SHELL OIL HARBOR ISLAND TERMINAL

PERIODIC REVIEW FINAL REPORT

Equilon Enterprises LLC Harbor Island Terminal
dba Shell Oil Products US Harbor Island Terminal
Former Texaco Harbor Island Terminal
Seattle, Washington

Cleanup Site ID# 5051
Facility Site ID# 2030

Northwest Regional Office

TOXICS CLEANUP PROGRAM

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APPENDICES

1.0 INTRODUCTION

This document is a review by the Washington State Department of Ecology (Ecology) of site cleanup conditions and monitoring data to ensure that human health and the environment are being protected at the Equilon Enterprises LLC dba Shell Oil Products US (Shell) Harbor Island Terminal and former Texaco Harbor Island Terminal (Site). This review focuses on the last five years from 2010 to 2014 for the Ecology Periodic Review and follows an earlier review published in 2010. The Site is divided into three parcels: Main Terminal and Tank Farm located at 2555 – 13th Avenue SW, North Tank Farm at 1835 - 13th Avenue SW, and Shoreline Manifold Area located at 1711 – 13th Avenue SW, Seattle, King County, Washington, shown in Figure 1.

Cleanup at this Site was approved by Ecology under Consent Decree No. 99-2-07176-0SEA entered at King County Superior Court on April 2, 1999. The requirements of the Consent Decree and Cleanup Action Plan are described in the Model Toxics Control Act regulations, Chapter 173-340 Washington Administrative Code (WAC). The CD is attached in Appendix A.

This Site is one of three petroleum terminals at Harbor Island, a man-made island and industrial area located at the south side of Elliott Bay and confluence with the Duwamish River. The three terminals make up one operable unit within Harbor Island and within the US Environmental Protection Agency (EPA) Harbor Island Superfund Site and represent Operable Unit #2 as shown in Figure 2. This review is to satisfy the requirements for the MTCA Periodic Review WAC 173-340-420 and the EPA Five-Year Review for Harbor Island Superfund Site. The fourth Five-Year Review is to be published in September 2015.

The EPA Federal Consent Decree was entered in August 1995 in US v. The Port of Seattle et al relating to claims under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. $ 9601 et seq. for the Harbor Island Superfund Site. Federal Consent Decree Article I, Paragraph 8 identifies operable units within the Harbor Island Superfund Site and recites that the Petroleum Tank Farm Operable Unit is under management of the Washington State Department of Ecology. The EPA and Ecology have entered into Memorandum of Understanding dated February 5, 1991 and March 3, 1994 setting forth the duties and responsibilities of each agency with regard to site management and enforcement activities at the Harbor Island Superfund Site, and see the documents in Appendix B.

Cleanup activities at this Site are being implemented under the Model Toxics Control Act (MTCA) regulations and in coordination with the EPA superfund regulations called CERCLA. The cleanup actions are to address and remediate concentrations of petroleum hydrocarbons, related petroleum chemicals and metals in soil and groundwater and to protect adjacent surface waters at Elliott Bay and the West Waterway, one of two waterways connecting the Duwamish River to Elliott Bay and Puget Sound.

The chemicals of concern at the Tank Farm Operable Unit are petroleum hydrocarbons, related petroleum chemicals and metals. Soil and groundwater cleanup levels were developed based on the industrial zoning of the site and the determination by Ecology that there is no current or planned future use of the groundwater for drinking water purposes. The cleanup level defined

for the site groundwater is intended to be protective of the adjacent surface waters and ecosystems and to prevent dissolved petroleum hydrocarbon plume in the groundwater from migrating off site which could impact adjacent properties and waterways.

The groundwater cleanup levels were developed to protect surface water aquatic organisms in Elliott Bay and adjacent waterway. The surface water standards are adopted for ambient water quality criteria under the WAC 173-201A and Section 304 of the federal Clean Water Act. Surface water standards are not established for total petroleum hydrocarbons (TPH), so groundwater cleanup levels for TPH-gas, TPH-diesel, and TPH-oil were selected as protective cleanup goals.

The MTCA cleanup levels for soil are established under WAC 173-340-740. The MTCA cleanup levels for groundwater are established under WAC 173-340-720. Specific chemicals of concern at the Shell Site identified in the Consent Decree for soils are: total petroleum hydrocarbons (TPH) and two metals arsenic and lead. There are two separate cleanup levels for surface soil and subsurface soil. The cleanup levels for groundwater are intended to be protective of surface water organisms. The groundwater chemicals of concern are free and dissolved phase petroleum: TPH-gas, TPH-diesel, and TPH-oil; petroleum related chemicals for benzene, ethylbenzene, toluene, carcinogenic poly-aromatic hydrocarbons (cPAHs); and metals copper and lead. Some of these chemicals remain at the Site, and cleanup actions continue.

The cleanup actions to date resulted in concentrations of petroleum and petroleum related chemicals remaining at the Shell Site which exceed MTCA cleanup levels. The WAC 173-340-420 (2)(b) requires that Ecology conduct a periodic review of a site every five years whenever Ecology approves cleanup action under an order or consent decree.

When evaluating whether human health and the environment are being protected, WAC 173-340-420(4) lists the factors that Ecology shall consider including:

(a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the Site;
(b) New scientific information for hazardous substances or mixtures present at the Site;
(c) New applicable state and federal laws for hazardous substances present at the Site;
(d) Current and projected Site use;
(e) Availability and practicability of higher preference technologies; and
(f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

Cleanup work with compliance monitoring at the Shell Site is ongoing and will continue. This review focuses on period from 2010 to 2014. Ecology will re-evaluate the cleanup action and monitoring results again in 2019. This Periodic Review focuses on cleanup progress at the Site especially the Shoreline Manifold, SH-04, TX-03A areas, and groundwater underlying the entire Site.
The Department shall publish a notice of all periodic reviews in the Site Register and provide an opportunity for public comment.

2.0 SUMMARY OF SITE CONDITIONS

2.1 Site Description and History

The 405-acre Harbor Island was constructed during the early 1900s in an area consisting of intertidal wetlands at the mouth of the Duwamish River. The island was created using sediments dredged to facilitate navigation in the lower Duwamish River and West Waterway (KJC, 1990). The Site is a petroleum distribution facility located on Harbor Island, which is approximately one mile southwest of downtown Seattle at the mouth of the Duwamish River as shown in Figure 1. The Shell site is comprised of three parcels and they are designated as the Main Tank Farm, North Tank Farm, and Shoreline Manifold Area, and listed in Figures 3 and 4.

Soil underlying the site consists of man-emplaced grade and dredge fill overlying native estuarine deposits (LCI and EMCON, 1997). The uppermost grade fill unit consists of coarse-grained fill varying from less than one foot to approximately two feet thick. The dredge fill unit was created when estuarine deposits near the site were dredged and used as fill. The contact between the dredge fill and native estuarine units is not well defined due to similar properties of the two units. The dredge fill appears to vary from approximately 8 to 20 feet thick at the site. It consists of fine- to medium-grained sand with some gravel. Native estuarine deposits underlie the dredge fill at depths of approximately 8 to 20 feet below grade. These deposits are composed of primarily fine- to medium-grained sand with thin silt interbeds.

Groundwater occurs as a thin lens of fresh water overlying brackish water at depth. The water table occurs within the dredge fill 4 to 8 feet below the ground surface (bgs). Groundwater within the dredge fill unit occurs under unconfined conditions. The groundwater quality and elevation at the North Tank Farm and Main Tank Farm areas generally are unaffected by tides; whereas the Shoreline Manifold Area groundwater quality and elevations are affected by tides at Elliott Bay and Puget Sound.

The native estuarine deposits are fully saturated, and groundwater within this unit is unconfined. Water quality and water elevations within this unit can be influenced by surrounding surface water bodies and associated tidal fluctuations. Localized groundwater elevation contour maps for the shallow water zone beneath the SH-04 and TX-03A areas were generated for representative sampling events and presented in Figures 5 and 6. In general groundwater flows from island center to shoreline, and in a south and westerly direction in the SH-04 area. In the TX-03A area, the shallow groundwater flows in a northwesterly direction from a potentiometric high located within the Main Tank Farm area.

Aquifer pumping tests were conducted during 2013 in the TX-03A Area. The results of the test calculated hydraulic conductivity values by two methods, (1) ranging from a low of 5.62E-03 centimeters per second (cm/s) to a high of 9.65E-03 cm/s in monitoring well MW-310, using the Theis solution and (2) a low estimate of 3.96E-03 cm/s also in TX-03A area and a high of 1.87E-02 cm/s in well MW-310 area using the Neuman solution (URS, 2013c).

Annual compliance monitoring has been conducted since 1999 at the Shoreline Manifold Area, SH-04 Area and TX-03A Area. Cleanup actions and annual compliance monitoring results are described for 2004 through 2014 and highlight this review period in the following sections.

2.2 Site Investigations and Sample Results

Cleanup actions have progressed on schedule at this Site. There are three areas that Ecology is monitoring closely during the 2010-2014 period: the Shoreline Manifold Area, the SH-04 Area at 13th Avenue SW with Kinder Morgan Liquids Terminal (east of 13th Avenue SW and east of the Shell site), and TX-03A Area shown in Figure 4. Sampling results and cleanup action progress for the three areas are presented below. Approximately 30 wells are monitored across the site annually for free product and/or sampled for chemicals of concern, including benzene, toluene, ethylbenzene, and xylenes (BTEX), TPH, and natural attenuation parameters.

Site wide quarterly monitoring was conducted until 2006 in accordance with the Compliance Monitoring Plan. Between 2006 and 2008 monitoring occurred in accordance to proposed changes (RETEC, 2006a and RETEC, 2006b). Reductions in the monitoring plan occurred in accordance with email correspondence with Ecology in 2008. Site-wide monitoring now occurs semi-annually in 2010 through 2014 and quarterly in 2012. Additional semi-annual samples were obtained in 2011 from monitoring wells to assess the dissolved groundwater plume along 13th Avenue SW and the Main Tank Farm, also commonly referred to as the SH-04 Area listed in Figure 5. Additional quarterly samples were collected in 2012 to assess dissolved hydrocarbon plume in the SH-04 and the TX-03A areas. The monitoring results for the wells monitored at the site are presented on Table 2 for TPH-gas, -diesel, -oil, and BTEX.

2.2.1 Shoreline Manifold Area

The groundwater at the Shoreline Manifold Area is monitored at two deep groundwater compliance monitoring wells, MW-213 and MW-214. The BTEX and PAH concentrations at the two deep monitoring wells have remained below the cleanup levels since January 2004. At MW-213 and MW-214, low levels of TPH (diesel) have been detected at concentrations below the cleanup levels. TPH as gasoline has not been detected above the laboratory method detection limit (MDL) in either MW-213 or MW-214 since 2004.

Additional cleanup actions and compliance monitoring in 2013 was conducted in the shallow groundwater monitoring wells, located in the Shoreline Manifold Area, including MW-208, MW-210, MW-211, and MW-212 and are described below in Section 2.3.

2.2.2 SH-04 Area

The SH-04 Area was jointly evaluated by Shell and Kinder Morgan Harbor Island Terminal located to the east of Shell Main Terminal, see Figures 3 and 4. Ecology confirmed the evaluation by Shell and Kinder Morgan that monitored natural attenuation (MNA) was an

appropriate remedy at this location. MNA has been successful in reducing petroleum concentrations in groundwater, and showing containment of the petroleum within the immediate area.

In accordance with the Shell Compliance Monitoring Plan (EMCON and LCI, 1999) natural attenuation is periodically monitored to evaluate reducing contaminant concentrations. Since 2004 MNA has been conducted at the SH-04 Area and the petroleum levels have decreased. Benzene concentrations have decreased since 2004 and reached cleanup level in late 2012. Groundwater gasoline concentrations have decreased since 2004 to 2010 and during 2010 to 2014 have fluctuated slightly between 5 and 8 mg/L and above cleanup level at 1 mg/L. Shell and Kinder Morgan have agreed to continue MNA and compliance monitoring at SH-04 Area.

Routine groundwater sampling has been conducted at several areas at the Shell Site and specifically at the SH-04 Area, at MW-05, MW-111, MW-112A, and SH-04 since 2004. Two wells, MW-305 and MW-306 have been monitored since they were installed in 2012. The analytical results for BTEX and gasoline at groundwater monitoring wells SH-04, MW-305, and MW-306 are presented in Figures 7, 8 and 9, respectively. All the monitoring results for SH-04 Area are presented on Table 2 and described below.

<u>BTEX Constituents in SH-04 Area:</u>

- BTEX concentrations at wells MW-05 and MW-112A have remained below the cleanup level since 2004.
- Well MW-111, benzene was near the cleanup level, since 2009 but exceeded the benzene cleanup criteria (0.071 mg/L) during a recent sampling event at that well, conducted in November 2013.
- Benzene concentrations have decreased at MW-305 and MW-306 since the wells were installed in 2012, but remain above the respective cleanup level for benzene of 0.071 mg/L, with the most recent concentrations at 0.0884 mg/L and 0.0762 mg/L, respectively. Toluene and ethylbenzene detections were all below the cleanup levels of 200 mg/L and 29 mg/L, respectively since 2012. A cleanup level for xylenes has not been established for the Site.
- The benzene concentrations have decreased at well SH-04 since 2004 and have remained below cleanup levels since May 2013.

<u>TPH Constituents in SH-04 Area:</u>

- TPH-gas and -diesel concentrations have remained below the screening level values at wells MW-05, MW-111, and MW-112A since 2004.
- TPH-gas concentrations at MW-305 increased during sampling events between 2012 and May 2013, and have fluctuated, but remained steady since May 2012.

- TPH-gas concentrations at MW-306 increased during sampling events between 2012 and May 2013, and have declined since May 2013 to the most recent sampling event conducted in April 2014.
- TPH-gas and -diesel concentrations have decreased at SH-04 Area since 2004. Only TPH gasoline was detected above the cleanup level at SH-04, and has decreased to below the cleanup level of 1 mg/L during the recent sampling event conducted in April 2014.

2.2.3 TX-03A Area

The TX-03A Area has been monitored quarterly or semi-annually since 2004 and is located near the north boundary of the Main Tank Farm shown in Figure 6. Evaluation for the TX-03A Area extends from north Main Tank Farm to right-of-way at SW Florida Street. During the 2010-2014 monitoring period BTEX constituents were analyzed in 16 monitoring wells for additional investigation in the TX-03A Area. Monitoring wells MW-301 through MW-304 were installed within the TX-03A Area in November 2011 to further assess the TX-03A Area. Monitoring wells MW-307 through MW-310 were installed in November 2012 in the TX-03A Area. Pilot testing wells were installed in September 2013, including SVE-1, PSV-1, PSV-2, and TW-01.

The analytical trends for BTEX and gasoline at the North Tank Farm groundwater monitoring wells MW-202 and MW-203 are presented in Figures 10 and 11, respectively. The analytical trends for BTEX and gasoline at the Main Tank Farm groundwater monitoring wells MW-308, MW-310, and TX-03A are shown in Figures 12, 13, and 14, respectively. The results for all wells located in the TX-03 Area are included on Tables 2 and 3 and described below.

<u>BTEX Constituents in the TX-03A Area</u>:

- BTEX constituents were not detected above the MDL in six of the 16 monitoring wells MW-101, MW-102, MW-201, MW-206A, MW-309, and TES-MW-1 shown in Figure 16.

- BTEX constituents were detected periodically above the MDL, but below the Cleanup Level at MW-202 and MW-203, and 204, located in the North Tank Farm.

- Benzene exceeded the cleanup level of 0.071 mg/L, in all sampling events between March 2012 and April 2014 in the Main Tank Farm monitoring wells MW-301 through MW-304, MW-307, MW-310, and TX-03A at concentrations during the most recent sampling event ranging from 0.0778 mg/L (MW-304) to 1.22 mg/L (TX-03A). The toluene and ethylbenzene detections were all below the cleanup levels of 200 mg/L and 29 mg/L, respectively. A cleanup level for xylenes has not been established for the site.

- The benzene concentration at MW-308 has declined since February 2013, and was below the cleanup level of 0.071 mg/Lfor benzene during the recent sampling event in April 2014. The toluene and ethylbenzene detections were also below the cleanup levels of 200 mg/L and 29 mg/L, respectively or below the method detection limit (MDL) since November 2013.

TPH Constituents in the TX-03A Area:

- Gasoline range hydrocarbons were detected in 12 of the 17 monitoring wells sampled in the TX-03A Area within the Main Tank Farm and shown in Figure 15. Detections in monitoring wells MW-202, MW-301 through MW 304, MW-307, MW-308, MW-310, and TX-03A were above the cleanup level of 1 mg/L at concentrations ranging from 3.57 mg/L (MW-301) to 11.8 mg/L (MW-303) during the most recent sampling event. The highest detections from each monitoring event were observed in monitoring well MW-303 in February 2013.

- The gasoline concentrations continue to decrease at MW-307 from 10.9 mg/L, detected in November 2012 to 5.68 mg/L detected in April 2014.

- The gasoline concentration near MW-308 decreased between the November 2012 (0.778 mg/L) and April 2014 (0.146 mg/L) groundwater sampling events and below cleanup level at 1 mg/L.

- Samples to monitor diesel and oil were collected during at least one monitoring event in 17 monitoring wells in the TX-03A area. None of the samples collected had concentrations of diesel or oil above the cleanup levels.

Soil Gas Assessment in the TX-03A Area

A soil gas assessment was conducted in May 2013 to further delineate the source of the petroleum hydrocarbons detected in the soil and groundwater in the TX-03A Area. Twenty temporary soil vapor probes equipped with GORE® Module passive soil-vapor samplers were installed in the northern boundary of the Main Tank Farm. Soil gas samples were analyzed for TPH and BTEX. The results of the petroleum hydrocarbons are included in the *Soil Gas Assessment Report TX-03A Area* (URS, 2013b) and are summarized below:

- High concentrations of TPH are present near SG-18, in the vicinity of the remedial excavation in the Main Tank Farm. The results also indicate an elevated TPH concentration located around soil gas sampling locations, SG-10, are not delineated south of the sampling location. Down-gradient and cross-gradient sample locations indicate this high concentration area is likely immobile, see Figure 15.

- High concentration of BTEX was detected around soil gas well SG-6, SG-15, and SG-18, and appear to decrease down-gradient and cross gradient and coincide with high groundwater concentrations detected in monitoring well MW-303, see Figure 16.

Florida Street Video Survey

A video survey was conducted in September 2013 to assess if impacted groundwater is entering the stormwater system under SW Florida Street in the area north of the Terminal Main Tank Farm. The stormwater system survey area is shown in Figure 17. Water was observed in the stormwater pipe at manhole D050-016. Cracks were observed at 143.60 feet, 143.65 feet, and

204.60 feet west of manhole D050-16. Water infiltration was observed seeping from the crack at 174.60 feet and also running at 197.20 feet west of manhole D0550-16.

Base on the observations reported in the *Stormwater Video Survey Report,* (URS 2014b), a work plan was prepared to sample the stormwater system during dry weather. The principal objective of the dry weather stormwater system sampling is to characterize the groundwater quality which may be entering the stormwater system due to groundwater infiltration and evaluate if contaminants are being conveyed from the Site at concentrations exceeding the site cleanup levels. The dry weather sampling was conducted in July, reported in September 2014 and listed in Figure 18.

The *Dry Weather Stormwater System Sampling Report*, (URS 2014c), includes video survey and water testing. It appears that the groundwater plume in the TX-03A area is entering the City of Seattle stormwater system. The TPH-gas and benzene concentrations above site cleanup level are entering the stormwater system. Shell is currently reviewing options to repair the stormwater system, and plans to conduct additional sampling to provide additional characterization downstream of manhole D050-014. Results are shown in Figure 18.

2.3 Cleanup Actions

Cleanup actions completed as of 2010 were summarized in the *Third Five-Year Review Report Harbor Island Superfund Site* (EPA, 2010). Cleanup actions conducted from 2010 to 2014 are summarized and described below with continued compliance monitoring. In addition to the cleanup actions described below, a Restrictive Covenants was filed October 5, 2000 and provided additional protection. The restrictive covenant provides for continued industrial use of the site, prohibits the use of groundwater at the property, provides for safety and notification of site workers, prohibits activities that would release or cause exposure to contamination, provides for continuance of remedial actions given property transference, and provides for Ecology access to the Site.

The cleanup actions at the Shell Site during 2010 to 2014 review period show:

- Declining concentrations for TPH and BTEX
- Improved monitored natural attenuation (MNA)
- Consistent and stable groundwater compliance.

The specific events at the Shoreline Manifold Area include prompt and complete cleanup after spillage in 2013, and continued inspection and monitoring. At the SH-04 and TX-03A Areas, cleanup actions focused on supplemental investigations, evaluation of alternative cleanup methods, pilot testing, and specific evaluation at the SW Florida Street stormwater system with planned further testing and cleanup work. Detailed cleanup actions and results for each area for the 2010-2014 review period are described below.

2.3.1 Shoreline Manifold Area Cleanup Actions

Historically, a free product and vapor extraction system operated in the Shoreline Manifold Area from 1996 to August 2005, until the hydrocarbon recovery declined. Removal of TPH-contaminated surface and subsurface soil hot spots included the removal of soil to 10,000 mg/kg in the Shoreline Manifold Area in November 2001 and completed in October 2009. The following cleanup actions have occurred in the Shoreline Manifold Area for the period through 2014:

- Year 2005 through 2010: passive free product recovery at MW-210, MW-211 and MW-212.
- Year 2010 through 2011: passive free product recovery at MW 210 and MW-212.
- Year 2012: Vacuum extraction of free product, quarterly, at MW-210 and MW-212.
- Groundwater compliance monitoring semi-annually for 2010 through 2014.

On September 10, 2013, Shell was completing an "In-Line" inspection of their dock lines at the Shoreline Manifold Area located at the north end of Harbor Island. During the line fill operation, a maintenance hose, which was rated for the given service, ruptured. Less than three barrels of diesel product were released to the surrounding area in the Shoreline Manifold Area. The following cleanup actions were implemented immediately following the release:

- Approximately 2.4 barrels of diesel fuel were removed from surfaces using a vacuum truck and sorbent pads.
- Approximately 8 to 10 cubic yards of gravel were removed and soil was pressure washed.
- Additional vacuum extraction of free product was conducted at and surrounding MW-212 to removed pooled diesel product surrounding the well.
- Three days later, September 10, 2013 spill was successfully cleaned-up; and BP continued passive free product recovery in 2014.
- Compliance monitoring has shown no spill damage and TPH concentrations are and continue below cleanup level.

Confirmation soil samples collected from the excavated area following the cleanup actions were below the Shoreline cleanup levels of 10,000 mg/kg. Observations of Elliot Bay at the time of the spill, and the cleanup of the sidewalk and catch basin, indicate that surface water was not impacted from the release. Groundwater sample results collected from shallow monitoring wells MW-208 and MW-211 in November 2013 were below the site cleanup levels for TPH, BTEX and PAHs. Passive free product recovery will be continued at the Shoreline Manifold Wells during 2014, to address potential residual product from the recent release.

2.3.2 SH-04 Area Cleanup Actions

The SH-04 Area is located along the 13 Avenue SW between Shell and Kinder Morgan Harbor Island Terminal shown in Figure 4. Impacted groundwater may be migrating from the properties located to the east of the SH-04 Area after considering the groundwater flow direction shown in

Figure 5. However, overall, the gasoline and BTEX analytical data collected from monitoring well SH-04 and plotted in Figure 7, indicate a decreasing trend for the past 10 years. A large decrease in the concentration occurred between March 2013 and November 2013, for all the constituents that also occurred during the period of the highest groundwater elevation recorded for SH-04. Overall, the trends indicate that the source of the hydrocarbons is not an ongoing release and is naturally attenuating, and TPH and benzene concentrations are decreasing.

The trends in the geochemical parameters and the TPH concentration have declined at SH-04 Area and indicate anaerobic biodegradation is occurring in the SH-04 Area. The geochemical parameters of DO and pH have been stable at SH-04 during since 2009 and through 2014 shown on Table 3. The groundwater temperature fluctuates seasonally between the lowest temperature of about 12°C, measured in March 2012, to the highest temperature for the groundwater of 20°C, measured in September 2012. Fluctuations in the ORP measurements are also evident and confirm that biodegradation is occurring and concentrations of TPH-gasoline and BTEX are decreasing. Monitored Natural Attenuation (MNA) is effectively cleaning up the SH-04 Area, as shown in Figure 17.

2.3.3 TX-03A Area Cleanup Actions

In the TX-03A Area, cleanup actions have included removal of impacted soil and Monitored Natural Attenuation. Historically, impacted soils were removed to 20,000 mg/kg in the Main Tank Farm in February 2004 and again in 2007. In 2003, petroleum-impacted soil was excavated from the Main Tank Farm, in the area northwest of AST 31538 (Figure 4) to remove soil which contained gasoline at concentrations greater than 20,000 milligrams per kilogram (mg/kg or parts per million). This included excavation of near-surface lead and arsenic contaminated soil in areas throughout the Main Tank Farm conducted from December 2003 through February 2004.

Since the previous 5-year review, Monitored Natural (bio-) Attenuation has occurred within the TX-03A Area and additional pilot testing of remedial technologies was conducted. In 2013, pilot tests were conducted for several remedial technologies, including air sparging (AS), soil vapor extraction (SVE), and groundwater pumping pilot tests to evaluate the most effective long-term remedial strategy for treating residual hydrocarbons in the vicinity of the Main Tank Farm. As part of the pilot test activities, the following wells were installed (Figure 4):

- One 1-inch diameter air sparging test well (ASW-1),
- One 4-inch diameter SVE well (SVE-1),
- Two ¾-inch diameter PSV monitoring wells (PSV-1 and PSV-2), and
- One 4-inch diameter pumping test well (TW-01).

The results of the pilot tests are included in *Pilot Testing Results TX-03A Area* (URS, 2013c) including the maximum and optimal radius of influences resulting from the AS and SVE pilot tests and the site-specific aquifer parameters determined by the groundwater pumping pilot tests.

The concentration trends at the TX-03 Area provide evidence that monitored natural attenuation (MNA) also called bio-attenuation is occurring in the Main Tank Farm. At MW-308 a

decreasing trend is evident, with the most recent groundwater results for benzene, below the cleanup level shown in Figure 12. The benzene plume has shrunk in size between MW-308 and MW-303 and the plume also appears to be stable in size in the area between MW-307 and MW-310. A decreasing trend in the concentration for benzene and TPH is also evident in Figure 13. At the TX-03A Area, the benzene concentrations overall appeared to have decreased from 2010 to 2014 with a slight increased in 2013, see Figure 14. In summary, the historical data indicate the recent concentrations are within the range of historical fluctuations in the benzene concentrations detected at these wells (URS, 2013c).

The geochemical data within the TX-03A Area continue to provide evidence that biodegradation is occurring in the TX-03A Area shown on Table 3. Temperature and pH readings are within acceptable range for biological activity to occur. Elevated DO and oxidation reduction potential ORP are present in the background well TES-MW-1, up-gradient of the source areas identified near MW-307 and MW-308. The DO concentrations at the site have historically been higher at the background wells, located outside of the dissolved-phase contaminant plume, as would be expected for conditions where ongoing biodegradation consumes the available oxygen. The ORP values measured at the background well TES-MW-1 ranged historically from -7 mV to 308 mV. At monitoring well TX-03A, located in the plume, the ORP values ranged from -153 mV to 5 mV, and have been consistently below -100 mV since October 2011. Carbon dioxide concentrations at TX-03A have ranged from the lowest level of 0.27 mg/L, to the highest concentration detected, of 210 mg/L also confirming MNA is occurring and the area is being cleaned-up.

Another indicator of natural attenuation in the plume is the presence of methane at several site groundwater monitoring wells, including TX-03A, MW-307, and MW-310, above background levels. The methane concentrations in the background well TES-MW-1 were not detected above the laboratory method detection limit (MDL). The methane concentration at MW-307 ranged from 7.92 mg/L to the most recent concentration detected of 7.27 mg/L. The presence of elevated methane concentrations within the plume is another indicator of strong reducing conditions within the plume, which occurs after the available oxygen, nitrate, and sulfate have been depleted by bio-degradation.

Two additional wells, down-gradient of the TX-03A Area, are proposed to be installed, at MW-311, and MW-312. The two locations are shown in Figure 17. The two new groundwater monitoring wells are anticipated to be installed in late 2014 and will be added to the annual sampling event to provide additional evidence of natural attenuation, down-gradient of TX-03A Area.

Highlighting specific results for this review period -2010 through 2014 are:

1.) Prompt evaluation and cleanup at September 2013 spill at Shoreline Manifold Area.
2.) Evaluate the nature and extent of contamination at the northern boundary of the Main Terminal, and remediate as necessary to meet cleanup goals.
3.) Document the TX-03A Area results and cleanup action progress and containment.

4.) Evaluate the nature and extent of contamination between Kinder Morgan and Shell facilities to determine if TPH and benzene are migrating outside the TF-OU2 boundary and remediate as necessary to meet cleanup goals.
5.) Document Shell/KM work at 13th Avenue SW area and Monitored Natural Attenuation progress.

2.4 Cleanup Levels

The Shell Harbor Island Terminal set cleanup levels developed based on the industrial zoning of the site and the determination by Ecology that there is no current or planned future use of the groundwater for drinking water purposes. The beneficial uses of the site groundwater are the protection of the adjacent surface waters and ecosystems and to prevent dissolved petroleum hydrocarbon plume in the groundwater from migrating off site which could impact adjacent properties. Cleanup levels were set for surface soils, subsurface soils, and groundwater to protect surface water and ecosystems following EPA Harbor Island Superfund ROD and MTCA.

Table 1. Shell Harbor Island Terminal Site Cleanup Levels

Medium	Substance	Cleanup Level*	Source(s)
Surface Soils 0-6 inch	Arsenic	32.6 mg/kg	EPA ROD Harbor Island Superfund
	Lead	1,000 mg/kg	"
	Total TPH	10,000 mg/kg	MTCA
Subsurface Soils	Total TPH	20,000 mg/kg	MTCA
Groundwater	Product	No Sheen	MTCA & Ambient Water Quality
	Benzene	71 ug/L	WAC 173-201A & federal
	cPAHs	0.031 ug/L	Clean Water Act section 304
	Copper	2.9 ug/L	"
	Ethylbenzene	29 mg/L	"
	Lead	5.8 ug/L	"
	Toluene	200 mg/L	"
	TPH-gas	10 mg/L	MTCA
	TPH-diesel	10 mg/L	MTCA
	TPH-oil	10 mg/L	MTCA

*Cleanup Level concentration measured in mg/kg = milligrams per kilogram or parts per million, mg/L = milligram per liter or parts per million in liquid, ug/L = microgram per liter or parts per billion in liquid.

2.5 Restrictive Covenant

Based on the Site industrial use, surface cover and cleanup levels, it was determined that the Site was eligible for an institutional controls and a Restrictive Covenant was recorded for the property. A Restrictive Covenant was recorded for the Shell Site on October 5, 2000 which imposed the following limitations:

1. The property shall be used only for traditional industrial uses.
2. No groundwater may be taken for any use from the property that is inconsistent with the Consent Decree.
3. As of the date of this Consent Decree, a portion of the property contains total petroleum hydrocarbons (TPH) in the soil, dissolved TPH in the groundwater, floating product on the water table, and lead and arsenic on the surface soils.
4. Specifically, residual TPH and dissolved TPH remain above cleanup level is at the TX-03A Area, SH-04 Area, Shoreline Manifold and possibly other areas. The owner shall not alter, modify, or remove the existing structure(s) in any matter that may result in the release or exposure to the environment of the contaminated soils, groundwater, vapors or create a new exposure pathway without prior written approval from Ecology, which approval will not be unreasonably withheld.
5. Any activity on the property that may result in a release or exposure of the contaminated soils, vapors and contaminated groundwater in a manner that is inconsistent with the cleanup action…is prohibited without written approval from Ecology.
6. And other provisions …for written notice 30-days in advance to transfer any interest in the property, …restrict property uses to be consistent with this Restrictive Covenant, …authorize representatives of Ecology to enter, inspect and collect samples, and …the owner reserves the right to amend or modify this Restrictive Covenant under WAC 173-340-440.

The Restrictive Covenant is consistent with current Shell Site use and is attached with the Consent Decree in Appendix A.

3.0 PERIODIC REVIEW

3.1 Effectiveness of completed cleanup actions

The Restrictive Covenant for the Site was recorded and is in place. This Restrictive Covenant prohibits activities that will result in the release of contaminants at the Site without Ecology's approval, and prohibits any use of the property that is inconsistent with the Covenant. This Restrictive Covenant serves to ensure the long term integrity of the remedy.

Based upon the site visit conducted on November 4, 2014, the buildings, asphalt cover, and ongoing cleanup action operations at the Site continue to eliminate exposure to contaminated soils by ingestion and contact. The asphalt appears in satisfactory condition and no repair, maintenance, or contingency actions have been required. The Site continues operation as a major petroleum distribution and storage facility. A photo log is available in Appendix C.

Soils with petroleum, petroleum related substances and arsenic and lead concentrations higher than site cleanup levels are still present at the Site. However, the remedy prevents human exposure to this contamination by ingestion and direct contact with soils. The Restrictive Covenant for the property and continued cleanup action will ensure that the contamination remaining is contained and controlled.

3.2 New scientific information for individual hazardous substances or mixtures present at the Site

There is no new applicable scientific information for the contaminants related to the Site.

3.3 New applicable state and federal laws for hazardous substances present at the Site

The cleanup at the Site was governed by Chapter 173-340 WAC (1996 ed.) provides that,

"A release cleaned up under the cleanup levels determined in (a) or (b) of this subsection shall not be subject to further cleanup action due solely to subsequent amendments to the provision in this chapter on cleanup levels, unless the department determines, on a case-by-case basis, that the previous cleanup action is no longer sufficiently protective of human health and the environment."

Although cleanup levels changed for petroleum hydrocarbon compounds as a result of modifications to MTCA in 2001, contamination remains at the Site above the new MTCA Method A and B cleanup levels. Even so, the cleanup action is still protective of human health and the environment. A table comparing MTCA cleanup levels from 1991 to 2001 is available below.

Chemical of Concern at Site	1991 MTCA Method A Soil Cleanup Level (ppm)	2001 MTCA Method A Soil Cleanup Level mg/kg (ppm)	1991 MTCA Method A Groundwater Cleanup level ug/L (ppb)	2001 MTCA Method A Groundwater Cleanup Level ug/L (ppb)
Arsenic	20	20	5	5
Lead	250	250	5	15
TPH-Total	NL	NL	1000	NL
TPH-Gas	100	100/30	NL	1000/800
TPH-Diesel	200	2000	NL	500
TPH-Oil	200	2000	NL	500

NL = None listed

3.4 Current and projected Site use

The Site is currently used for industrial purposes. There have been no changes in current or projected future Site or resource uses.

3.5 Availability and practicability of higher preference technologies

The remedy implemented included capping and containment of hazardous substances, and they continue to be protective of human health and the environment. While higher preference cleanup technologies may be available, they are still not practicable at this Site.

3.6 Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the remedial action were capable of detection below selected Site cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

4.0 CONCLUSIONS

The following conclusions have been made as a result of this periodic review at the Shell Site:

- The cleanup actions completed at the Site appear to be protective of human health and the environment.

- Soils cleanup levels have not been met at the standard point of compliance for the Site; however, the cleanup action has been determined to comply with cleanup standards since the long-term integrity of the containment system is ensured, and the requirements for containment technologies are being met.

- Groundwater cleanup levels have not been met at the standard points of compliance for the Site; however, overall concentrations of petroleum hydrocarbons and BTEX have declined or remain static throughout the Site. Semi-annual groundwater monitoring is used to assess cleanup and natural biodegradation at the Site. Conditions at the Site continue to improve and remain protective of human health and the environment.

- The Restrictive Covenant for the property is in place and continues to be effective in protecting public health and the environment from exposure to hazardous substances and protecting the integrity of the cleanup action.

Based on this periodic review, the Department of Ecology has determined that the requirements of the Restrictive Covenant continue to be met. No additional cleanup actions are required by the property owner. It is the property owner's responsibility to continue the cleanup action and compliance monitoring, and to inspect the Site annually to assure that the integrity of the remedy is maintained.

4.1 Next Review

The next review for the Site will be scheduled five years from the date of this periodic review in 2019. In the event that additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years from the completion of those activities.

Ecology recommends continued cleanup action and compliance monitoring and to review the Restrictive Covenants in 2019 prior to the next review.

REFERENCES

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URS, 2013a. *Well Installation Report,* TX-03A Area, Shell Harbor Island Terminal, Seattle, Washington. March 13.

URS, 2013b. *Soil Gas Assessment Report*, TX-03A Area, Shell Harbor Island Terminal, Seattle, Washington, October 23.

URS, 2013c. *Pilot Testing Results*, TX-03A Area, Shell Harbor Island Terminal, Seattle, Washington. December 18.

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URS 2014b, *Stormwater Video Survey Report,* Shell Harbor Island Terminal, Seattle Washington, January 14.

URS 2014c, *Dry Weather Stormwater System Sampling Report,* Shell Harbor Island Terminal, Seattle Washington, September 15.

TABLES

Table 2
Shell Oil Harbor Island Terminal
Petroleum Hydrocarbons and BTEX in Groundwater
Compliance Monitoring Results for 2004 through 2014

Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
MW-05	01/15/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.37	< 0.5
	04/21/04	0.0015	< 0.001	0.0053	< 0.001	< 0.25	0.41	< 0.5
	07/28/04	0.0015	0.001	< 0.001	0.0017	< 0.25	< 0.25	< 0.5
	10/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/25/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/18/05	< 0.001	< 0.001	< 0.001	< 0.001	0.072	< 0.25	< 0.5
	07/12/05	< 0.001	< 0.001	< 0.001	< 0.001	0.25	< 0.25	< 0.5
	10/19/05	< 0.001	< 0.001	< 0.001	< 0.001	0.11	< 0.25	< 0.5
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	< 0.238	< 0.476
	11/19/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.25	< 0.5
	11/17/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/29/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.14	< 0.1
	05/23/11	<.0003	<.0005	<.0003	<.0007	0.0744	NA	NA
	10/25/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	0.115	< 0.095	< 0.19
	11/29/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.0954	< 0.095
	11/07/13	< 0.00020	0.00083 J	< 0.00020	0.00087 J	0.345	< 0.049	< 0.097
MW-101	01/16/04	< 0.001	< 0.001	< 0.001	0.0028	0.55	< 0.25	< 0.5
	04/20/04	0.0016	< 0.001	< 0.001	0.0014	0.67	< 0.25	< 0.5
	07/28/04	0.0012	< 0.001	< 0.001	0.0011	1.0	< 0.25	< 0.5
	10/18/04	0.0011	< 0.001	< 0.001	< 0.001	0.42	< 0.25	< 0.5
	01/26/05	< 0.001	< 0.001	< 0.001	0.0011	0.51	< 0.25	< 0.5
	04/19/05	0.0016	< 0.001	< 0.001	< 0.001	0.58	< 0.25	< 0.5
	07/13/05	< 0.001	< 0.001	< 0.001	< 0.001	0.31	< 0.25	< 0.5
	10/10/05	< 0.001	< 0.001	< 0.001	< 0.001	0.16	< 0.25	< 0.5
	01/27/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	0.223	< 0.236	< 0.476
	11/18/08	< 0.005	< 0.005	< 0.005	< 0.005	0.1	< 0.25	< 0.5
	11/18/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/26/10	< 0.0005	< 0.001	< 0.001	< 0.001	0.15	0.13	< 0.1
	10/27/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	0.0936	< 0.10	< 0.20
	11/26/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	0.188 J	0.0937 J	< 0.10
	11/06/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	0.118 J	< 0.0048	< 0.0095
MW-102	01/14/04	0.0021	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/21/04	0.0036	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	07/28/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	10/18/04	0.0011	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/25/05	0.0024	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/18/05	0.0027	< 0.001	< 0.001	< 0.001	< 0.05	< 0.25	< 0.5
	07/13/05	< 0.001	< 0.001	< 0.001	< 0.001	0.077	< 0.25	< 0.5
	10/19/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.25	< 0.5
	01/26/06	0.00498	< 0.0005	0.00174	0.00201	< 0.05	< 0.238	< 0.472
	11/19/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.25	< 0.5
	11/18/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/28/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/26/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	0.113	< 0.20
	11/28/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.050	< 0.10
	11/07/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.047	0.144 J

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Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
MW-104	01/15/04	0.0019	< 0.001	0.15	0.1028	**2.7**	1.2	< 0.5
	01/15/04	0.0012	< 0.001	0.1	0.0706	**2**	1.3	< 0.5
	04/21/04	0.0066	0.0025	0.35	0.0931	**4.3**	1.7	< 0.5
	07/28/04	0.0018	< 0.001	0.048	0.017	**2.2**	0.87	< 0.5
	07/28/04	0.0017	< 0.001	0.049	0.019	**2.1**	1.3	< 0.5
	10/19/04	< 0.001	< 0.001	0.0021	0.0016	< 0.25	0.61	< 0.5
	01/24/05	< 0.001	< 0.001	0.0012	< 0.001	< 0.25	0.74	< 0.5
	04/18/05	< 0.001	< 0.001	0.057	0.0067	**1.4**	1.2	< 0.5
	07/12/05	0.0014	< 0.001	0.11	0.012	**1.8**	0.7	< 0.5
	10/19/05	< 0.001	< 0.001	0.024	0.0049	0.29	0.62	< 0.5
	01/25/06	0.00245	0.00129	0.33	0.0273	**2.07**	3.73	< 0.962
	10/30/07	NA	NA	NA	NA	**1.25**	NA	NA
	05/20/08	NA	NA	NA	NA	**4.00**	2.10	< 0.5
	11/18/08	NA	NA	NA	NA	0.13	0.69	< 0.5
	04/08/09	NA	NA	NA	NA	**1.80**	1.60	< 0.1
	11/17/09	< 0.0005	< 0.001	0.0016	< 0.001	0.21	0.17	< 0.1
	04/27/10	NA	NA	NA	NA	**3.90**	2.50	0.27
	10/26/10	NA	NA	NA	NA	0.23	0.23	< 0.1
	05/23/11	<0.0006	0.003	0.104	0.0018	**4.44**	0.45	<0.097
	10/25/11	NA	NA	NA	NA	**3.38**	0.413	< 0.20
	03/01/12	0.00079 J	0.0015	0.0467	0.0016 J	**3.69**	NA	NA
	06/13/12	NA	NA	NA	NA	**4.78**	0.423	< 0.10
	09/26/12	0.00066 J	0.0024	0.0509	0.0019 J	**4.54**	NA	NA
	11/29/12	0.00038 J	0.00037 J	0.0113	< 0.00046	0.592	0.315	< 0.098
	05/14/13	NA	NA	NA	NA	**5.07**	0.601	< 0.096
	11/07/13	NA	NA	NA	NA	**3.62**	0.666 J	< 0.095
	04/24/14	NA	NA	NA	NA	**5.68**	1.13	0.100 J
MW-105	01/15/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	1.4	< 0.5
	04/21/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.65	< 0.5
	07/27/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	2.2	< 0.5
	10/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	1.8	< 0.5
	01/24/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	3	< 0.5
	04/18/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	1.3	0.78
	07/12/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	1.7	< 0.5
	10/18/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	1.7	0.66
	01/25/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	3.95	< 0.962
	11/19/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	NA	NA
	11/17/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.17	< 0.1
	10/26/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	NA	NA
	10/25/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	0.253	< 0.20
	11/26/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.291	< 0.098
	11/07/13	< 0.00020	< 0.00020	< 0.00020	< 0.000046	< 0.050	0.189	< 0.095
MW-111	01/15/04	0.047	< 0.001	< 0.001	< 0.001	< 0.25	0.98	< 0.5
	04/21/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.48	< 0.5
	07/27/04	0.015	< 0.001	< 0.001	0.0012	< 0.25	0.45	< 0.5
	10/19/04	0.036	0.0012	< 0.001	0.0035	0.35	0.45	< 0.5
	01/25/05	**0.079**	< 0.005	< 0.005	< 0.005	0.58 J	0.63	< 0.5
	04/18/05	< 0.001	< 0.001	< 0.001	< 0.001	0.096	< 0.25	< 0.5
	07/12/05	0.0094	< 0.001	< 0.001	< 0.001	0.23	0.26	< 0.5
	10/18/05	0.017	< 0.001	< 0.001	0.0013	0.26	0.27	< 0.5
	01/25/06	**0.0956**	0.00189	0.000796	0.0037	0.683	0.998	< 0.481
	11/19/08	0.014	< 0.005	< 0.005	< 0.005	0.230	0.370	< 0.5
	11/17/09	0.041	< 0.001	< 0.001	< 0.001	0.240	0.110	< 0.1
	10/26/10	0.0043	< 0.001	< 0.001	< 0.001	< 0.1	0.120	< 0.1
	05/23/11	0.0006	<.0005	<.0003	<.0007	<0.050	NA	NA
	10/25/11	0.00094	< 0.0010	< 0.0010	< 0.0020	< 0.20	0.122	< 0.20
	11/29/12	0.0248	0.0010	< 0.00020	0.0012 J	0.371	0.269	< 0.10
	11/07/13	**0.0845**	0.0010	0.00023 J	0.00069 J	0.208	0.174	< 0.095

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Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
MW-112A	01/15/04	0.02	< 0.001	< 0.001	< 0.001	0.25	0.63	< 0.5
	04/21/04	< 0.005	< 0.005	< 0.005	< 0.005	< 1.2	0.56	< 0.75
	07/27/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.51	< 0.5
	10/19/04	0.0013	< 0.001	< 0.001	< 0.001	< 0.25	0.68	< 0.5
	01/24/05	0.003	0.0012	< 0.001	0.001	0.44	0.65	< 0.5
	04/20/05	< 0.001	< 0.001	< 0.001	< 0.001	0.42	1.4	< 0.5
	07/12/05	0.0029	< 0.001	< 0.001	< 0.001	0.28	0.48	< 0.5
	10/18/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.25	< 0.5
	01/26/06	0.00211	< 0.0005	< 0.0005	< 0.001	0.236	0.602	< 0.485
	11/19/08	< 0.005	< 0.005	< 0.005	< 0.005	0.300	1.300	< 0.5
	11/18/09	0.00075	< 0.001	< 0.001	< 0.001	0.200	0.230	< 0.1
	10/29/10	0.03600	< 0.001	< 0.001	0.0015	0.770	0.600	< 0.1
	05/24/11	0.00041	<0.0005	<0.0003	<0.0007	0.129	NA	NA
	10/25/11	0.0055	< 0.0010	< 0.0010	< 0.0020	0.292	0.200	< 0.20
	11/25/12	0.0058	0.00022 J	0.00037 J	< 0.00046	0.197 J	0.282	< 0.10
	11/04/13	0.0238	0.00068 J	0.0376	0.0012 J	0.909	1.72	< 0.19
MW-201	01/14/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/20/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/26/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.33	< 0.5
	04/20/05	< 0.001	< 0.001	< 0.001	0.0021	< 0.25	< 0.25	< 0.5
	07/13/05	< 0.001	< 0.001	< 0.001	< 0.001	0.12	0.7	< 0.5
	10/20/05	< 0.001	< 0.001	< 0.001	< 0.001	0.22	4.6	2.3
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.050	0.342	< 0.476
	11/20/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	0.41	< 0.5
	11/19/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/27/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.18	< 0.1
	10/26/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	0.0899	1.46	0.181
	11/27/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.122	< 0.10
	11/06/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	0.0964 J	0.520	< 0.094
MW-202	01/14/04	< 0.001	< 0.001	< 0.001	< 0.001	**2.5**	**15**	< 10
	04/20/04	0.014	0.0062	0.074	0.021	**4.4**	**28**	< 10
	01/26/05	< 0.005	< 0.005	< 0.005	< 0.005	**7.7**	5.2	< 5
	04/20/05	0.016	0.0022	0.036	0.0237	**3.7**	6.2	< 5
	07/13/05	0.016	0.0033	0.067	0.0191	**3.5**	6.2	< 1
	10/20/05	0.019	0.0021	0.058	0.0056	**3.3**	5.9	< 2.5
	01/26/06	0.0224	0.00598	0.041	0.0191	**5.79**	**11.2**	< 4.76
	04/25/06	0.007	0.0038	0.062	0.0124	**6.8**	8.7	<4.85
	10/12/06	0.009	0.0034	0.083	0.0062	**5.7**	**11.5**	0.834
	04/26/07	0.008	0.0048	0.063	<0.015	**4.8**	8.2	1.05
	10/30/07	NA	NA	NA	NA	**4.55**	**10.9**	< 1
	05/20/08	NA	NA	NA	NA	**2.3**	1.8	< 2.5
	11/20/08	NA	NA	NA	NA	**5**	2.2	< 0.5
	04/07/09	NA	NA	NA	NA	**4.8**	**14**	< 0.1
	11/19/09	NA	NA	NA	NA	**6.6**	**20**	< 0.5
	04/27/10	NA	NA	NA	NA	**3.3**	6.4	0.12
	10/27/10	0.0081	0.0031	0.066	0.0022	**6**	5.4	< 0.1
	05/23/11	NA	NA	NA	NA	**3.5**	1.84	<0.097
	10/26/11	NA	NA	NA	NA	**4.3**	1.02	< 0.21
	03/02/12	0.0053	0.0019	0.0107	0.0013 J	**3.87**	NA	NA
	06/13/12	NA	NA	NA	NA	**3.31**	1.54	< 0.10
	09/26/12	0.0058	0.0029 J	0.0378	< 0.0018	**4.07**	NA	NA
	11/27/12	0.0113	0.0034	0.0274	0.0022	**6.07**	2.67	< 0.30
	05/15/13	NA	NA	NA	NA	**3.83**	1.62	< 0.096
	11/06/13	< 0.00020	0.0027	0.0335	0.0012 J	**4.68**	1.29	< 0.095
	04/22/14	NA	NA	NA	NA	**3.22**	2.18	<0.28

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Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
MW-203	01/13/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.26	< 0.5
	07/27/04	0.013	< 0.001	0.0069	< 0.001	**2.6**	0.45	< 0.5
	10/19/04	0.013	< 0.001	0.015	0.0025	**1.6**	< 0.25	< 0.5
	10/19/04	0.017	< 0.001	0.012	0.0018	**1.4**	< 0.25	< 0.5
	01/25/05	0.0063	< 0.001	0.011	0.0013	**1.6**	0.52	0.68
	04/19/05	0.0068	< 0.001	0.0018	< 0.001	0.63	< 0.25	0.55
	07/13/05	0.01	< 0.001	0.0077	< 0.001	0.89	< 0.25	< 0.5
	10/20/05	0.023	0.002	0.021	0.0026	**4.2**	2.1	1.1
	01/23/06	0.00186	< 0.0005	0.00182	0.00125	0.76	0.565	< 0.943
	04/26/06	0.00694	0.00076	0.00079	<0.003	**1.38**	0.660	0.625
	10/13/06	0.02300	0.00553	0.00448	0.00652	**6.22**	7.390	1.34
	04/27/07	0.00502	<0.0005	0.00053	<0.003	**1.24**	0.507	0.515
	05/20/08	NA	NA	NA	NA	0.60	0.320	< 0.5
	11/18/2008	NA	NA	NA	NA	0.17	< 0.25	< 0.5
	04/08/09	NA	NA	NA	NA	< 0.1	0.12	0.11
	11/17/09	NA	NA	NA	NA	< 0.1	< 0.1	< 0.1
	04/26/10	NA	NA	NA	NA	0.16	0.18	< 0.1
	10/25/10	NA	NA	NA	NA	0.92	0.36	< 0.1
	05/23/11	NA	NA	NA	NA	0.333	0.085	0.314
	10/26/11	NA	NA	NA	NA	**1.380**	0.262	0.118
	06/13/12	NA	NA	NA	NA	0.459	0.134	0.332
	11/27/12	NA	NA	NA	NA	**1.05**	0.0943 J	< 0.10
	05/15/13	NA	NA	NA	NA	0.144 J	< 0.048	< 0.096
	11/06/13	NA	NA	NA	NA	0.680	< 0.047	< 0.094
	04/22/14	NA	NA	NA	NA	0.164	0.210	0.732
MW-204	07/27/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	1.6	< 0.5
	01/26/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	6.2	< 1
	04/18/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	1.5	0.79
	07/13/05	< 0.001	< 0.001	< 0.001	< 0.001	0.076	1.1	0.59
	10/19/05	< 0.001	< 0.001	< 0.001	< 0.001	0.082	0.45	< 0.5
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	5.53	< 0.952
	04/25/06	<0.0005	<0.0005	<0.0005	<0.003	0.076	2.5	1.11
	10/12/06	<0.0005	<0.0005	<0.0005	<0.003	0.0634	0.90	0.519
	04/26/07	<0.0005	<0.0005	<0.0005	<0.003	0.086	1.81	0.749
	10/30/07	NA	NA	NA	NA	< 0.05	NA	NA
	11/20/08	< 0.005	< 0.005	< 0.005	< 0.005	0.13	1.0	< 0.5
	11/19/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	3.5	0.16
	10/27/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.29	< 0.1
	10/27/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	0.0660	0.599	< 0.20
	11/27/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.975	< 0.10
	11/06/13	0.00057 J	< 0.00020	< 0.00020	< 0.00046	0.0762 J	0.280	0.0976 J
MW-206A	01/22/04	< 0.001	< 0.001	< 0.001	0.004	< 0.25	< 0.25	< 0.5
	04/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	07/27/04	< 0.005	< 0.005	< 0.005	< 0.005	< 1.2	1.8	0.78
	10/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	2	1.1
	01/25/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	2.1	2.2
	04/18/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	1.3	1.5
	07/13/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	1.2	1.9
	10/20/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	2.1	7.9
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	4.41	2.54
	11/20/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.25	2.1	1.7
	11/19/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.1	< 0.1
	10/25/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	0.18
	10/26/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	0.141	< 0.20
	11/27/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.116	0.111 J
	11/06/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.047	< 0.094

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Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
MW-213	01/14/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/20/04	< 0.005	< 0.005	< 0.005	< 0.005	< 0.25	< 0.25	< 0.5
	07/28/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	10/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/25/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/19/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.25	< 0.5
	07/12/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.25	< 0.5
	10/20/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	0.34	< 0.5
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	0.653	< 0.495
	10/30/07	< 0.001	< 0.001	< 0.001	< 0.003	NA	NA	NA
	11/19/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.25	< 0.25	< 0.5
	04/07/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	11/18/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	04/26/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/28/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	05/24/11	<0.0003	<0.0005	<0.0003	<0.0007	< 0.050	< 0.049	< 0.098
	10/25/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	< 0.11	< 0.21
	06/12/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.050	< 0.10
	11/29/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.050	< 0.10
	05/15/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.048	< 0.096
	11/05/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.0625 J	< 0.095
	04/23/14	<0.001	<0.001	<0.001	<0.002	<0.10	0.0586	<0.19
MW-214	01/14/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/20/04	< 0.005	< 0.005	< 0.005	< 0.005	< 0.25	< 0.25	< 0.5
	07/28/04	< 0.005	< 0.005	< 0.005	< 0.005	< 1.2	< 0.25	< 0.5
	10/19/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/25/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	0.36	< 0.5
	04/19/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	0.3	< 0.5
	07/12/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	0.29	< 0.5
	10/20/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	0.33	< 0.5
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	0.91	< 0.476
	10/30/07	< 0.001	< 0.001	< 0.001	< 0.003	NA	NA	NA
	05/05/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.25	0.91	< 0.5
	07/10/08	-	-	-	-	-	< 0.5	< 1
	11/19/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.25	0.80	< 0.5
	04/07/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.17	< 0.1
	11/18/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.11	< 0.1
	04/26/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.19	< 0.1
	10/28/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	05/24/11	<0.0003	<0.0005	<0.0003	<0.0007	<0.050	0.127	<0.097
	10/25/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	0.126	< 0.21
	06/12/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.050	0.135 J
	11/29/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.048	< 0.095
	05/15/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.0857 J	< 0.096
	11/05/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.0552 J	< 0.094
	04/23/14	<.001	<.001	<.001	<.002	<0.10	0.118	<0.19
MW-301	03/02/12	**0.240**	0.0138	0.00990	0.0212	**3.37**	NA	NA
	09/25/12	**0.333**	0.0131	0.0186	0.0192	**4.02**	NA	NA
	11/28/12	**0.241**	0.0099	0.0125	0.0106	**2.76**	NA	NA
	02/21/13	**0.659**	0.0175	0.0264	0.0173 J	**3.98**	0.315	< 0.10
	05/15/13	**0.357**	0.0122	0.0231	0.0145	**3.63**	NA	NA
	11/04/13	**0.160**	0.0097	0.0164	0.0109	**2.29**	NA	NA
	04/23/14	**0.252**	0.0072	0.0135	0.0075	**3.57**	NA	NA
MW-302	03/01/12	**0.831**	0.0275	0.213	0.248	**5.33**	NA	NA
	06/12/12	**0.574**	0.0156	0.0183	0.0244	**4.18**	NA	NA
	06/28/12	**1.23**	0.0437	0.403	0.289	**5.65**	NA	NA
	09/25/12	**0.657**	0.0247	0.180	0.106	**4.07**	NA	NA
	11/25/12	**0.449**	0.0152	0.191	0.177	**4.58**	NA	NA
	02/22/13	**0.393**	0.0149	0.124	0.116	**4.15**	0.435	< 0.10
	05/14/13	**0.873**	0.0231	0.236	0.145	**4.19**	NA	NA
	09/05/13	**0.783**	0.0189	0.162	0.0746	**3.70**	NA	NA
	11/05/13	**0.607**	0.0112	0.0977	0.0529	**2.69**	NA	NA
	04/23/14	**0.98**[a]	0.0269	0.0276	0.2320	**5.86**	NA	NA

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		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
MW-303	03/02/12	**3.13**	0.0759	0.760	0.232	**12.3**	NA	NA
	06/13/12	**2.90**	0.0957	0.884	0.268	**12.5**	NA	NA
	09/25/12	**1.83**	0.0635	0.474	0.146	**9.14**	NA	NA
	11/28/12	**1.94**	0.0873	1.18	0.319	**12.6**	NA	NA
	02/21/13	**2.34**	0.0955	1.29	0.338	**12.8**	0.674	< 0.10
	05/15/13	**1.90**	0.0864	0.983	0.272	**10.6**	NA	NA
	11/04/13	**0.884**	0.0278	0.219	0.0544	**6.11**	NA	NA
	04/23/14	**1.580**	0.0710	1.114	0.2240	**11.80**	NA	NA
MW-304	03/01/12	**0.686**	0.0351	0.214	0.264	**5.64**	NA	NA
	06/12/12	**1.04**	0.0408	0.270	0.218	**5.98**	NA	NA
	09/25/12	**0.630**	0.0240	0.198	0.105	**3.93**	NA	NA
	11/28/12	**0.411**	0.0244	0.306	0.252	**5.89**	NA	NA
	02/22/13	**0.507**	0.0225	0.208	0.149	**5.56**	0.762	0.186 J
	05/14/13	**0.645**	0.0283	0.209	0.144	**4.73**	NA	NA
	09/05/13	**0.862**	0.0188	0.0849	0.0616	**3.09**	NA	NA
	11/05/13	**0.695**	0.0163	0.0629	0.0540	**2.67**	NA	NA
	04/23/14	**0.778**	0.0248	0.185	0.1470	**5.93**	NA	NA
MW-305	03/01/12	**1.14**	0.0227	0.0389	0.0375 J	**5.84**	NA	NA
	06/11/12	**1.34**	0.0221	0.0517	0.0331 J	**5.97**	NA	NA
	09/26/12	**1.27**	0.0229	0.0388	0.0355 J	**5.89**	NA	NA
	11/28/12	**0.286**	0.0061	0.0032 J	0.0140	**1.53**	NA	NA
	05/15/13	**0.397**	0.0263	0.290	0.0867	**6.28**	NA	NA
	11/07/13	**0.0844**	0.0250	0.216	0.0919	**3.59**	NA	NA
	04/23/14	**0.0884**	0.0139	0.0941	0.0454	**2.82**	NA	NA
MW-306	03/01/12	**0.606**	0.0150	0.0353	0.718	**4.74**	NA	NA
	06/11/12	**0.393**	0.0115	0.0509	0.763	**5.09**	NA	NA
	09/26/12	**1.05**	0.0261	0.135	0.147	**6.56**	NA	NA
	11/28/12	**0.393**	0.0125	0.0183	0.0895	**3.06**	NA	NA
	05/15/13	**0.746**	0.0472	0.837	3.70	**18.5**	NA	NA
	11/07/13	**0.101**	0.0502	0.482	2.65	**12.8**	NA	NA
	04/23/14	**0.0762**	0.0345	0.325	1.97	**11.0**	NA	NA
MW-307	11/26/12	**2.150**	0.0858	0.833	0.513	**10.9**	NA	NA
	02/22/13	**0.497**	0.0358	0.226	0.145	**6.02**	0.604	< 0.094
	05/15/13	**0.437**	0.0461	0.167	0.120	**4.56**	NA	NA
	09/05/13	**0.643**	0.0645	0.154	0.131	**5.30**	NA	NA
	11/06/13	**0.568**	0.0448 J	0.104	0.0912	**4.39**	NA	NA
	04/22/14	**0.520**	0.0408	0.241	0.1520	**5.68**	NA	NA
MW-308	11/26/12	**0.144**	0.0010 J	0.0072	0.0013 J	0.778	NA	NA
	02/22/13	**0.668**	0.0078 J	0.0443	0.0059 J	**3.48**	0.354	< 0.10
	05/15/13	**0.392**	0.0052 J	0.0427	< 0.0046	**2.54**	NA	NA
	11/06/13	**0.237**	0.0033 J	0.0056	0.0026 J	**1.65**	NA	NA
	04/22/14	0.016	<0.001	0.00036 J	<0002	0.146	NA	NA
MW-309	11/28/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	NA	NA
	02/21/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.0790 J	< 0.10
	05/16/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	NA	NA
	11/06/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	NA	NA
	04/23/14	<0.001	<0.001	<0.001	<0.002	<0.10	NA	NA
MW-310	11/28/12	**0.86**	0.0265	0.211	0.147	**5.74**	NA	NA
	02/21/13	**1.80**	0.0768	0.506	0.180	**8.37**	0.603	< 0.10
	05/14/13	**0.993**	0.0703	0.654	0.175	**6.49**	NA	NA
	09/05/13	**0.960**	0.0598	0.310	0.110	**5.51**	NA	NA
	11/05/13	**0.772**	0.0409	0.226	0.0846	**4.92**	NA	NA
	04/23/14	**0.796**	0.0432	0.187	0.0607	**5.88**	NA	NA
SH-04	01/13/04	**1.2**	0.21	0.14	2.11	**15.0**	4.7	< 2.5
	04/20/04	**1.5**	0.49	0.64	5.79	**26.0**	6.2	< 10
	07/27/04	**1.3**	0.13	0.55	1.78	**15.0**	5.4	0.53
	04/20/05	**0.98**	0.061	0.36	1.07	**11.0**	4.2	< 1.5
	04/25/06	**1.3**	0.09	0.65	2.31	**20.0**	8.2	2.52
	10/30/07	**0.88**	0.032	0.32	0.08	**<5.0**	NA	NA
	05/20/08	**1.1**	0.05	0.52	0.66	**8.9**	4.8	0.92
	11/20/08	**0.79**	0.032	0.23	0.04	**6.6**	2.7	< 0.5
	04/08/09	**0.9**	0.04	0.25	0.19	**9.2**	4.7	< 0.1
	11/16/09	**0.48**	0.023	0.07	0.02	**4.9**	3.7	< 0.1
	04/27/10	**0.7**	0.03	0.27	0.13	**7.3**	4.7	0.39
	10/25/10	**0.58**	0.019	0.18	0.01	**4.0**	2.8	< 0.1
	05/23/11	**0.66**	0.015	0.15	0.03	**5.4**	1.8	0.13

Table 2
Shell Oil Harbor Island Terminal
Petroleum Hydrocarbons and BTEX in Groundwater
Compliance Monitoring Results for 2004 through 2014

Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
	10/27/11	**0.393**	0.0200	0.0926	0.0279	**5.35**	1.22	< 0.19
	03/01/12	**0.614**	0.0227	0.0932	0.0124 J	**5.53**	NA	NA
	06/11/12	**0.426**	0.0142	0.112	0.0198 J	**6.00**	1.49	0.393
	09/25/12	**0.124**	0.0184	0.461	0.139	**6.52**	NA	NA
	11/25/12	**0.0730**	0.0079 J	0.609	0.326	**8.15**	0.762	< 0.098
	05/15/13	0.0016 J	0.00050	0.0042	0.0032 J	**2.16**	0.376	< 0.096
	11/04/13	0.0032	0.00043 J	0.0071	0.0050	**1.05**	0.134	< 0.094
	04/24/14	0.0091	0.00053 J	0.00091 J	0.0014 J	**0.94**	0.469	0.0944 J

Table 2
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Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
TES-MW-1	01/14/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/20/04	0.0067	< 0.001	0.011	0.043	< 0.25	< 0.25	< 0.5
	04/20/04	0.0075	< 0.001	0.013	0.049	< 0.25	< 0.25	< 0.5
	07/28/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	10/18/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/25/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	01/25/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	< 0.25	< 0.5
	04/19/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.25	< 0.5
	07/13/05	0.001	< 0.001	0.006	0.0189	0.10	< 0.25	< 0.5
	10/20/05	0.0039	< 0.001	0.013	0.0437	0.23	< 0.25	< 0.5
	01/27/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.05	< 0.240	< 0.481
	11/18/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	< 0.25	< 0.5
	11/18/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	10/26/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	< 0.1	< 0.1
	05/24/11	<0.0003	<0.0005	<0.0003	<0.0007	<0.050	NA	NA
	10/27/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	< 0.10	< 0.20
	11/26/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.050	< 0.10
	11/06/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	< 0.048	< 0.095
TX-03A	01/13/04	**2.9**	0.018	0.038	0.091	**2.7**	0.86	< 0.5
	04/19/04	**4.4**	0.047	0.12	0.11	**12**	1.3	< 0.5
	07/27/04	**1.7**	0.011	0.016	0.037	**5.2**	0.81	< 0.5
	10/18/04	**3.2**	0.024	0.062	0.093	**7.5**	1.2	< 0.5
	01/24/05	**2.5**	0.02	< 0.01	0.065	**8.2**	0.54	< 0.5
	04/19/05	**2.5**	0.021	0.026	0.049	**6.1**	0.47	< 0.5
	07/12/05	**3.1**	0.024	0.044	0.054	**10**	0.32	< 0.5
	10/31/07	**2.2**	0.023	0.060	0.050	<5.0	NA	NA
	05/20/08	**0.9**	0.007	0.016	0.010	**3.0**	NA	NA
	11/20/08	**2.1**	0.019	0.038	0.018	**4.5**	NA	NA
	04/08/09	**1.2**	< 0.025	0.028	< 0.025	**3.5**	NA	NA
	11/17/09	**1.0**	0.008	0.016	0.011	**2.4**	NA	NA
	04/27/10	**1.7**	0.010	0.009	0.010	**4.6**	NA	NA
	10/25/10	**1.7**	0.011	0.067	0.013	**3.3**	NA	NA
	05/23/11	**1.78**	<0.025	0.044	<0.035	**7.5**	NA	NA
	10/27/11	**3.44**	0.0712	0.147	0.111	**8.51**	NA	NA
	03/01/12	**1.74**	0.0261	0.0272	0.0345 J	**5.58**	NA	NA
	06/12/12	**1.57**	0.0200 J	0.0139 J	0.0300 J	**6.78**	NA	NA
	09/25/12	**1.7**	0.0298	0.0410	0.0501	**5.53**	NA	NA
	11/28/12	**1.18**	0.0188 J	0.0232	0.0357 J	**4.91**	NA	NA
	02/21/13	**2.81**	0.0403	0.0421	0.0489 J	**8.20**	0.320	< 0.10
	05/15/13	**2.15**	0.0459 J	0.189	0.0643 J	**3.11**	NA	NA
	11/05/13	**2.72**	0.0343 J	0.0364 J	0.0411 J	**6.01**	NA	NA
	04/23/14	**1.22**	0.0171	0.0251	0.0270	**5.76**	NA	NA
TX-04	01/13/04	0.025	0.0055	< 0.001	0.01940	0.650	0.59	< 0.5
	04/21/04	0.0025	0.0017	< 0.001	0.0031	0.47	2.200	< 0.75
	07/27/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	1.50	< 0.5
	10/18/04	< 0.001	< 0.001	< 0.001	0.0022	0.28	1.2	< 0.5
	01/24/05	0.0310	0.0071	< 0.001	0.020	0.87	0.64	< 0.5
	04/20/05	0.014	0.00360	< 0.001	0.0085	0.54	0.73	< 0.5
	07/12/05	< 0.001	< 0.001	< 0.001	0.00140	0.340	0.82	< 0.5
	10/18/05	< 0.001	< 0.001	< 0.001	< 0.001	0.20	1.100	< 0.5
	01/25/06	0.00127	0.001	< 0.0005	0.00151	0.206	0.84	< 0.476
	11/18/08	< 0.005	< 0.005	< 0.005	< 0.005	0.076	< 0.25	< 0.5
	11/16/09	< 0.0005	< 0.001	< 0.001	< 0.001	0.17	0.13	< 0.1
	10/25/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.17	< 0.1
	05/23/11	<0.0003	<0.0005	<0.0003	<0.0007	0.055	NA	NA
	10/26/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	< 0.20	0.0966	< 0.20
	11/26/12	0.0013	0.00038 J	< 0.00020	0.00052 J	0.0980 J	0.0807 J	< 0.10
	11/04/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.0492 J	< 0.095

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Location ID	Sample Date	Chemical (mg/L)						
		Benzene	Toluene	Ethyl-benzene	Total Xylenes (mixed isomers)	Gasoline Range Hydro-carbons	Diesel Range Hydro-carbons	Motor Oil Range Hydrocarbons
Cleanup Level*(mg/L)		**0.071**	**200**	**29**	**NE**	**1**	**10**	**10**
TX-06A	01/14/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	5.8	< 1
	04/21/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	3.4	< 0.75
	07/27/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	3.6	< 0.5
	10/18/04	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	4.1	< 0.5
	01/24/05	< 0.001	< 0.001	< 0.001	< 0.001	< 0.25	2.7	< 0.5
	04/20/05	< 0.001	< 0.001	< 0.001	< 0.001	0.18	6.3	< 1.5
	07/13/05	< 0.001	< 0.001	< 0.001	< 0.001	0.26	2.5	< 0.5
	10/18/05	< 0.001	< 0.001	< 0.001	< 0.001	0.072	0.93	< 0.5
	01/26/06	< 0.0005	< 0.0005	< 0.0005	< 0.001	0.126	1.57	< 0.476
	11/18/08	< 0.005	< 0.005	< 0.005	< 0.005	< 0.05	0.49	< 0.5
	11/17/09	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.24	< 0.1
	10/28/10	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.1	0.72	< 0.1
	10/25/11	< 0.0010	< 0.0010	< 0.0010	< 0.0020	0.0519	0.499	< 0.21
	11/25/12	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.50	0.716	< 0.098
	11/07/13	< 0.00020	< 0.00020	< 0.00020	< 0.00046	< 0.050	0.358	< 0.095

Note:
*** =** Cleanup levels per the Cleanup Action Plan (Ecology, 1998)
Bold = indicate detected concentration greater than cleanup level.
< = concentration undetected at the detection limit.
ID = identification
J = indicates a estimated value.
mg/L = milligrams per liter
NA = not analyzed
NE = not established
[a] = Result is from Run #2

Table 3
Shell Oil Harbor Island Terminal
Compliance Monitoring Natural Attenuation Parameters
2004 through 2013

Well	Date	Parameter																					
		Gasoline Range Hydrocarbons (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	B/X Ratio	Total BTEX (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Dissolved Oxygen (mg/L)	Hardness (mg/L)	Iron Total (mg/L)	Ferrous Iron (mg/L)	Methane (mg/L)	ORP (mv)	pH	Specific Conductance (µS/cm)	Sulfate (mg/L)	Temperature (°C)	Turbidity (NTU)	Iron Dissolved (mg/L)	Manganese Dissolved (mg/L)
Upgradient Wells																							
TES-MW-1	01/14/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	9.4	NM	NM	NM	NM	100	4.79	223	NM	10.5	4.4	NM	NM
	04/20/04	< 0.25	0.0067	< 0.001	0.011	0.043	--	0.0607	40	12.5	3.1	60	0.135	ND	< 0.0012	132.6	4.57	149	39.1	10.7	4.0	NM	NM
	04/20/04	< 0.26	0.0075	< 0.001	0.013	0.049	--	0.0695	NM	NM	NM	NM	0.138	NM	0.14	NM	NM	NM	46.3	NM	NM	NM	NM
	07/28/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	1.6	NM	NM	NM	NM	164.7	5.40	171	NM	17.6	4.1	NM	NM
	10/18/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	5.4	NM	NM	NM	NM	245	5.04	106	NM	14.6	-10.0	NM	NM
	01/25/05	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	5.5	NM	NM	NM	NM	208	4.98	93	NM	11.0	8.0	NM	NM
	04/20/05	0.18	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	10	50	4.9	<20	0.844	0	<0.0012	62	5.33	8.2	14.6	11.9	NM	NM	NM
	07/13/05	0.26	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	0.1	NM	NM	NM	NM	155.8	5.52	118	NM	16.4	3.8	NM	NM
	10/18/05	0.072	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	0.16	NM	NM	NM	NM	99.2	6.44	157	NM	16.1	9.6	NM	NM
	01/26/06	0.126	< 0.0005	< 0.0005	< 0.0005	< 0.001	--	< 0.001	NM	NM	5.52	NM	NM	NM	NM	212.7	5.53	41	NM	8.3	4.5	NM	NM
	11/18/08	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	--	< 0.005	NM	NM	7.81	NM	NM	NM	NM	308.0	4.92	311	NM	13.7	13.1	NM	NM
	11/18/09	< 0.1	< 0.0005	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	6.19	NM	NM	NM	NM	169.0	4.78	16.3	NM	11.2	0.0	NM	NM
	10/26/10	< 0.1	< 0.0005	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	4.80	NM	NM	NM	NM	161.0	4.65	12.0	NM	11.9	15.1	NM	NM
	10/27/11	< 0.20	< 0.0010	< 0.0010	< 0.0010	< 0.0020	--	< 0.0020	NM	NM	3.38	NM	NM	NM	NM	-7.2	8.47	104	NM	11.57	10.9	NM	NM
	11/26/12	< 0.050	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/06/13	< 0.050	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00020	NM	NM	2.91	NM	NM	NM	NM	181	5.84	137	NM	12.27	0	NM	NM
Plume Wells																							
MW-101	01/14/04	NA	NA	NA	NA	NA	--	NA	NM	NM	1.72	NM	NM	NM	NM	-99.7	5.42	202	NM	12.3	1.9	NM	NM
	01/16/04	0.55	< 0.001	< 0.001	< 0.001	0.0028	--	0.0028	NM	NM	0.87	NM	NM	NM	NM	-61.5	6.52	225	NM	12.4	6.9	NM	NM
	04/20/04	0.67	0.0016	< 0.001	< 0.001	0.0014	--	0.003	140	65	0.78	> 400	15.5	4.5	0.06	120	6.1	247	17.2	12.0	5.8	NM	NM
	07/28/04	1	0.0012	< 0.001	< 0.001	0.0011	--	0.0023	NM	NM	0.4	NM	NM	NM	NM	60.3	6.86	280	NM	17.8	4.3	NM	NM
	10/18/04	0.42	0.0011	< 0.001	< 0.001	< 0.001	--	0.0011	NM	NM	0.24	NM	NM	NM	NM	132.3	14.25	386	NM	15.1	5.5	NM	NM
	01/26/05	0.51	< 0.001	< 0.001	< 0.001	0.0011	--	0.0011	NM	NM	1.51	NM	NM	NM	NM	36	7.74	356	NM	11.8	-1.0	NM	NM
	04/19/05	0.58	0.0016	< 0.001	< 0.001	< 0.001	--	0.0016	160	100	NM	>600	24.6	4	0.58	-98	6.71	389	39	12.8	NM	NM	NM
	07/13/05	0.31	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	0.07	NM	NM	NM	NM	-75	6.68	319	NM	16.0	1.4	NM	NM
	10/10/05	0.16	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	0.25	NM	NM	NM	NM	-89.8	7.01	661	NM	16.2	1.0	NM	NM
	01/27/06	0.223	< 0.0005	< 0.0005	< 0.0005	< 0.001	--	< 0.001	NM	NM	0.18	NM	NM	NM	NM	-47.7	6.57	187	NM	10.8	17.4	NM	NM
	11/18/08	0.100	< 0.005	< 0.005	< 0.005	< 0.005	--	< 0.005	NM	NM	1.49	NM	NM	NM	NM	-55.0	6.98	725	NM	13.6	33.4	NM	NM
	11/18/09	< 0.1	< 0.0005	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	1.45	NM	NM	NM	NM	-95	6.53	38.3	NM	12.4	2.7	NM	NM
	10/26/10	0.150	< 0.0005	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	1.79	NM	NM	NM	NM	-125	6.57	31.7	NM	11.5	21.0	NM	NM
	10/27/11	0.094	< 0.0010	< 0.0010	< 0.0010	< 0.0020	--	< 0.0050	NM	NM	5.65	NM	NM	NM	NM	-108	8.81	228.0	NM	11.6	15.1	NM	NM
	11/26/12	0.188 J	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/06/13	0.118 J	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00020	NM	NM	6.44	NM	NM	NM	NM	-78.7	6.31	256	NM	13.13	1.51	NM	NM

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2004 through 2013

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		Gasoline Range Hydrocarbons (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	B/X Ratio	Total BTEX (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Dissolved Oxygen (mg/L)	Hardness (mg/L)	Iron Total (mg/L)	Ferrous Iron (mg/L)	Methane (mg/L)	ORP (mv)	pH	Specific Conductance (µS/cm)	Sulfate (mg/L)	Temperature (°C)	Turbidity (NTU)	Iron Dissolved (mg/L)	Manganese Dissolved (mg/L)
TX-03A	01/13/04	**2.7**	**2.9**	0.018	0.038	0.091	32	3.052	NM	NM	1.400	NM	NM	NM	NM	-59	6.39	480	NM	14.0	1.8	NM	NM
	04/19/04	**12**	**4.4**	0.047	0.12	0.11	40	4.677	360	150	1.440	> 600	36.1	6.000	13	21	6.18	560	< 1	13.7	2.4	NM	NM
	07/27/04	**5.2**	**1.7**	0.011	0.016	0.037	46	1.764	NM	NM	1.310	NM	NM	NM	NM	68	6.26	589	NM	17.9	3.0	NM	NM
	10/18/04	**7.5**	**3.2**	0.024	0.062	0.093	34	3.379	NM	NM	2.770	NM	NM	NM	NM	-100	6.63	595	NM	16.7	42.0	NM	NM
	01/24/05	**8.2**	**2.5**	0.02	< 0.01	0.065	38	2.585	NM	NM	1.79	NM	NM	NM	NM	5.0	5.11	563	NM	14.6	43.1	NM	NM
	04/19/05	**6.1**	**2.5**	0.021	0.026	0.049	51	2.596	320	150	0	>600	35.3	4	1.9	-86	6.47	552	< 1	13.8	20	NM	NM
	07/12/05	**10**	**3.1**	0.024	0.044	0.054	57	3.222	NM	NM	0.16	NM	NM	NM	NM	-121.0	6.55	477	NM	17.3	55.6	NM	NM
	10/31/07	< 5	**2.2**	0.023	0.060	0.050	44	2.330	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/20/08	**4.5**	**2.1**	0.019	0.038	0.018	117	2.175	169	210	0.5	NM	39.3	30.4	3.5	-59	6.87	821	< 1	15.8	31.8	NM	NM
	04/08/09	**3.5**	**1.2**	< 0.025	0.028	< 0.025	--	1.228	NM	NM	0	NM	NM	NM	NM	-145	6.58	236	NM	12.8	43.1	NM	NM
	11/17/09	**2.4**	**0.97**	0.0078	0.016	0.011	88	1.005	202	65.8	1.29	160	32.2	36	12.8	-102	6.39	50.6	1.2	16.3	9.7	NM	NM
	04/27/10	**4.6**	**1.7**	0.0096	0.0087	0.0099	172	1.7282	NM	NM	0.21	NM	NM	NM	NM	-153	5.76	52.8	NM	13.2	9.5	NM	NM
	10/25/10	**3.3**	**1.7**	0.011	0.067	0.013	131	1.7910	181	0.27	1.39	140	34.6	30	5.84	-115	6.68	42.5	6.8	15.5	48.0	NM	NM
	05/23/11	**7.5**	**1.78**	<0.025	0.044	<0.035	--	1.8240	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	10/27/11	**8.51**	**3.44**	0.0712	0.147	0.111	31.0	3.7692	247	9.29	1.72	196	30.8	20.3	12.2	-101	8.50	478	< 0.50	15.44	NM	NM	NM
	03/01/12	**5.58**	**1.74**	0.0261	0.0272	0.0345	50.4	1.83	NM	NM	0.00	NM	NM	NM	NM	-118	6.71	564	NM	12.29	12.6	NM	NM
	06/12/12	**6.78**	**1.57**	0.0200	0.0139	0.0300	52.3	1.63	NM	NM	4.00	NM	NM	NM	NM	-103	7.19	507	NM	14.0	4.5	NM	NM
	09/25/12	**5.53**	**1.7**	0.0298	0.041	0.0501	33.9	1.82	NM	NM	0.00	NM	NM	NM	NM	-139	6.48	514	NM	17.83	15.2	NM	NM
	11/28/12	**4.91**	**1.18**	0.0188 J	0.0232	0.0357 J	33.1	1.26	164	16.4	0.00	127	33.9	NM	6.08	-104	6.70	439	< 0.50	13.79	NM	NM	NM
	11/05/13	**6.01**	**2.72**	0.0343 J	0.0364 J	0.0411 J	66.2	2.83	188	16.4	0.06	152	44.9	4.0	6.27	-114	6.57	528	< 0.50	10.98	0.0	< 0.200	0.470
MW-302	03/01/12	**5.33**	**0.831**	0.0275	0.213	0.248	3.35	1.32	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	06/12/12	**4.18**	**0.574**	0.0156	0.0183	0.0244	23.5	0.63	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	06/28/12	**5.65**	**1.23**	0.0437	0.403	0.289	4.26	1.97	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	09/25/12	**4.07**	**0.657**	0.0247	0.180	0.106	6.20	0.97	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/25/12	**4.58**	**0.449**	0.0152	0.191	0.177	2.54	0.83	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/05/13	**2.69**	**0.607**	0.0112	0.0977	0.0529	11.5	0.769	102	15.7	0.10	84.3	2.11	6.0-6.5	3.41	-67	6.42	346	13.2	14.81	0.0	< 0.200	0.349
MW-304	11/05/13	**2.67**	**0.695**	0.0163	0.0629	0.0540	12.9	0.828	128	12.7	0.10	88.6	35.5	7.0	7.65	-119	6.60	396	< 0.50	12.20	0.0	0.345	0.273
MW-307	11/26/12	**10.9**	**2.15**	0.0858	0.833	0.513	4.19	3.58	144	16.0	0.00	84.9	33.5	NM	7.92	-62	7.18	332	1.5	12.70	36.6	NM	NM
	11/06/13	**4.4**	**0.568**	0.0448 J	0.104	0.091	6.23	0.808	60.0	8.44	0.07	45.4	27.0	3.5	7.27	-106	6.42	231	< 0.50	12.31	0.8	< 0.200	0.217
MW-308	11/26/12	0.778	**0.144**	0.0010 J	0.007	0.0013 J	110	0.153	298	6.17	0.00	384	0.542	NM	2.49	23	6.79	728	97.0	10.65	25.2	NM	NM
	11/06/13	**1.650**	**0.237**	0.0033 J	0.006	0.0026 J	91	0.249	NM	NM	4.89	NM	NM	NM	NM	NM	6.09	307	NM	12.98	0.99	NM	NM
MW-309	11/28/12	< 0.050	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00046	84.0	7.34	0.00	94.7	36.6	NM	0.188	-126	7.80	358	32.1	15.25	36.8	NM	NM
	11/06/13	< 0.050	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00046	NM	NM	1.51	NM	NM	NM	NM	NM	6.18	325	NM	15.75	6.6	NM	NM
MW-310	11/28/12	**5.74**	**0.86**	0.0265	0.211	0.147	5.9	1.24	158	13.3	0.00	132	29.3	NM	6.70	-88	7.22	385	< 0.50	13.97	80.6	NM	NM
	11/05/13	**4.92**	**0.772**	0.0409	0.226	0.085	9.1	1.12	134	11.3	0.05	114	29.6	2.0-2.5	4.52	-95	6.44	396	< 0.50	14.07	0.0	0.982	0.528
TW-01	11/07/13	**3.24**	**0.431**	0.0245	0.132	0.072	6.0	0.66	80.0	9.31	1.25	58.0	27.0	3.0	5.29	-45.1	6.03	228	2.7	15.38	3.01	4.58	0.320

Table 3
Shell Oil Harbor Island Terminal
Compliance Monitoring Natural Attenuation Parameters
2004 through 2013

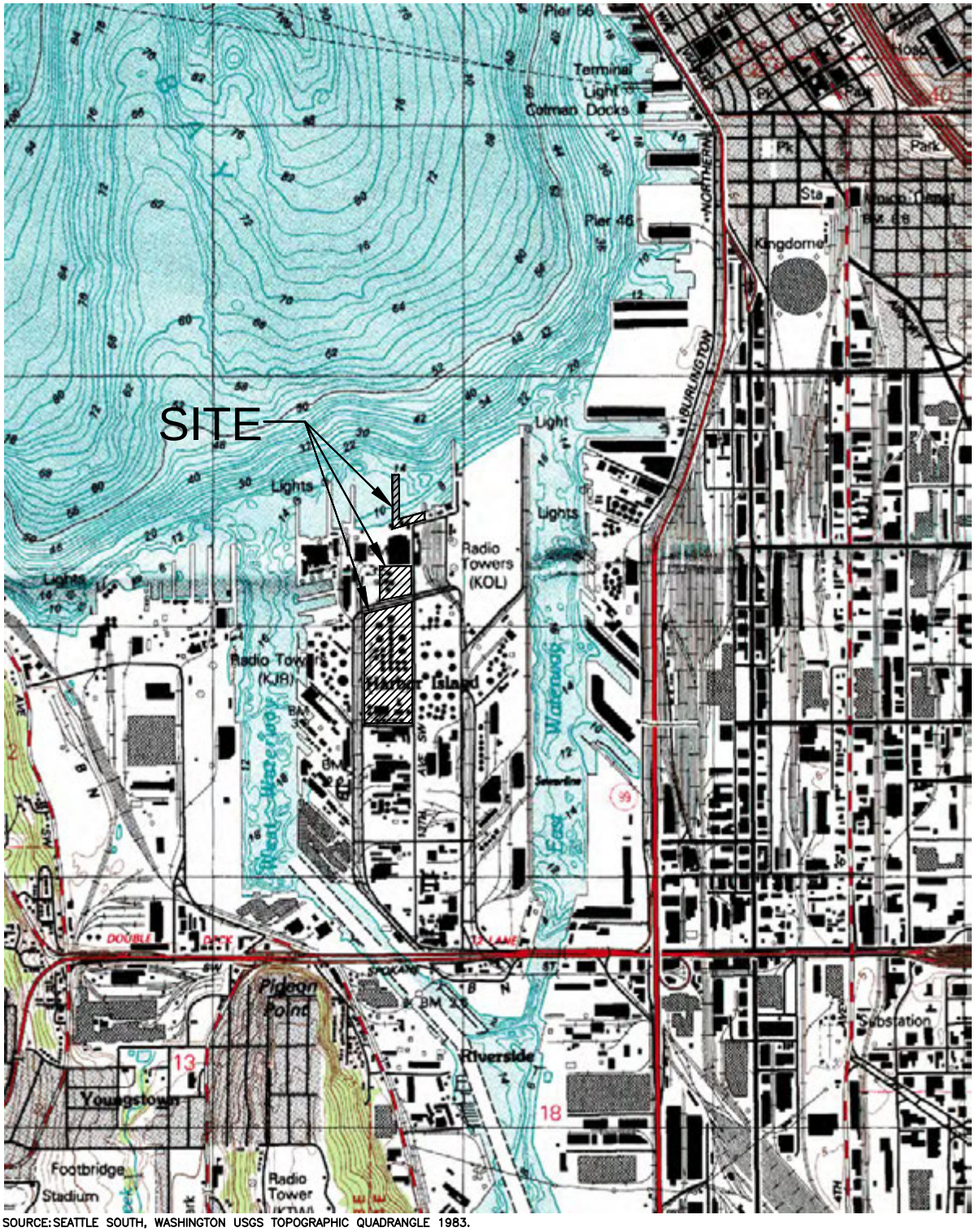
Well	Date	Parameter																					
		Gasoline Range Hydrocarbons (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	B/X Ratio	Total BTEX (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Dissolved Oxygen (mg/L)	Hardness (mg/L)	Iron Total (mg/L)	Ferrous Iron (mg/L)	Methane (mg/L)	ORP (mv)	pH	Specific Conductance (µS/cm)	Sulfate (mg/L)	Temperature (°C)	Turbidity (NTU)	Iron Dissolved (mg/L)	Manganese Dissolved (mg/L)
MW-202	01/14/04	**2.5**	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	12.4	NM	NM	NM	NM	-40.2	5.32	52	NM	8.0	9.1	NM	NM
	04/20/04	**4.4**	0.014	0.0062	0.074	0.021	0.67	0.1152	180	160	1.31	> 400	47.8	3	0.92	112	5.27	317	< 1	12.1	9.8	NM	NM
	01/26/05	**7.7**	< 0.005	< 0.005	< 0.005	< 0.005	--	< 0.005	NM	NM	1.69	NM	NM	NM	NM	3	4.8	218	NM	11.6	126	NM	NM
	04/20/05	**3.7**	0.016	0.0022	0.036	0.0237	0.68	0.0779	200	180	0	>600	42.2	8	0.9	-60	7.78	44	<1	12.6	26.0	NM	NM
	07/13/05	**3.5**	0.016	0.0033	0.067	0.0191	0.84	0.1054	NM	NM	0.11	NM	NM	NM	NM	-22	6.09	281	NM	15.7	6.3	NM	NM
	10/20/05	**3.3**	0.019	0.0021	0.058	0.0056	3.4	0.0847	NM	NM	0.44	NM	NM	NM	NM	-47.9	6.42	576	NM	15.5	5.5	NM	NM
	01/26/06	**5.79**	0.0224	0.00598	0.041	0.0191	1.17	0.0885	NM	NM	0.18	NM	NM	NM	NM	-104.7	7.73	213	NM	10.78	70	NM	NM
	11/20/08	**5.00**	NM	NM	NM	NM	--	NM	73	220	3.65	228	32.5	36.6	1.8	232.0	6.40	532	< 1	14.50	10	NM	NM
	04/07/09	**4.80**	NM	NM	NM	NM	--	NM	NM	NM	0	NM	NM	NM	NM	-82	6.12	0.175	NM	11.86	56.1	NM	NM
	11/19/09	**6.60**	NM	NM	NM	NM	--	NM	64	194	1.65	120	45.2	19	2.31	-53	5.81	51.6	82	12.4	29.5	NM	NM
	04/27/10	**3.30**	NM	NM	NM	NM	--	NM	NM	NM	0.22	NM	NM	NM	NM	-96	5.46	34	NM	12.3	55.4	NM	NM
	10/27/10	**6.00**	0.0081	0.0031	0.066	0.0022	3.7	0.0794	75	71.8	2.35	70	34.8	7.4	4.36	-48	6.15	29.5	< 1.0	15	24	NM	NM
	10/26/11	**4.30**	NM	NM	NM	NM	--	NM	84	21.3	2.45	45.4	27.4	8.5	6.08	-104	8.22	214	< 0.50	12.90	2.72	NM	NM
	03/02/12	**3.87**	0.0053	0.0019	0.0107	0.0013	4.1	0.0192	NM	NM	0.00	NM	NM	NM	NM	-39	6.30	334	NM	10.03	27.2	NM	NM
	06/13/12	**3.31**	NM	NM	NM	NM	--	NM	NM	NM	4.36	NM	NM	NM	NM	-59	7.22	284	NM	12.5	25.7	NM	NM
	09/26/12	**4.07**	0.0058	0.0029	0.0378	< 0.0018	--	0.0465	NM	NM	0.00	NM	NM	NM	NM	-112	6.74	332	NM	14.20	25.0	NM	NM
	11/27/12	**6.07**	0.0113	0.0034	0.0274	0.0022	5.1	0.0443	110	10.6	0.00	101	35.9	NM	1.07	-70	7.33	383	15.0	12.99	77.7	NM	NM
	11/06/13	**4.68**	< 0.00020	0.0027	0.0335	0.0012 J	--	0.0374	80.0	22.1	2.28	71.8	37.9	3.0	3.57	-43.6	5.79	263	0.76	13.67	4.9	< 0.200	0.439
MW-203	01/13/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	2.91	NM	NM	NM	NM	-6.9	6.38	243	NM	12.4	13.7	NM	NM
	04/19/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	220	85	1.02	180	12	1	< 0.0012	110	6.58	369	2.4	13.0	39.2	NM	NM
	07/27/04	**2.6**	0.013	< 0.001	0.0069	< 0.001	--	0.0199	NM	NM	1.12	NM	NM	NM	NM	90.9	6.11	514	NM	16.4	32.2	NM	NM
	10/18/04	**1.6**	0.013	< 0.001	0.015	0.0025	5.2	0.0305	NM	NM	0.35	NM	NM	NM	NM	136.8	9.42	643	NM	14.8	110	NM	NM
	01/25/05	**1.6**	0.0063	< 0.001	0.011	0.0013	4.8	0.0186	NM	NM	2.79	NM	NM	NM	NM	21	6.37	476	NM	12.9	210	NM	NM
	04/19/05	0.63	0.0068	< 0.001	0.0018	< 0.001	--	0.0086	220	145	0	>600	26.7	5.5	0.43	0	6.22	44	6.48	12.8	5	NM	NM
	07/13/05	0.89	0.01	< 0.001	0.0077	< 0.001	--	0.0177	NM	NM	0.67	NM	NM	NM	NM	-46	6.34	351	NM	15.0	15	NM	NM
	10/20/05	**4.2**	0.023	0.002	0.021	0.0026	8.8	0.0486	NM	NM	1.12	NM	NM	NM	NM	-48.7	6.69	902	NM	15.9	34	NM	NM
	01/23/06	0.76	0.00186	< 0.0005	0.00182	0.00125	1.49	0.00493	NM	NM	2.2	NM	NM	NM	NM	7.6	6.45	131	NM	11.4	60	NM	NM
	11/18/08	0.17	NM	NM	NM	NM	--	NM	80	< 10	10.3	208	1.56	1.35	< 0.0012	87.0	7.11	448	17.1	13.9	190	NM	NM
	04/08/09	< 0.1	NM	NM	NM	NM	--	NM	NM	NM	1.87	NM	NM	NM	NM	-31.0	6.83	136	NM	12.2	338	NM	NM
	11/17/09	< 0.1	NM	NM	NM	NM	--	NM	86	22.1	5.5	86	2.36	< 0.1	< 0.001	197	6.28	25.8	8.3	12.2	45.6	NM	NM
	04/26/10	0.16	NM	NM	NM	NM	--	NM	NM	NM	0.30	NM	NM	NM	NM	-109.0	6.81	40.9	NM	12.7	80.1	NM	NM
	10/25/10	0.92	NM	NM	NM	NM	--	NM	139	0.04	1.58	150	7.83	4.3	0.104	-4	6.10	43.8	14	14.1	51.8	NM	NM
	05/23/11	0.333	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	10/26/11	**1.38**	NM	NM	NM	NM	--	NM	180	26.2	2.94	146	28.1	8.8	0.701	-81	8.40	384.0	< 0.50	13.98	10.9	NM	NM
	06/13/12	0.459	NM	NM	NM	NM	--	NM	NM	NM	4.27	NM	NM	NM	NM	-38	7.20	375	NM	12.8	22.3	NM	NM
	11/27/12	**1.05**	NM	NM	NM	NM	--	NM	170	16.7	0.00	140	21.2	NM	0.582	22	6.61	250	24.4	14.83	41.7	NM	NM
	11/06/13	0.680	NM	NM	NM	NM	--	NM	190	20.1	0.18	161	21.9	3.0	0.800	-51	6.35	486	< 0.50	12.59	0.0	3.68	0.178

Table 3
Shell Oil Harbor Island Terminal
Compliance Monitoring Natural Attenuation Parameters
2004 through 2013

Well	Date	Parameter																					
		Gasoline Range Hydrocarbons (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	B/X Ratio	Total BTEX (mg/L)	Total Alkalinity (mg/L)	Carbon Dioxide (mg/L)	Dissolved Oxygen (mg/L)	Hardness (mg/L)	Iron Total (mg/L)	Ferrous Iron (mg/L)	Methane (mg/L)	ORP (mv)	pH	Specific Conductance (µS/cm)	Sulfate (mg/L)	Temperature (°C)	Turbidity (NTU)	Iron Dissolved (mg/L)	Manganese Dissolved (mg/L)
Downgradient Well																							
MW-201	01/14/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	1.98	NM	NM	NM	NM	-95.5	5.59	282	NM	12.0	1.5	NM	NM
	04/20/04	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	40	30	5.52	> 400	0.0772	ND	< 0.0012	61.3	5	101	5.71	11.4	7.0	NM	NM
	01/26/05	< 0.25	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	9.12	NM	NM	NM	NM	129	5.48	720	NM	9.0	9.0	NM	NM
	04/20/05	< 0.25	< 0.001	< 0.001	< 0.001	0.0021	--	0.0021	15	24	6.24	40	0.205	0	<0.0012	83	6.66	700	7.67	11.9	8.0	NM	NM
	07/13/05	0.12	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	0.16	NM	NM	NM	NM	178.1	5.64	99	NM	15.4	1.9	NM	NM
	10/20/05	0.22	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	0.42	NM	NM	NM	NM	49.2	7.21	535	NM	14.1	3.9	NM	NM
	01/26/06	< 0.050	< 0.0005	< 0.0005	< 0.0005	< 0.001	--	< 0.001	NM	NM	7.47	NM	NM	NM	NM	-72.5	7.02	24	NM	8.3	4	NM	NM
	11/20/08	< 0.05	< 0.005	< 0.005	< 0.005	< 0.005	--	< 0.005	NM	NM	14.08	NM	NM	NM	NM	268.0	6.12	172	NM	9.3	38	NM	NM
	04/07/09	**3.5**	0.0074	< 0.001	0.023	0.0016	4.6	0.032	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/19/09	< 0.1	< 0.0005	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	7.79	NM	NM	NM	NM	61.0	5.21	13.2	NM	10.6	6.5	NM	NM
	10/27/10	< 0.1	< 0.0005	< 0.001	< 0.001	< 0.001	--	< 0.001	NM	NM	6.92	NM	NM	NM	NM	157	4.79	15.2	NM	12.7	0.5	NM	NM
	10/26/11	0.0899	< 0.0010	< 0.0010	< 0.0010	< 0.0020	--	< 0.0050	NM	NM	2.77	NM	NM	NM	NM	-76.0	7.59	655	NM	11.53	5.9	NM	NM
	11/27/12	< 0.050	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
	11/06/13	0.0964 J	< 0.00020	< 0.00020	< 0.00020	< 0.00046	--	< 0.00020	NM	NM	0	NM	NM	NM	NM	-74	6.68	800	NM	11.78	0	NM	NM

Note:
< = concentration undetected at the detection limit.
Bold = detected concentration greater than cleanup level defined by Cleanup Action Plan (Ecology, 1998) for Gasoline (1 mg/L) or benzene (0.071 mg/L)
*** =** Cleanup levels per the Cleanup Action Plan (Ecology, 1998)
^{o}C = degrees Celsius
BTEX = benzene, toluene, ethylbenzene, and total xylenes
B/X = benezene to xylene
ID = identification
mg/L = milligrams per liter
mV = millivolts
NA = not analyzed
ND = Not detected
NM = Not measured
NTU = nephelometric turbidity unit
ORP = oxidation-reduction potential
µS/cm = microsiemens per centimeter

FIGURES



SOURCE: SEATTLE SOUTH, WASHINGTON USGS TOPOGRAPHIC QUADRANGLE 1983.

SITE VICINITY MAP

SHELL
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

FIGURE 1

URS

415-2328-007/046C(FR01) 8/10 (B)

N

0 300

SCALE IN FEET

Operable Unit Boundary

Figure 2
Harbor Island Operable Units

415-2328-007/046C(FR01) 9/10 (B)

N

0 175

SCALE IN FEET

Figure 3
Tank Farm Facility Boundaries

LEGEND

- MW-212 — Shallow groundwater monitoring well location
- MW-205 — Deep groundwater monitoring well location
- MW-210 — Product recovery / monitoring well location
- TW-01 — 4" Pumping Test Well
- ASW-1 — 1" Air Sparging Test Well
- SVE-1 — 3/4" Permanent Soil Vapor Monitoring Well
- PSV-1 — 4" Soil Vapor Extraction Text Well
- P-101 — Piezometer location
- Shell property line

100 0 100 200

SCALE IN FEET

URS

SITE MAP

SHELL - HARBOR ISLAND TERMINAL
ANNUAL COMPLIANCE MONITORING REPORT
SEATTLE, WASHINGTON

FIGURE 4

K:\46194268_Seattle_Terminal\MXD\2014\DEC\FIGURE 4.dwg Dec 09, 2014 - 1:12pm

Map Features

- Shell Groundwater Monitoring Well
- Shell Piezometer
- Proposed Monitoring Well
- Kinder-Morgan Groundwater Monitoring Well
- Kinder-Morgan Temporary Groundwater Monitoring Well
- Groundwater Contour (8.5)
- Approximate Groundwater Flow Direction
- Shell Site Boundary
- Kinder-Morgan Site Boundary

Source: USGS, 2009.

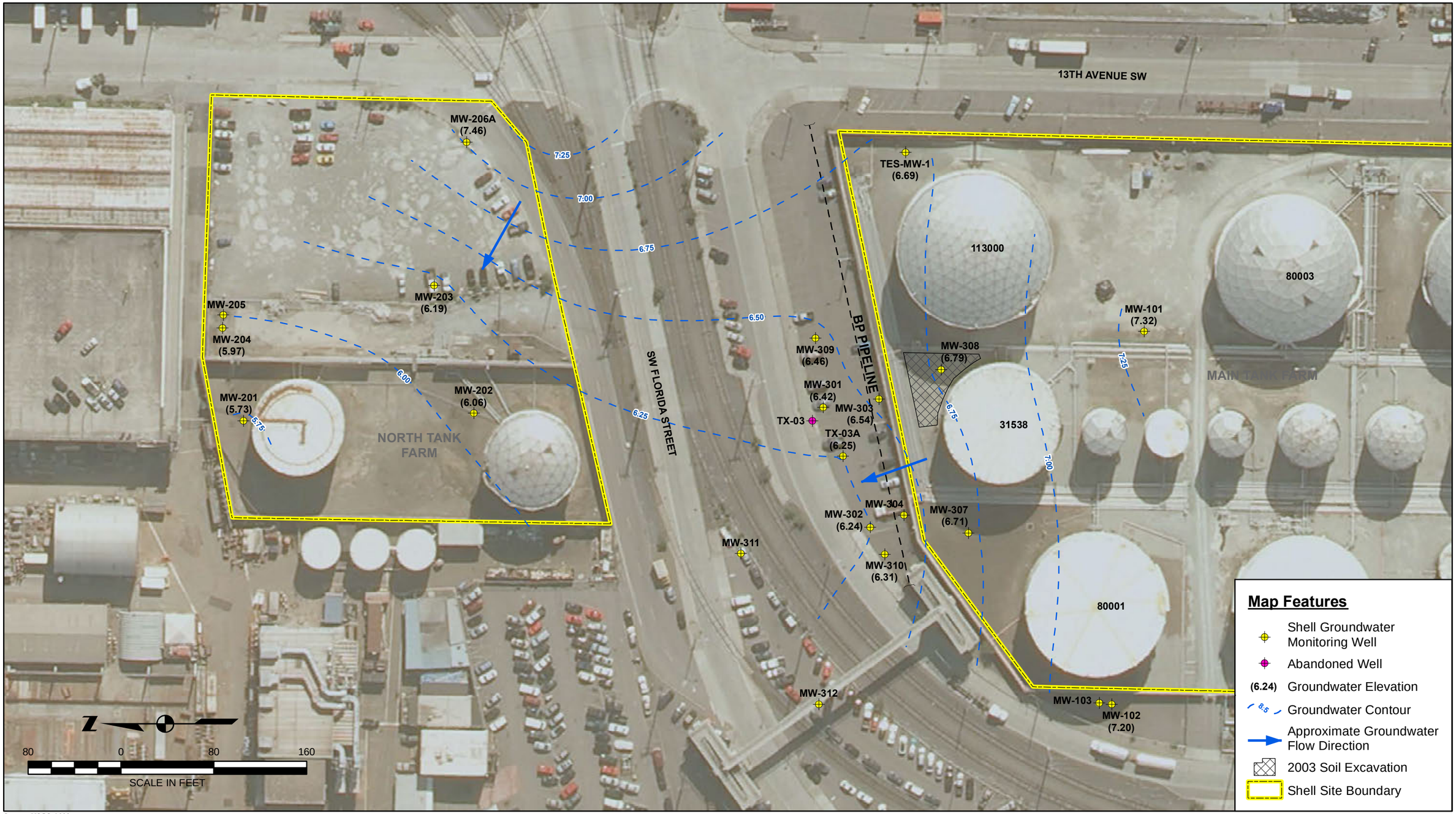
K:\46194268_Seattle_Terminal\MXD\2014\DEQ\Fig 5 SH-04 GW Contours - Aug 2012.mxd

URS

GROUNDWATER CONTOUR MAP SH-04 AREA – AUGUST 2012

SHELL
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

FIGURE 5



Source: USGS, 2009.

TX-03A AREA GROUNDWATER SURFACE CONTOUR MAP – MAY 2013

SHELL - HARBOR ISLAND TERMINAL
ANNUAL COMPLIANCE MONITORING REPORT
SEATTLE, WASHINGTON

URS

FIGURE 6

K:\46194268_Seattle_Terminal\MXD\2014\DEQ\Fig 6 TX-03A GW Contours - May 2013.mxd

Figure 7: SH-04 Groundwater BTEX and Gasoline Concentrations

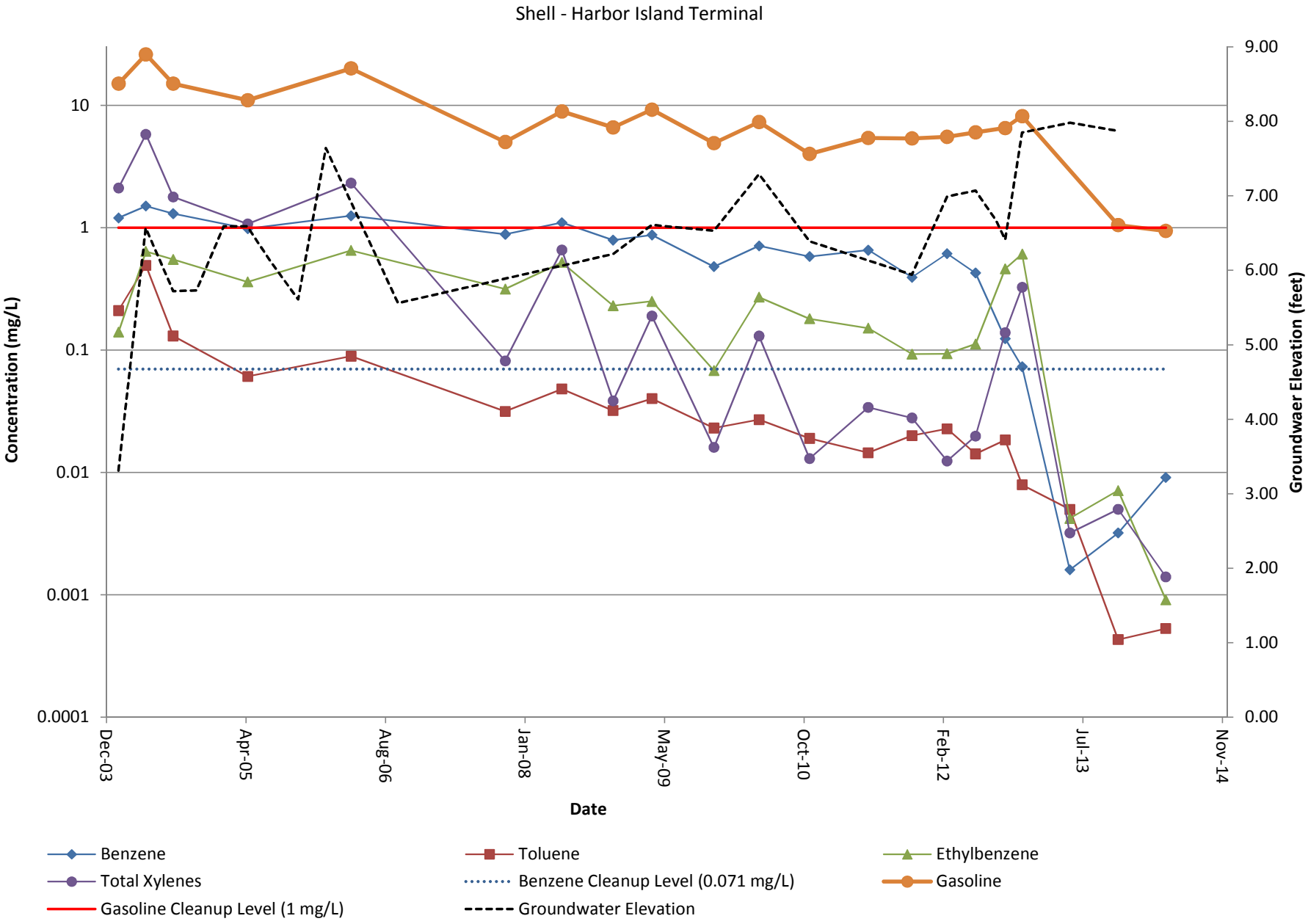


Figure 8: MW-305 Groundwater BTEX and Gasoline Concentrations

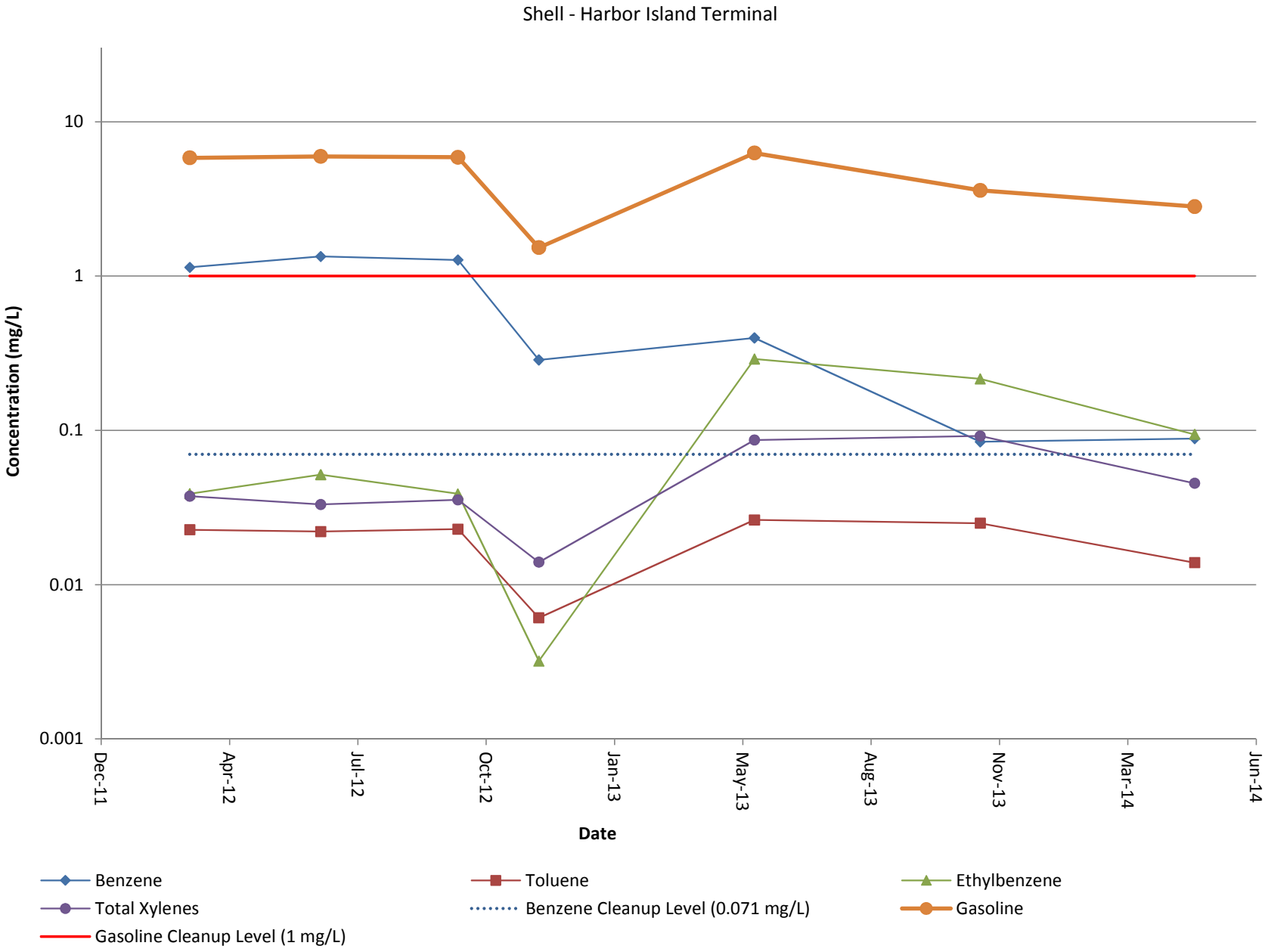


Figure 9: MW-306 Groundwater BTEX and Gasoline Concentrations

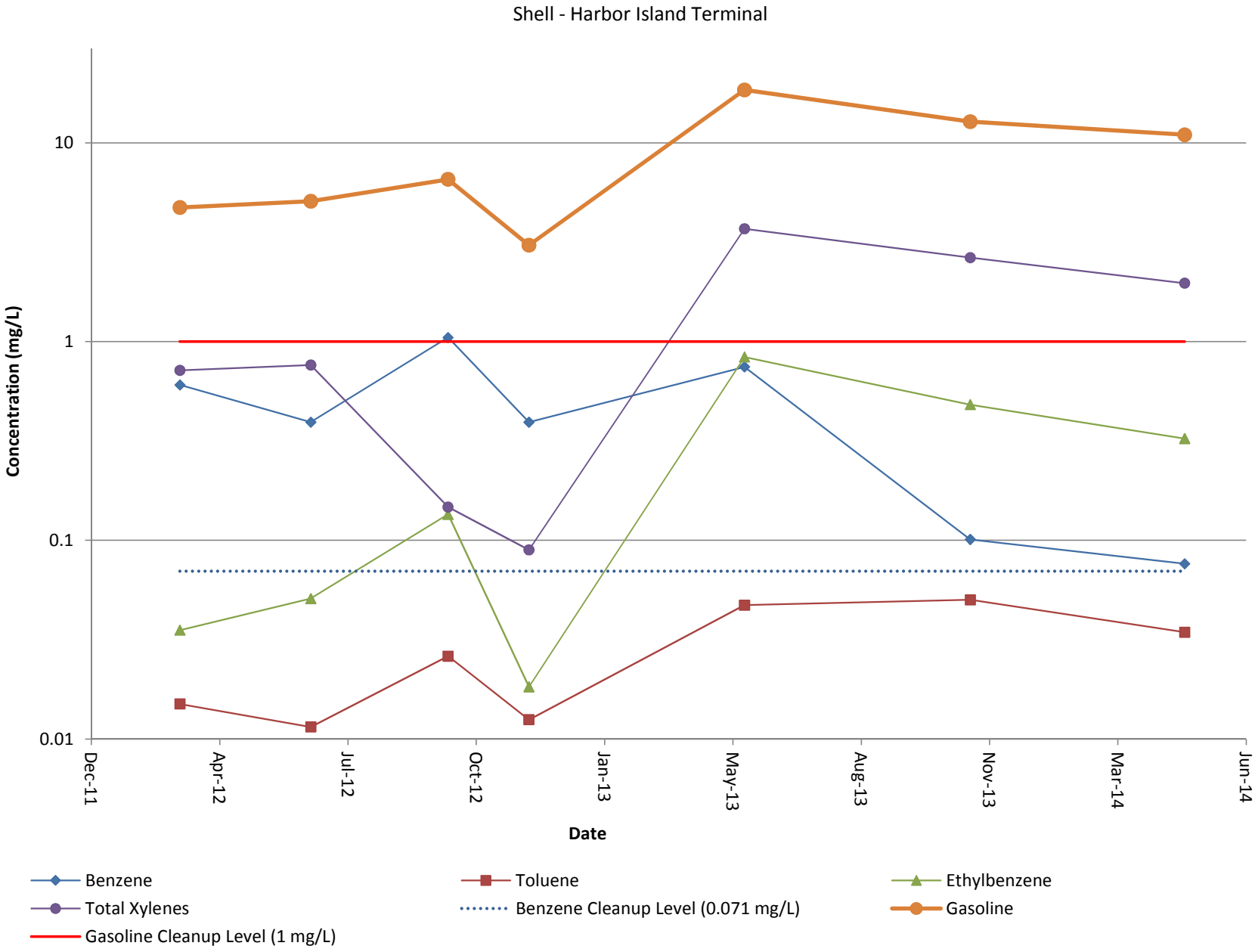


Figure 10: MW-202 Groundwater BTEX and Gasoline Concentrations

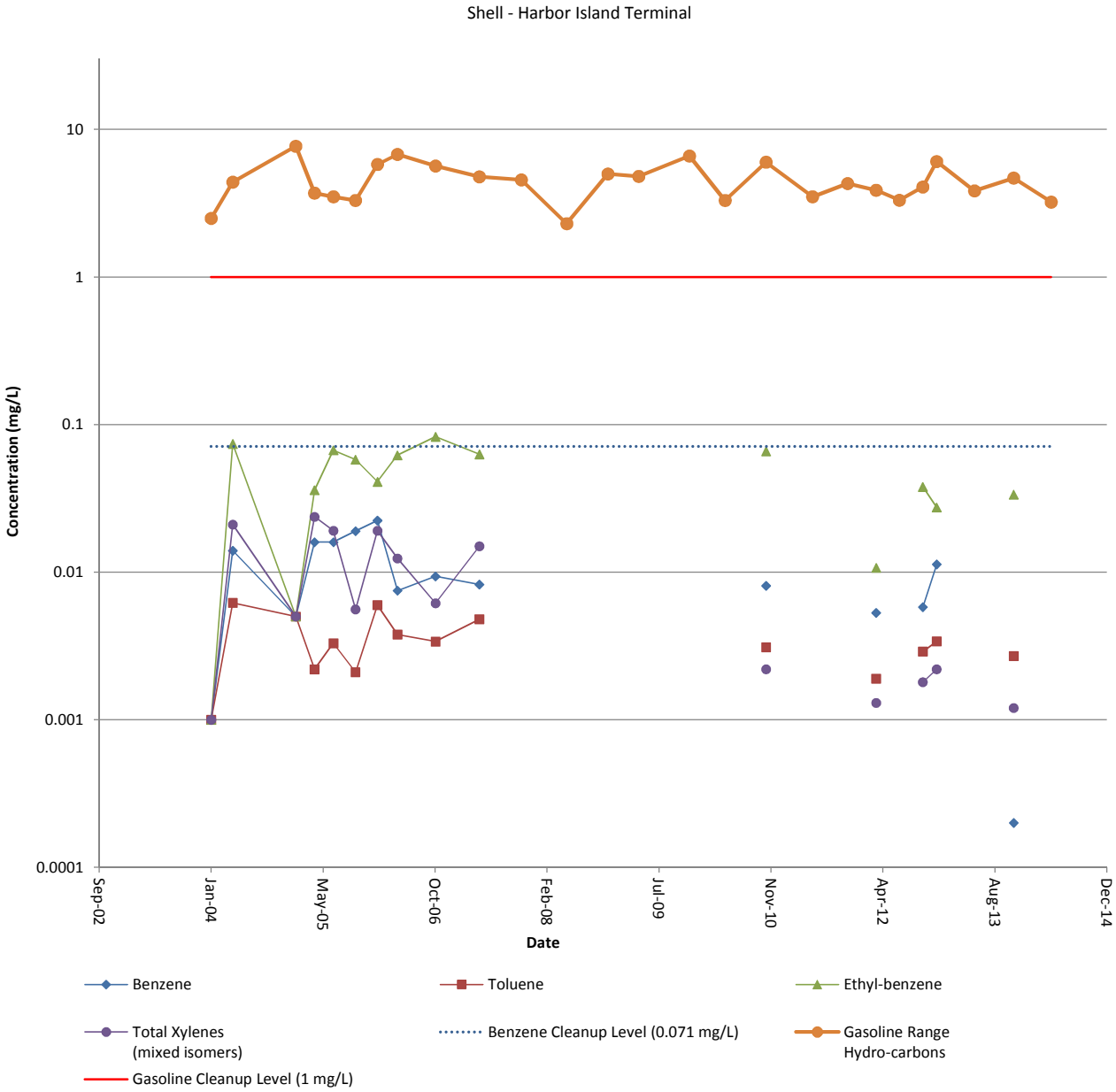


Figure 11: MW-203 Groundwater BTEX and Gasoline Concentrations

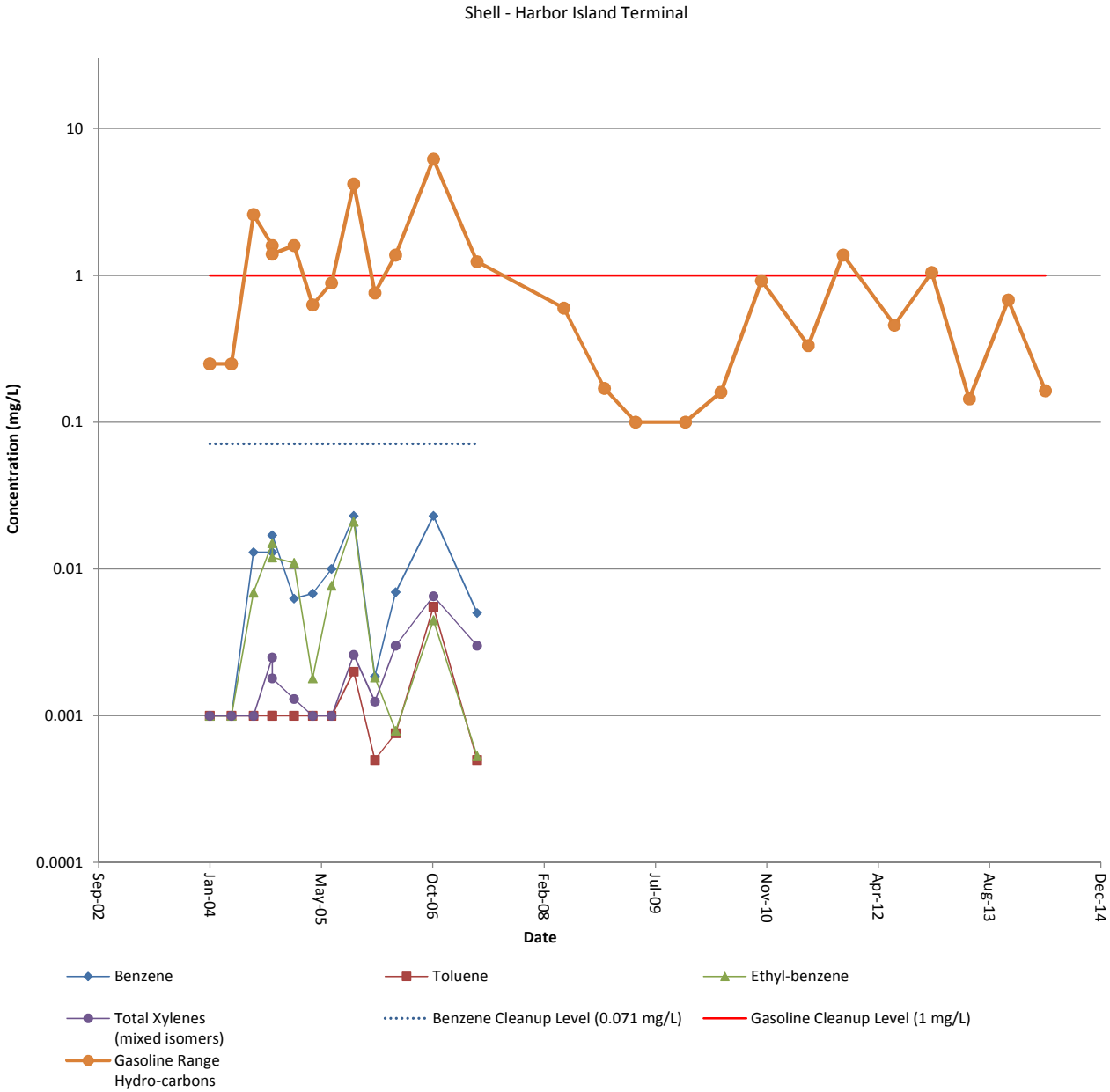


Figure 12: MW-308 Groundwater BTEX and Gasoline Concentrations

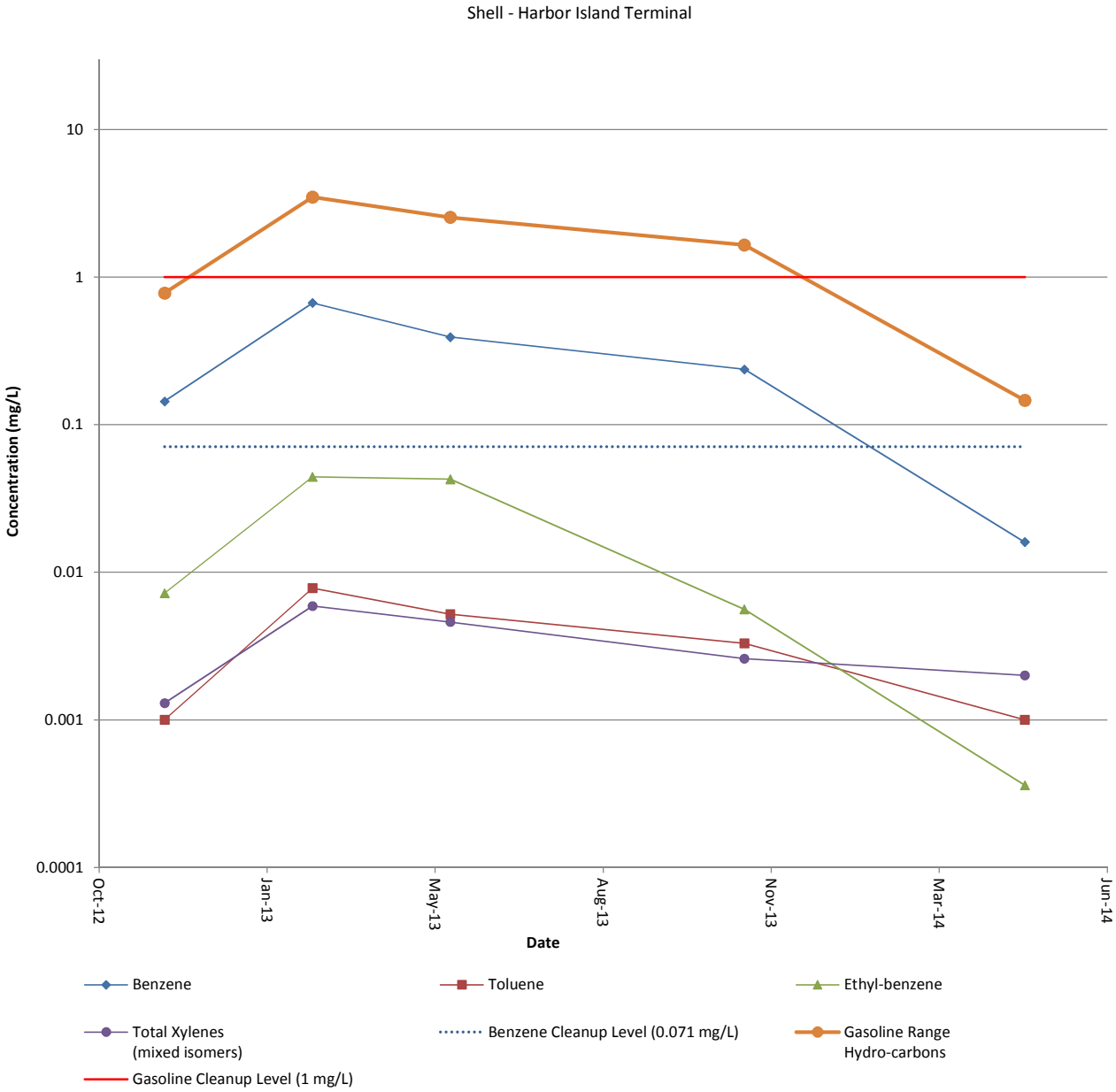


Figure 13: MW-310 Groundwater BTEX and Gasoline Concentrations

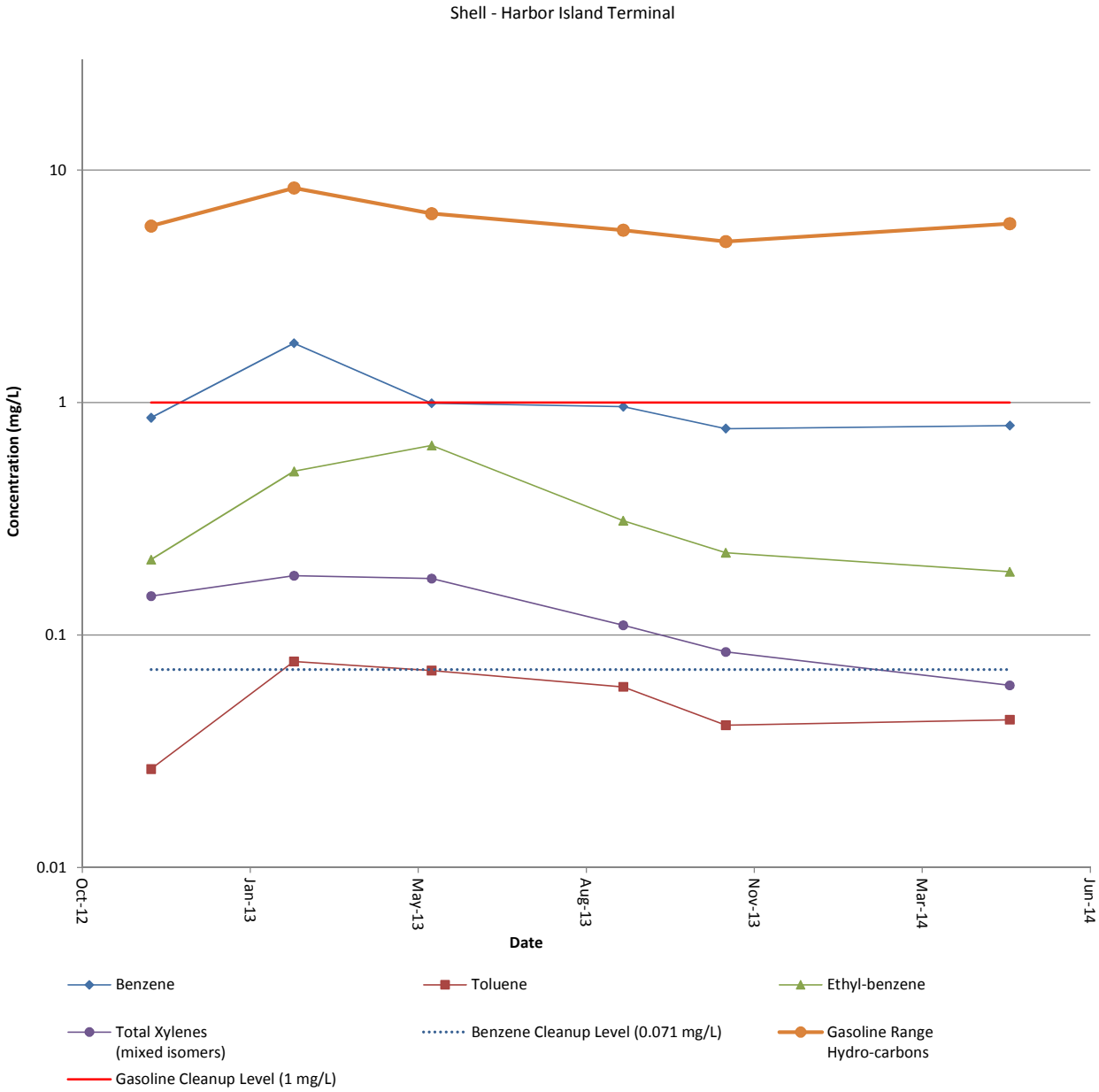
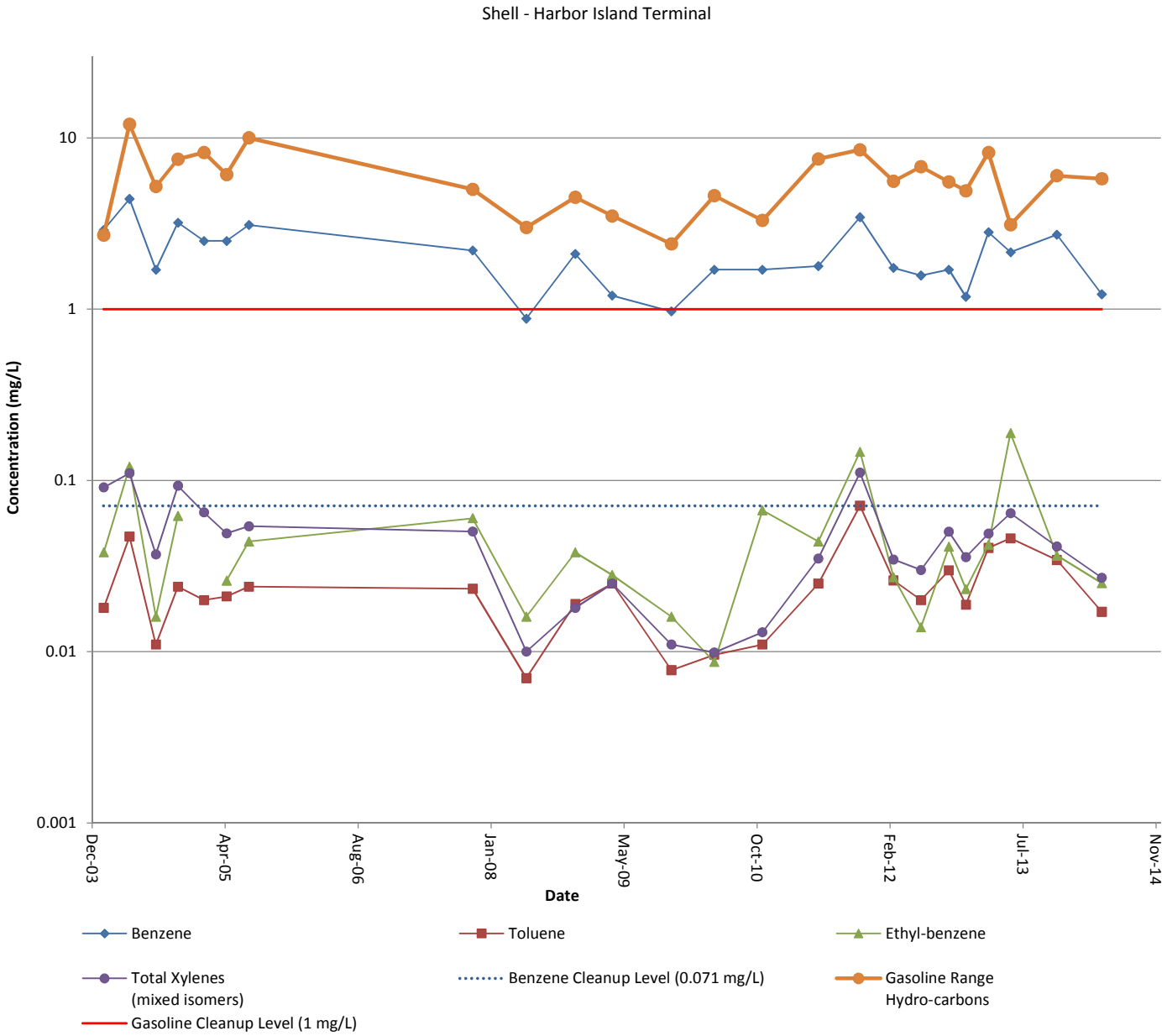
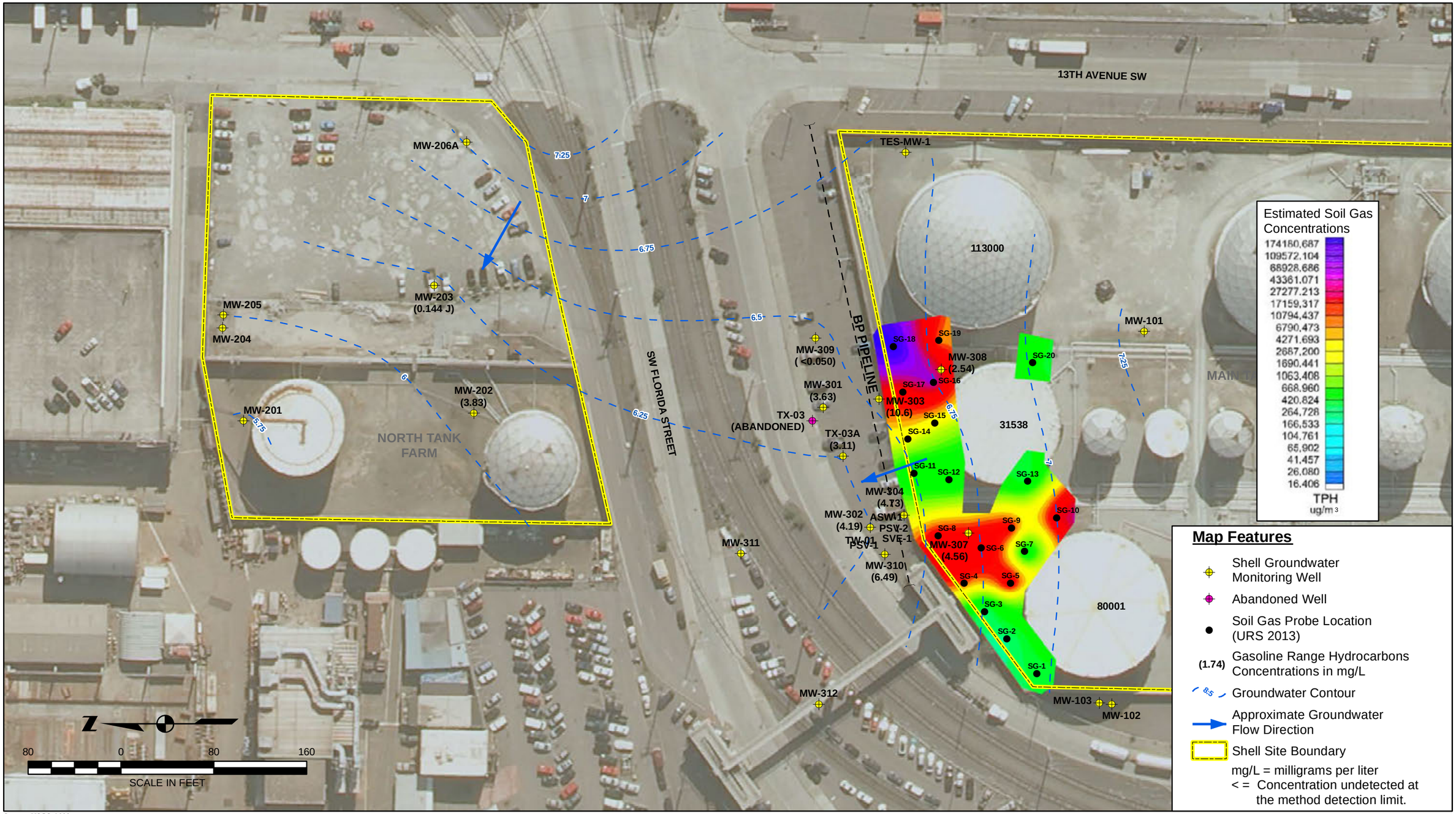


Figure 14: TX-03A Groundwater BTEX and Gasoline Concentrations





Source: USGS, 2009.

K:\46194268_Seattle_Terminal\MXD\2014\DEQ\Fig 15 Gx Concentrations.mxd

URS

TX-03 AREA TPH CONCENTRATION MAP - MAY 2013

SHELL
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

FIGURE 15

Map Features

- Shell Groundwater Monitoring Well
- Abandoned Well
- Soil Gas Probe Location (URS 2013)
- (8.24) Summed BTEX Concentrations in mg/L
- 8.5 Groundwater Contour
- Approximate Groundwater Flow Direction
- Shell Site Boundary

mg/L = milligrams per liter
< = Concentration undetected at the method detection limit.

Source: USGS, 2009.

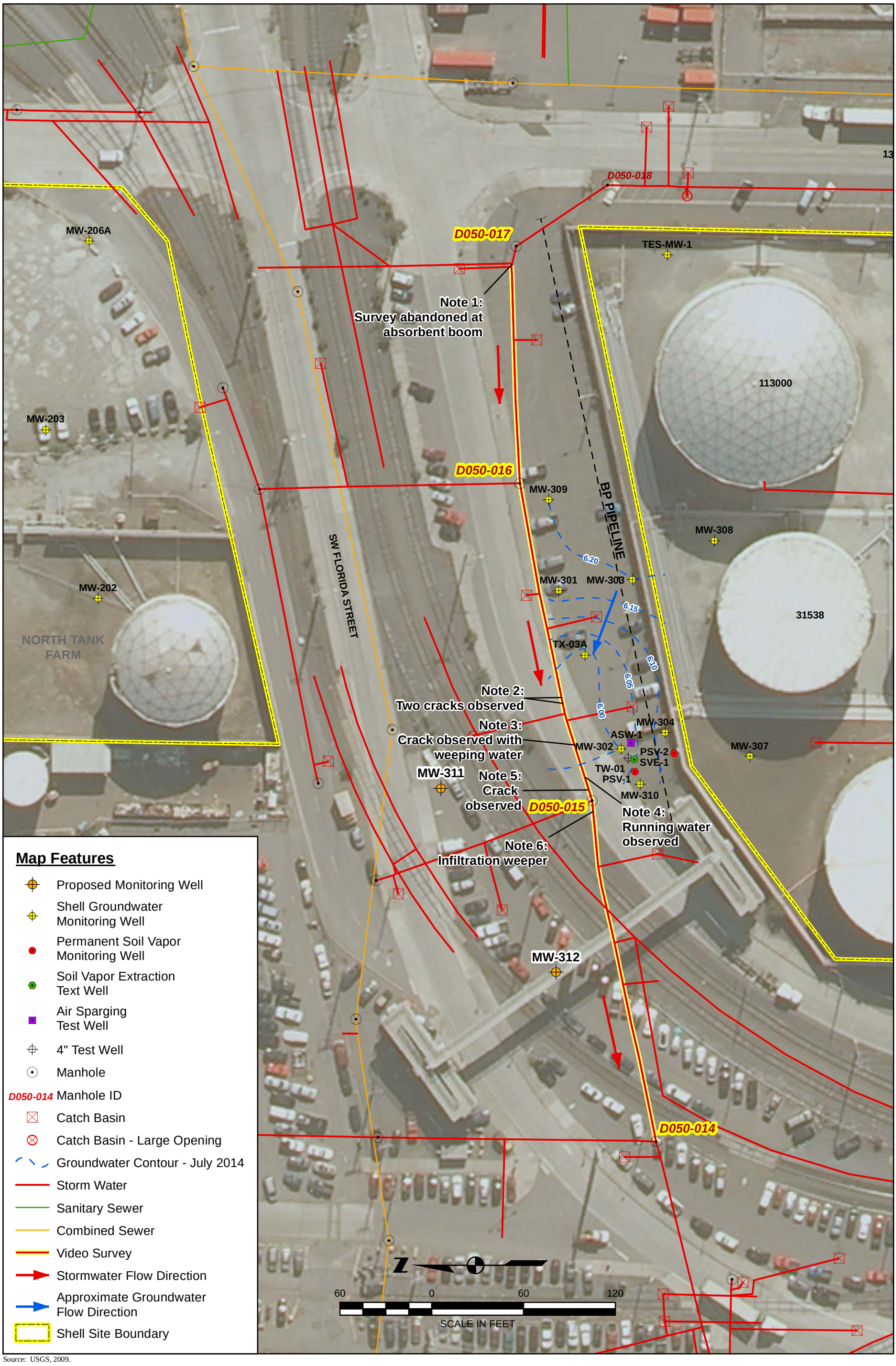
TX-03 AREA SUMMED BTEX CONCENTRATION MAP - MAY 2013

SHELL
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

URS

FIGURE 16

K:\46194268_Seattle_Terminal\MXD\2014\DEQ\Fig 16 BTEX Concentrations.mxd



Map Features

- Proposed Monitoring Well
- Shell Groundwater Monitoring Well
- Permanent Soil Vapor Monitoring Well
- Soil Vapor Extraction Text Well
- Air Sparging Test Well
- 4" Test Well
- Manhole
- D050-014 Manhole ID
- Catch Basin
- Catch Basin - Large Opening
- Groundwater Contour - July 2014
- Storm Water
- Sanitary Sewer
- Combined Sewer
- Video Survey
- Stormwater Flow Direction
- Approximate Groundwater Flow Direction
- Shell Site Boundary

Source: USGS, 2009.

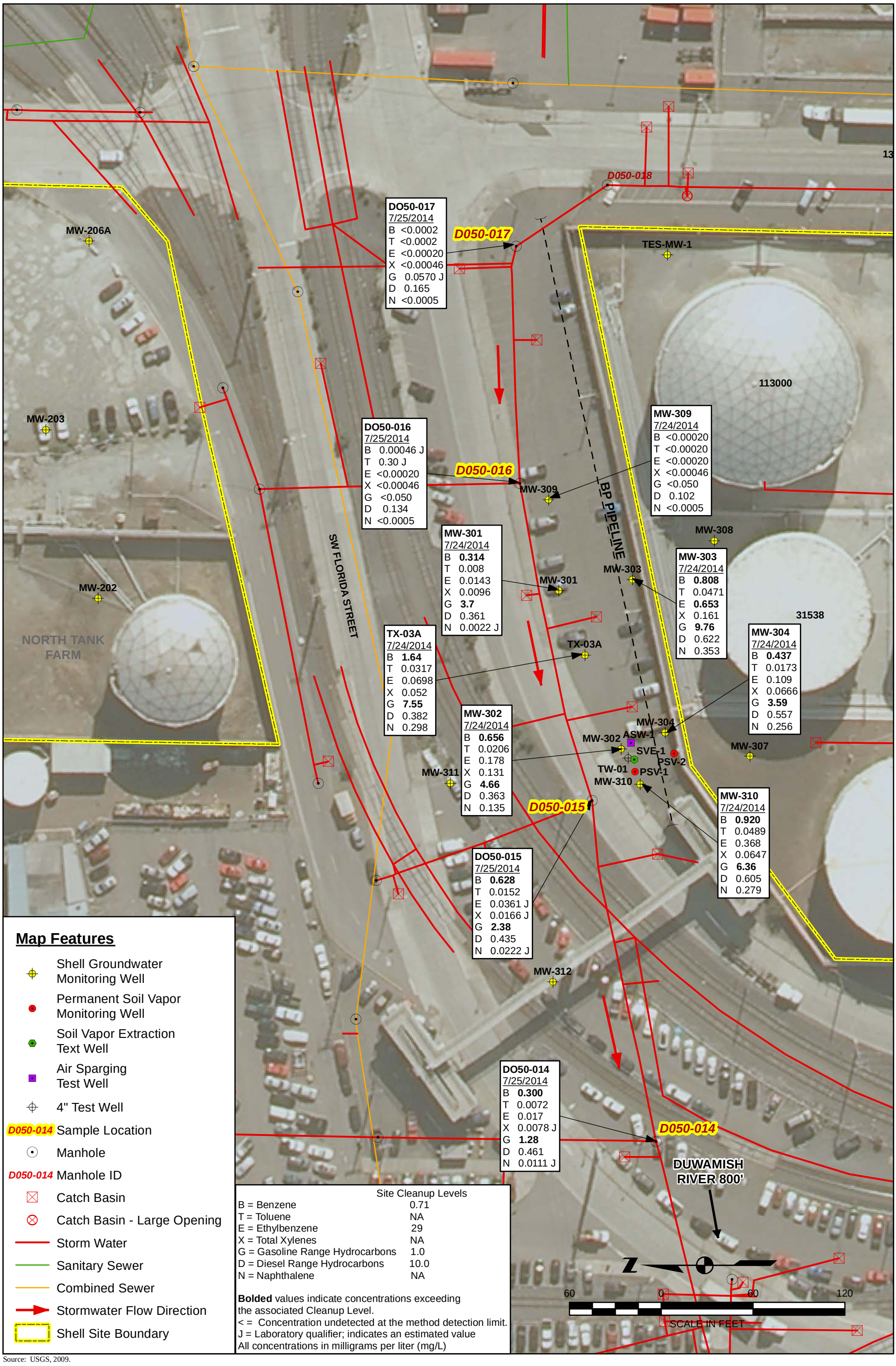
K:\46194268_Seattle_Terminal\MXD\2014\Ecology\Fig 17 TX-03 Area Video Survey.mxd

URS

TX-03 AREA VIDEO SURVEY

SHELL
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

FIGURE 17



Source: USGS, 2009.

TX-03A AREA GROUNDWATER AND STORMWATER CONCENTRATIONS - JULY 2014

SHELL
HARBOR ISLAND TERMINAL
SEATTLE, WASHINGTON

URS

FIGURE 18

K:\46194268 Seattle Terminal\MXD\2014\Ecology\Fig 18 TX-03 Area 2Q14.mxd

APPENDIX A

IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
IN AND FOR THE COUNTY OF KING

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

EQUILON ENTERPRISES LLC,

Defendant.

NO. 99-2-07176-0SEA

ORDER ENTERING CONSENT DECREE

(EX PARTE)

Having reviewed the Consent Decree signed by the parties to this matter, the Joint Motion for Entry of the Consent Decree, the Declaration of Mark C. Jobson, and the file herein, it is hereby

ORDERED AND ADJUDGED that the Consent Decree in this matter is entered and that the Court shall retain jurisdiction over the Consent Decree to enforce its terms.

DATED this 2 day of April, 1999.

Judge, King County Superior Court

Presented by:

CHRISTINE O. GREGOIRE
Attorney General

MARK C. JOBSON, WSBA #22171
Assistant Attorney General
Attorney for Ecology

Date: March 3, 1999

Approved for entry and notice of presentation waived:

EQUILON ENTERPRISES LLC

Humberto Molina, Jr., TBA #14256350
Equiva Services LLC
Attorney for Equilon Enterprises LLC

Date: 3-17-99

ATTORNEY GENERAL OF WASHINGTON
Ecology Division
PO Box 40117

IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON
KING COUNTY

STATE OF WASHINGTON,
DEPARTMENT OF ECOLOGY,

Plaintiff,

v.

Equilon Enterprises LLC

Defendant.

No. 99-2-07176-0 SEA

CONSENT DECREE

TABLE OF CONTENTS

ATTORNEY GENERAL OF WASHINGTON
Ecology Division
PO Box 40117

I. INTRODUCTION

A. In entering into this Consent Decree (Decree), the mutual objective of the Washington State Department of Ecology (Ecology), and Equilon Enterprises LLC and Texaco Refining and Marketing Inc. (TRMI), here and after referred to collectively as Equilon is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Decree requires Equilon to undertake the following remedial action(s):

1. Implement the Cleanup Action Plan (CAP)
2. Provide for public participation
3. Provide Remedial Design (RD)
4. Implement the Groundwater Compliance Monitoring that includes:
   a. Protection monitoring
   b. Performance monitoring
   c. Confirmational monitoring

Ecology has determined that these actions are necessary to protect public health and the environment.

B. The Complaint in this action is being filed simultaneously with this Decree. An answer has not been filed, and there has not been a trial on any issue of fact or law in this case. However, the parties wish to resolve the issues raised by Ecology's complaint. In addition, the parties agree that settlement of these matters without litigation is reasonable and in the public interest and that entry of this Decree is the most appropriate means of resolving these matters.

C. In signing this Decree, Equilon agrees to its entry and agrees to be bound by its terms.

D. By entering into this Decree, the parties do not intend to discharge nonsettling parties from any liability they may have with respect to matters alleged in the complaint. The

parties retain the right to seek reimbursement, in whole or in part, from any liable persons for sums expended under this Decree.

E. This Decree is not an admission of and shall not be construed as proof of liability or responsibility for any releases of hazardous substances or cost for remedial action nor an admission of any facts; provided, however, that Equilon shall not challenge the jurisdiction of Ecology in any proceeding to enforce this Decree. This Decree supercedes Agreed Order No. DE-92 TC-N160.

F. The Court is fully advised of the reasons for entry of this Decree, and good cause having been shown: IT IS HEREBY ORDERED, ADJUDGED, AND DECREED AS FOLLOWS:

II. JURISDICTION

A. This Court has jurisdiction over the subject matter and over the parties pursuant to Chapter 70.105D RCW, the Model Toxics Control Act (MTCA), and venue is proper in King County.

B. Authority is conferred upon the Washington State Attorney General by RCW 70.105D.040(4)(a) to agree to a settlement with any potentially liable person if, after public notice and hearing, Ecology finds the proposed settlement would lead to a more expeditious cleanup of hazardous substances. RCW 70.105D.040(4)(b) requires that such a settlement be entered as a consent decree issued by a court of competent jurisdiction.

C. Ecology has determined that a release or threatened release of hazardous substances has occurred at the Site which is the subject of this Decree.

D. Ecology has given notice to Equilon, as set forth in RCW 70.105D.020(15), of Ecology's determination that Equilon is a potentially liable person for the Site and that there has been a release or threatened release of hazardous substances at the Site.

E. The actions to be taken pursuant to this Decree are necessary to protect public health, welfare, and the environment, AND TO COMPLY WITH MTCA AND CERCLA.

F. Equilon has agreed to undertake the actions specified in this Decree and consents to the entry of this Decree under the MTCA.

III. PARTIES BOUND

This Decree shall apply to and be binding upon the signatories to this Decree (parties), their successors and assigns. The undersigned representative of each party hereby certifies that he or she is fully authorized to enter into this Decree and to execute and legally bind such party to comply with the Decree. Equilon agrees to undertake all actions required by the terms and conditions of this Decree and not to contest state jurisdiction regarding this Decree. No change in ownership or corporate status shall alter the responsibility of Equilon under this Decree. Equilon shall provide a copy of this Decree to all agents, contractors and subcontractors retained to perform work required by this Decree and shall ensure that any contract for such work will be in compliance with this Decree.

IV. DEFINITIONS

Except as specified herein, all definitions in WAC 173-340-200 apply to the terms in this Decree.

A. Site: The Site, owned by Equilon, is divided into three parcels: the Main Terminal and Tank Farm, the North Tank Farm, and the Shoreline Manifold Area located at 2555 13th Avenue SW, 1835 13th Avenue, and 1711 13th Avenue SW, respectively, Seattle, Washington, 98124 (collectively referred to as the "Site") on Harbor Island. The Site is part of the Tank Farm Operable Unit One (OU1) for the Harbor Island Superfund Site. The Site is more particularly described in Exhibit A to this Decree which is a detailed site diagram.

B. Parties: Refers to the Washington State Department of Ecology and Equilon.

C. Equilon: Refers to Equilon Enterprises LLC and Texaco Refining and Marketing Inc. (TRMI).

D. Consent Decree or Decree: Refers to this Consent Decree and each of the exhibits to the Decree. All exhibits are by this reference incorporated herein, and are integral and enforceable parts of this Consent Decree. The terms "Consent Decree" or "Decree" shall include all exhibits to the Consent Decree.

V. STATEMENT OF FACTS

Ecology makes the following finding of facts without any express or implied admissions by Equilon.

A. Equilon presently owns the following property known as Equilon Seattle Sales Terminal. The facility is divided into three parcels: the Main Terminal and Tank Farm, the North Tank Farm, and the Shoreline Manifold Area located at 2555 13th Avenue SW, 1835 13th Avenue, and 1711 13th Avenue SW, respectively, Seattle, Washington, 98124 (collectively referred to as the "Site"). The Main Terminal consists of two office buildings, a warehouse, a former bottle filling building, a blending building, a light oil truck loading rack, a lube oil truck loading rack, pipeline receipt facilities, two regulated underground storage tanks (USTs), five unregulated USTS, eighty-three above-ground storage tanks, piping, pumps, a boiler, and a garage. The products stored at the Main Terminal and Tank Farm include three grades of motor gasoline, aviation gasoline, jet fuel, middle distillates (e.g., diesel #2), and lubricating oils. The North Tank Farm contains two above-ground storage tanks that store diesel. The Shoreline Manifold Area and Dock consists of manifolds controlling the flow of product between the tank farms and the dock.

B. Ecology files contain the following report: Remedial Investigation, Texaco Harbor Island Terminal, Seattle, Washington. EMCON Northwest, Inc., Final 1996 RI Report. Based on the RI Report, Ecology finds as follows:

1. Free-phase hydrocarbons are confirmed to be present on the Site situated at the top of the water table at the Main Terminal, North Tank Farm, and beneath the Shoreline Manifold Area next to Elliott Bay; and

2. Residual hydrocarbons exceeding MTCA methods A and B matrix concentrations are confirmed to be present in the soil at the Site beneath portions of the Main Terminal, North Tank Farm, and the Shoreline Manifold Area.

3. Dissolved petroleum hydrocarbons exceeding the Surface Water Quality Standards are confirmed to be present in the groundwater at the Site beneath areas of the Main Terminal, North Tank Farm, and the Shoreline Manifold Area.

4. Lead and arsenic above Method A concentrations are confirmed to be present in the surface soil at the Tank Farm of the Main Terminal and the North Tank Farm.

C. Ecology files contain the following report: Final Focused Feasibility Study Report; Texaco Harbor Island Terminal, Seattle, Washington. EMCON, Inc., May 14, 1997 (FFS Report). Based on the FFS Report, Ecology finds as follows:

1. Equilon identified a preferred remedy after evaluating other alternative remedies to address the hazardous substances located on site. Ecology concurs that the remedy preferred by Equilon is appropriate. The preferred remedy is to:

a. Continue product recovery and associated dissolved TPH hydrocarbons plume removal at the Shoreline Manifold Area;

b. Remove free product from the groundwater throughout the site;

c. Excavate accessible TPH hot spots over 10,000 mg/kg (EPA ROD for TPH hot spot is 10,000 mg/kg for Harbor Island) in the subsurface soil to improve groundwater quality at the shoreline;

d. Excavate accessible TPH hot spots over 20,000 mg/kg (EPA Guideline for Corrective Action Plan and Monitored Natural Attenuation Documents) in the

subsurface soil to improve groundwater quality, enhance biodegradation of residual TPH and provide a more timely restoration of the inland portions of the site;

e. Excavate lead hot spots in surface soils adjacent to the oil/water separator, and dispose or treat off-site;

f. Cap or excavate surface soils in which concentrations exceed 1,000 mg/kg for lead and 32.6 mg/kg for arsenic (EPA ROD for Surface Soils on Harbor Island) to prevent direct contact, prevent infiltration to the groundwater, and prevent surface runoff to the bay through storm drains; and

g. Implement a groundwater monitoring program, institutional controls, and, contingency plans. The groundwater monitoring program may include bioassay/sediment sampling at the Shoreline Manifold and evaluation of additional remedial actions if triggered by the contingency plans.

D. In August, 1995, the United States District Court for Western District of Washington (Civil Action No. 95-01495-Z) entered a Consent Decree (Federal Consent Decree) in *U.S. v. The Port of Seattle et al.* relating to claims under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq., involving the Harbor Island Superfund Site. Article I, Paragraph 8 of the Federal Consent Decree identifies operable units within the Harbor Island Superfund Site and recites that the Petroleum Tank Farm Operable Unit is under the management of the Department of Ecology. The Environmental Protection Agency and Ecology have entered into Memorandums of Understanding, dated February 5, 1991 and March 3, 1994, setting forth the duties and responsibilities of each agency with regard to site management and enforcement activities at the Harbor Island Superfund Site.

VI. WORK TO BE PERFORMED

This Decree contains a program designed to protect public health, welfare and the environment from the known release, or threatened release, of hazardous substances at, on, or

from the Site. Equilon agrees to take the following remedial actions and to conduct all work in accordance with Ch. 173-340 WAC, unless otherwise specifically provided herein. These actions are more specifically described in the Draft Cleanup Action Plan attached as Exhibit B.

A. Task 1: Implement the Cleanup Action Plan:

1. Continue with product and associated dissolved TPH hydrocarbon recovery along the Shoreline Manifold Area next to Elliott Bay. In addition, remove free product from the groundwater throughout the site;

2. Excavate TPH hot spots above 10,000 mg/kg in the subsurface soil along the shorelines and above 20,000 mg/kg at the inland portions of the site to improve groundwater quality, enhance biodegradation of the residual TPH and provide a more timely restoration of the affected areas;

3. Excavate lead hot spots in the surface soil next to the oil/water separator;

4. Cap or excavate surface soils in which lead and arsenic concentrations exceed 1000 mg/kg and 32.6 mg/kg, respectively (EPA ROD for Harbor Island Surface Soils);

5. Implement groundwater monitoring program;

6. As part of the groundwater monitoring program, implement sediment/bioassay sampling and additional remedial actions if triggered by the contingency plan.

7. Implement institutional controls and Restrictive Covenant; and

8. Implement contingency plans, if necessary.

B. Task 2: Provide for public participation.

C. Task 3: Provide Remedial Design (or Engineering Report).

D. Task 4: Implement the Compliance Groundwater Monitoring Program Exhibit F, that includes:

1. Protection monitoring;

2. Performance monitoring;

3. Confirmational monitoring.

E. Task 5: Implement Schedule as outlined in Exhibit E.

F. Equilon agrees not to perform any remedial actions on the Site that are inconsistent with the remedial actions required under this consent decree.

VII. DESIGNATED PROJECT COORDINATORS

The project coordinator for Ecology is:

Nnamdi Madakor, Senior Hydrogeologist
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452
(425) 649-7112

The project coordinator for Equilon is:

Jeff Goold, Project Manager
Equiva Services, LLC
10602 NE 38th Place
Kirkland, Washington, 98033
(425) 741-8642

Each project coordinator shall be responsible for overseeing the implementation of this Decree. The Ecology project coordinator will be Ecology's designated representative at the Site. To the maximum extent possible, communications between Ecology and Equilon and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Decree, shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the remedial work required by this Decree. The project coordinators may agree to minor modifications to the work to be performed without formal amendments to this Decree. Minor modifications will be documented in writing by Ecology.

Each party may change its respective project coordinator. Written notification shall be given to the other parties at least ten (10) days prior to the change.

VIII. PERFORMANCE

All work performed pursuant to this Decree shall be under the direction and supervision, as necessary, of a professional engineer or hydrogeologist, or equivalent, with experience and expertise in hazardous waste site investigation and cleanup. Any construction work must be under the supervision of a professional engineer. Equilon shall notify Ecology in writing as to the identity of such engineer(s) or hydrogeologist(s), or others and of any contractors and subcontractors to be used in carrying out the terms of this Decree, in advance of their involvement at the Site.

IX. ACCESS

Ecology or any Ecology-authorized representatives shall have the authority to enter and freely move about all property at the Site at all reasonable times for the purposes of, inter alia: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Decree; reviewing Equilon's progress in carrying out the terms of this Decree; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Decree; and verifying the data submitted to Ecology by Equilon. Without limitation on Ecology's rights under this section, Ecology will provide Equilon advance notice of its entry onto the Site when feasible. All parties with access to the Site pursuant to this paragraph shall comply with Site access and operating procedures, Exhibit C. Ecology shall make available to Equilon the results of all sampling, laboratory reports, videos and other test results generated by Ecology or on its behalf.

X. SAMPLING, DATA REPORTING, AND AVAILABILITY

Equilon shall make available to Ecology the results of all sampling, laboratory reports, and/or test results generated by Equilon, or on its behalf, in the implementation of this Decree and shall submit these results in accordance with Section XI of this Decree.

In accordance with WAC 173-340-840(5), ground water sampling data shall be submitted according to the requirements that will be established in the Groundwater Compliance Monitoring Program.

Each party shall allow split or replicate samples to be taken by the other and shall provide 5 working days notice before conducting any sampling activities.

XI. PROGRESS REPORTS

Equilon shall submit to Ecology written progress reports that describe the actions taken to implement the requirements of this Decree. The progress report shall be prepared no more frequently than set forth in the following schedule:

- Quarterly during remedial design activities;
- Monthly during construction phase activities;
- Monthly for the first quarter after remedial system startup.

The frequency of progress reports to be submitted following the first quarter after remedial system startup shall be established in the Groundwater Compliance Monitoring Program. Progress reports shall include the following:

A. A list of on-site activities that have taken place during the reporting period;

B. Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests;

C. Description of all deviations from the schedule (Section VI, Work To Be Performed: Task 5) during the current reporting period and any planned deviations in the upcoming reporting period;

D. For any deviations in schedule, a plan for recovering lost time and maintaining compliance with the schedule;

E. All raw data (including laboratory analysis) received by Equilon during the past month and an identification of the source of the sample; and

F. A list of deliverables for the upcoming month if different from the schedule.

All progress reports shall be submitted by the fifteenth day of the reporting period in which they are due after the effective date of this Decree. Unless otherwise specified, progress reports and any other documents submitted pursuant to this Decree shall be sent to Ecology's project coordinator.

XII. RETENTION OF RECORDS

Equilon shall preserve, during the pendency of this Decree and for ten (10) years from the date this Decree is no longer in effect as provided in Section XXV, all records, reports, documents, and underlying data in its possession relevant to the implementation of this Decree and shall insert in contracts with project contractors and subcontractors a similar record retention requirement. Upon request of Ecology, Equilon shall make all non-archived, non-privileged records available to Ecology and allow access for review. All archived non-privileged records shall be made available to Ecology within a reasonable period of time.

XIII. TRANSFER OF INTEREST IN PROPERTY

Prior to any voluntary or involuntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site, Equilon shall provide for continued operation and maintenance of any containment system, treatment system, and monitoring system installed or implemented pursuant to this Decree.

Prior to transfer of any legal or equitable interest in all or any portion of the property, and during the effective period of this Decree, Equilon shall serve a copy of this Decree upon any prospective purchaser, lessee, transferee, assignee, or other successor in interest of the property; and, at least thirty (30) days prior to any transfer, Equilon shall notify Ecology of said contemplated transfer.

XIV. RESOLUTION OF DISPUTES

A. In the event a dispute arises as to an approval, disapproval, payment obligation, proposed modification or other decision or action by Ecology's project coordinator, the parties shall utilize the dispute resolution procedure set forth below.

1. Upon receipt of the Ecology project coordinator's decision, Equilon has fourteen (14) days within which to notify Ecology's project coordinator of its objection to the decision.

2. The parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

3. Equilon may then request Ecology management review of the decision. This request shall be submitted in writing to the Toxics Cleanup Program Manager within seven (7) days of receipt of Ecology's project coordinator's decision.

4. Ecology's Program Manager shall conduct a review of the dispute and shall issue a written decision regarding the dispute within thirty (30) days of Equilon request for review. The Program Manager's decision shall be Ecology's final decision on the disputed matter.

B. If Ecology's final written decision is unacceptable to Equilon, the parties may, by mutual agreement, submit the dispute to a neutral mediator. If the parties reach agreement as a result of the mediation, they shall jointly prepare a written resolution of the dispute immediately following the mediation session. If the parties fail to reach agreement as a result of the mediation, then Ecology shall, within thirty (30) days after the conclusion of the mediation, issue a written statement either reaffirming its original decision or setting forth a new decision. Equilon has the right to submit the dispute to the Court for resolution within thirty (30) days after any of the following: (i) Equilon receives written notice that Ecology does not agree to submit the dispute to mediation; (ii) after mediation, Equilon receives a written statement from Ecology that is

unacceptable to Equilon; or (iii) Ecology fails to issue the final decision described earlier in this paragraph. The parties agree that one judge should retain jurisdiction over this case and shall, as necessary, resolve any dispute arising under this Decree.

C. For disputes that involve Ecology's investigative and remedial decisions, and others covered by RCW 70.105D.060, the standard of review shall be arbitrary and capricious. For all other disputes, the court shall decide the standard of review.

D. The parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used. Where either party utilizes the dispute resolution process in bad faith or for purposes of delay, the other party may seek sanctions.

Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Decree, unless Ecology agrees in writing to a schedule extension or the Court so orders.

XV. AMENDMENT OF CONSENT DECREE

Except for an extension granted pursuant to Section XVI below or technical revisions to Section VI or Exhibit B affecting the nature or scope of remedial work, this Decree may only be amended by a written stipulation among the parties to this Decree that is entered by the Court or by order of the Court. Such amendment shall become effective upon entry by the Court. Agreement to amend shall not be unreasonably withheld by any party to the Decree.

Equilon shall submit any request for an amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in a timely manner after the request for amendment is received. If the amendment to the Decree is substantial, Ecology will provide public notice and opportunity for comment. Reasons for the disapproval shall be stated in writing. If Ecology does not agree to any proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section XIV of this Decree. Technical revisions to Section VI

or Exhibit B, affecting the nature or scope of remedial work, may be made by mutual written agreement of the parties without approval of the court.

XVI. EXTENSION OF SCHEDULE

A. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least 15 days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify the reason(s) the extension is needed.

An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. A requested extension shall not be effective until approved by Ecology or the Court. Ecology shall act upon any written request for extension in a timely fashion. It shall not be necessary to formally amend this Decree pursuant to Section XV when a schedule extension is granted.

B. The burden shall be on Equilon to demonstrate to the reasonable satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause includes, but is not limited to, the following.

1. Circumstances beyond the reasonable control and despite the due diligence of Equilon including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by Equilon; or

2. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

3. Endangerment as described in Section XVII; or

4. Other circumstances deemed by Ecology to be exceptional, extraordinary, or otherwise necessary to protect the environment or public interest.

However, neither increased costs of performance of the terms of the Decree nor changed economic circumstances shall be considered circumstances beyond the reasonable control of Equilon.

C. Ecology may extend the schedule for a period not to exceed ninety (90) days, except where an extension is needed as a result of:

1. Delays in the issuance of a necessary permit which was applied for in a timely manner; or

2. Other circumstances deemed exceptional or extraordinary by Ecology; or

3. Endangerment as described in Section XVII.

Ecology shall give Equilon written notification in a timely fashion of any extensions granted pursuant to this Decree. Ecology shall not unreasonably withhold approval of requested extensions.

XVII. ENDANGERMENT

In the event Ecology determines that activities implementing or in compliance with this Decree, or any other circumstances or activities, are creating or have the potential to create a danger to the health or welfare of the people on the Site or in the surrounding area or to the environment, Ecology may order Equilon to stop further implementation of this Decree for such period of time as needed to abate the danger or may petition the Court for an order as appropriate. During any stoppage of work under this section, the obligations of Equilon with respect to the work under this Decree which is ordered to be stopped shall be suspended and the time periods for performance of that work, as well as the time period for any other work dependent upon the work which is stopped, shall be extended, pursuant to Section XVI of this Decree, for such period of time as Ecology determines is reasonable under the circumstances.

In the event Equilon determines that activities undertaken in furtherance of this Decree or any other circumstances or activities are creating an endangerment to the people on the Site or in

the surrounding area or to the environment, Equilon may stop implementation of this Decree for such period of time necessary for Ecology to evaluate the situation and determine whether Equilon should proceed with implementation of the Decree or whether the work stoppage should be continued until the danger is abated. Equilon shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after such stoppage of work, and thereafter provide Ecology with documentation of the basis for the work stoppage. If Ecology disagrees with Equilon's determination, it may order Equilon to resume implementation of this Decree. If Ecology concurs with the work stoppage, Equilon's obligations shall be suspended and the time period for performance of that work, as well as the time period for any other work dependent upon the work which was stopped, shall be extended, pursuant to Section XVI of this Decree, for such period of time as Ecology determines is reasonable under the circumstances. Any disagreements arising under this clause shall be resolved through the dispute resolution procedures in Section XIV.

XVIII. COVENANT NOT TO SUE

A. In consideration of Equilon's compliance with the terms and conditions of this Decree, Ecology covenants that compliance with this Decree shall stand in lieu of any and all administrative, legal, and equitable remedies and enforcement actions available to Ecology against Equilon for the release or threatened release of hazardous substances covered by the terms of this Decree.

B. This covenant is strictly limited in its application to the Site specifically described in Exhibit A and to those hazardous substances that Ecology knows to be located at the Site as of the date of entry of this Decree. This covenant is not applicable to any other hazardous substance or area, and Ecology retains all of its authority relative to such substances and areas.

C. In the following circumstances Ecology may exercise it full legal authority to address releases of hazardous substances at the Site nothwithstanding the Covenant Not to Sue set forth above:

1. If Equilon fails to comply with the terms and conditions of this Decree, including all exhibits, and, after written notice of noncompliance, fails to comply; or

2. If factors not known at the time of entry of this Decree, including factors listed in WAC 173-340-420(2), are discovered and Ecology determines, in light of these factors, that further remedial action is necessary at the Site to protect human health or the environment, provided that, if this paragraph becomes operative, Ecology will allow Equilon to propose the further action where such proposal can be made promptly and without endangering human health or the environment; or

3. If Ecology determines that conditions at the Site cause an endangerment to human health or the environment, and that actions beyond those required under this Decree are necessary.

D. The Covenant Not to Sue set forth above shall have no applicability whatsover to

1. Criminal liability;

2. Any liability for damages to natural resources;

3. Any Ecology action against potentially liable persons not a party to this Decree.

XIX. INDEMNIFICATION

Equilon agrees to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property arising from or on account of acts or omissions of Equilon , its officers, employees, agents, or contractors in entering into and implementing this Decree. However, Equilon shall not indemnify the State of Washington nor save nor hold its

employees and agents harmless from any claims or causes of action arising out of the intentional misconduct or negligent acts or omissions of the State of Washington, or the employees or agents of the State, in implementing the activities pursuant to this Decree.

XX. COMPLIANCE WITH APPLICABLE LAWS

A. All actions carried out by Equilon pursuant to this Decree shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in Paragraph B. of this section.

B. Exhibit B, the Draft Cleanup Action Plan, will be amended to include the substantive requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals for the remedial action under this Decree.

Equilon has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(l) would otherwise be required for the remedial action under this Decree. In the event either Equilon or Ecology determines that additional permits or approvals addressed in RCW 70.105D.090(l) would otherwise be required for the remedial action under this Decree, it shall promptly notify the other party of this determination. Ecology shall determine whether Ecology or Equilon shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, Equilon shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by Equilon and on how Equilon must meet those requirements. Ecology shall inform Equilon in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Decree. Equilon shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

Ecology shall ensure that notice and opportunity for comment is provided to the public and appropriate agencies prior to establishing the substantive requirements under this section.

C. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(l) would result in the loss of approval from a federal agency which is necessary for the State to administer any federal law, the exemption shall not apply and TRMI shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(l), including any requirements to obtain permits.

D. In implementing this Decree for purposes such as sampling, it is contemplated that Equilon may remove limited quantities of soil, groundwater, and other materials (collectively, "Materials") from real property within or adjacent to the Site. Any removal shall be done in compliance with all applicable laws as required by this Section XX. It is agreed that any disposition of the Material by Equilon, including documents generated pursuant to such disposition, shall not be deemed to be an admission by such party of liability for purposes of the Model Toxics Control Act.

XXI. REMEDIAL AND INVESTIGATIVE COSTS

A. Equilon agrees to pay costs incurred by Ecology pursuant to this Decree which have not been previously paid. These costs shall include work performed by Ecology or its contractors for, or on, the Site under Ch. 70.105D RCW, both prior to and subsequent to the issuance of this Decree, for investigations, remedial actions, and Decree preparation, negotiations, oversight and administration. Ecology costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Equilon agrees to pay the required amount within ninety (90) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be

provided upon request and Equilon has submitted such a request to Ecology. Itemized statements shall be prepared quarterly. Failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement will result in interest charges at the rate of twelve percent per annum. Equilon reserves the right to review and approve any charges prior to payment. Any dispute regarding remedial and investigation costs for the Site shall be subject dispute resolution pursuant to Section XIV. Equilon reserves the right to pay the undisputed portion of an invoice and not pay the disputed portion.

XXII. IMPLEMENTATION OF REMEDIAL ACTION

If Ecology determines that Equilon has failed without good cause to implement the remedial action, Ecology may, after notice and reasonable opportunity to Equilon to cure the failure, perform any or all portions of the remedial action that remain incomplete. If Ecology performs all or portions of the remedial action because of Equilon's failure to comply with its obligations under this Decree, Equilon shall reimburse Ecology for the costs of doing such work in accordance with Section XXI, provided that Equilon is not obligated under this section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of this Decree.

XXIII. FIVE YEAR REVIEW

As remedial action, including ground water monitoring, continues at the Site, the parties agree to review the progress of remedial action at the Site, and to review the data accumulated as a result of site monitoring as often as is necessary and appropriate under the circumstances or as agreed upon in the Compliance Groundwater Monitoring Program for the Site. The parties agree to meet to discuss the Site status every five years upon request from Ecology, or at Equilon's request. Ecology reserves the right to require further remedial action at the Site under appropriate circumstances. This provision shall remain in effect for the duration of the Decree.

XXIV. PUBLIC PARTICIPATION

Ecology shall maintain the responsibility for public participation at the Site. However, Equilon shall cooperate with Ecology and, if agreed to by Ecology, shall:

A. Prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of engineering design reports. Ecology will finalize (including editing if necessary) and, after receiving and considering comments from Equilon, distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings;

B. Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before major meetings with the interested public and local governments. Likewise, Ecology shall notify and consult with Equilon prior to the issuance of all press releases and fact sheets, and before major meetings with the interested public and local governments;

C. Participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions, or as a presenter; and

D. Provide Ecology with copies of documents to be placed in information repositories to be located at the Seattle Public Library, Downtown Branch, Magazines, Newspapers and Government Publications Dept., 1000 4th Ave., Seattle, Washington 98104 and Ecology's Northwest Regional Office at 3190 160th Avenue SE, Bellevue, Washington 98008-5452. At a minimum, copies of all public notices, fact sheets, and press releases; all quality assured ground water, surface water, soil sediment, and air monitoring data; remedial actions plans, supplemental remedial planning documents, and all other similar documents relating to performance of the remedial action required by this Decree shall be promptly placed in these repositories.

XXV. DURATION OF DECREE

A. This Decree shall remain in effect and the remedial program described in the Decree shall be maintained and continued until Equilon has received written notification from

Ecology that the requirements of this Decree have been satisfactorily completed. Ecology shall issue such notification within sixty (60) days after the requirements of this Decree have been satisfactorily completed. Thereafter the parties within thirty (30) days shall jointly request that the Court vacate this Consent Decree.

B. Upon completion of each action specified in the Final CAP, Ecology shall issue a Certificate of Completion within sixty (60) days after such action has been completed.

XXVI. CLAIMS AGAINST THE STATE

Equilon hereby agrees that it will not seek to recover any costs incurred in implementing the remedial action required by this Decree from the State of Washington or any of its agencies, with the exception of the Department of Natural Resources; and further, that Equilon will make no claim against the State Toxics Control Account or any Local Toxics Control Account for any costs incurred in implementing this Decree. Except as provided above, however, Equilon expressly reserves its right to seek to recover any costs incurred in implementing this Decree from any other potentially liable person. Equilon further reserves its right to make a claim against the State or Local Toxics Control Account for the costs incurred in remediating hazardous substances released as a result of third-party offsite activities, but only if future amendments to MTCA allow for such claims, and operate retroactively. No determination has been made whether such a claim, if filed, would be valid, and both parties agree that any claim would have to be evaluated under the law in effect at the time the claim was made.

XXVII. EFFECTIVE DATE

This Decree is effective upon the date it is entered by the Court.

XXVIII. PUBLIC NOTICE AND WITHDRAWAL OF CONSENT

This Decree has been the subject of public notice and comment under RCW 70.105D.040(4)(a). As a result of this process, Ecology has found that this Decree will lead to a more expeditious cleanup of hazardous substances at the Site.

If the Court withholds or withdraws its consent to this Decree, it shall be null and void at the option of any party and the accompanying Complaint shall be dismissed without costs and without prejudice. In such an event, no party shall be bound by the requirements of this Decree.

XXIX. LAND USE RESTRICTIONS

Equilon agrees that the restrictive covenant, Exhibit D, shall be recorded with the office of the King County Auditor within 10 days of the entry of this Decree and shall restrict future uses of the Site. With Ecology's prior written approval, and after completion of the remedial action required by this Decree, Equilon, or its successor(s), may record an instrument that provides that the restrictive covenant provided in Exhibit D shall no longer limit uses of the Site or be of any further force or effect.

XXX. CONTRIBUTION PROTECTION

A. With regard to claims or cross-claims for contribution against Equilon for Matters Addressed in this Consent Decree, the parties hereto agree that Equilon is entitled to contribution protection from any actions, claims, or cross-claims pursuant to MTCA, RCW 70.105D.080, CERCLA § 107 or 113, or any other federal or state claim or cross-claim seeking, under other theories, substantially similar relief, to the fullest extent allowed by MTCA, RCW 70.105D.080, CERCLA § 107 or 113(f)(2). The contribution protection conferred in this section shall not be frustrated by the use of non-CERCLA or non-MTCA theories to seek relief in the nature of contribution or indemnification. For the purpose of this paragraph, "Matters Addressed" shall include all past and future investigation and remedial measures taken at the Site by Equilon pursuant to this Consent Decree or under Ecology oversight.

B. The percentage of response costs paid by Equilon under this Decree shall not in any way constitute an admission as to an appropriate allocation of liability, if any, at the Site.

This Section XXX shall apply to, but is not limited to, successors in interest who assume obligations under this Decree.

XXXI. RESERVATION OF RIGHTS

By agreeing to this Decree, Equilon and Ecology agree to abide by its items. The execution and performance of the Decree is not, however, an admission by Equilon of any fact or liability for any purpose other than as a foundation for the entry of this Decree. Equilon's performance under the Decree is undertaken without waiver of or prejudice to any claims or defenses whatsover that may be asserted in the event of further administrative proceedings or litigation not associated with, or related to, this Decree.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

By: _____
JAMES PENDOWSKI
Program Manager
Toxics Cleanup Program

STATE OF WASHINGTON
ATTORNEY GENERAL'S OFFICE

By: _____
for
TANYA BARNETT
WSBA #17491
Assistant Attorney General

EQUILON ENTERPRISES LLC

By: _____
(On behalf of TRMI and EQUILON)
STEPHEN M PEYTON
Seattle Terminal Manager

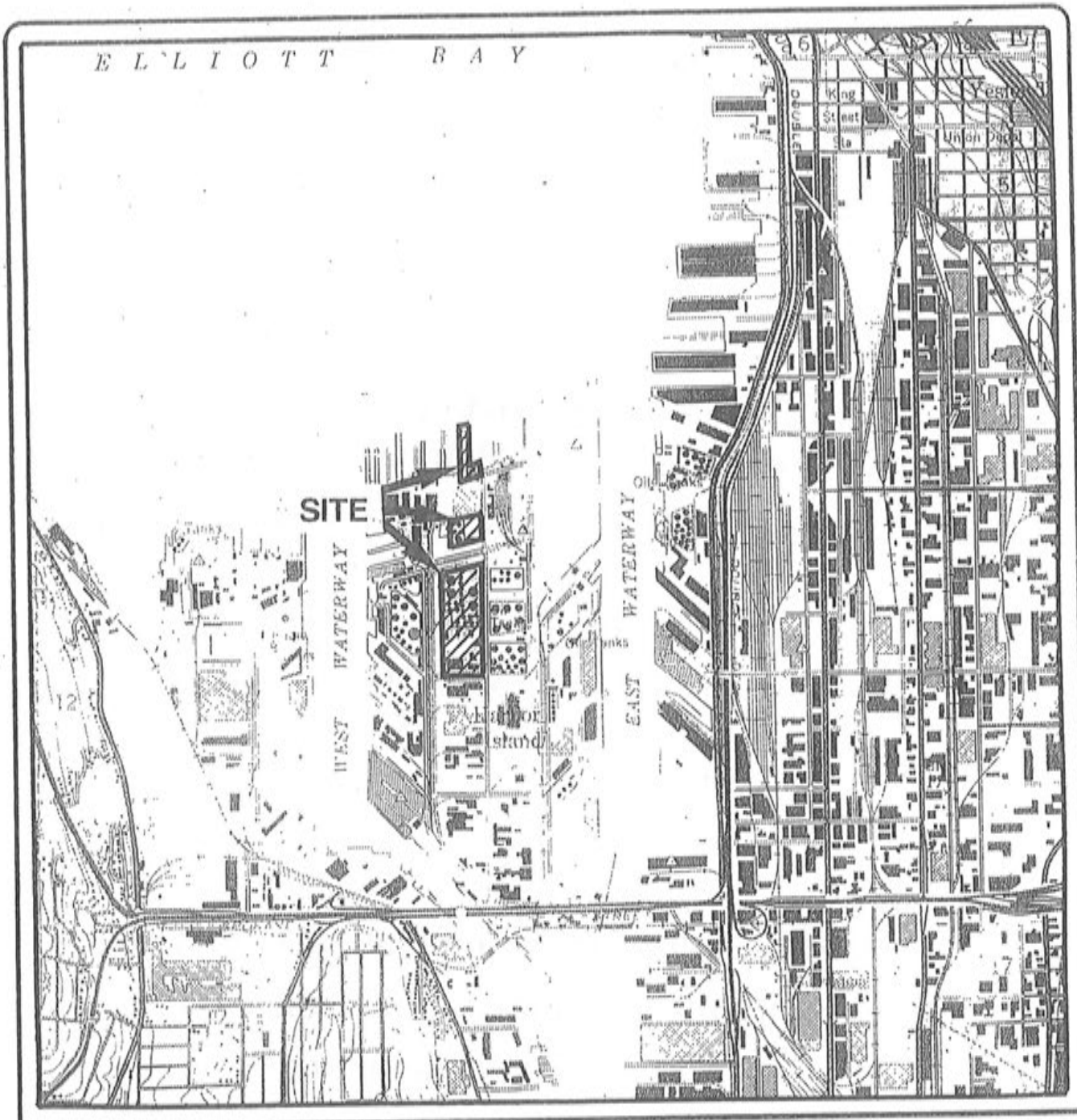
Dated this 2 day of April, 1998.

_____
JUDGE
King County Superior Court

ATTORNEY GENERAL OF WASHINGTON
Ecology Division
PO Box 40117
Olympia, WA 98504-0117

EXHIBIT A

SITE DIAGRAM



SOURCE: U.S.G.S. 7.5 MIN. QUAD. SEATTLE, SOUTH 1973

WASHINGTON

N

0 2000 4000

SCALE (ft)

DATE 10-96
DWN. MLP
REV.
APPR.
PROJECT NO.
41236-001.001

EXHIBIT A
EQUILON SEATTLE SALES TERMINAL
SEATTLE, WASHINGTON

SITE LOCATION MAP

EXHIBIT B
CLEANUP ACTION PLAN (CAP)
EQUILON SEATTLE SALES TERMINAL
HARBOR ISLAND SITE
SEATTLE, WASHINGTON

ISSUED BY

WASHINGTON STATE DEPARTMENT OF ECOLOGY

NORTHWEST REGIONAL OFFICE, BELLEVUE

SEPTEMBER 28, 1998

TABLE OF CONTENT

EXHIBIT B
CLEANUP ACTION PLAN (CAP)

EQUILON SEATTLE SALE TERMINAL

SEATTLE, WASHINGTON

September 28, 1998

1.0 INTRODUCTION

This Cleanup Action Plan (CAP) is provided to describe the proposed remediation at the Equilon Enterprises LLC and Texaco Refining and Marketing Inc. (TRMI) Seattle Sales Terminal site (Equilon), on Harbor Island in Seattle, Washington. It has been prepared to satisfy the requirements of the Model Toxics Control Act (MTCA) Agreed Order No. DE 92 TC-N160, cooperatively entered into between Texaco Refining and Marketing Inc. (TRMI) and the Washington State Department of Ecology (Ecology).

The purposes of this CAP are to: 1) describe the site, including a summary of its history and extent of contamination; 2) identify the site-specific cleanup standards, 3) summarize the remedial cleanup action alternatives presented in the Focused Feasibility Studies (FFS), 4) identify and describe selected remedial action alternative for the site and 5) a discussion of the implementation schedule. Detailed information regarding site history, characterization, and the evaluation of alternative cleanup actions is contained in the final RI and final FFS reports [EMCON 1994, Lovely Consulting, Inc. (LCI) and EMCON, 1997].

The remedial actions selected for the site are to occur under the legal framework of a Consent Decree between Equilon and Ecology.

2.0 SUMMARY OF SITE CONDITIONS AND INTERIM REMEDIATION SYSTEM

This section provides a summary of site conditions, including the nature and extent of impacts and a description of the interim remediation system. In addition, the exposure pathways identified for the site are briefly described.

2.1 SITE

The Equilon Seattle Sales Terminal consists of the main terminal and main tank farm, located inland in the north-central part of Harbor Island; the north tank farm, located north of the main terminal; and the Shoreline Manifold Area and Dock, located adjacent to Elliott Bay at the north end of Harbor Island (Figure 1). Groundwater flows in a radial pattern outward from the center of Harbor Island and enters the marine surface water at the island's edge. The site is zoned industrial and meets the industrial criteria established under WAC 173-340-745. In addition, the site will likely remain an industrial facility in the foreseeable future because of the site zoning, and, perhaps more importantly, because of the substantial industrial improvements to Harbor Island (e.g., construction of cargo handling facilities and construction of major petroleum distribution pipelines for the island). Ecology and EPA have determined that there is no current or planned future use of groundwater beneath Harbor Island for drinking water purposes. The cleanup objective is to protect the surface water and associated ecosystem.

2.1.1 Nature and Extent

The following section summarizes the nature and extent of contamination at the site based on the results of the RI, Interim Actions and FFS. A general discussion of the contaminants detected at the site is presented first. A summary of the floating product plume beneath the Shoreline Manifold Area is presented next since this is the primary area of concern at the site. Sections on TPH, BTEX and cPAHs; and arsenic, copper, and lead follow.

The results of the site characterization activities conducted during the RI indicate that contaminants present in soil and groundwater at the inland portions of the site are primarily weathered total petroleum hydrocarbons as diesel (TPH-D) with lesser amounts of weathered gasoline (TPH-G) and heavier oil (TPH-O), and a few inorganic metals (arsenic, copper and lead). Arsenic and lead in the surface soil are the result of airborne releases from the former smelter located adjacent to but not owned or operated by the Equilon terminal. Copper, only found in groundwater, is attributed to natural background on Harbor Island. The inorganic metals are present at low concentrations at a few locations in groundwater. In the north tank farm, there is a small amount of measurable floating product at one location, in the vicinity of MW-204. Since completion of the RI, approximately 700 gallons of unleaded gasoline was released in 1996 from a 'pinhole' leak in a section of a pipe at the Shoreline Manifold Area. At the Shoreline Manifold area, in addition to weathered TPH-D in soil, there is localized contained floating product on the water table. At the main terminal and main tank farm, lead is present at higher concentrations in surface soil than subsurface soil due to airborne transport of lead particulate in stack emissions from historic lead smelter activities adjacent to the Equilon Terminal.

Floating Product. Data collected during the FFS show that the impacted area of primary concern at the site is a small product plume located beneath the Shoreline Manifold Area adjacent to Elliott Bay. A small lens of floating product is trapped behind the foundation of the island bulkhead that forms a partial barrier to groundwater flow to the Bay. The bulkhead structure acts as a "hanging wall" which allows groundwater and some dissolved petroleum hydrocarbons to flow beneath the foundation while trapping the floating product. The water

table elevations fluctuate seasonally due to rainfall and in response to tidal influence from the Bay; however, the water table elevation does not drop below the base of the bulkhead. Due to the dampening effect of the bulkhead structure, water table fluctuations in response to tidal influence and seasonal fluctuations are 1 to 2 feet near Elliott Bay. The resulting "smear" zone of product in soil beneath the product plume is more than 2 feet thick.

An interim product recovery system has been in operation under the Shoreline Manifold Area since the release was discovered in 1996 (Figure 2). This system has been effective in removing product on top of the groundwater table, preventing migration of product sheen into Elliott Bay, and ensuring protection of receptors in Elliott Bay. Based on the amount of product and vapor recovered (about 500 gallons), and dissolved constituents in water recovered to date, the interim system has recovered nearly all of the released product. Accessible TPH soil hot spots at this location that act as potential ongoing sources to groundwater contamination will be excavated to the extent practicable.

TPH, BTEX, and cPAHs. RI data also indicate that elevated concentrations of TPH are present in subsurface soil within localized inland areas of the main terminal, main tank farm, north tank farm; and Shoreline Manifold Area. Concentrations of TPH-G and TPH-D have been detected in groundwater above cleanup levels within or in close proximity to areas where the historical spills or one recent (1996) spill occurred. Groundwater monitoring results indicated concentrations of TPH-G exceeded the cleanup level in 25 percent of the samples, exceeded the cleanup level of TPH-D in 2 percent of the samples, and did not exceed the cleanup level for TPH-O in any samples. Benzene and carcinogenic polynuclear aromatic hydrocarbons (cPAHs) have also been detected in groundwater above cleanup levels. Concentrations of benzene exceeded the cleanup level in approximately 35 percent of the groundwater samples. Concentrations of cPAHs exceeded the cleanup level in 1 percent of the samples collected and only in one well (MW-208). In addition to collecting groundwater quality data, groundwater contaminant modeling was conducted during the RI and FFS. The ground water quality and modeling results indicate that dissolved-phase hydrocarbons are not migrating off site at concentrations that pose a threat to surface water at the shorelines of Harbor Island, but slightly exceeds criteria at the property boundaries.

Arsenic, Copper, and Lead. Arsenic was found in surface soil within portions of the main tank farm above Harbor Island action levels set in the EPA ROD for the surface soils but below MTCA cleanup levels. Lead was identified in surface soil in portions of the main tank farm and adjacent to the oil/water separator above the levels designated in the EPA ROD for the surface soils. EPA conducted surface soil investigations for the island including the Texaco site. Ecology and EPA in a memorandum of agreement (MOA), agreed not to duplicate investigation efforts on the island except where data gaps exist. Ecology concurred with the EPA ROD on Harbor Island. The occurrence of lead and arsenic are most likely associated with stack emissions from the former lead smelter located adjacent to the terminal but was never owned nor operated by Equilon. Dissolved copper and lead are the only metals detected in groundwater above cleanup levels during the RI monitoring. Concentrations of dissolved copper and lead exceeded the cleanup level in approximately 44 percent and 1 percent of the samples collected, respectively. Dissolved copper and lead were also detected across much of the northern portion of Harbor Island during the USEPA RI, indicating elevated background concentrations. Copper and lead were not detected in subsurface soils above the cleanup level. These inorganic metals

are associated with the former lead smelter and marine paints used at shipbuilding and repair facilities adjacent to the Equilon Terminal (Tetra Tech 1988).

Marine Sediments. Based on the results of marine sediment sampling conducted by EPA adjacent to the site, sediments have not been impacted by adjacent shoreline activities (e.g., Equilon operations) above levels that would cause adverse effects to aquatic life. No further action is proposed by EPA for the marine sediments adjacent to Equilon property.

2.1.2 Exposure Pathways

The following pathways were evaluated at the site as part of the FFS (LCI and EMCON 1997):

- Product to Groundwater and Surface Water
- Soil to Groundwater
- In land Groundwater to Surface Water
- Soil Particulate to Air
- Soil Direct Contact
- Groundwater to Marine Sediments

As described in the following sections, the primary exposure pathways identified for the site are associated with the Shoreline Manifold Area and associated TPH contaminated soil hot spot and dissolved petroleum hydrocarbons in groundwater (Section 1.1.2.1, 1.1.2.2 & 1.1.2.3), and lead and arsenic particulate in surface soil (Section 1.1.2.4.). Secondary exposure pathways identified for the site are associated with the dissolved petroleum hydrocarbon plume in the inland portions of the site in Main and North Tank areas (Section. 1.1.2.3)

2.1.2.1 Product to Groundwater and Surface Water

The two potential transport pathways associated with product release and plume beneath the Shoreline include (1) occasional product migration into the Elliott Bay through discontinuities in the subsurface barriers, and (2) partitioning of hydrocarbons from the product or adjacent soil to the groundwater, and then subsequent transport in dissolved phase to the surface water through groundwater discharges. These pathways associated with the product release and plume by the Shoreline area are the primary pathways of concern at the site because they pose a potential threat to the surface water and its ecosystem. The proposed cleanup action will interrupt these pathways by continuing the use of the existing bulkhead and remedial actions which will focus on removal of the product, and associated dissolved petroleum hydrocarbons, if present, as discussed in Section 4. These actions will be effective in meeting cleanup levels in groundwater at the point of compliance, providing protection to day workers, and preventing migration of product sheen and potential dissolved petroleum hydrocarbon plumes into the surface water adjacent to the Equilon site.

2.1.2.2 Soil to Groundwater Pathway

The results of groundwater monitoring data and groundwater modeling conducted during the RI and FFS indicate that the soil to groundwater pathway for the inland sources appears to be complete and are stabilizing. The last recorded spill to inland soils took place over five years ago. Groundwater monitoring data indicate that the dissolved plumes associated with these sources appear to be stabilizing and are generally decreasing. Soil to groundwater pathway from the inland portion of the Equilon site (portions of the main terminal, main terminal tank farm and the north tank farm) does not pose a threat to the surface water at the shorelines based on the results of the fate and transport modeling and groundwater monitoring for the site. Therefore, offsite migration to adjacent properties is considered a secondary concern. Accessible TPH soil hot spots that act as potential ongoing sources to groundwater contamination will be excavated to the extent practicable so that the dissolved petroleum hydrocarbon in groundwater does not adversely impact off-site properties, to improve groundwater general conditions at the source and to enhance the timely restoration of the impacted area through natural degradation. Monitoring wells will be sampled along the property boundaries as part of the Groundwater Compliance Monitoring Program to provide early warning of any pending off property migration. A detailed contingency plan is outlined in the compliance groundwater monitoring program for the site as a 'backup' remediation technology in case the Preferred Corrective Option proves ineffective.

Soil to groundwater pathway at the Equilon site located at the shoreline is a primary concern because of its potential direct threat to the surface water and associated ecosystem. The soil to groundwater pathway at the shoreline was not considered in the fate and transport modeling for the site. Equilon has implemented interim actions at the Shoreline Manifold Area which includes excavation of TPH-impacted soil, active product recovery, vapor extraction, treatment of recovered groundwater with BTEX constituents, product sparging, and passive product recovery. These actions have been effective at recovering almost all the product in well points at along the bulkhead.

Accessible TPH soil hot spots that reflect the most recent spill of 1996 will be excavated to the extent practicable. The completeness of these actions to interrupt vapor and soil to groundwater pathways, and protect human health and the Bay will be verified further through the compliance groundwater monitoring program for the site. If groundwater quality, or other performance and cleanup standards are confirmed above state and federal standards, the contingency plan outlined in this cap will be implemented.

The selected remedy for groundwater cleanup at the shoreline manifold area combines several remedial elements to meet the remedial action objectives of removing petroleum vapors, product and the dissolved petroleum hydrocarbons during product recovery. These elements include the following technologies: extraction monitoring well points system to remove product from the water table and the associated dissolved petroleum hydrocarbons, treatment of the extracted groundwater prior to discharge at a disposal facility, and monitoring/institutional controls. These technologies will enhance and expedite the natural biodegradation of the residual TPH along the shoreline.

2.1.2.3 Inland Soil to Groundwater to Surface Water Pathway

The results of groundwater analytical modeling conducted during the RI and FFS indicate that the dissolved-phase hydrocarbon plumes originating at some locations inland within the main terminal, and the main tank farm will not reach Elliott Bay or the Duwamish River at concentrations above surface water cleanup levels. Accessible TPH soil hot spots will be excavated to the extent practicable to improve groundwater general conditions at these locations that act as potential ongoing sources to groundwater contamination. Continued groundwater monitoring will be conducted as part of the cleanup action to verify protection of Elliott Bay and to ensure that contaminated groundwater is contained within property boundaries.

Accessible areas of the site that contain TPH soil hot spots of primary and secondary concerns at the site are located at the Shoreline Manifold area next to the Bay (primary concern), and other secondary areas of concern are located north of the Main tank area, and east of the warehouse.

Accessible TPH soil hot spots at the Manifold, primary area of concern next to Elliott Bay shall be excavated to the extent practicable using the action levels of 10,000 mg/kg set by U.S. EPA ROD for the rest of the Island.

Accessible TPH soil hot spots at the inland locations, secondary areas of concern at the middle of the island shall be excavated to the extent practicable using the action levels of 20,000 mg/kg. This action level is the EPA (A Guide to Corrective Action, EPA, May 1995) recommended lower threshold criteria to enable natural attenuation to successfully reduce total petroleum hydrocarbons concentrations in soils to acceptable levels within a reasonable restoration time period of few years (5).

The technologies proposed for the accessible inland TPH soil hot spots and the associated dissolved petroleum hydrocarbon in the groundwater will include soil excavation on/off site treatment/disposal. Also, if needed, other remedial technologies identified in the contingency plan will be implemented to prevent adverse off property groundwater impacts. These technologies will improve groundwater quality at the site, enhance timely restoration of the impacted areas and expedite natural biodegradation of the residual TPH left in place.

The completeness of these actions to interrupt groundwater to surface water pathway, and protect human health and the Bay will be verified further through the groundwater compliance monitoring program for the site. If groundwater quality, or other performance and cleanup standards are confirmed above appropriate state and federal standards, the contingency plan outlined in this CAP will be implemented.

2.1.2.4 Soil Particulate to Air Pathway

This pathway is not of concern for TPH because TPH-impacted soil is not located at ground surface and are mostly weathered. The majority of the main terminal is paved with asphalt or concrete. Small areas of the main terminal and all of the main tank farm are covered with gravel. The tanks and tank farm walls also offer some protection from the wind. In addition, the hydrocarbons in soil at the inland portion of the site are very weathered and mostly comprised of diesel and oil, not the volatile and more mobile compounds present in gasoline, except the

Shoreline Manifold Area where a recent gasoline spill occurred in 1996. The surface areas of impact in this location are limited in extent.

EPA ROD for surface soils on Harbor Island requires 3 inches of asphalt cap to the extent practicable on areas of Harbor Island that exceed 32.6 mg/kg, arsenic and 1000.0 mg/kg, lead based on a risk assessment RI study and MTCA, respectively. EPA conducted surface soil investigations for the island including the Equilon site.

The results of the EPA RI surface soil lead and arsenic analyses for the Equilon site indicate that this pathway is not of concern for the portions of the main terminal paved with asphalt, but of primary concern for portions of the main terminal (adjacent to the oil/water separator) and the main tank farm area covered with gravel where lead and arsenic levels exceed Harbor Island surface soil action levels. Ecology concurs with EPA that this is a concern because the gravel cover does not provide adequate protection from primarily direct contact, and secondarily from groundwater infiltration, leaching, and surface runoff discharges to storm drains where these suspended metals are transported directly to the bay and sediments at the island edges.

The proposed cleanup actions to excavate or cap areas of the surface soil lead next to the oil/water separator, and portions of the main terminal tank farms that exceed lead and arsenic EPA Harbor Island surface soil action levels will effectively eliminate the soil to air pathway as discussed in Section 4. The final configuration and details, type of cap, areas to excavate, and justifications will be presented in the Remedial Design Phase of the site.

2.1.2.5 Soil Direct Contact Pathway

This pathway is of limited concern for TPH because all elevated TPH concentrations in soils at the site are below the ground surface and are considered low risks, however, concerns relating to metals, arsenic and lead will be permanently addressed either through capping or excavation. Additional protection will be provided through the restrictive and deed covenant on the property and institutional controls.

2.1.2.6 Groundwater to Marine Sediments

This pathway is not of concern at this time since the results of EPA marine sediment sampling in Elliott Bay (adjacent to the site) did not indicate that impacts due to Equilon operations exceeded the Marine Sediment Cleanup Standards to require active remediation. However, due to the location of the petroleum hydrocarbons plume at the Shoreline Manifold Area next to Elliott Bay of the Equilon site, sediments, biota, and the surface water will be evaluated if groundwater quality is confirmed above state and federal standards at the points of compliance. The details and specifics for implementation of surface water, sediment and biota sampling are described in the Groundwater Compliance Monitoring Program for the site. This is to ensure continued protection of human health and the Bay by the preferred remedial action alternative proposed in this CAP.

2.2 INTERIM REMEDIATION SYSTEM

Interim Actions implemented at the Shoreline Manifold Area and North tank Farm included soil excavation of TPH-impacted soil, passive and active product removal, vapor extraction, and treatment of recovered groundwater with dissolved BTEX constituents. These interim actions were implemented in response to two releases in the Shoreline Manifold Area (a small volume, 200 gallons of diesel release in 1991, a small volume, 700-900 gallons of gasoline release in 1996) and one release in the North Tank Farm (3000 gallons of diesel released). Implementation of these interim actions has provided removal of sources (contaminated soil) in the release areas and significant reduction of the product plume behind the bulkhead.

Since these interim actions were completed without Ecology's direct oversight, the completeness of these interim actions to interrupt vapor, soil to groundwater, and groundwater to surface water pathways, and protect human health and the environment will be verified further through the compliance groundwater monitoring program for the site. After implementing the Preferred Options, if groundwater quality, or other performance and cleanup standards are confirmed above state and federal standards at the points of compliance, the Contingency Plan outlined in this CAP will be implemented.

These interim actions have helped improve the overall groundwater quality at the Shoreline Manifold Area. A description of the interim actions taken is presented below.

January 1991 Interim Action

Approximately 200 gallons of No. 2 diesel was released onto soil on January 11, 1991 from a pinhole leak in a product line at the Shoreline Manifold Area. Nine hundred gallons of diesel and water was recovered from the excavation at the manifolds using a vacuum truck. About 10 cubic yards of petroleum impacted soil was excavated from the area and stockpiled for appropriate disposal/treatment.

August 1991 Interim Action

Approximately 3,000 gallons of diesel was released at the north tank farm on August 31, 1991 during product transfer operations. A vacuum truck was used to recover 3,052 gallons of product. In addition, TPH-impacted soil was excavated and disposed off-site.

August 1996 Interim Action

Interim actions were implemented at the Shoreline Manifold Area upon discovery of a small product release in August 1996. Immediate actions taken after discovery included identification of the product type, pressure testing of the pipelines in the vicinity, and isolation of the release source. A pinhole (approximately 1/16-inch in diameter) was discovered in the pipe. Based on the area of impact and the nature of the leak, it is estimated that approximately 700 to 900 gallons (17 to 21 barrels) of unleaded gasoline were released. Follow-up activities included repair of the pipe, excavation of impacted soil (25 tons) in the vicinity of the release, and manual product recovery from vicinity wells (MW-212 and WP-2).

The interim actions included installation of six additional well points (WP-3 through WP-8) along the bulkhead, installation of a total fluids pump for continuous product recovery, performance of a vapor extraction pilot test, and installation of a vapor extraction/treatment system (blower and catalytic oxidizer). The location of the well points and the treatment system are shown on Figure 2. The current radius of influence of the vapor recovery wells covers the entire area impacted by the spill. Of the estimated 700 to 900 gallons released, approximately 390 to 400 gallons, with an additional 100 gallons in the vapor phase have been recovered to date. The interim action has been effective at removing almost all of the visible product along the bulkhead, thereby significantly reducing the product plume in size and volume. The interim action is in progress and the groundwater analytical results of the newly installed conditional compliance groundwater monitoring wells by the shoreline show that the adjacent surface water (Elliott Bay) is adequately protected.

3.0 SUMMARY OF CLEANUP STANDARDS

The Model Toxics Control Act (MTCA) cleanup regulations provide that a cleanup action must comply with cleanup levels for selected hazardous substances, points of compliance (POCs), and applicable or relevant and appropriate state and federal laws (ARARs) [Washington Administrative Code (WAC) 173-340-710]. The final indicator hazardous substances identified for the site, the associated cleanup levels, and ARARs are briefly summarized in the following sections. POCs will be established within the product plume area and at downgradient edge of the site or property boundary. POCs are outlined in the Groundwater Compliance Monitoring Plan.

3.1 INDICATOR HAZARDOUS SUBSTANCES

Indicator hazardous substances (IHSs) were identified for the Texaco Harbor Island Terminal site as part of the FFS using the criteria outlined in WAC 173-340-708(2). The final list of IHSs for groundwater and soil are a subset of the contaminants detected at the site. The final soil IHSs are arsenic and lead for surface soil; and benzene, toluene, xylenes, TPH-G, TPH-D, and TPH-O for subsurface soil. The final groundwater IHSs are benzene, toluene, ethylbenzene, cPAHs, TPH-G, TPH-D, TPH-O, copper, lead, and free product.

3.2 CLEANUP LEVELS

Soil and groundwater cleanup levels for the final IHSs were developed based on the industrial zoning of the site and the determination by Ecology that there is no current or planned future use of the groundwater for drinking water purposes. The beneficial use of the site groundwater is the protection of the adjacent surface waters and ecosystems and to prevent dissolved petroleum hydrocarbon plume in the groundwater from migrating off site which could impact adjacent properties.

Surface soil cleanup levels were determined based on EPA ROD for Harbor Island. Ecology concurred with EPA's ROD in 1994.

Arsenic	32.6 mg/kg
Lead	1,000 mg/kg

Surface soil (0-6 inches) cleanup levels for BTEX and TPH were not developed because surface soil concentrations did not exceed screening levels. The subsurface soil action level for TPH at the primary areas of concern for the site is set to meet the remedial objective of protecting surface water at the property boundaries and shorelines and is:

Total TPH	10,000 mg/kg

This TPH cleanup is also protective for other chemical constituents in petroleum product (i.e., BTEX).

The subsurface soil action level for TPH at the secondary areas of concerns, inland of the site is set to meet the remedial objective of protecting surface water at the property boundaries by improving groundwater general conditions at the source, enhancing timely restoration of the impacted area through natural biodegradation and to prevent off property migrations and is:

Total TPH	20,000 mg/kg

Groundwater cleanup levels were determined by Ecology to be surface water standards that are protective of aquatic organisms in Elliott Bay. These surface water standards are the adopted ambient water quality criteria (WAC 173-201A and Section 304 of the federal Clean Water Act). The category of ambient water quality standards selected as relevant and appropriate for the site are the chronic criteria for protection of aquatic organisms (WAC 173-201A-040). Surface water standards are not established for TPH; therefore, the groundwater cleanup levels for TPH-G, TPH-D, and TPH-O were selected as protective cleanup goals at this time.

Product	No Sheen
Benzene	0.071 mg/L
cPAHs	0.000031 mg/L
Copper	0.0029 mg/L
Ethylbenzene	29.0 mg/L
Lead	0.0058 mg/L
Toluene	200.0 mg/L

TPH-G	1.0 mg/L
TPH-D	10 mg/L
TPH-O	10 mg/L

Copper and lead are from off-site sources and are found throughout the groundwater beneath Harbor Island.

3.3 ARARS

The selected cleanup action will comply with federal, state and local ARARs. Applicable requirements are federal and state laws or regulations that legally apply to a hazardous substance, cleanup action, location, or other circumstance at the site. Relevant and appropriate requirements are those federal and state regulations that do not legally apply but address situations sufficiently similar that they may warrant application to the cleanup action. Potential ARARs pertinent to remediation alternatives include substantive requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW. Others are identified and defined in the FFS (LCI and EMCON 1997) and they include the Model Toxics Control Act (WAC 173-340), the Washington State Dangerous Waste Regulations (WAC 173-303, Washington State Water Quality Standards for Surface Water (WAC 173-201A), and laws requiring or authorizing local government permits or approvals for the remedial action implementation.

4. SUMMARY OF SELECTED CLEANUP ACTION

Site-specific cleanup action alternatives were developed and analyzed for soil and groundwater in the final FFS (LCI and EMCON, 1997) to ensure the protection of human health and the environment at the site. Based on this initial screening and evaluation of supplemental data collected during the FFS, the following three alternatives were selected for further evaluation.

- **Alternative 1A - No Further Action.** This alternative includes cleanup actions performed at the Terminal to date, groundwater monitoring as part of the island-wide operable unit, passive product recovery, ongoing interim actions, and continued use of the existing bulkhead at the Shoreline Manifold area.

- **Alternative 3A - Product Recovery and Associated Dissolved Petroleum Hydrocarbons and Reuse, Treatment of Groundwater Prior to Proper Disposal, Source Identification and Removal at the Property Boundaries, Surface Soil Excavation or Cap, Excavation of Accessible TPH Subsurface Soil Hot Spots to the Extent Practicable, Groundwater and Product Monitoring, Institutional Controls, Deed Restrictions and Contingency Plans.** This alternative includes continued product recovery with enhanced vapor extraction and passive product recovery at the Shoreline Manifold Area; product monitoring; aggressive passive product recovery at the North Tank Farm; excavation or capping of lead impacted surface soil near the oil/water separator excavation or capping of surface soil impacted with lead and arsenic

in the main tank farm; source identification and removal to contain migrating contaminated groundwater within property boundaries, excavation of accessible TPH subsurface soil hot spots to the extent practicable; groundwater monitoring in point of compliance and property wells; natural biodegradation of residual TPH in subsurface soils; and institutional controls including a deed restriction and contingency plans 'backup technology'.

- **Alternative 4A - Product Recovery and Reuse, On-Site Soil Stabilization, and Institutional Controls.** This alternative includes all actions in Alternative 3A except the gravel cover and contingent soil excavation or 3 inches of asphalt cap, stabilization of lead-impacted soil in the main tank farm, and an upgraded storm water collection system.

The proposed cleanup action for the site was selected based on a comparison of each cleanup action alternative with the following criteria (WAC 173-340-360(2) and (3)) and consideration of the MTCA remedy selection requirements:

- Overall Protection of Human Health and the Environment
- Compliance with Cleanup Standards
- Use of Permanent Solutions to the Maximum Extent Practicable
- Compliance with ARARs
- Provision for Compliance Monitoring
- Provision for Reasonable Restoration Time Frame

THE SELECTED REMEDIAL ALTERNATIVE (3A). Alternative No. 3A, the selected alternative in this CAP, includes active and passive product recovery and associated dissolved petroleum hydrocarbons by the shoreline, source identification and removal at property boundaries to contain dissolved petroleum hydrocarbons within property limits, reuse of recovered product, treatment of groundwater with dissolved petroleum hydrocarbons (before disposal), capping or excavating surface soil impacted with lead and arsenic, excavating accessible TPH soil hot spots in the subsurface to the extent practicable, groundwater monitoring at compliance and performance wells, natural attenuation for the TPH residuals in the subsurface below action levels, access restrictions, contingency plans and deed restrictions. The major features of Alternative 3A are presented on Figure 3. A conceptual description of each element of this alternative and how it will be implemented at the site is presented below. Detailed descriptions with engineering drawings, specifications and justifications will be presented in the Remedial Design phase for the site:

Active Product Recovery. Current estimated volume of free product adhered to soil present at the Shoreline Manifold area based on the recovered volume is less than 200 gallons. Measurable product has been reduced to a sheen. Active product recovery has been initiated at the Shoreline Manifold area as part of an interim action. The system includes a network of six well points in the vicinity of MW-212 and a vapor extraction/treatment system (blower and catalytic oxidizer). It is anticipated that the duration of the active product recovery is nearly complete based on the product recovered to date. This will be confirmed through compliance and performance standards evaluations. Detail of this evaluation is contained in the Groundwater

Compliance Monitoring Program for the site. Throughout the site, including the inland areas, free product shall be recovered from the water table when ever present.

Passive Product Recovery. Passive product recovery, using peristaltic pumps, product recovery canisters, and absorbent materials (filter "socks") will be performed in the vicinity of MW-204 and MW-212 until there is no evidence of measurable petroleum hydrocarbon sheen (Figure 3). The details of this system will be presented in the Remedial Design phase. For the wells at the Shoreline Manifold Area, passive product recovery is intended to supplement the active product recovery system as needed. The performance standards (no sheen) of this Passive product recovery will be evaluated periodically. The frequency of this reevaluation will be presented in the Groundwater Compliance Monitoring Plan for the site. Throughout the site, including the inland areas, free product shall be recovered from the water table when ever present.

Reuse of Recovered Product. Recovered product will continue to be recycled into new product.

Groundwater Treatment. During active product recovery, associated petroleum hydrocarbons dissolved in the groundwater may be recovered during the process. The recovered petroleum hydrocarbons in the groundwater will be separated from the product through gravity separation and the water discharged to the King County sewer system under a King County discharge permit or disposed of at an approved facility. Additional treatment (carbon adsorption),will only be used if needed to meet discharge limits.

Location of Accessible Impacted Soils and Volumes.

Accessible areas of the site that contain elevated TPH impacted subsurface soil hot spots that are of primary and secondary concerns at the site are located at the Manifold area next to the Bay (primary concern), and other secondary areas of concern are north of the Main tank area, and east of the warehouse. Accessible TPH soil hot spots at these locations could pose potential threats to Elliot Bay and adjacent properties respectively and will require excavation to the extent practicable.

Elevated lead impacted surface soil (about 13,000 mg/kg) will be capped or excavated adjacent to the oil/water separator. This area is shown on Figure 3. This elevated lead concentration next to the oil/water separator averages 4 inches in thickness, and covers an area approximately 2,785 square feet (sf) in the vicinity of TX-26, SB-129a, and SB-131. The soil volume is approximately 35 cubic yards, comprised of 80 percent gravel and 20 percent sand/silt.

The surface soil impacted areas above the EPA action levels of 32.6 mg/kg and 1000 mg/kg for arsenic and lead respectively that are subject to capping or excavation are shown in Figure 3. The estimated volume of lead and arsenic impacted soil is about 3,500 cubic yards.

The volume of the accessible TPH subsurface soil hot spots subject to excavation to the extent practicable at the shoreline is about 382 cubic yards, while the volume at the inland locations are as follows; Main Tank farm area is about 117 cubic yards, and the Main Terminal Warehouse area-is about 50 cubic yards.

Soil Excavation and Off-Site Disposal or Capping

Lead impacted soil adjacent to the oil/water separator would be excavated and transported to an approved hazardous waste disposal facility. Lead and arsenic above EPA action levels will be excavated and transported/treated before disposal at an approved disposal facility. These areas would be backfilled with clean imported material. Excavated TPH subsurface soil hot spots will be treated on/off site, and/or disposed at an approved disposal facility.

Back filling of surface soils, and subsurface soils will comprise of clean fill material or treated material which will be tested before reuse on the site to ensure that it meets minimum requirements under the regulation for metals and TPH respectively. Excavation, disposal and back filling would be accomplished through the legal framework of the Consent Decree.

Excavation or capping of the surface soils above action levels will prevent surface runoff directly to the storm drains and sediments and protect day workers from direct contact of contaminated arsenic and lead surface soils. Excavation of the accessible TPH subsurface soil hot spots that act as ongoing source to groundwater contamination will improve general groundwater conditions at the source, enhance restoration time for the impacted areas and enhance biodegradation of the residual TPH in the subsurface. In addition, groundwater monitoring program will be implemented to monitor the ongoing intrinsic degradation/natural attenuation of the residual TPH in soils as part of the selected cleanup action. A deed restriction will also be implemented to prevent inappropriate future use of the site.

Contingency Plans. A contingency plan is a cleanup technology that serves as a "backup" remediation technology in the event that the Preferred Option fails or proves in effective in a timely manner (5 years). A Contingency plan that contains engineering plan and design will be triggered and implemented within 30 days of meeting any of the following criteria;

If the results of the groundwater monitoring program after implementing the Preferred Corrective Options indicate elevated contaminant concentration over the specified restoration time frame of 5 years,

or contaminants are identified in point of compliance wells located outside of the original plume boundary, indicating renewed contaminant migration,

or contaminant migration are not decreasing at a sufficient rate to ensure that the primary and secondary concerns identified for the site are being met.

Inland Groundwater Contingency Plan for Property Boundary Shall Include:

- Source identification and removal (and supplemented by treatment) if needed, to prevent adverse impacts to offsite properties.

Shoreline Contingency Plan Shall Include:

- Expand hydraulic control to ensure removal of free product from the water table
- When relocation of the above ground construction of the petroleum delivery pipelines that are currently underground are completed, complete excavation to the extent practicable, TPH soil hot spots.

- Sediment and bioassay sampling as determined necessary through the groundwater compliance monitoring program.

This contingency plan is outlined in detail in the attached Groundwater Monitoring Plan, Exhibit F, developed for the site.

Product Monitoring. Throughout the site, including the inland areas, free product shall be removed from the water table when ever present. Product occurrence or, if appropriate, product thickness, will be monitored at the inland and shoreline locations of the site in the following proposed monitoring wells, MW-06, MW-204, MW-208, MW-210, MW-211, and MW-212. Use of source identification and removal shall be used as needed to ensure that dissolved petroleum hydrocarbons associated with the free product to prevent adverse impacts to offsite properties. Well points are proposed in the Groundwater Compliance Monitoring Plan for the Site in the vicinity of MW-212 to assess the effectiveness of product recovery and to monitor potential changes in the nature and extent of product at localized areas. The duration of the product monitoring will be based on the performance and cleanup standards outlined in the attached Groundwater Compliance Monitoring Plan, Exhibit F, for the site.

Groundwater Compliance Monitoring. The attached groundwater compliance monitoring plan, Exhibit F, is consistent with WAC 173-340-410 and includes protection monitoring, performance and confirmation monitoring. The three types of compliance monitoring to be conducted include the following:

- **Protection Monitoring** to confirm that human health and the environment are adequately protected during construction and the operation and maintenance period of the cleanup action.
- **Performance Monitoring** to confirm that the cleanup action has attained cleanup standards and other performance standards.
- **Confirmation Monitoring** to confirm the long-term effectiveness of the cleanup action once cleanup actions and other performance standards have been attained.

Points of Compliance: Soil. The determination of adequate soil treatment will be based on the remedial actions ability to comply with the groundwater cleanup standards for the site, to meet performance standards designed to minimize human health or environmental exposure to soils above cleanup levels, and to provide practicable treatment of contaminated soils. Performance standards designed to minimize human and environmental exposure to soils above the cleanup levels set for the site shall include: Performance monitoring is outlined in the Groundwater Monitoring Program for the site and a covenant on the property which limits the site to industrial use only and prohibits any activity which may interfere with the protectiveness of the remedial action.

Groundwater. The achievement of cleanup levels in groundwater shall be measured at points of compliance located within the product plume area and at the downgradient edge of the site. These points of compliance shall consist of monitoring wells located in the product plume area and on the downgradient property boundary. Exact location of these wells are identified in the Groundwater Compliance Monitoring Program for the site.

Access Restrictions. The site is an operating facility and has restricted access (fences, signs, work permit requirements) as part of standard operations. These restrictions are in place

24 hours/day and 7 days/week. The Access and Operating Procedures for the Equilon Site is contained in Exhibit C, of the Consent Decree.

Deed Restrictions. Institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of a cleanup action or result in exposure to hazardous substances at the site. Such measures are required to assure continued protection of human health and the environment when a cleanup action results in residual concentrations of IHS that exceed MTCA Methods A or B cleanup levels and where conditional points of compliance are established. The site is currently an "industrial" site and is anticipated to be zoned and used as an industrial site in the foreseeable future. Equilon will add a restrictive covenant to the property deed that will restrict the property use to industrial uses or interfering with remedial action implementation proposed in this document. A copy of the proposed Restrictive Covenant for the Equilon Site is contained in Exhibit D, of the Consent Decree.

Work Construction. Schedule to begin work under this proposed CAP are contained in Exhibit E, of the Consent Decree. Work construction at the Equilon site will be conducted under a Safety and Health Plan prepared under WAC 173-340-810.

5. JUSTIFICATION FOR THE SELECTED REMEDIAL ACTION

The cleanup action, as proposed, is designed to accomplish the following requirements: protect human health and the environment, comply with cleanup standards per WAC 173-340-700, comply with applicable state and federal laws per WAC 173-340-710, provide compliance monitoring per WAC 173-340-410, use permanent solutions to the maximum extent practicable per WAC 173-340-360 (2), (3), (4), (5), (7), and (8), provide a reasonable time restoration per WAC 173-340-360 (6) and consider public concerns per WAC 173-340-600. The following sections discusses how the proposed cleanup action will meet these requirements.

Protection of Human Health and the Environment.

Removal of accessible TPH-impacted soil hot spots in the subsurface, removal or capping of lead and arsenic impacted surface soils, product recovery and associated vapor and dissolved petroleum hydrocarbons and extraction well points will prevent free-phase and associated dissolved petroleum hydrocarbon migration into the Bay and beyond property boundaries, enhance timely restoration of site by removing TPH soil hot spots that act as ongoing sources to groundwater, air and sediment contamination.

Completion of the active and passive product recovery at the shoreline will capture and prevent the spread of potential dissolved petroleum hydrocarbons from migration into the Bay and improve overall groundwater quality. Capping or excavation of lead and arsenic surface soils in the main terminal tank farm will effectively eliminate the soil to air particulate pathway, soil to groundwater pathway through infiltration and leaching, hereby effectively protecting day workers through the direct contact and surface water runoffs pathways. Soil excavation of areas with elevated lead concentrations and accessible TPH soil hot spots would remove the source of the surface lead and TPH contamination near the oil/water separator and other accessible areas of the site. Source identification and removal will prevent dissolved petroleum hydrocarbons from migrating off site and impacting adjacent properties. Monitoring wells by the shoreline and the

property boundaries will provide additional protection by triggering implementation of Contingency Plans for the site.

Comply with Cleanup Standards per WAC 173-340-700 through 760.

The overall goal of cleaning up groundwater for the protection of surface water quality and containing contaminated groundwater within property limits will be met.

The goal of soil cleanup standards and action levels for petroleum hydrocarbons and metals are to protect the beneficial use of groundwater (surface water quality and associated ecosystem) and to contain residual contamination within property boundaries. The selected remedy that includes completion of the product recovery and associated vapor and dissolved petroleum hydrocarbon, excavation of accessible TPH soil hot spots and capping or excavation of surface soil contaminated metals will result in substantive compliance with the soil cleanup standards by reducing concentrations of contaminants in soils to levels that will support and maintain the attainment of groundwater quality standards in a timely manner.

Compliance with Applicable State and Federal Laws per WAC 173-340-710.

The preferred alternative meets all state and federal laws. All activities carried out to implement the preferred alternative will meet any laws requiring or authorizing local government permits or approval for the remedial action on the site.

Provide Compliance Monitoring per WAC 173-340-410.

The preferred alternative provides for long-term monitoring to ensure that groundwater continues to meet cleanup standards after remedial actions have been completed. During the remedial actions, performance monitoring will be conducted to confirm that cleanup actions have attained cleanup standards and treatment goals. After remedial actions, confirmation monitoring will be conducted to confirm and ensure that cleanup actions have attained cleanup standards and performance standards. Protection monitoring will be used to ensure that human health and the environment are being adequately protected during construction and operation of the cleanup actions. The specifics and details of these monitoring activities, locations, number and type of analytes, frequency, duration, and contingency plans are described in the Compliance Groundwater Monitoring Plan in Exhibit F, for the site. Schedule for this activity is contained in Exhibit E, of the Consent Decree.

Use of Permanent Solutions to the Maximum Extent Practicable per WAC 173-340-360 (4), (5), (7), and (8).

Excavation of accessible TPH soil hot spots to the extent practicable, capping or excavation of lead and arsenic impacted surface soils, product recovery, groundwater treatment and reuse are permanent treatment technologies that will effectively improve groundwater quality permanently and in a timely manner.

Provide for a Reasonable Restoration Time Frame per WAC 173-340-360 (6).

Natural attenuation with active excavation of accessible subsurface TPH hot spots (e.g., source control), lead and arsenic in the surface soils will provide for a reasonable restoration time frame of 5 years for the site groundwater that is protective of the surface water and its ecosystem (primary concern) and adjacent properties (secondary concern).

In view of subsurface TPH soil hot spots that generate dissolved petroleum hydrocarbons in the groundwater above cleanup standards, Ecology believes that natural attenuation alone will not be sufficient to provide a reasonable restoration time frame for this site.

The projected 5 years restoration time frame is reasonable, and will allow for a meaningful statistical evaluation of compliance monitoring data and constitutes that time after the active Preferred Options have been implemented. For the Shoreline Manifold Area, restoration time begins after free product is removed from the water table, excavation of accessible TPH soil hot spots, followed by Groundwater Monitoring Program, and Contingency Plan review and implementation, if necessary. If Contingency implementation for the Shoreline Manifold is needed for the TPH in the subsurface soil based on the results of the gorundwater compliance monitoring or other performance standards, Contingency Plan shall begin after the successful relocation to above ground of the current under ground petroleum pipelines. Restoration time begins immediately after contingency implementation activity.

Where contingency plan implementation is not necessary, restoration time for the site is 5 years and the restoration clock begins 30 days after implementation of the Preferred Corrective Option for the site. This is the time required to reduce residual TPH in the subsurface to reasonable levels and groundwater quality below state standards and to collect meaningful statistical data to evaluate groundwater compliance monitoring data. Other specific time lines are outlined in Exhibit E, Schedule, and are detailed in the attached Compliance Groundwater Monitoring Program, Exhibit F, for the Equilon Site.

Consider Public Concerns per WAC 173-340-600.

The public is given the opportunity to comment during a 30-day public comment period upon completion of remedial milestones in the cleanup process. Some of these milestones include: The RI/FS, CAP, Agreed Order/Consent Decree, and Remedial Design (RD). Ecology will consider all comments received. At the end of the comment period, Ecology will prepare a responsiveness summary listing each comment received and Ecology's response to the comment.

6.0 IMPLEMENTATION SCHEDULE

Exhibit E, of the Consent Decree contains outline of the schedule for the remedial design and implementation activities. The Consent Decree will be entered in court, and will become effective once signed by all parties involved. As outlined in the schedule, specifics on detailed analysis may be needed to complete the remedial design. Ecology has review and approval authority for these documents and the public have an opportunity to participate in each milestone through the 30-day public comment period.

7. REFERENCES

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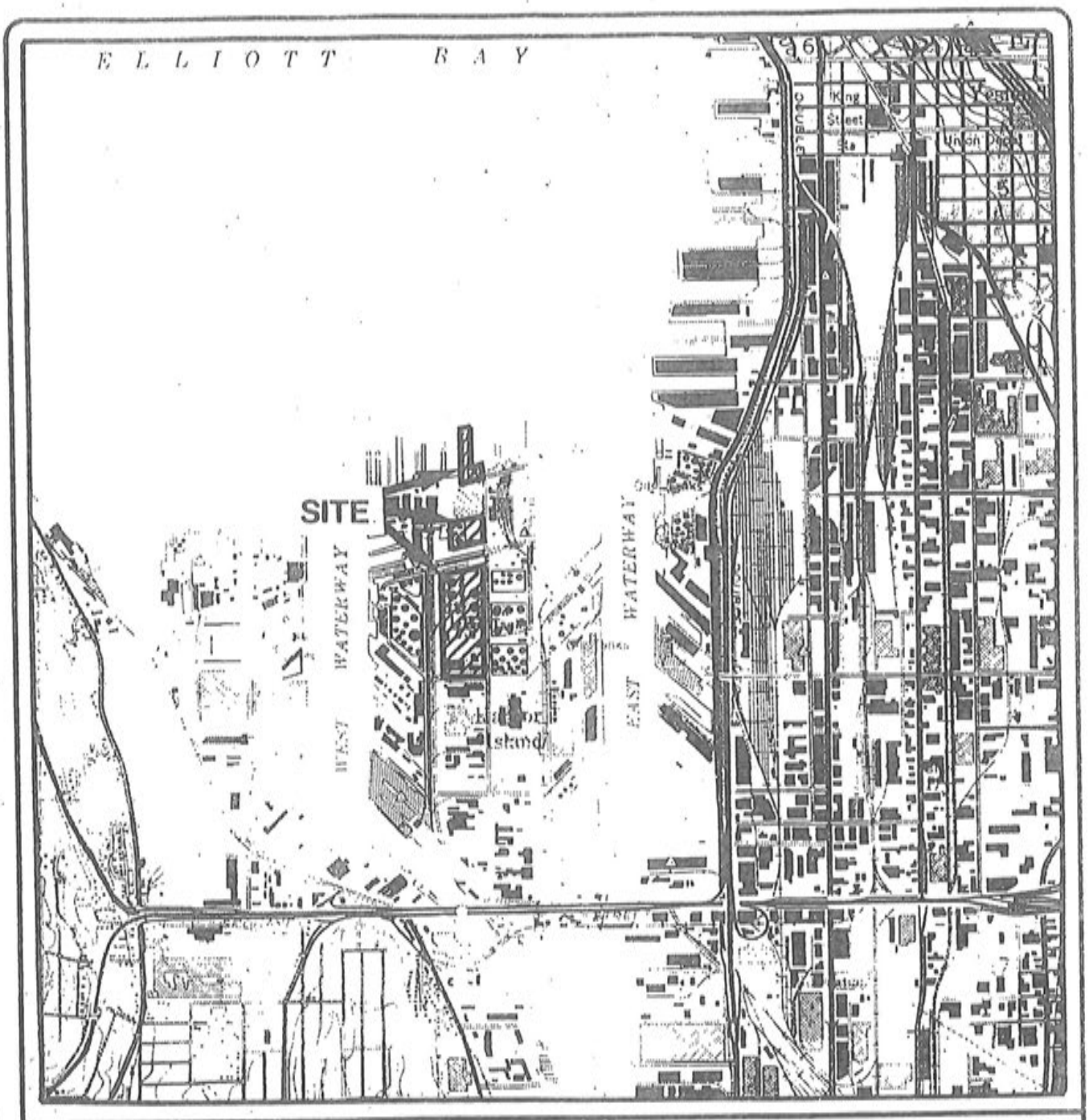
FIGURES



SOURCE: U.S.G.S. 7.5 MIN. QUAD. SEATTLE, SOUTH 1973

WASHINGTON

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SCALE (ft)

DATE	10-96
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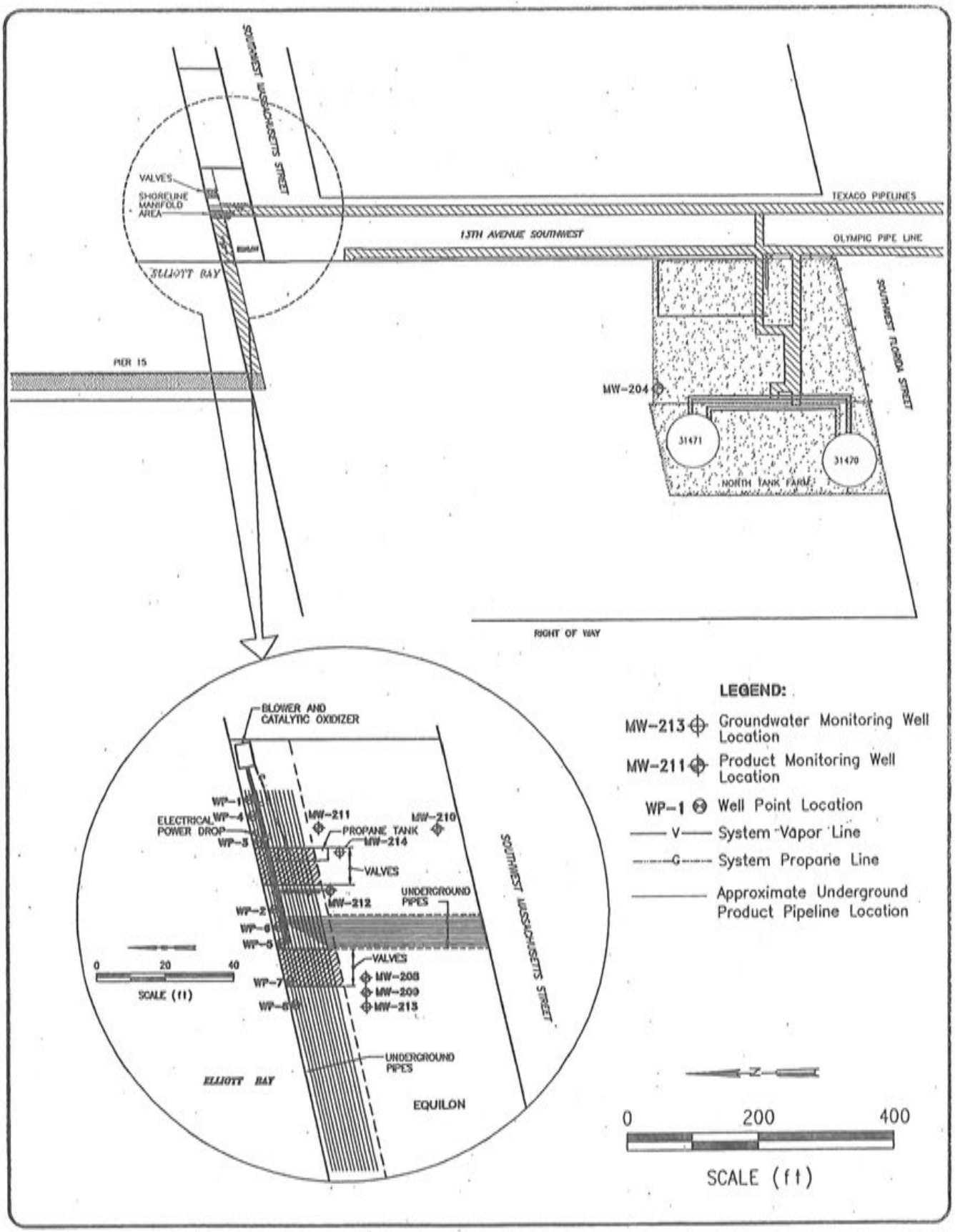
PROJECT NO.	41236-001001

Figure 1
EQUILON SEATTLE SALES TERMINAL
SEATTLE, WASHINGTON

SITE LOCATION MAP



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41236.001.001

FIGURE 2

EQUILON SEATTLE SALES
SEATTLE, WASHINGTON

SHORELINE MANIFOLD AREA
WELL LOCATIONS

EXHIBIT D
RESTRICTIVE COVENANT

EQUILON

2555 13th Avenue SW, Seattle, Washington

This Declaration of Restrictive Covenant is made pursuant to RCW 70.105D.030(l)(f) and (g) and WAC 173-340-440 by the Equilon Enterprises LLC and Texaco Refining and Marketing Inc., [EQUILON] its successors and assigns.

Remedial action (hereafter "Remedial Action") is to be conducted on the Property that is the subject of this Restrictive Covenant. The Remedial Action is described in the Final Cleanup Action Plan, CAP, Equilon Seattle Sales Terminal. This document is an exhibit to the Consent Decree entered in State of Washington, Department of Ecology vs. Equilon Enterprises LLC, King County Superior Court No. **99-2-07176-0 SEA**

This Restrictive Covenant is required because residual concentrations of lead and arsenic may remain beneath a capped impermeable material, or excavated. If excavated, this restrictive covenant will be amended at a later date, and because residual concentrations of dissolved total petroleum hydrocarbons and its constituents (e.g. benzene), that exceed the Surface Water Quality and other cleanup standards for groundwater established under WAC 173-340-720 may remain after Remedial Action is completed, and because total petroleum hydrocarbon impacted soils are left in the subsurface at the Property.

The undersigned, EQUILON, is the fee owner of real property (hereafter "Property") in the County of King, State of Washington, that is subject to this Restrictive Covenant. The Property is legally described in Attachment A of this Restrictive Covenant and made a part hereof by reference.

EQUILON, makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1.

a. The Property shall be used only for traditional industrial uses, as described in RCW 70.105D.020(23) and defined in and allowed under the City of Seattle's zoning regulations codified in the City of Seattle as of the date of this Restrictive Covenant.

b. No groundwater may be taken for any use from the Property that is inconsistent with the Remedial Action implementation.

Section 2.

a. As of the date the Consent Decree was entered, a portion of the Property contains total petroleum hydrocarbons in the soil, dissolved total petroleum hydrocarbons in the groundwater, some floating product on the water table, lead and arsenic on the surface soils.

b. Specifically, elevated soil concentrations of residual petroleum hydrocarbons and dissolved residual of petroleum hydrocarbons and its constituents are present on the east site of the warehouse (former UST location) by the main terminal and near tank 31538, and tank 31470; and beneath the Shoreline Manifold Area next to Elliott Bay. Also, elevated concentrations of lead and arsenic above Harbor Island surface soil action levels of 1000 mg/kg and 32.6 mg/kg respectively are present in portions of the tank farm of the main terminal area. These locations are shown in the enclosed map (Attachment B). The Owner shall not alter, modify, or remove the existing structure(s) in any manner that may result in the release or exposure to the environment of the contaminated soils, groundwater, vapors or create a new exposure pathway without prior written approval from Ecology, which approval will not be unreasonably withheld.

c. Any activity on the property that may result in the release or exposure to the environment of the contaminated soils, vapors and contaminated groundwater in a manner that is inconsistent with the Remedial Action implementation, or create a new pathway that endangers the public health and the environment, is prohibited without written approval from Ecology, which approval shall not be unreasonably withheld. Site workers conducting construction activities within these areas will follow the Health and Safety Plans to be developed under WAC 173-340-810. Also they will be instructed on precautionary actions to avoid direct contact with contaminated soils, vapors and groundwater to ensure protection of site workers.

Section 3. The Owner of the Property must give thirty (30) day advance written notice to Ecology prior to transfer of any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 4. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the Property.

Section 5. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment. Approval by Ecology pursuant to Section 5 shall not be unreasonably withheld.

Section 6. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect Remedial Actions conducted at the Property, and to inspect records that are related to the Remedial Action. Ecology will provide EQUILON advanced notice of its entry

onto the Site when feasible. Ecology shall adhere to Access and Operating Procedures attached as Exhibit C, and applicable Health and Safety Plans to be developed.

Section 7. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and opportunity for comment, concurs, which concurrence shall not be unreasonably withheld.

DATED: _____ Equilon Enterprises LLC

By _____
Its _____

STATE OF WASHINGTON)
) ss.
COUNTY OF KING)

On this ___ day of October, 1998, before me personally appeared _____, to me known to be the _____ of _____, the corporation that executed the within and foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that was authorized to execute the said instrument, and that the seal affixed, if any, is the corporate seal of said corporation.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal the day and year first above written.

_____
(Signature)

_____
(Please print name legibly)

NOTARY PUBLIC in and for the State of Washington, residing at

_____.

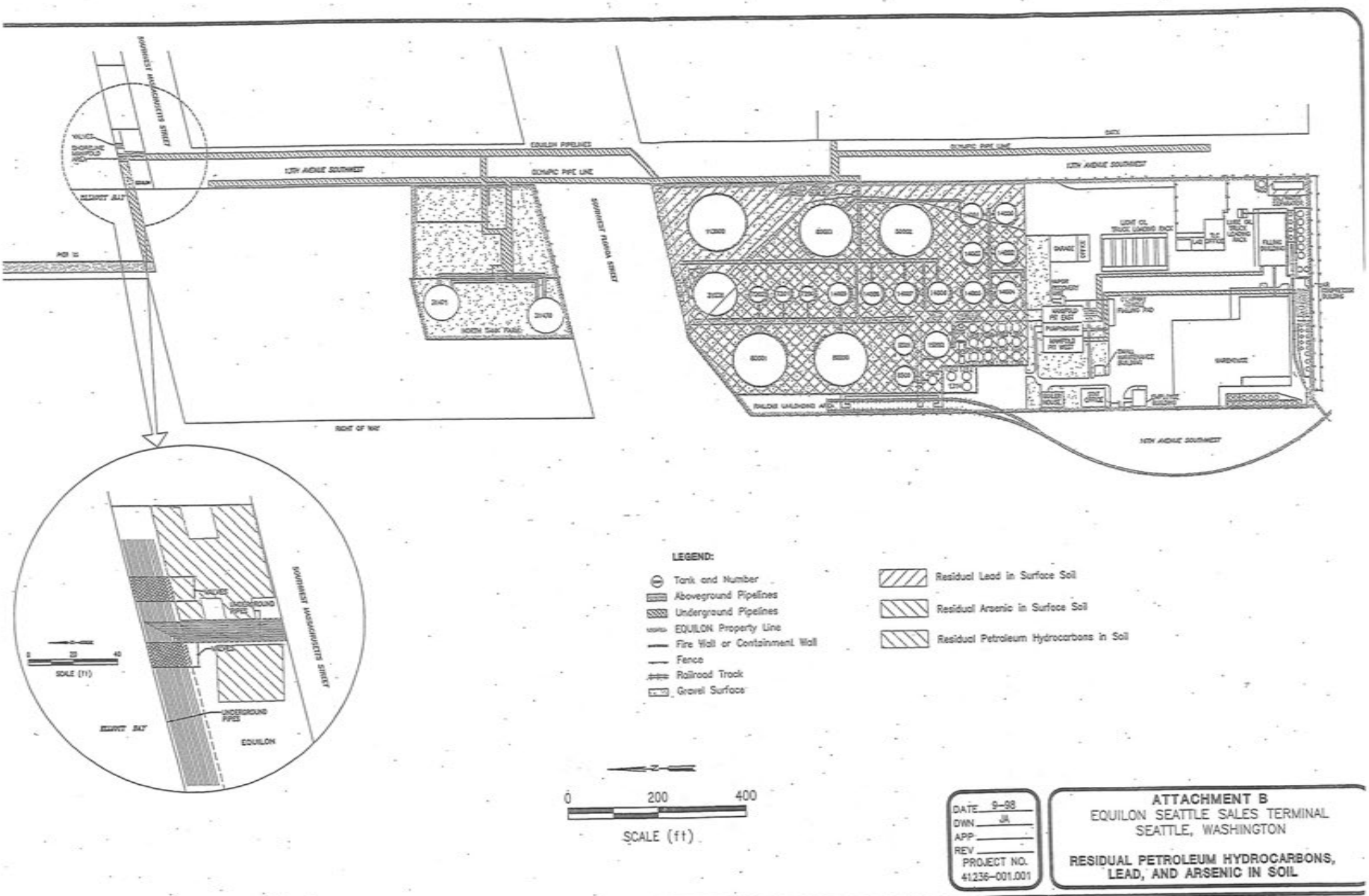
My commission expires: _____.

ATTACHMENT A

LEGAL DESCRIPTION

Main Terminal and Tank Farm: 2555 13th Avenue Southwest, Seattle, Washington 98134. **North Tank Farm.** 1835 13th Avenue Southwest, Seattle, Washington 98134. **Shoreline Manifold Area.** 1711 13th Avenue Southwest, Seattle, Washington 98134. Subject property lies between 13th Avenue SW and 16th Avenue SW and north of SW Lander Street, Seattle, Washington.

Parcel "A" - Lots 1 thru 47 inclusive, Block 403, Seattle Tidelands.
Parcel "B" – That portion of Blocks C and D of vacated Lewis Avenue adjacent, all in Frinks Waterfront Addition, according to the plat recorded in Volume 12 or Plats, Page 89, in King County, Washington, described as follows:
Beginning at the southwest corner of said Block C and running thence South 76°42'12 " West along Westerly extension of Southerly line of said Block C, being also the Northerly line of Railroad Avenue, now W. Florida Street, 117.85 ft.; thence North parallel with the East line of said Block C, 327.23 ft.; thence North 76°42'13" East 142.00 ft.; thence South 6.85 ft., thence East 216.63 ft. to the beginning of a curve to the right having a radius of 60 ft.; thence along said curve, and Southeasterly line of said Block 40.16 ft. to Southerly line of said Block C, thence South 76°42'12" West along said Southerly line 199.14 ft. to the TPOB, TOGETHER WITH an easement for ingress, egress and utilities as granted by instruments recorded under Auditor's File Nos. 6450860 and 6450861.
Parcel "C" - That portion of Lot 1, Block F, lying East of the prolongation of the West line of 13th Avenue S.W., as now located; and Lot 2, Block G, lying West of a line parallel with the East line of said Lot and 66.743 ft. Westerly therefrom, being measured along the inner harbor line; all in Frink's Waterfront Addition, according to the plat recorded in Volume 12 of Plats, page 89, in King County, Washington.



DATE 9-98
DWN JA
APP
REV
PROJECT NO.
41236-001.001

ATTACHMENT B
EQUILON SEATTLE SALES TERMINAL
SEATTLE, WASHINGTON

RESIDUAL PETROLEUM HYDROCARBONS, LEAD, AND ARSENIC IN SOIL

APPENDIX B

MOU KAILT / Shell / BPARCO HARBOR ISLAND

SIT 8.5.3

SUPERFUND/TOXICS CLEANUP PROGRAM
MEMORANDUM OF AGREEMENT
FOR THE HARBOR ISLAND SUPERFUND SITE

Signed 2/5/91

Purpose

The purpose of this site specific memorandum of agreement (MOA) between Ecology and EPA is to clarify the roles and responsibilities of each agency with regard to site management and enforcement activities at the Harbor Island superfund site. This agreement applies only to EPA and Ecology activities at the Harbor Island site and does not apply to or influence the work of either party at other Superfund sites. This agreement is an addendum to the Superfund Memorandum of Agreement (SMOA) dated October 26, 1989. It is expected that this agreement will be in effect only until both the groundwater and soil/sediments Records of Decision (RODs), arising from EPA's investigations, are completed. At that time, it is anticipated that another MOA or perhaps a site specific cooperative agreement will be required.

Basic Enforcement Responsibilities

Since all of Harbor Island is one superfund site, EPA will retain the lead for most enforcement activities at the site. Ecology will be the lead agency for cleanup of three tank farms, (Shell Oil, Texaco, and Arco) on the site. Ecology agrees to pursue an order with each of these three facilities on the island and to require that investigations of groundwater, surface water (including storm water) and soils at each of these facilities be consistent, at a minimum, with the island wide work plan prepared by Roy F. Weston, Inc. for EPA.

Ecology agrees to use its own enforcement authorities through the Model Toxics Control Act (MTCA) to assure that the three tank farm sites are cleaned up. It is Ecology's understanding that EPA will divide the remainder of the site into two operable units, one to address groundwater and one to address soils and sediments. Each operable unit will require a Record of Decision and state concurrence. Ecology cleanups will be endeavor to be as consistent as possible with the RODs with which Ecology has concurred. However, as stated in the SMOA, Ecology conducted cleanups are done without EPA involvement or oversight and as such will be done using state cleanup standards and procedures.

EPA will complete the RI/FS for the remainder of the island (soils and groundwater) as well as sediment and air investigations for the entire island, and will pursue required cleanup activities using CERCLA authorities. EPA will take the lead for all sites found to be contaminated with both petroleum and other contaminants, which at this time include Todd Shipyard/Mobile Oil property and the Shell terminal's Yard A. Following the issuance of the RODs, Ecology may accept responsibility for cleanup of additional sites which EPA, through its investigation, finds to be contaminated solely from petroleum products. Ecology and EPA shall meet and concur before any transfer of site

responsibility occurs. Ecology will handle transferred sites as priorities and resources allow.

Basic Site Management Responsibilities

The site will remain an EPA lead site. Ecology will continue to complete the EPA oversight tasks outlined in the Management Assistance Cooperative Agreement. However, due to the high degree of interaction between EPA and the Urban Bay Action Team at Ecology's Northwest Regional Office (NWRO), Ecology will dedicate one staff member at NWRO assume these tasks, and the headquarters office will no longer be involved in oversight of EPA work. The NWRO staff person will serve as EPA's primary contact at Ecology for all Harbor Island issues, prepare MTCA orders for investigation and cleanup of the Shell, Texaco, and Arco properties and provide coordination between Ecology and EPA. NWRO staff will continue to pursue source control through the efforts of the Urban Bay Action Team.

EPA will provide to the NWRO staff contact three copies of documents to be reviewed. Review times by Ecology shall be consistent with those specified in the SMOA unless otherwise agreed upon by both EPA and Ecology. Ecology will assure that MTCA orders are consistent with the final approved work plan for the Phase II investigation without formal EPA oversight, as outlined in the SMOA. Ecology will keep EPA informed of all significant events and accomplishments at the state lead sites. Two copies of any reports or data submitted to Ecology by potential liable persons (PLPs) or their contractors shall be provided to EPA to assist in the island wide investigation.

Site Specific Responsibilities

1. Port of Seattle-Terminal 18. EPA will take the lead on this site which will include Shell Yard A and Terminal 18D. If investigation shows that the contamination of the property stems solely form petroleum products, Ecology may take responsibility for assuring cleanup on that portion of the Port of Seattle property.

2. Todd Shipyard-Mobil. EPA will take the lead on the entire Todd Shipyard property including the old Mobil tank farm. If the investigation shows that the contamination on the old Mobil property stems solely from petroleum products, Ecology may take responsibility for assuring cleanup on that portion of the Todd property.

3. Tank Farms-Shell Oil, Arco, Texaco. With the exception of Shell Yard A, Ecology will take the lead on these three tank farms and will follow through to final cleanup using MTCA authorities.

Schedules

EPA has decided to divide the site into two separate operable units and therefore will prepare two separate RODs for the site. The first ROD will address soils and sediments for the island and is scheduled to be

events and accomplishments on the tank farm operable unit and will also provide two copies of all final reports to EPA.

For the EPA operable units, Ecology will provide support agency management assistance to EPA as specified in the SMOA. The most important remaining assistance tasks will be to: 1) review and comment on the Remedial Investigation/Feasibility Study (RI/FS) Reports for the Lockheed and Sediment units, and 2) review, comment and concur on the Proposed Plans and the RODs for the Lockheed and Sediment units. In addition, as stated in the SMOA, EPA and Ecology will meet prior to the start of all consent decree negotiations with responsible parties to discuss goals and bottom line positions for negotiations.

EPA's Sediment RI Report has identified large areas of contaminated sediments around Harbor Island which exceed the cleanup levels as specified in the Sediment Management Standards. EPA will use its knowledge of contaminant sources on Harbor Island, its understanding of contaminant transport in the sediments, Ecology's sediment clustering analysis, and best professional judgement to determine which contaminated sediments will be remediated under Superfund authority. Where there are contaminated sediment areas exceeding the cleanup levels outside of the Superfund site boundary, Ecology will be the lead agency for enforcing cleanup actions in these areas. EPA will coordinate sediment remedial actions selected for the Superfund site with remedial actions selected by Ecology in adjacent contaminated sediment areas.

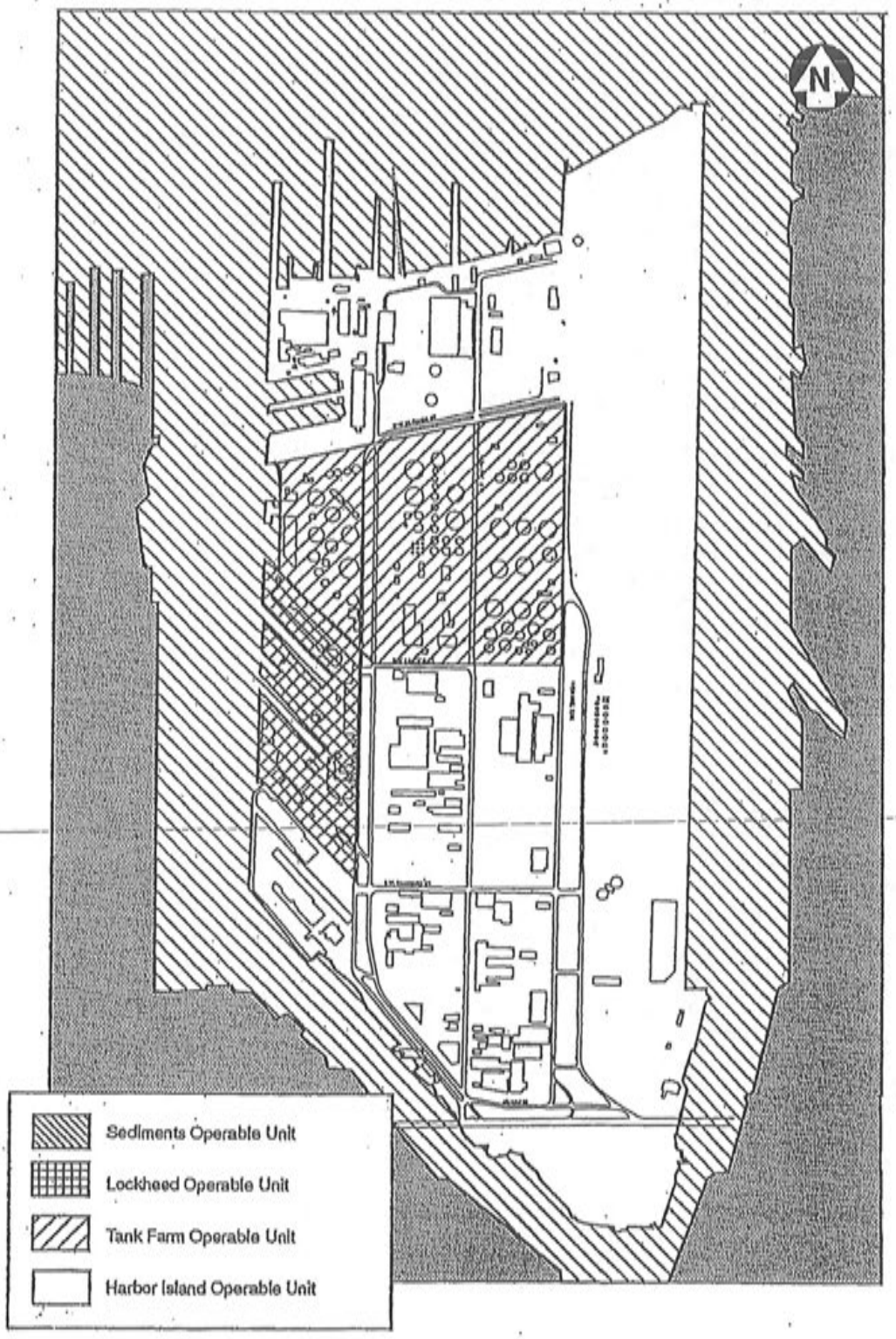
Schedule

The ROD for island-wide soil and groundwater was signed on September 30, 1993. EPA intends to issue "special notice" letters to the PRPs in November, 1993, and to finalize a Consent Decree with these PRPs by the fall of 1994. EPA plans to complete a ROD for the Lockheed Shipyard in the spring of 1994, and to complete a Consent Decree for this unit in early 1995. EPA intends to complete a ROD for the marine sediment unit in the fall of 1994 and a Consent Decree in early 1995. Ecology intends to complete CAPs for each of the petroleum tank farms by January 1995. In general, remedial actions selected for sources of contamination will be initiated before initiating remedial actions selected for marine sediments.

Data Exchange

Ecology and EPA agree to exchange data in a manner which will facilitate decision making by both parties. Upon request, each agency shall have access to data collected by the other agency, its contractors, or by the PRPs conducting work under agreement with the other agency.

Figure 1
Harbor Island Operable Units



WNSO

1994 MEMORANDUM OF AGREEMENT FOR THE HARBOR ISLAND SUPERFUND SITE

Purpose

The purpose of this site specific Memorandum of Agreement (MOA) between the Department of Ecology (Ecology) and the Environmental Protection Agency (EPA) is to clarify the roles and responsibilities of each agency with regard to site management and enforcement activities at the Harbor Island Superfund Site in Seattle, WA. This MOA supersedes the previous version dated February 5, 1991. Unless specified otherwise, the definitions and provisions set forth in the Superfund/Hazardous Waste Cleanup Memorandum of Agreement (SMOA) of 1989 between EPA and Ecology, will apply to this MOA.

Basic Enforcement Responsibilities

The Harbor Island Superfund Site has been broken up into four operable units (Fig. 1), which are: the petroleum tank farms, island-wide soil and groundwater, Lockheed Shipyard #1, and the marine sediments around the island. Ecology will be the lead agency for the petroleum tank farms because the primary contaminant at these tank farms is petroleum, which is identified as a hazardous substance under the Model Toxics Control Act (MTCA) but is not a hazardous substance under CERCLA. EPA will be the lead agency for the remaining three operable units.

Ecology will issue a Cleanup Action Plan (CAP) for each tank farm which will identify cleanup goals and select a remedial action for each tank farm. Ecology will use its authority under MTCA to have the selected remedies implemented by the Potentially Liable Persons (PLPs) associated with this unit. EPA will issue a Record of Decision (ROD) for each of its three operable units which will identify cleanup goals and select remedial actions for these operable units. EPA will use its authority under CERCLA to have the selected remedies implemented by the Potentially Responsible Parties (PRPs) associated with each of these units.

Basic Site Management Responsibilities

The tank farm operable unit is defined as property owned or leased by Shell Oil (including Yard "A"), Texaco, and ARCO. This unit also includes petroleum contamination which has migrated from these properties in the form of contaminated groundwater or petroleum product floating on groundwater. Ecology will manage the cleanup of the tank farm operable unit with no oversight by EPA. However, Ecology will keep EPA informed of all significant

completed by March, 1992. The second ROD will address groundwater and is proposed for completion in March, 1992. Ecology intends to develop a schedule for its orders to the tank farms which will allow EPA and the tank farms to conduct concurrent groundwater sampling events. Ecology and EPA agree that soils data from the tank farms will not be available in time to be used in preparation of the soils/sediment ROD, but that Ecology's Cleanup Action Plans will address any necessary remediation indicated by that data.

Data Exchange

Ecology and EPA agree to exchange data in a manner to facilitate decision making by both parties. EPA shall have access to all data collected by Ecology and the PLPs including that done for source control. Ecology shall have access to all data collected by EPA, its contractors and the PRPs.

Dispute Resolution

In the event of disputes between EPA and Ecology concerning site activities, the agency site managers will attempt to promptly resolve such disputes. If disputes cannot be resolved at this level, the problem will be referred to the supervisors of these persons for futher consultation. This supervisory referral and resolution process will continue, to the level necessary to resolve the conflict.

In the event that schedules for activities at the tank farms and the Weston investigation conflict, EPA and Ecology will meet to discuss options. Preference shall be given to those activities which are actively reducing a known threat to human health or the environment rather than to investigatory activities. Every effort shall be made to accomodate both activities. For example, product recovery operations at a tank farm have the potential to affect groundwater investigation results. EPA and Ecology shall give priority to the continuing operation of the product recovery system, yet may schedule an inactive period to allow the investigation to proceed. Such decisions will be made on a case by case basis by the agency project managers.

For the Department of Ecology

Carol L. Fleskes 1/25/91
Carol L. Fleskes Date
Program Manager, Toxics
Cleanup Program

For the Environmental Protection Agency

Philip G. Millam 2-5-91
Philip G. Millam Date
Chief, Superfund Branch

1150.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

March 27, 1995

RECEIVED
MAR 2 _ 1995
GERAGHTY & MILLER, INC.
[illegible]

Larry Roberts
Geraghty & Miller, Inc.
8330 154th Avenue N.E.
Redmond, WA 98052-3864

Re: Harbor Island Operable Unit Boundaries

Dear Mr. Roberts:

The Record of Decision for the Soil and Groundwater operable unit of the Harbor Island site did not identify the precise boundary between the Soil and Groundwater unit and the adjacent Petroleum Tank Farm unit along Southwest Lander Street. After discussing this issue with Ecology's site manager, Nnamdi Madakor, we decided to define the boundary to be the middle of Southwest Lander Street. If you have any further questions on this issue, please contact me at (206) 553-7721.

Sincerely,

Keith A. Rose

Keith A. Rose
Remedial Project Manager

cc: Nnamdi Madakor, Ecology

Dispute Resolution

In the event of dispute between EPA and Ecology concerning responsibilities for the Harbor Island site, the site managers for each agency will attempt to promptly resolve such disputes. If disputes cannot be resolved at this level, the problem will be referred to the supervisors of these persons for resolution. This supervisory referral and resolution process will continue, to the management level necessary to resolve the conflict.

In the event that schedules for remedial actions at the site conflict, EPA and Ecology will evaluate options to eliminate this conflict. Preference will be given to those remedial actions which will eliminate the most significant human health or environmental risks at the site in the shortest timeframe. Such decisions will be made on a case-by-case basis by both agency's site managers and program managers.

Carol L. Fleskes 2/10/94

Carol L. Fleskes Date
Program Manager
Toxics Cleanup Program
Department of Ecology

Carol Rushin Date
Chief
Superfund Remedial Branch
Environmental Protection Agency

APPENDIX C

USA Environmental Protection Agency

Harbor Island Superfund Site #OU 2

Shell Oil Harbor Island Terminal

Former Equilon Enterprises LLC Harbor Island Terminal

Seattle, WA

EPA Five-Year Review

Interview Record with Site Inspection & Photographs

November 4, 2014

Shell Oil Harbor Island Terminal, former Equilon Enterprises LLC Harbor Island Terminal Site
Appendix C. Photo Log on November 4, 2014

Photo 1. Shell Oil Products Harbor Island Terminal Site showing location of SH-04 Area.

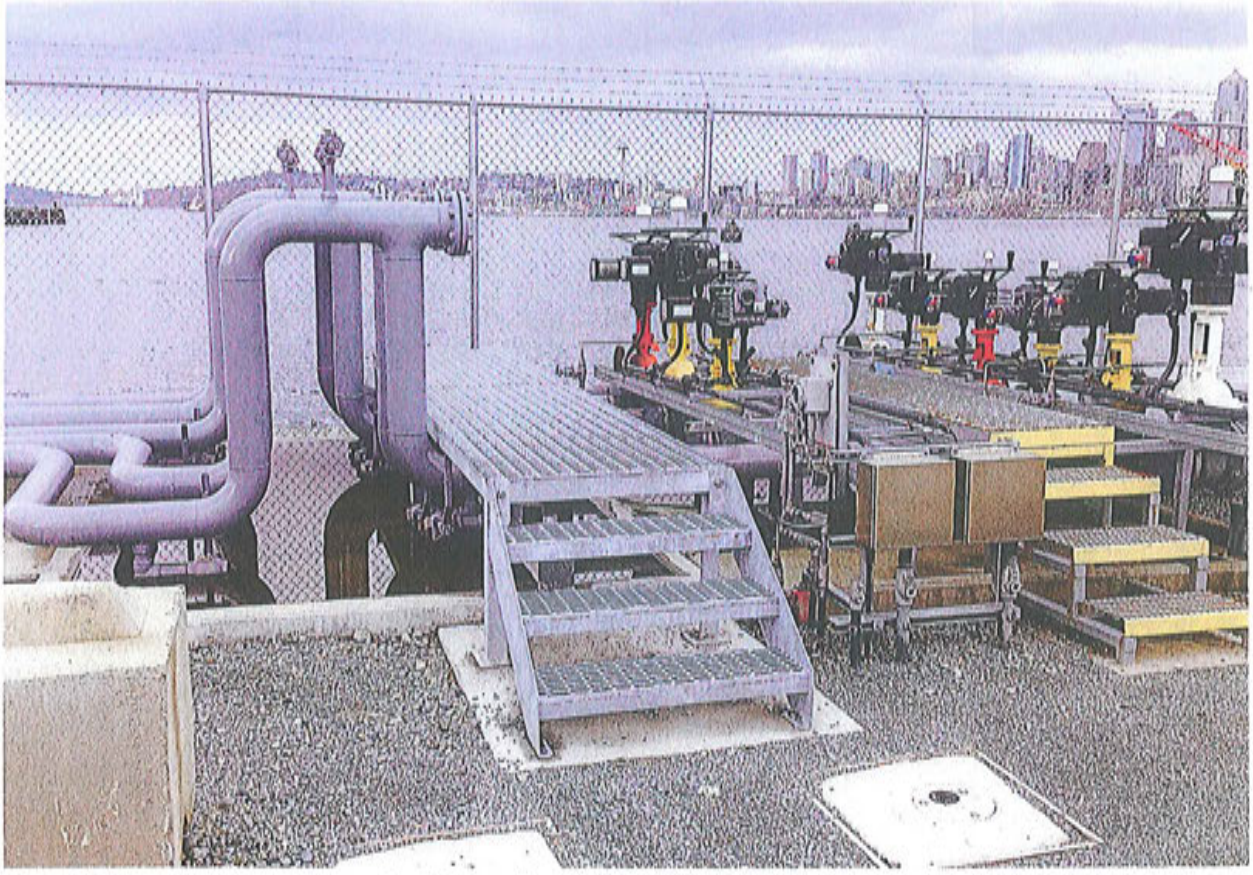


Photo 2. Shell Harbor Island Terminal Shoreline Manifold Area looking northeast across Elliott Bay to City of Seattle in background.

Photo 3. Shell Shoreline Manifold Area looking northwest to Port of Seattle.

Photo 4.

Five-Year Review Interview Record			
Site:	Shell Harbor Island	**EPA ID No:**	

Interview Type: Site visit and inspection
Location of Visit: 2555 13th Avenue SW, Seattle Washington
Date: 11/4/2014
Time: 14:00-16:00

Interviewers

Name	Title	Organization
Maura O'Brien, PG/HG #869 and site manager	Toxics Cleanup Program	Ecology

Interviewees

Name	Organization	Title	Telephone	Email
Paul Katz	Shell	Terminal Manager	206.224.0484	paul.katz@Shell.com
Perry Pineda	Shell	Shell Oil SR. Environmental PM	425.413.1164	Perry.pineda@Shell.com
Brian Pletcher	AECOM	Project Manager	503.243.3120	Brian.pletcher@AECOM.COM

Summary of Conversation

1) What is your overall impression of the project?
The cleanup actions completed at the Site appear to be protective of human health and the environment and follow the cleanup requirements.

2) Is the remedy functioning as expected? How well is the remedy performing?
Remedy is functioning as expect. Many remedial actions have been completed; and monitored natural attenuation of dissolved hydrocarbons is occurring with recommend MNA monitoring.

3) What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?
The SH-04 area continues to show a decrease in contaminate levels. The TX-03A area continues to be evaluated and delineated.

4) Is there a continuous O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities. O&M consists of monthly free product removal and monitoring at the Shoreline manifold area, and periodic compliance monitoring across the Site.

5) Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines in the last five years? If so, do they affect protectiveness of the remedy? Please describe changes and impacts. There are no changes in O&M and current MNA and compliance monitoring appear to be protective. Current practices at the Shoreline Area appear to be effective.

6) What are the annual operating costs for your organization's involvement with the site? Not specified.

7) Have there been unexpected O&M difficulties or costs at the site in the last five years? If so, please give details.

None

8) Have there been opportunities to optimize O&M or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency. In 2012 quarterly vac events were conducted to reduce free product in wells. Product is not very mobile and product continues to be observed in 2 wells at the Shoreline Manifold area. Vac events were discontinued due to lack of effectiveness.

9) Are you aware of any changes in Federal/State/County/Local laws and regulations that may impact the protectiveness of the remedy? None

10) Do you have any comments, suggestions, or recommendations regarding the project? Continue MNA, product removal and assessment of TX-03A area.

Additional Site-Specific Questions

[If needed]