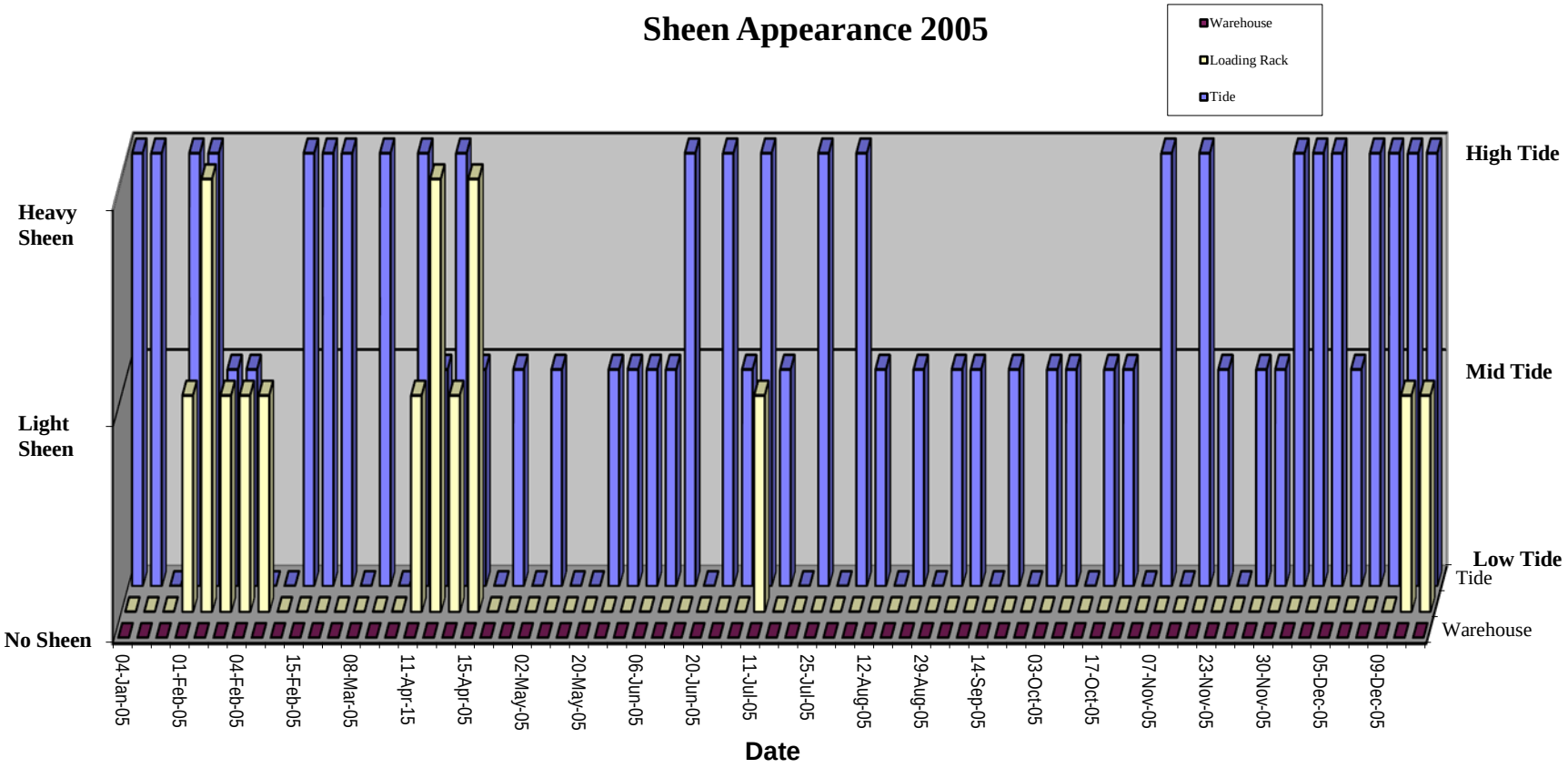
Sheen Observations 2002 Through 2012


Sheen Appearance 2002
Warehouse
Loading Rack
Tide
High Tide
Mid Tide
Low Tide
Strong Sheen
Light Sheen
No Sheen
Tide
Loading Rack
Warehouse
4-Jan-02
11-Jan-02
22-Jan-02
4-Feb-02
21-Feb-02
25-Mar-02
27-Mar-02
3-May-02
21-May-02
18-Jun-02
10-Jul-02
21-Aug-02
20-Sep-02
25-Nov-02
19-Dec-02
Date

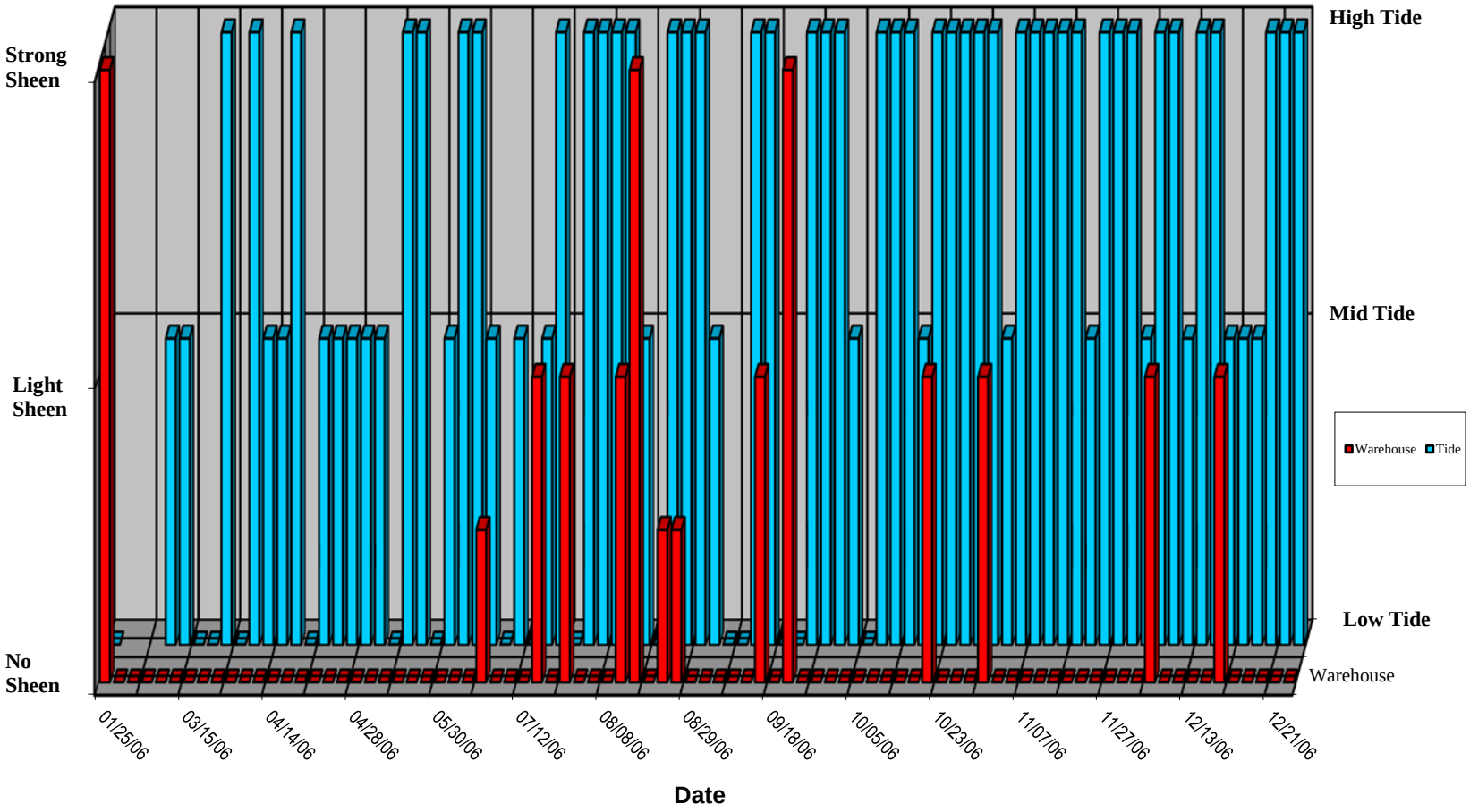

Sheen Appearance 2003
Warehouse
Loading Rack
Tide
High Tide
Mid Tide
Low Tide
Strong Sheen
Light Sheen
No Sheen
Tide
Warehouse
16-Jan-03
10-Feb-03
11-Feb-03
11-Feb-03
13-Feb-03
14-Feb-03
20-Feb-03
21-Feb-03
3-Mar-03
11-Mar-03
1-Apr-03
15-Apr-03
15-May-03
21-May-03
3-Jun-03
15-Jul-03
7-Aug-03
15-Sep-03
17-Sep-03
9-Oct-03
12-Nov-03
17-Dec-03
Date

Sheen Appearance 2004

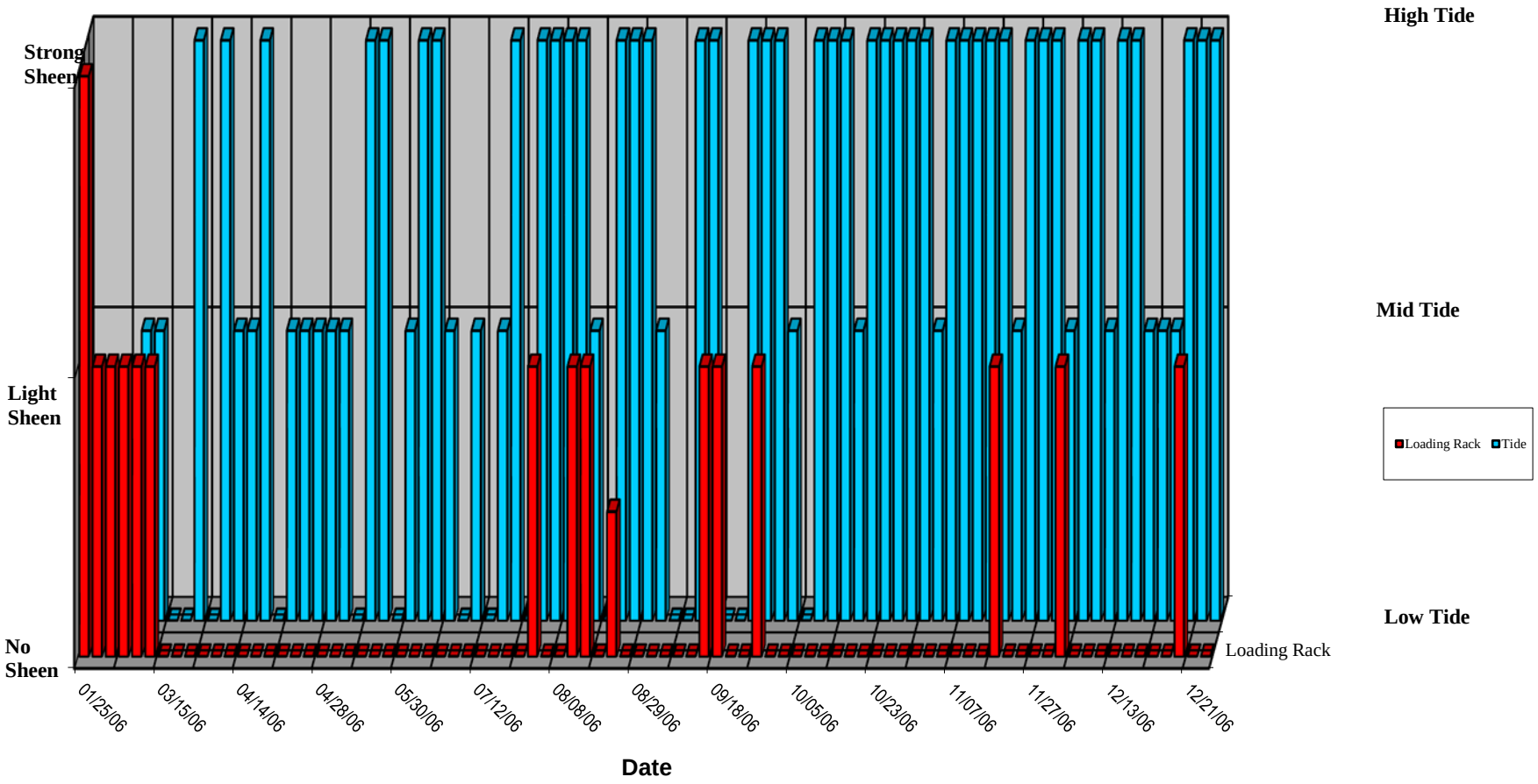


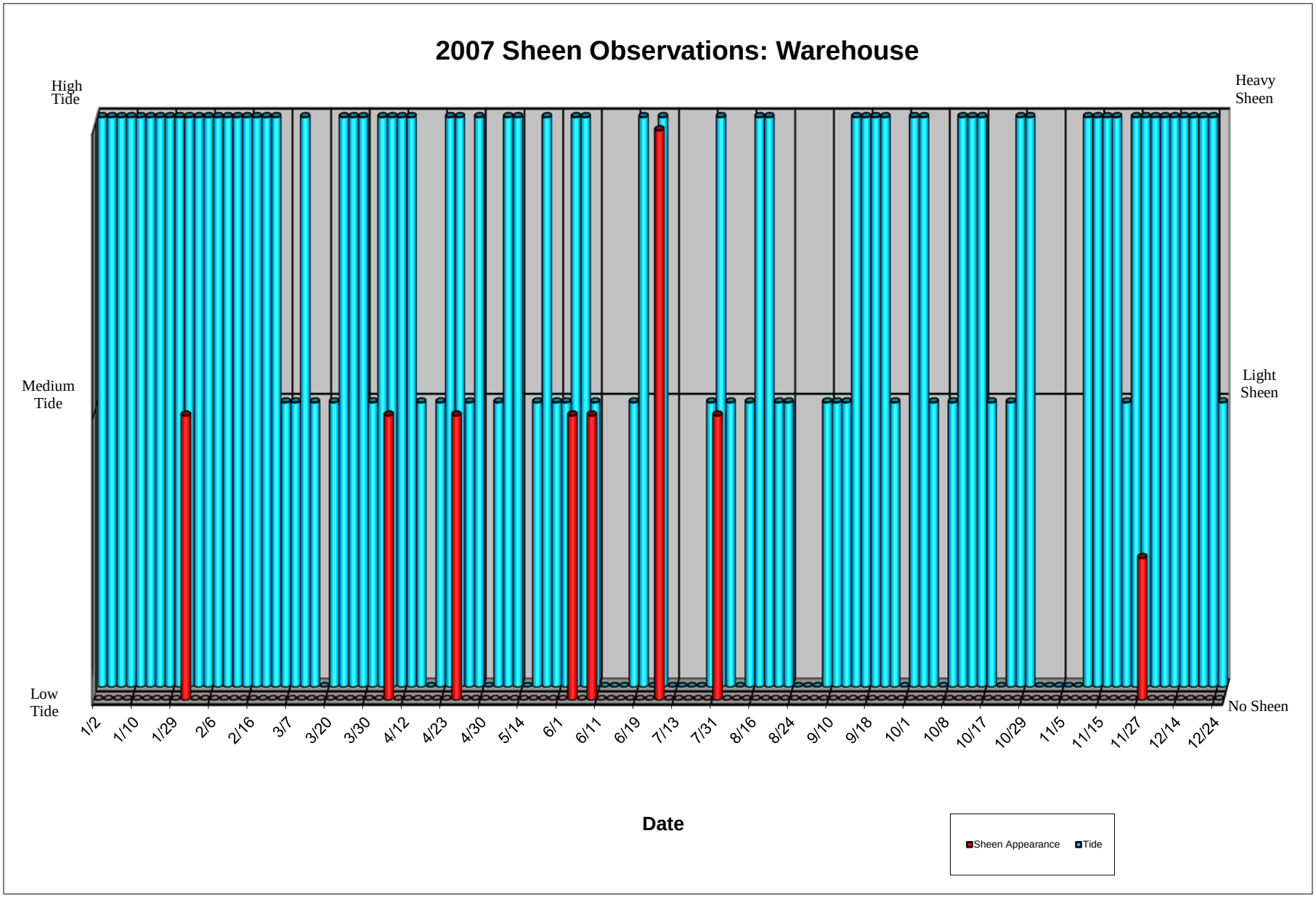

Sheen Appearance 2005
Warehouse
Loading Rack
Tide
High Tide
Mid Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
Tide
Warehouse
04-Jan-05
01-Feb-05
04-Feb-05
15-Feb-05
08-Mar-05
11-Apr-15
15-Apr-05
02-May-05
20-May-05
06-Jun-05
20-Jun-05
11-Jul-05
25-Jul-05
12-Aug-05
29-Aug-05
14-Sep-05
03-Oct-05
17-Oct-05
07-Nov-05
23-Nov-05
30-Nov-05
05-Dec-05
09-Dec-05
Date

Sheen Appearance 2006

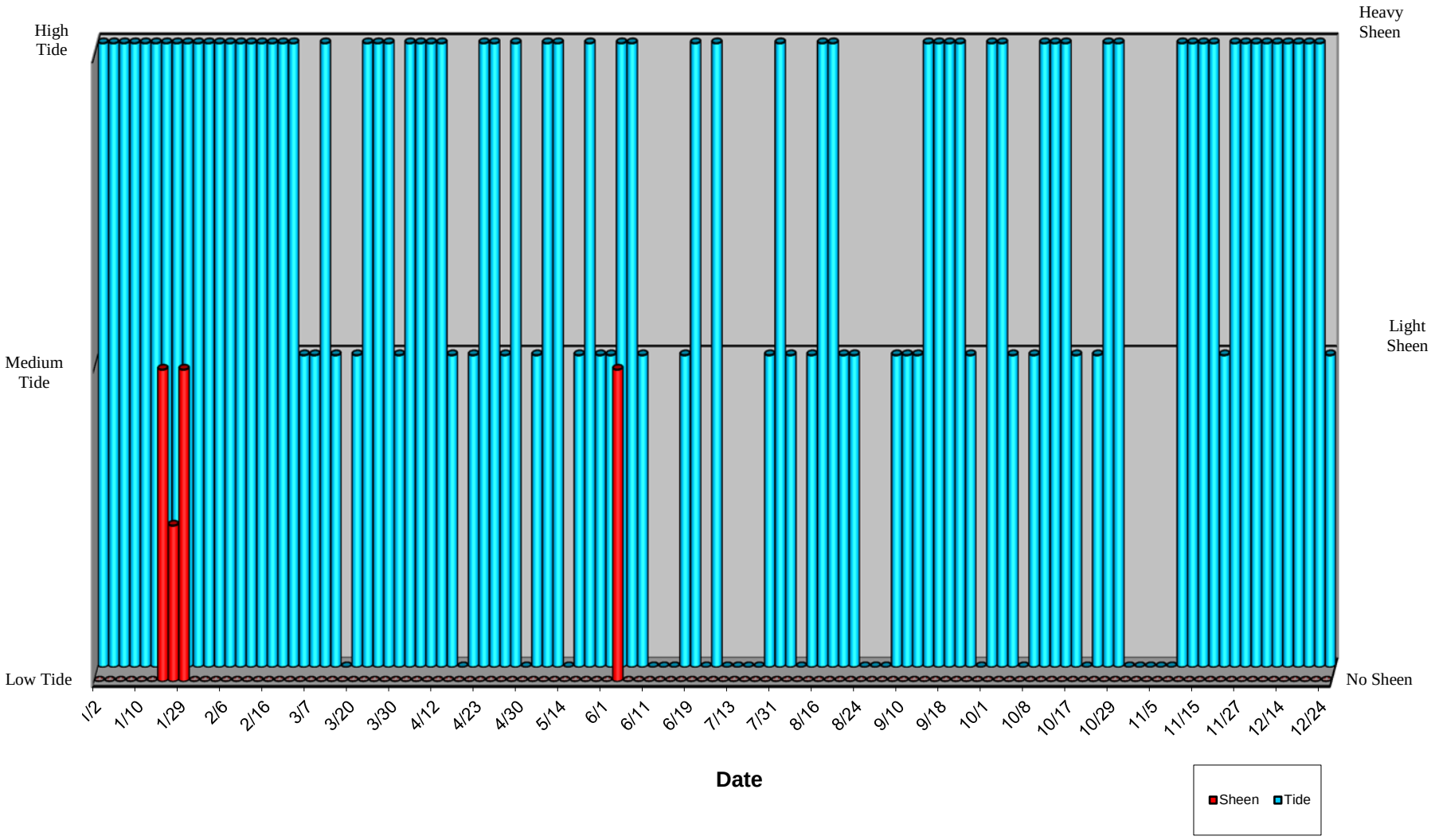


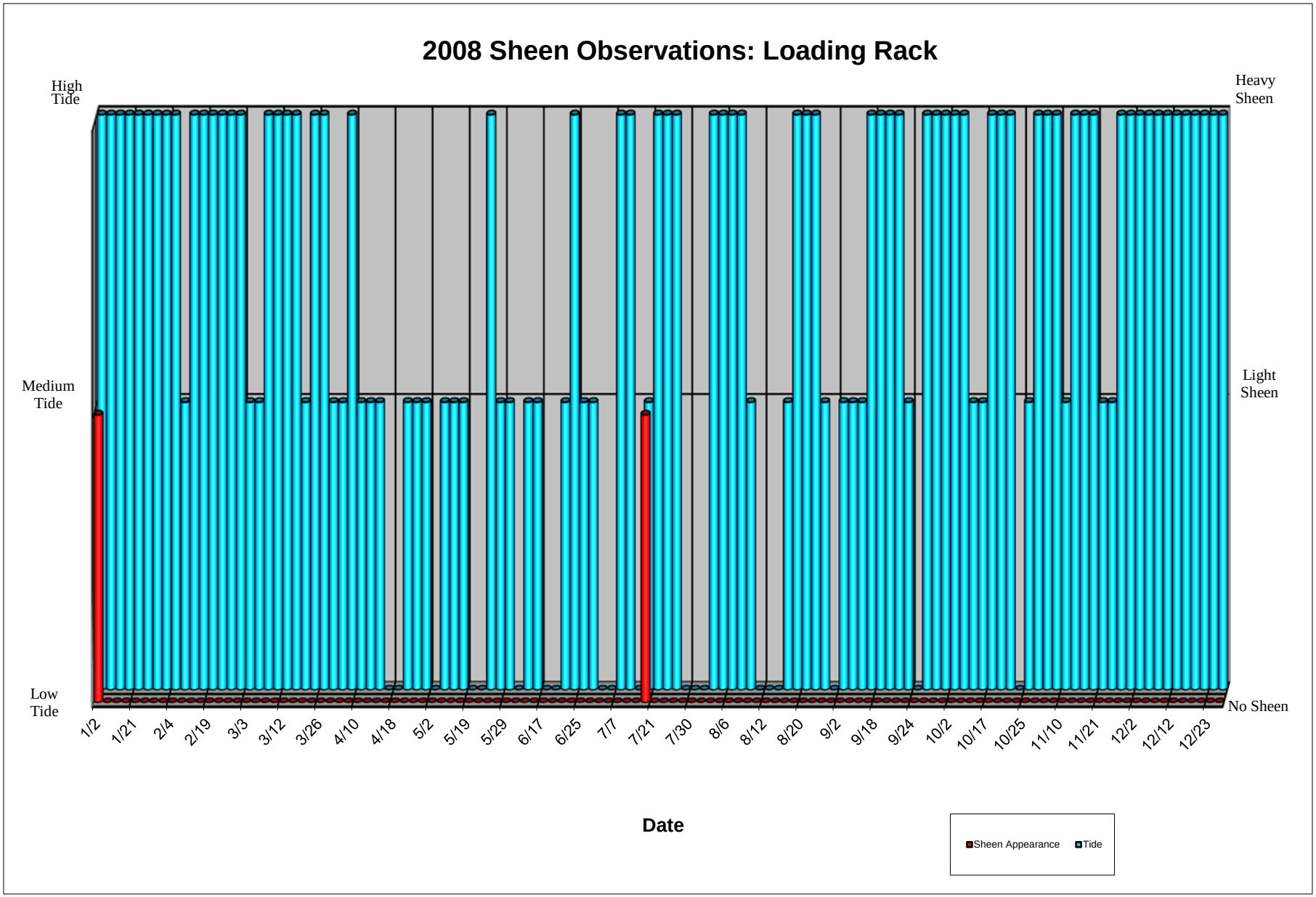
Sheen Appearance 2006

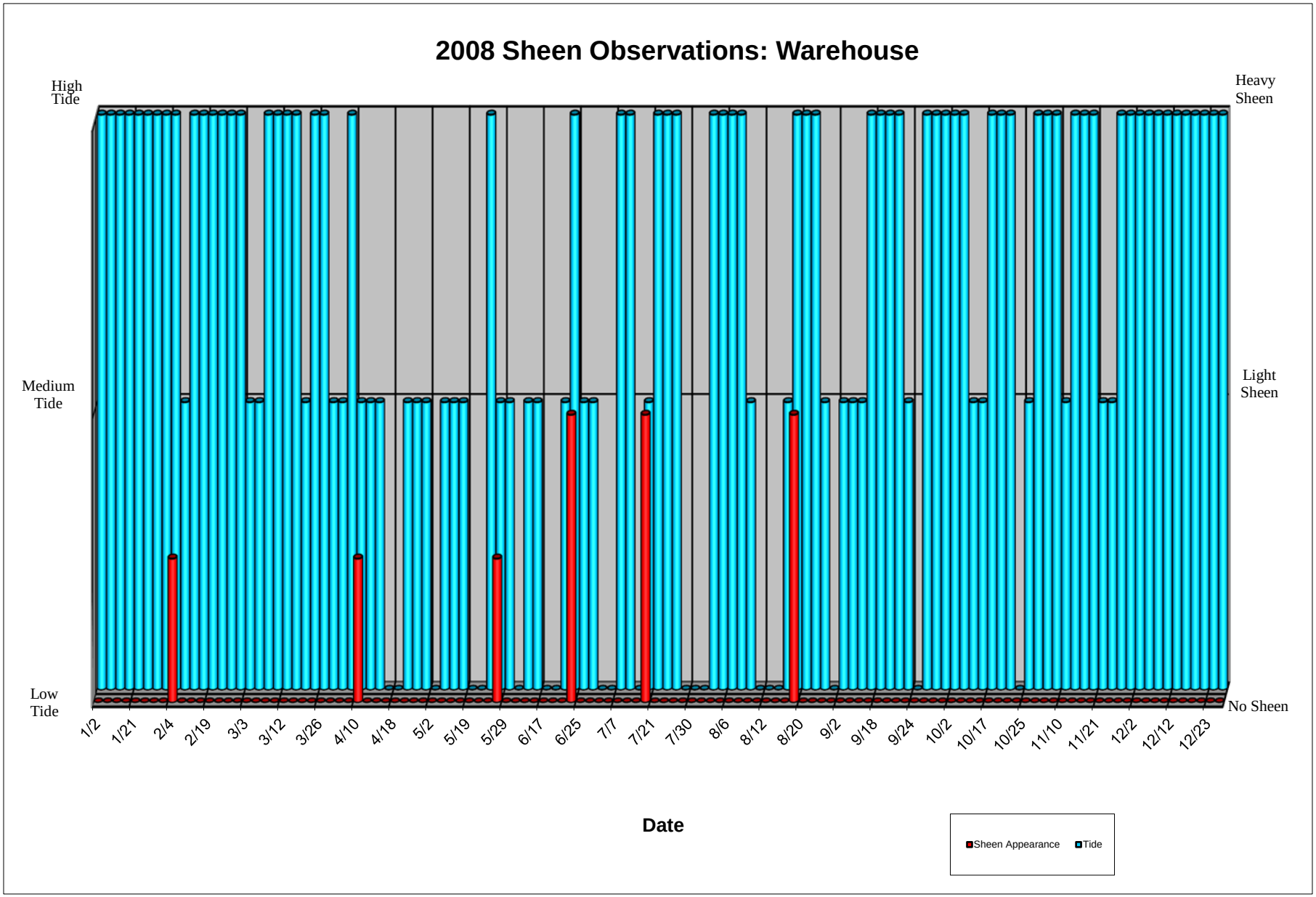


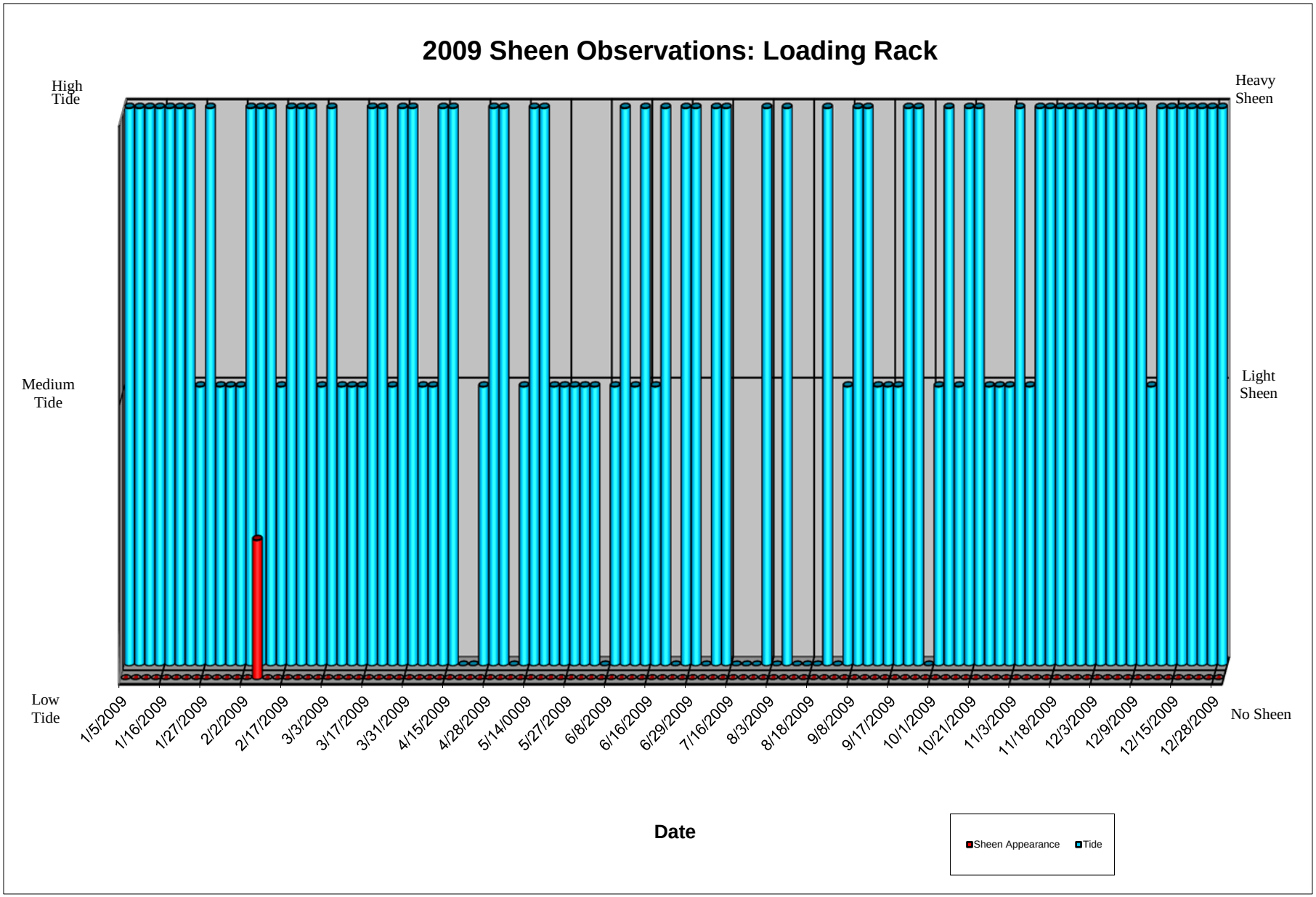

2007 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2
1/10
1/29
2/6
2/16
3/7
3/20
3/30
4/12
4/23
4/30
5/14
6/1
6/11
6/19
7/13
7/31
8/16
8/24
9/10
9/18
10/1
10/8
10/17
10/29
11/5
11/15
11/27
12/14
12/24
Date
Sheen Appearance
Tide

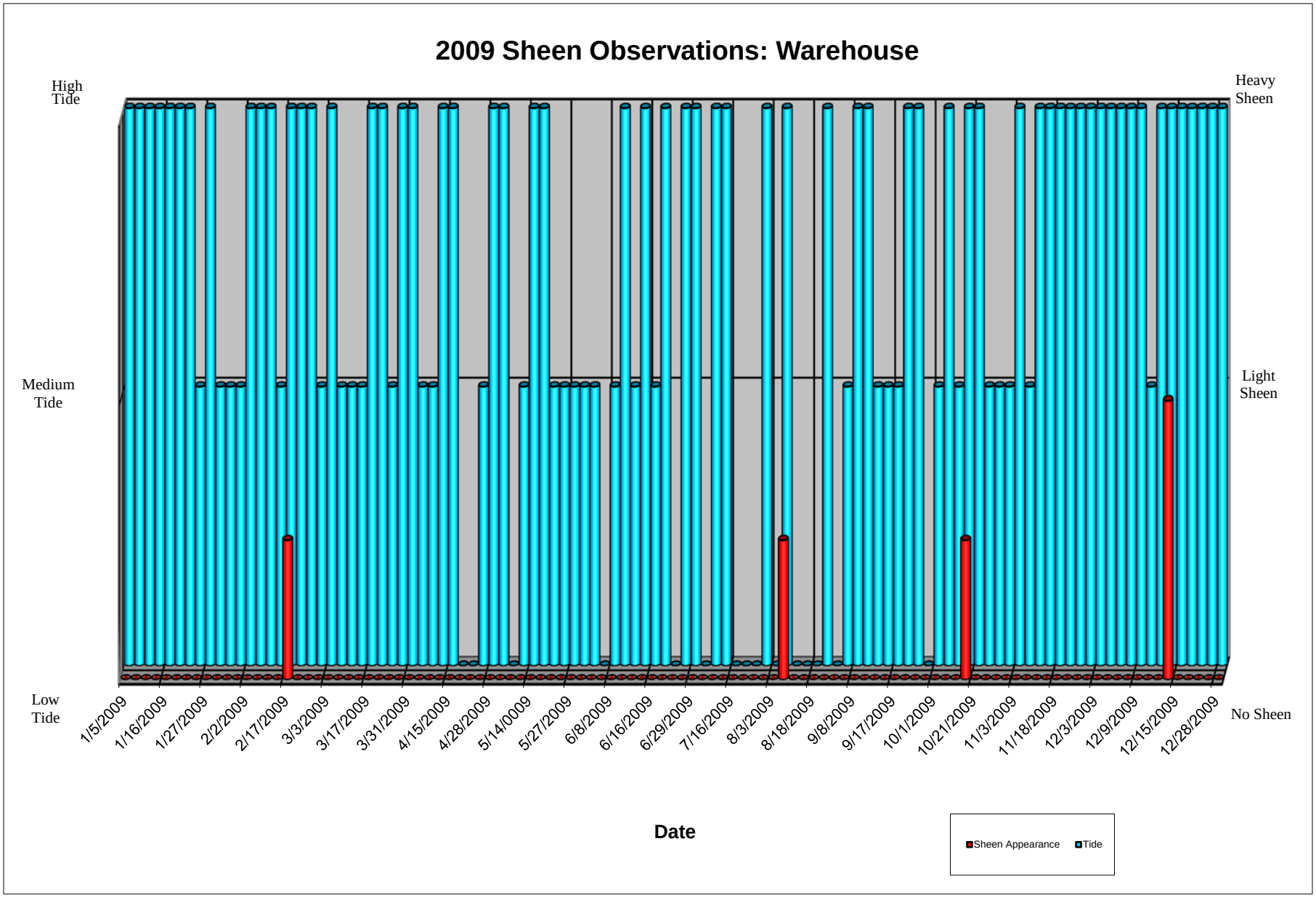
2007 Sheen Observations: Loading Rack



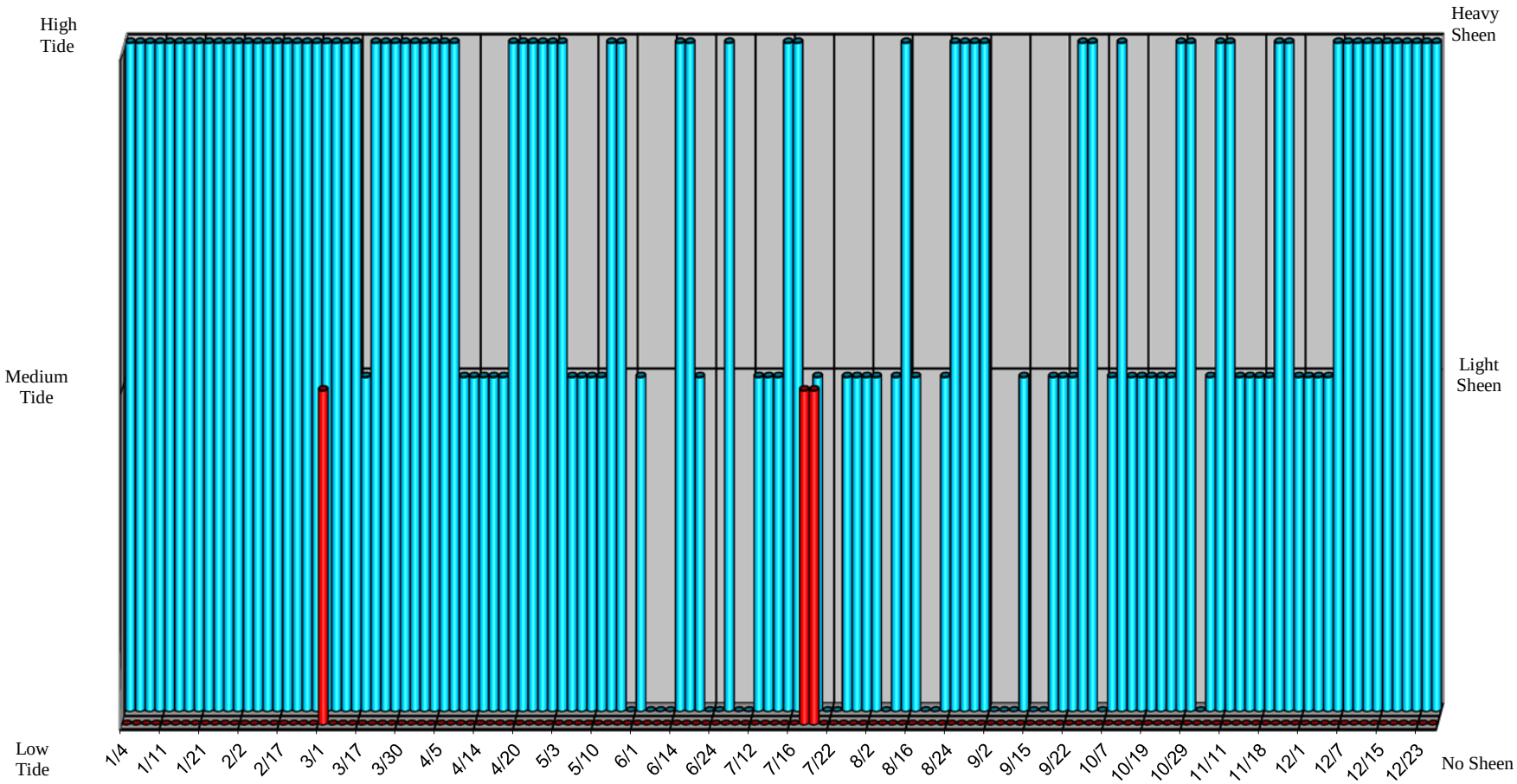

2008 Sheen Observations: Loading Rack
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2
1/21
2/4
2/19
3/3
3/12
3/26
4/10
4/18
5/2
5/19
5/29
6/17
6/25
7/7
7/21
7/30
8/6
8/12
8/20
9/2
9/18
9/24
10/2
10/17
10/25
11/10
11/21
12/2
12/12
12/23
Date
Sheen Appearance
Tide


2008 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/2
1/21
2/4
2/19
3/3
3/12
3/26
4/10
4/18
5/2
5/19
5/29
6/17
6/25
7/7
7/21
7/30
8/6
8/12
8/20
9/2
9/18
9/24
10/2
10/17
10/25
11/10
11/21
12/2
12/12
12/23
Date
Sheen Appearance
Tide

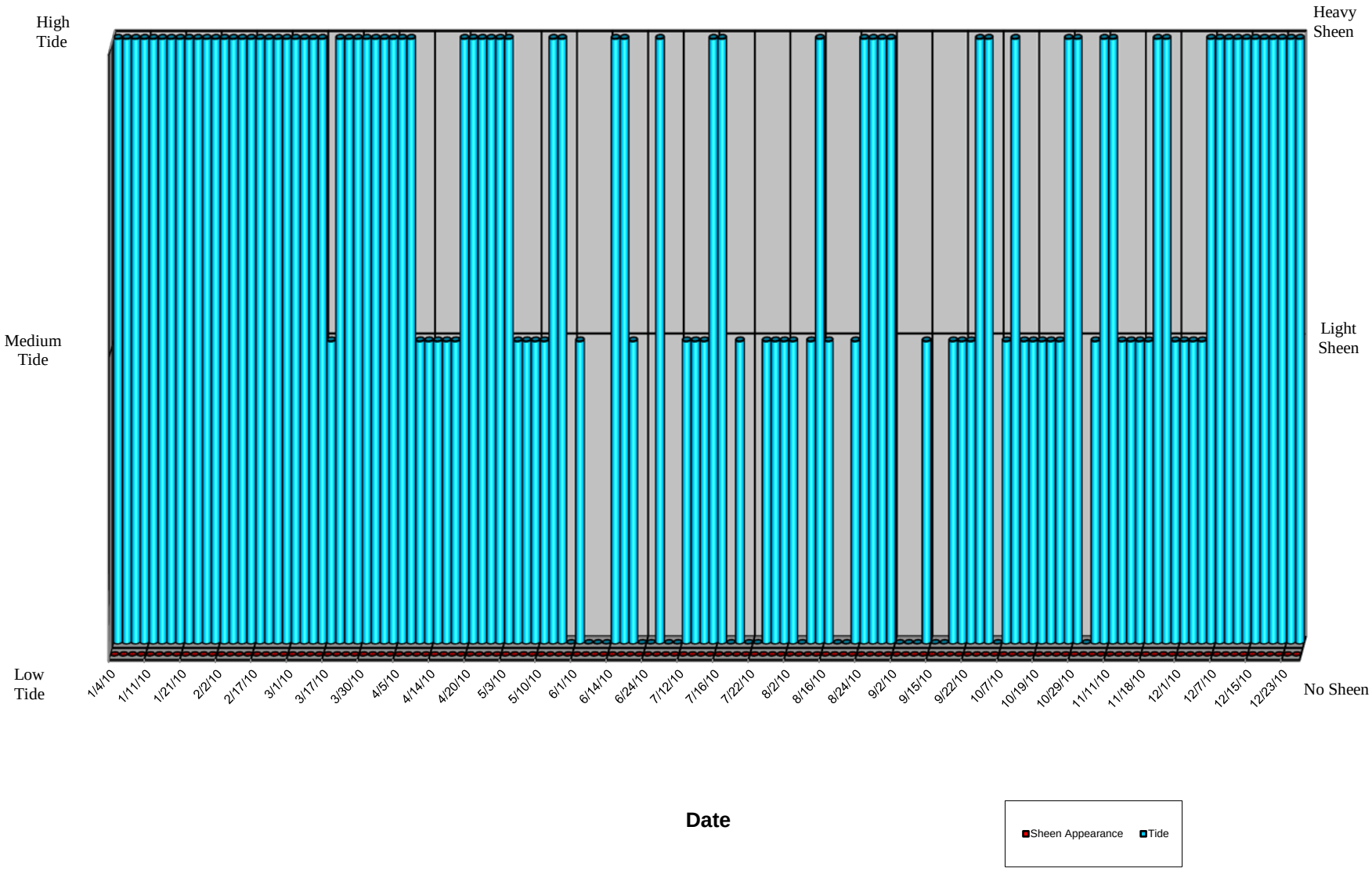

2009 Sheen Observations: Loading Rack
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/5/2009
1/16/2009
1/27/2009
2/2/2009
2/17/2009
3/3/2009
3/17/2009
3/31/2009
4/15/2009
4/28/2009
5/14/0009
5/27/2009
6/8/2009
6/16/2009
6/29/2009
7/16/2009
8/3/2009
8/18/2009
9/8/2009
9/17/2009
10/1/2009
10/21/2009
11/3/2009
11/18/2009
12/3/2009
12/9/2009
12/15/2009
12/28/2009
Date
Sheen Appearance
Tide


2009 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/5/2009
1/16/2009
1/27/2009
2/2/2009
2/17/2009
3/3/2009
3/17/2009
3/31/2009
4/15/2009
4/28/2009
5/14/0009
5/27/2009
6/8/2009
6/16/2009
6/29/2009
7/16/2009
8/3/2009
8/18/2009
9/8/2009
9/17/2009
10/1/2009
10/21/2009
11/3/2009
11/18/2009
12/3/2009
12/9/2009
12/15/2009
12/28/2009
Date
Sheen Appearance
Tide

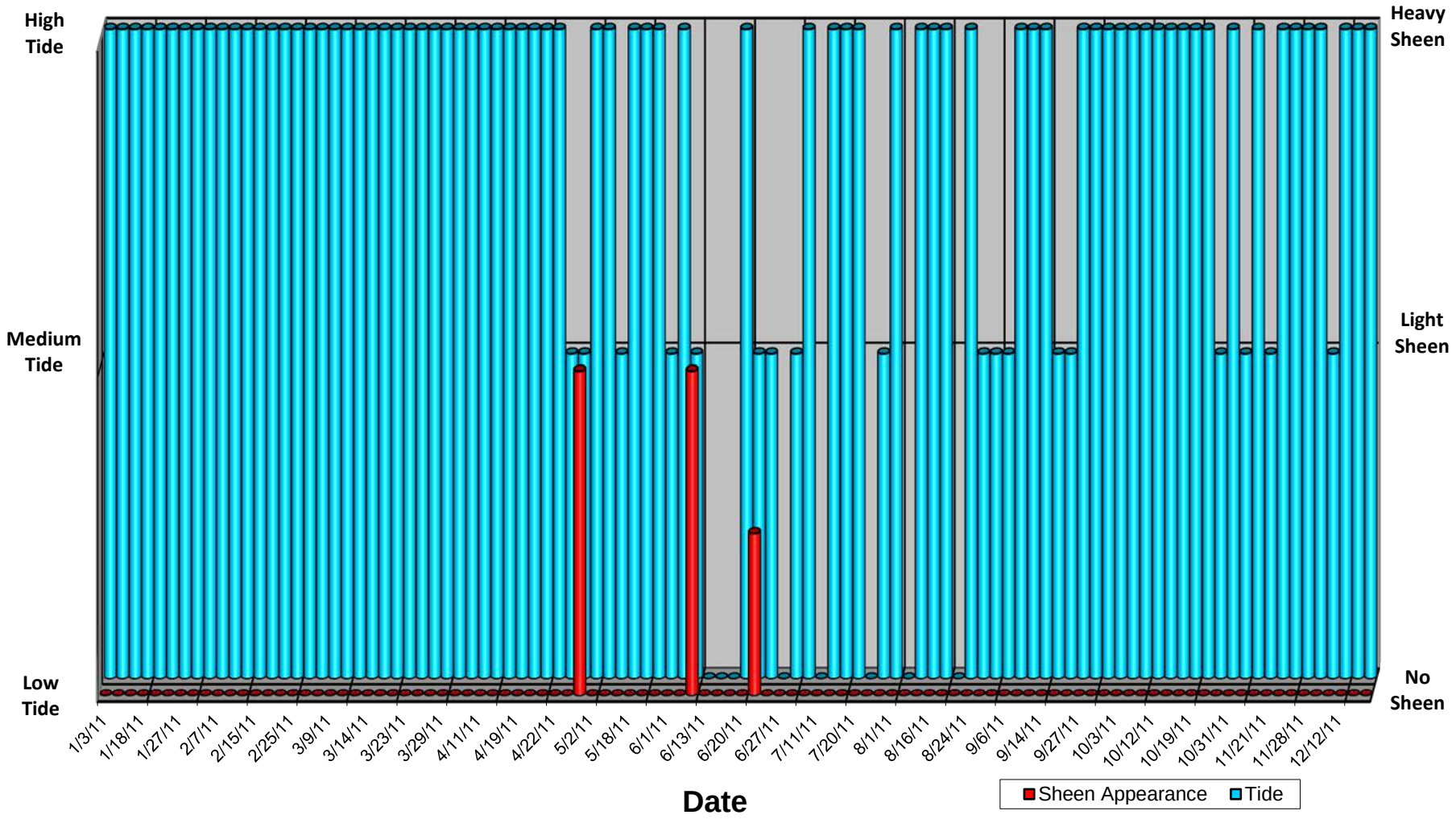
2010 Sheen Observations: Warehouse



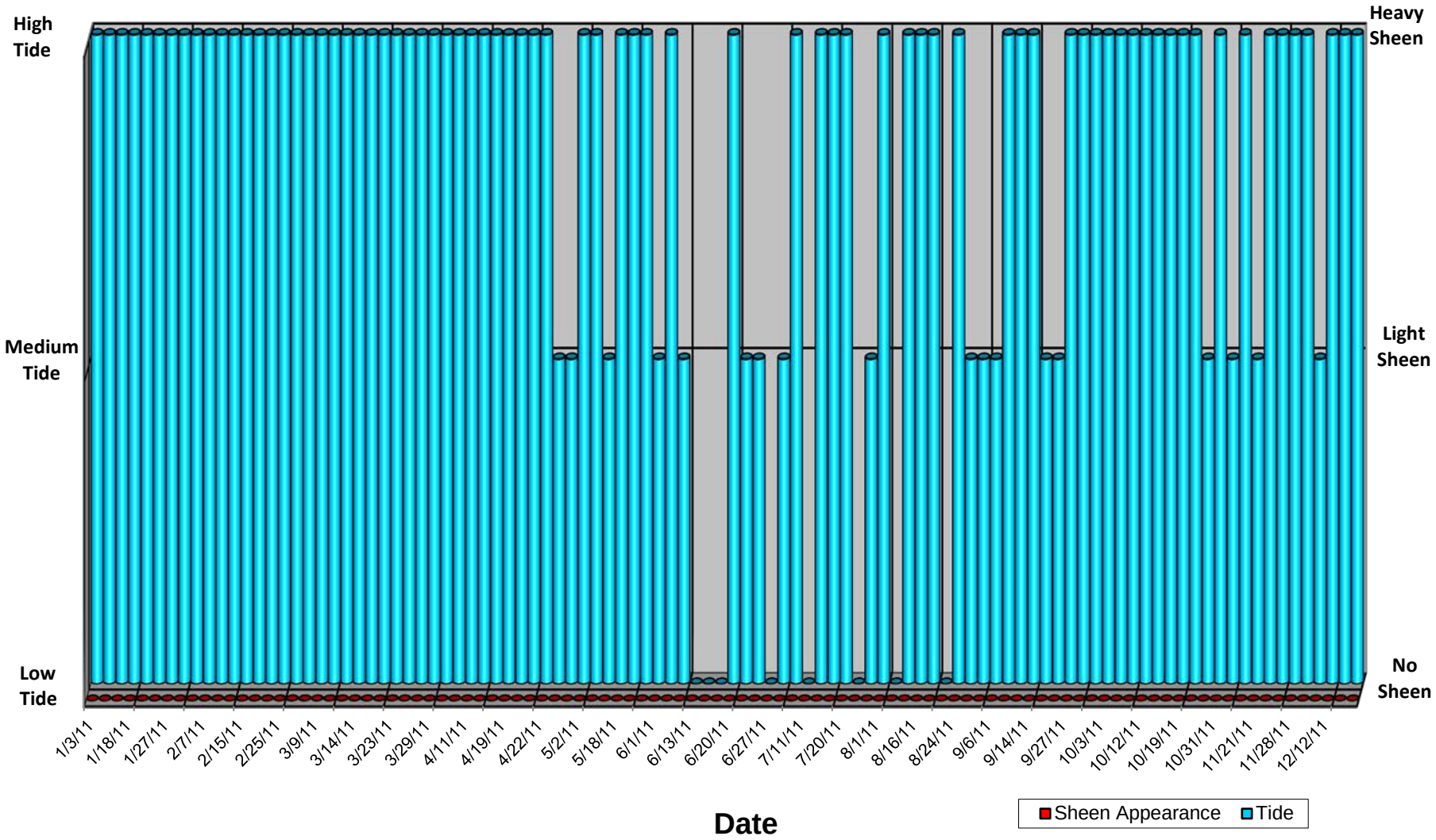
2010 Sheen Observations: Loading Rack

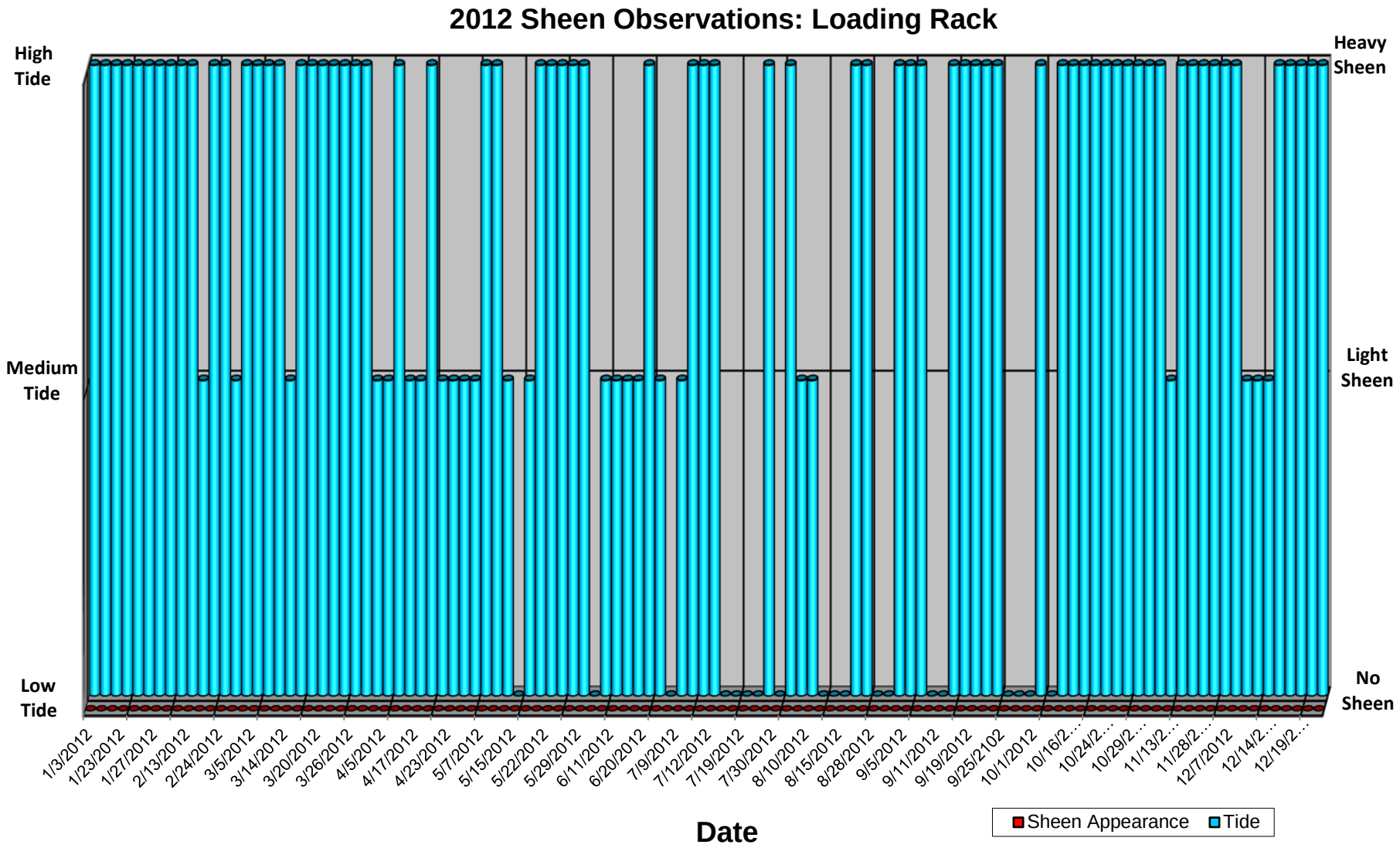


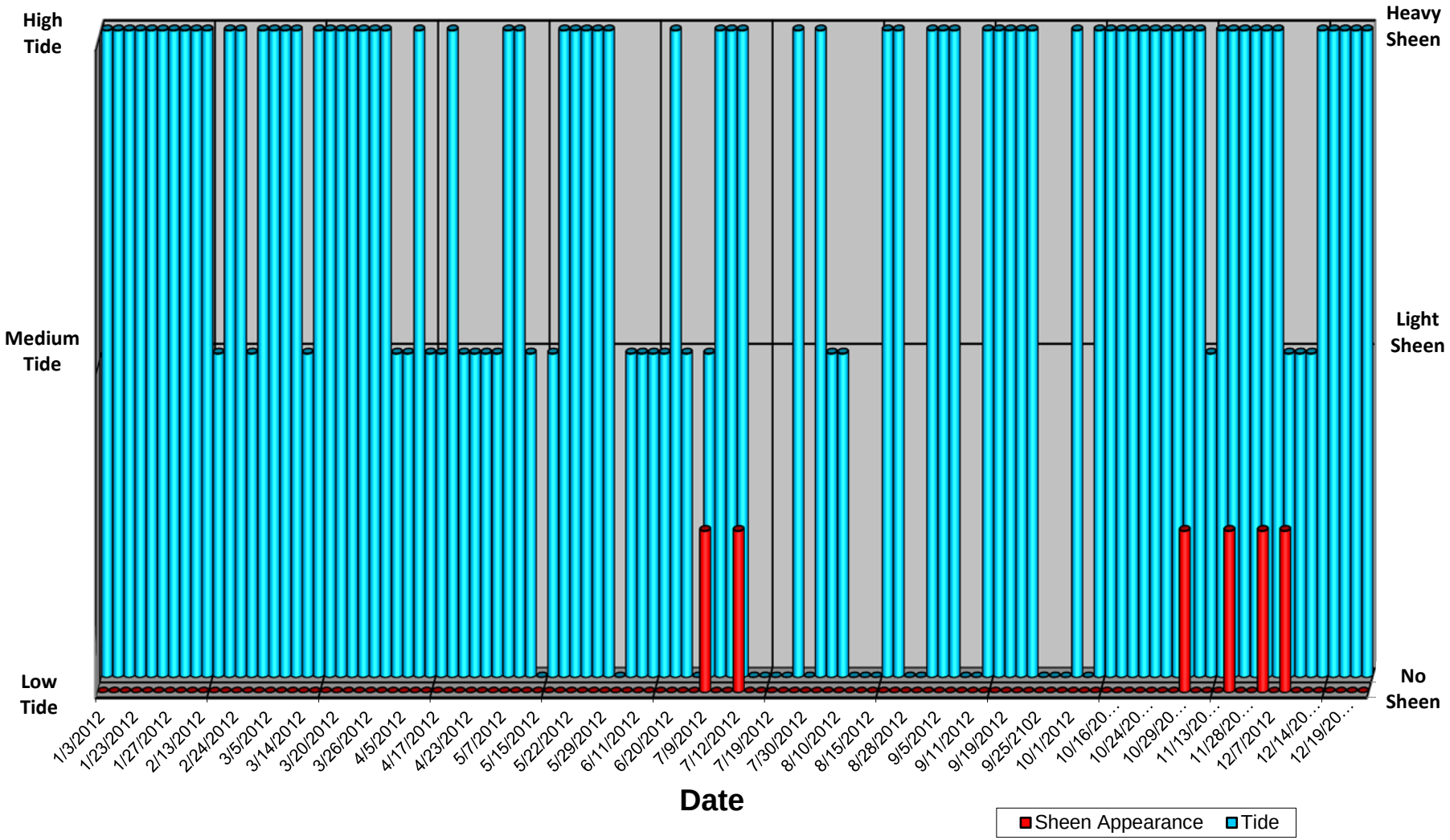
2011 Sheen Observations: Warehouse



2011 Sheen Observations: Loading Rack




2012 Sheen Observations: Loading Rack
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/3/2012
1/23/2012
1/27/2012
2/13/2012
2/24/2012
3/5/2012
3/14/2012
3/20/2012
3/26/2012
4/5/2012
4/17/2012
4/23/2012
5/7/2012
5/15/2012
5/22/2012
5/29/2012
6/11/2012
6/20/2012
7/9/2012
7/12/2012
7/19/2012
7/30/2012
8/10/2012
8/15/2012
8/28/2012
9/5/2012
9/11/2012
9/19/2012
9/25/2102
10/1/2012
10/16/2…
10/24/2…
10/29/2…
11/13/2…
11/28/2…
12/7/2012
12/14/2…
12/19/2…
Date
Sheen Appearance
Tide


2012 Sheen Observations: Warehouse
High Tide
Medium Tide
Low Tide
Heavy Sheen
Light Sheen
No Sheen
1/3/2012
1/23/2012
1/27/2012
2/13/2012
2/24/2012
3/5/2012
3/14/2012
3/20/2012
3/26/2012
4/5/2012
4/17/2012
4/23/2012
5/7/2012
5/15/2012
5/22/2012
5/29/2012
6/11/2012
6/20/2012
7/9/2012
7/12/2012
7/19/2012
7/30/2012
8/10/2012
8/15/2012
8/28/2012
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10/29/20…
11/13/20…
11/28/20…
12/7/2012
12/14/20…
12/19/20…
Date
Sheen Appearance
Tide