DRAFT
REMEDIAL INVESTIGATION AND INTERIM ACTION REPORT

Chevron Site No. 30-2095
Former Chevron Bulk Terminal
149 and 167 Main Avenue
Morton, Washington

February 2006

Prepared for:

6001 Bollinger Canyon Road K2252
San Ramon, CA 94583

Prepared by:

Science Applications International Corporation
18912 North Creek Parkway, Suite 101
Bothell, WA 98011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIMITATIONS

In preparing this report, SAIC has relied on verbal and written information provided by secondary sources, including information provided by Chevron. Because the assessment consisted of evaluating a limited supply of information, SAIC may not have identified all potential items of concern and/or discrepancies and, therefore, SAIC warrants only that the project activities under this contract have been performed within the parameters and scope communicated by Chevron and reflected in the contract. SAIC has made no independent investigations concerning the accuracy or completeness of the information relied upon.

1.0 INTRODUCTION

1.1 Objectives

This report is being submitted to document the activities and findings of a remedial investigation (RI) into the nature and extent of contamination at a former Standard Oil Company of California petroleum bulk terminal in Morton, Washington. In addition, this report documents an interim action soil removal effort that was subsequently conducted at the site. This report is intended to fulfill the requirements of the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) (WAC 173-340-350[7] and (WAC 173-340-430[7]) and is being submitted in accordance with Sections IV(4) and IV(2) of Enforcement Order DE03TCPSR5715. The remedial investigation and interim action were performed by Science Applications International Corporation (SAIC) on behalf of Chevron Environmental Management Company (Chevron).

1.2 Site Background

Standard Oil constructed the former bulk terminal in 1924 near the intersection of Main Avenue and First Street on property leased from Chehalis Western Railroad (Figure 1). The terminal was fenced and included six vertical above-ground storage tanks (ASTs) (two 19,000-gallon, one 13,000-gallon, and three 6,000-gallon tanks) for gasoline, diesel, kerosene, and heating oil. The terminal also included tank truck and rail car unloading headers (TTUHs and TCUHs), tank truck loading racks (TTLRs), and a pump house. Other structures included a 2,500-square foot warehouse, part of which was used as a garage and part of which was used to handle drummed product, and a 300-square foot office building (Figure 2).

From 1924 until the mid-1950s the terminal was supplied by rail. Rail tank cars were positioned on a railroad spur located southwest of the warehouse and unloaded via the TCUHs. The facility was later modified to allow unloading of tank trucks via TTUHs located near the ASTs. In 1971 a tank truck loading area was constructed to the east of the warehouse. The terminal operated until the late 1970s. Around 1981 the ASTs, piping, pumps, and headers were removed from the site. The warehouse and office building were left intact and remain on the site.

In 1985 the property on which the terminal was located, which consisted of two separate parcels, was sold to Pacific Fire Trails. Pacific Fire Trails did not develop the property and, in 1993, sold it to Dana and Diana Wolfe. The Wolfes soon after sold the western parcel to Janet Parks. The Parks parcel contains a 5,000-square foot building, which currently houses a thrift store (Jan's Lost & Found). This structure existed during the period the bulk terminal was in operation; however, it was located outside of the terminal fence and was not associated with terminal operations. A portion of the warehouse and the office building from the former bulk terminal are still located on the eastern parcel. Adjacent properties are owned by Chester Walker and the City of Tacoma (Figure 2).

In 2003 a citizen reported to Ecology that a fuel odor had been noted during an excavation at the site in the early 1980s. Lewis County Health Department, in conjunction with Ecology, conducted an initial investigation and identified petroleum-contaminated soil at several locations. Based on these findings, Ecology issued Enforcement Order DE 03TCPSR-5715 to Chevron, Dana and Diana Wolfe, and Janet Parks on January 20, 2004, requiring the parties to investigate and clean up petroleum contamination at the site. Chevron initiated a remedial investigation, described below, in May 2004.

In June 2005 the Cowlitz River Valley Historical Society (CRVHS) acquired the eastern parcel of the former terminal site from Dana and Diana Wolfe. The CRVHS plans to develop the site as an historic

tourist facility. On October 15, 2005, a partially restored railway depot was moved onto the property. Future development plans include construction of a railway platform adjacent to the depot, a parking area, museum, and restrooms.

2.0 REMEDIAL INVESTIGATION ACTIVITIES

In accordance with the enforcement order, SAIC prepared an RI work plan (SAIC 2004). The work plan was reviewed and approved by Ecology. RI activities, including a soil and groundwater investigation, began in May 2004. Sample locations are shown on Figures 3 and 4, and investigation activities are outlined below:

- May 17 – June 8, 2004: Thirty-nine soil borings (SB-1 through SB-39) were installed and sampled in order to define the nature and extent of soil contamination.

- June 28 – July 9, 2004: Four monitoring wells, MW-1 through MW-4, were installed, developed, sampled, and surveyed in order to evaluate groundwater contamination and to define the hydraulic gradient.

- September 14 – October 1, 2004: Eight additional monitoring wells, MW-5 through MW-12, were installed, developed, and surveyed and borings SB-46 through SB-48 and SB-51 through SB-55 were installed and sampled to further define contamination at the site.

The 12 monitoring wells were sampled four times during quarterly sampling rounds conducted on October 11, 2004; January 13, 2005; April 11, 2005; and July 11, 2005. In addition, a series of depth-to-water measurements were taken over a 12-month period in all wells to assess seasonal variations in water-table elevation and gradient.

2.1 Soil Sampling

A total of 55 soil borings were completed on the site. Soil borings were advanced with a hand auger for at least the first 8 feet; below this depth, borings were advanced either by hand auger or with a geoprobe rig. Soil borings drilled for the installation of monitoring wells were advanced using a hollow-stem auger. Borings were geologically logged and field screened for organic vapors with a photoionization detector (PID). In general, borings were advanced to depths of 12 to 16 feet, well beyond the limits of detectable contamination in most locations. Borings SB-3, SB-34, and SB-39 were advanced to 24 to 28 feet in order to characterize deeper stratigraphy. Boring logs are presented in Appendix A.

At least one sample from the most highly contaminated interval (based on field observations and measurements) was collected from each boring for laboratory analysis. Additional samples were collected in borings where contamination was present in multiple and/or lengthy intervals. All samples were analyzed by an Ecology-certified laboratory, Lancaster Laboratories, Lancaster, Pennsylvania. Complete laboratory reports are presented in Appendix B.

Samples from the initial 39 soil borings, SB-1 through SB-39, were analyzed for the following parameters:

- Gasoline-range organics (GRO) by method NWTPH-Gx
- Diesel-range organics (DRO) by method NWTPH-Dx
- Heavy-oil range organics (ORO) by method NWTPH-Dx
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by method 8260

- Ethylene dibromide (EDB or 1,2-DBA) by method 8260
- Ethylene dichloride (EDC or 1,2-DCA) by method 8260
- Methyl tertiary-butyl ether (MTBE) by method 8260
- Lead by method 7421

Approximately 20 percent of the boring, representing the most highly contaminated samples, was analyzed for the following additional parameters:

- Polychlorinated biphenyls (PCBs) by method 8082
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by method 8270
- Napthalenes by method 8260
- n-hexane by method 8260
- Halogenated volatile organic compounds (VOCs) by method 8260
- Volatile petroleum hydrocarbons by (VPH) method WA-VPH
- Extractable petroleum hydrocarbons (EPH) by method WA-EPH

Based on the results from soil samples collected from the initial 39 borings, GRO, DRO, ORO, and BTEX compounds were identified as the contaminants of potential concern for the site and analyses of samples from subsequent soil samples were limited to these parameters.[1]

2.2 Monitoring Well Installation and Groundwater Sampling

A total of 12 monitoring wells were installed on the site. A hollow-stem auger drill rig was used to install the monitoring wells. All monitoring wells were completed at a depth of 20 feet and were screened from 5 to 20 feet. Well installation logs are presented in Appendix A.

Monitoring wells were sampled with a peristaltic pump and dedicated sample tubing. Samples were collected from within the screened zones using low-flow rates to minimize drawdown and turbulence. During purging, groundwater was routed through a closed flow cell, which allowed temperature, dissolved oxygen (DO), pH, specific conductance, and turbidity to be monitored. Wells were purged until field parameters stabilized. All samples were analyzed by an Ecology-certified laboratory, Lancaster Laboratories, Lancaster, Pennsylvania.

Groundwater samples collected on July 9, 2004, from the first four wells installed at the site, MW-1 through MW-4, were analyzed for the following parameters:

- GRO by method NWTPH-Gx
- DRO by method NWTPH-Dx
- ORO by method NWTPH-Dx
- BTEX by method 8260
- EDB by method 8260
- EDC by method 8260
- MTBE by method 8260

[1] EDB, EDC, MTBE, PCBs, cPAHs, naphthalenes, n-hexane, and halogenated VOCs were not detected in any of these soil samples above MTCA cleanup levels. With one exception, lead concentrations were all well below the cleanup level of 250 mg/kg. Lead was detected at a concentration of 918 mg/kg in boring SB-15 at a depth of 2 feet. However, this exceedance does not coincide with significant petroleum contamination and areas of the site with significant petroleum contamination do not contain lead exceedances. Therefore, it seems unlikely that the lead in SB-15 is related to past terminal activities. This exceedance will be considered further in the feasibility study (FS).

- cPAHs by method 8270
- Napthalenes by method 8260
- n-hexane by method 8260
- Dissolved lead by method 7421
- PCBs by method 8082

Based on the results of groundwater samples collected during this round, GRO, DRO, ORO, and BTEX compounds were identified as the contaminants of potential concern for the site and analyses of samples from subsequent groundwater monitoring rounds were limited to these parameters.[2]

3.0 HYDROGEOLOGY

3.1 Stratigraphy

Soil borings indicated that the site is underlain by unconsolidated materials consisting of fill and alluvial deposits. Figure 5 presents an east-west geologic cross-section of the site. The uppermost unit at the site is fill that typically ranges between 1 to 4 feet in thickness, but is absent in places. The fill consists of poorly sorted silt, sand, and gravel. Below the fill is a sequence of mottled silts and clays, organic-rich in places, that is split by a thin sand and/or sandy gravel layer. The coarse-grained unit occurs at a depth of between 8 to 12 feet and is continuous across a portion of the site. The lower units that have been investigated at the site consist mostly of thinly interstratified silts and sands.

3.2 Groundwater Occurrence and Flow

During drilling, saturated conditions were usually first encountered at depths of 5 to 10 feet within the coarser-grained sediments. Often, saturated sands were sandwiched between unsaturated silty units. Once installed, water levels in the monitoring wells typically stabilized at between 1 and 6 feet below land surface suggesting the presence of some local, semi-confined conditions.

A series of depth-to-water measurement rounds conducted over a 12-month period indicated that the water-table at the site, as defined by the water levels in the monitoring wells, is irregular and variable. This situation is typical of sites dominated by local recharge and conditions where wells tap discontinuous and/or perched water-bearing zones. Representative water-table elevation contours are shown on Figure 6. The contoured data sometimes show a groundwater ridge or mound over the central portion of the site in the vicinity of MW-2 and MW-10; at other times, the water table exhibits a simpler configuration with a gradient to the southeast. In general, flow beneath most of the site appears to be generally to the southeast but varies broadly between south and east. Given the discontinuous nature of the water-bearing zones at the site, the groundwater gradients constructed from depth-to-water measurements may not reflect actual groundwater flow paths.

[2] EDB, MTBE, PCBs, cPAHs, naphthalenes, n-hexane, and halogenated VOCs were not detected in any of these groundwater samples above MTCA cleanup levels. With one exception, EDC concentrations were also reported at less than the cleanup level of 5 µg/L. EDC was reported at a concentration of 10 µg/L in well MW-3; however, the compound was reported as a non-detect (<0.5 µg/L) in the field duplicate of this sample. Because of the limited magnitude and frequency of this possible exceedance, the finding that EDC was not detected in any site soil sample above its cleanup level, and the fact that the presence of EDC in MW-3 was not confirmed in the field duplicate, EDC was not included in subsequent groundwater monitoring rounds.

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 Indicator Contaminants

As discussed in Sections 3.1 and 3.2, GRO, DRO, ORO, and BTEX compounds were identified as the contaminants of potential concern for the site. Of these, ORO, ethylbenzene, toluene, and xylenes did not exceed MTCA Method A cleanup levels in environmental samples. Therefore, GRO, DRO, and benzene are defined as indicator contaminants. Tables 1 and 2 summarize the results for the indicator contaminants in soil and groundwater, respectively.

4.2 Soil Contamination

GRO is the most widespread contaminant at the site occurring in concentrations exceeding 300 mg/kg (>10 times Method A cleanup level) throughout the AST area, between the AST area and the railroad tracks, beneath the northern portion of the warehouse, and to the south and southeast of the warehouse (Figure 7). Soil contamination in these areas is consistent with spills and leaks of petroleum products during historical terminal operations. High concentrations of GRO in soil were also found in two samples beneath the west portion of the thrift store and in one sample immediately adjacent to the south side of the thrift store. Historical records indicate that this structure was formerly a feed warehouse and do not indicate that it was ever part of the bulk terminal operations; the source of GRO in these samples is not clear.

The extent of DRO and benzene (Figures 8 and 9) contamination is much more restricted than GRO and is generally limited to the AST area between the former ASTs and the railroad tracks. The area of DRO and benzene contamination in soil is encompassed by the area of GRO contamination.

Based on analytical results and field observations, the main vertical zone of soil contamination occurs largely within the range of seasonal water-table fluctuation. Soil contamination typically is first encountered at a depth of about 2 feet and is limited to a maximum depth of 6 to 8 feet in most places. Contaminants were detected to somewhat greater depths in SB-43 (10 feet) and SB-39 (12 feet).

4.3 Groundwater Contamination

Complete groundwater monitoring rounds were conducted during October 2004, January 2005, April 2005, and July 2005. No separate-phase hydrocarbon (SPH) was detected in any monitoring well during any round. The most significant groundwater contaminants relative to Method A cleanup levels are benzene and GRO. The most significant exceedances of these two contaminants typically occur in three monitoring wells: MW-2 (just south of the former AST area), MW-4 (near the former TCUH), and MW-10 (between the AST area and the railroad tracks). Lower and/or less-frequent exceedances have also been observed in MW-6, MW-8, and MW-3. The affected monitoring wells are located adjacent to or downgradient from former bulk terminal facilities. For example, MW-2 and MW-10 are located near or downgradient of the AST area and MW-4 is located near the former TCUH.

Monitoring results suggest that the areal extent of groundwater contamination is largely restricted to the area of soil contamination (Figures 10 through 12). The south-through-east groundwater gradient and the spatial distribution of groundwater contaminants, including the "clean boundary" formed by MW-1, MW-9, MW-11, and MW-12, indicate that contaminants have not migrated offsite to the south and east in the directions of these wells. Given the existing array of monitoring wells, it is not possibly to definitively evaluate potential offsite contaminant migration to the southeast (e.g., toward the intersection of Front

Street and Davis Lake Road). The relatively low-magnitude exceedances of cleanup levels in MW-6 and the low-permeability soils at the site suggest that any offsite migration in this direction would be of very limited concentration and extent. Nonetheless, additional data, such as an offsite monitoring well located to the south of MW-5 and MW-6, would be helpful to confirm this.

Complete groundwater monitoring rounds were conducted during October 2004, January 2005, April 2005, and July 2005. In general, concentrations detected from round to round were quite consistent with the highest detected concentration in each well typically being no more than two to three times the lowest detected concentration. No clear seasonal or long-term trends were evident.

5.0 EXPOSURE PATHWAYS

The site history indicates that the primary sources of soil contamination were from discharges of petroleum products to surface or subsurface soils via leaks or spills. Results of the site investigation indicate that soil contamination is restricted to the former terminal property (portions of the Parks and CRVHS parcels), the railroad track area, and beneath the thrift store.

5.1 Human Pathways

Part of the former terminal property is currently occupied by a thrift store and associated parking lot. The rest of the property is not used at present and is awaiting development by the CRVHS as an historic tourist facility; this portion of the property is occupied by a railroad depot, railroad tracks, and two other unoccupied buildings. Under present conditions, potential exposure of humans to contaminated soil at the site is considered to be low. During the next 12 to 24 months, the former terminal property is expected to be developed by the CRVHS. Development plans call for the site to be almost completely covered by buildings (depot, museum, and restrooms) and paved areas (parking lot, driveways, and sidewalks). Under these conditions, potential exposure of humans to contaminated soil would be further reduced from current conditions.

There are currently no drinking water wells at the site. The city of Morton, including the thrift shop, is served by the city's municipal water supply system. Future site development plans indicate that the CRVHS depot project will be also connected to the municipal supply. The results of the present investigation indicate that groundwater contamination does not extend more than 100 to 150 feet downgradient to the south and east from the likely sources of past leaks and spills. Although additional data would be needed to fully define the downgradient extent of contamination to the southeast of the site, it not likely that such contamination extends significantly farther in this direction than it does to the south and east. Given that the nearest domestic or industrial supply wells to the site are located more than one-quarter mile to the southeast along the 300 block of Davis Lake Road (Figure 13; Table 3; Appendix C), the potential exposure of humans to contaminated groundwater from the site is considered to be extremely low.

5.2 Ecological Pathways

Under MTCA, exposure of terrestrial organisms to contaminated soils must be evaluated by performing a Terrestrial Ecological Evaluation (TEE) as described in WAC 173-340-7491. This evaluation involves examination of the nature of potential ecological receptors, the toxicity of soil contaminants to terrestrial organisms, and the presence and nature of exposure pathways. Appendix D presents the details of the TEE that was performed for this site.

The first step in the process involves an evaluation to determine whether the site is exempt from the requirements of a TEE. For example, a site located in a developed urban setting that does not contain sufficient habitat to host plant or animal receptors would be exempt. Similarly, a site where contaminated soil lies at a depth that is inaccessible to potential receptors would also be exempt. The results of this step for the present site indicates that the present site is not exempt from a TEE.

The next step in the process involves an evaluation to determine whether a site-specific TEE must be performed or whether the site qualifies for a simplified TEE. This evaluation focuses on the nature of potential receptors that may be present (e.g., endangered species, protected wetlands, extensive native vegetation, etc.). The results of this step indicate that a site-specific TEE is not required and that a simplified TEE is sufficient.

The simplified TEE involves scoring various attributes of the site, including its habitat value, the nature of potential receptors, and the nature and distribution of soil contaminants. The results of this evaluation for the present site indicate that the values in Table 749-2 of WAC 173-340 are to be considered when developing soil cleanup levels. The relevant values from this table for the present site are as follows:

- GRO – 200 mg/kg
- DRO – 460 mg/kg
- Lead – 220 mg/kg

These values will be considered when developing, evaluating, and implementing cleanup actions for soil at the site.

6.0 INTERIM ACTION

An interim action was performed in October 2005. The interim action involved removing contaminated soil beneath a portion of the site in order to accommodate the movement of an historical railroad depot onto the CRVHS property. The action consisted of excavating and disposing of contaminated soil beneath the footprint of the depot, properly disposing of the excavated soil, collecting and analyzing performance monitoring samples using an onsite mobile laboratory, and backfilling the excavation with clean, compacted material. The action was performed in accordance with the *Interim Action Plan, Chevron Site No. 30-2095, Former Bulk Terminal, 149 and 167 Main Avenue, Morton, Washington* dated September 20, 2005 (SAIC 2005).

6.1 Objectives

Enforcement order DE03TCPSR5715 specifies a process and schedule for the selection and implementation of final cleanup actions at the site. However, the depot move schedule did not allow adequate time for this process. Therefore, the interim action was conducted in advance of final cleanup action using the interim action process outlined in MTCA. As required, the interim action met the criteria set forth in subsections (1), (2), and (3) of WAC 173-340-430 by having the following characteristics:

- The interim action was conducted because the contamination would cost substantially more to address once the planned development is completed and contaminated soil will be difficult to access.
- The interim action achieved soil cleanup standards for a portion of the site.
- The interim action did not foreclose reasonable alternatives for the final cleanup action.

6.2 Activities

6.2.1 Well abandonment

Prior to remedial excavation activities at the site, monitoring well MW-10, located within the excavation footprint, was abandoned. The monitoring well was decommissioned by a licensed driller from Cascade Drilling, Inc. of Woodinville, Washington, in accordance with WAC 170-160. The 2-inch diameter well was abandoned by placing bentonite chips into the existing well casing up to the surface followed by water for chip hydration. The entire well casing and screen were later completely removed during soil excavation.

6.2.2 Soil excavation

Approximately 1,290 tons (860 cubic yards) of petroleum-contaminated soil were excavated from the south-central portion of the site (Figure 14). The completed excavation measured approximately 60 feet by 70 feet and ranged in depth between 4 feet (east end) and 13 feet (west end) below ground surface.

Soil excavation was conducted between October 6 and 13, 2005, with a Volvo trackhoe operated by Pacific Northern Environmental (PNE). SAIC staff provided oversight during excavation activities. An approximately 1:1 slope was maintained throughout the excavation to prevent slumping or caving of site soil. During soil excavation, debris such as railroad ties and vertical 8- to10-foot wooden poles were unearthed and removed from the western portion of the excavation. Abandoned monitoring well MW-10 was also encountered and entirely removed from the excavation.

Excavated soil was either directly loaded into dump trucks or temporarily stockpiled on polyethylene sheeting. Stockpiled soil was loaded into dump trucks using a Volvo front end loader. The excavation proceeded downward until visual observations of sheen and discoloration, odor, and field screening with a PID indicated that clean soil had been encountered. The excavation proceeded outward to beyond the anticipated depot footprint.

All excavated soil was transported to Rinker Materials Northwest in Everett, Washington, where it was treated using low-temperature thermal desorption.

6.2.3 Groundwater management

Perched groundwater was encountered approximately 2 to 3 feet below ground surface. Groundwater that collected in the excavation was pumped into a 20,000-gallon temporary storage tank where it was sparged with air and periodically analyzed by the onsite laboratory. Once concentrations of DRO, GRO, and BTEX were reduced to below MTCA Method B levels, the groundwater was discharged to the Morton wastewater treatment plant via an onsite manhole. Approximately 8,000 gallons of groundwater were discharged.

6.2.4 Excavation soil sampling

Confirmation samples were collected from the floor and sidewalls of the excavation and were submitted to the onsite mobile laboratory for analysis of the indicator contaminants GRO (by method NWTPH-Gx), DRO (by method NWTPH-Dx), and BTEX (by method 8015). The laboratory was operated by ESN-Northwest and is accredited by Ecology for the relevant analytical methods. Complete laboratory reports are presented in Appendix B. Confirmation sample locations are shown on Figure 14 and analytical results are summarized in Table 4.

6.2.5 Backfill and compaction

Following confirmation sampling, the excavation was backfilled with 8-inch minus aggregate up to approximately 6 feet below grade followed by 1-1/4-inch minus aggregate up to final grade. At the request of CRVHS, the excavation was backfilled only to within 2 to 5 feet of the surrounding land surface to facilitate the installation of a foundation for the depot. The upper 2 feet of backfill was compacted with a Bomag compactor to 95 to 99 percent of maximum density in order to accommodate the proposed foundation. Compaction was verified in the field in four locations by an engineer from PSI using a Troxler model 3430 nuclear density gauge.

6.3 Findings

Samples collected from the floor of the excavation confirmed that contamination beneath the footprint of the depot had been removed to below MTCA Method A cleanup levels, thus meeting the objective of the interim action. GRO and benzene were detected above MTCA Method A cleanup levels in some of the sidewall samples beyond the depot footprint. As discussed above, the interim action was not intended to remove petroleum-contaminated soil beyond the depot footprint. The remaining soil contamination will be addressed as part of final cleanup actions at the site.

7.0 RECOMMENDATIONS

The results of the RI confirm that concentrations of one or more of the indicator contaminants, GRO, DRO, and benzene, exceed MTCA levels in soil and groundwater that likely are applicable to the site. There is sufficient information to select, design, and implement a cleanup action. It is recommended that an FS be developed for the site that defines the cleanup standards, monitoring requirements, and schedule, and will provide sufficient information to develop and implement a cleanup action plan that meets the MTCA requirements.

It is further recommended that one additional monitoring well be installed to the south of MW-5 in the vicinity of the intersection of Front Street and Davis Lake road. After being developed and allowed to stabilize, this well, along with all other onsite monitoring wells, should be sampled for GRO, DRO, and benzene. The purpose of this well is to confirm that groundwater contaminants have not migrated downgradient off site toward the southeast and to provide an additional sampling point for use in future confirmational sampling.

TABLES

Table 1. Soil Analytical Results Summary

Soil Boring	Sample Depth (ft)	Sample Date	Gasoline-Range Hydrocarbons (mg/kg)	Diesel-Range Hydrocarbons (mg/kg)	Benzene (mg/kg)
SB-1	7	5/17/2004	20	10	<0.0005
SB-2	6.5	5/17/2004	**880**	**2500**	**0.265**
	9	5/17/2004	**--**	**--**	0.068
SB-3	2.5	5/18/2004	<1.0	<3.0	<0.0005
	4.5	5/18/2004	<1.0	<3.0	<0.0005
	6	5/18/2004	<1.0	<3.0	<0.0005
SB-4	2.5	5/18/2004	<1.0	<3.0	<0.0005
	6	5/19/2004	**370**	190	<0.062
	10	5/19/2004	8	7.5	<0.0020
SB-5	2.5	5/18/2004	<1.0	<3.0	<0.0005
	4.75	5/18/2004	<1.0	<3.0	<0.0005
	6.5	5/18/2004	18	7.2	<0.0005
SB-6	6	5/18/2004	**1300**	1400	<0.063
	7	5/18/2004	**690**	750	**0.42**
SB-7	6	5/18/2004	**1000**	**2100**	<0.062
	6 (Dup)	5/18/2004	**280**	1600	0.022
SB-8	1.5	5/18/2004	<1.0	4.1	<0.0005
	5.5	5/18/2004	**170**	6.9	<0.0010
SB-9	2.5	5/18/2004	8.2	4.3	<0.0005
	5	5/18/2004	**53**	570	<0.0020
	8.5	5/19/2004	9.6	9.8	<0.0005
SB-10	3.5	5/18/2004	<1.0	<3.0	<0.0005
	5.5	5/18/2004	23	6.1	<0.0005
	8.5	5/19/2004	11	<3.0	<0.0005
SB-11	1.5	5/18/2004	**75**	13	**0.15**
	3.5	5/18/2004	**1600**	1400	**0.16**
	11	6/8/2004	<1.0	<3.0	0.006
SB-12	2.5	5/18/2004	**240**	460	<0.0010
	5.5	5/18/2004	**210**	500	<0.0005
	5.5 (Dup)	5/18/2004	**210**	180	<0.0030
SB-13	5.5	5/19/2004	<1.0	43	<0.0005
	6.5	5/19/2004	**1400**	1100	**0.18**
SB-14	4.5	5/19/2004	<10	680	<0.0005
	5.5	5/19/2004	**1000**	1000	**0.25**
	11	6/8/2004	<1.0	<3.0	0.002
SB-15	2	5/19/2004	<10	150	<0.0005
	6.5	5/19/2004	**1300**	1100	**0.1**

Table 1. Soil Analytical Results Summary

Soil Boring	Sample Depth (ft)	Sample Date	Gasoline-Range Hydrocarbons (mg/kg)	Diesel-Range Hydrocarbons (mg/kg)	Benzene (mg/kg)
SB-16	5.5	5/19/2004	**970**	830	**0.1**
	8	5/19/2004	**160**	540	**0.341**
SB-17	3.5	5/19/2004	<1.0	24	<0.0005
	5.5	5/19/2004	**1300**	**2400**	**0.44**
SB-18	4	5/19/2004	**1200**	**2500**	**1.3**
	8	5/19/2004	**1300**	880	**2.46**
	9	5/19/2004	23	11	0.002
	15	5/19/2004	<1.0	4.6	0.006
SB-19	4	5/19/2004	<1.0	5.5	<0.0005
	5	5/19/2004	**160**	480	0.002
SB-20	2	5/19/2004	**490**	370	<0.063
	2 (Dup)	5/19/2004	**730**	670	<0.062
	4.5	5/19/2004	**1200**	1000	<0.050
SB-21	4.5	5/19/2004	**280**	39	<0.0005
	8	5/19/2004	4.2	<3.0	<0.0005
SB-22	1	5/20/2004	**770**	730	0.003
	3	5/20/2004	**66**	70	0.0006
SB-23	2.5	5/20/2004	1.7	27	<0.0005
	4.5	5/20/2004	**380**	620	<0.0030
SB-24	2.5	5/20/2004	2.4	<3.0	<0.0005
	4	5/20/2004	**59**	72	<0.0005
SB-25	3.5	5/20/2004	2.6	82	<0.0005
	5.5	5/20/2004	**110**	200	<0.0030
SB-26	2.5	5/20/2004	<1.0	<3.0	<0.0005
	4	5/20/2004	2.4	12	<0.0005
SB-27	3	5/20/2004	14	<3.0	**0.041**
	4.5	5/20/2004	6.3	5.4	0.01
SB-28	4.5	5/20/2004	**330**	110	<0.0005
	8	6/8/2004	1.1	<3.0	<0.0005
SB-29	3.5	5/20/2004	1.7	5.4	<0.0005
	5	5/20/2004	<1.0	<3.0	<0.0005
SB-30	3	5/20/2004	1.2	15	<0.0005
SB-31	3	5/20/2004	**290**	1400	<0.0030
SB-32	3	5/20/2004	<1.0	<3.0	<0.0005
	6	5/20/2004	23	230	<0.0005
SB-33	2.5	5/20/2004	15	<3.0	<0.0005
	3.5	5/20/2004	<1.0	<3.0	<0.0005
	3.5 (Dup)	5/20/2004	1.2	<3.0	<0.0005

Table 1. Soil Analytical Results Summary

Soil Boring	Sample Depth (ft)	Sample Date	Gasoline-Range Hydrocarbons (mg/kg)	Diesel-Range Hydrocarbons (mg/kg)	Benzene (mg/kg)
SB-34	3	5/20/2004	<1.0	<3.0	<0.0005
SB-35	2.5	5/20/2004	<1.0	<3.0	<0.0005
SB-36	5.5	5/20/2004	<1.0	<3.0	<0.0005
SB-37	4	5/20/2004	**43**	180	<0.0005
	5.5	5/20/2004	1.6	8.2	<0.0005
SB-38	2.5	5/20/2004	**220**	**2100**	<0.0030
	5.5	5/20/2004	**190**	92	<0.0020
SB-39	2	6/7/2004	1.4	3.7	<0.0005
	5	6/7/2004	**950**	**2100**	**0.071**
	12	6/8/2004	**360**	38	0.006
SB-40	7.5	6/28/2004	**310**	250	**0.29**
SB-41	2.5	6/28/2004	**250**	1500	0.003
	5	6/28/2004	**1400**	510	**0.12**
SB-42	5	6/28/2004	**110**	180	<0.0030
SB-43	4	9/14/2004	**91**	240	<0.0010
	8	9/14/2004	**550**	920	<0.063
SB-44	4	9/14/2004	**180**	**5700**	<0.062
SB-45	4	9/14/2004	<1.0	<3.0	<0.0005
SB-46	5	9/14/2004	<1.0	4.6	<0.0005
SB-47	4	9/14/2004	<1.0	<3.0	<0.0005
	7	9/14/2004	22	21	<0.0005
SB-48	4	9/14/2004	<1.0	5.5	<0.0005
	7.5	9/14/2004	<1.0	4.2	0.002
SB-49	5	9/30/2004	<1.0	<3.0	<0.0005
	15	9/30/2004	<1.0	<3.0	<0.0005
SB-50	5	9/30/2004	<1.0	<3.0	<0.0005
	12.5	9/30/2004	<1.0	<3.0	<0.0005
SB-51	5.75	10/1/2004	<1.0	<3.0	<0.0005
SB-52	4.5	10/1/2004	**660**	1600	<0.063
	7	10/1/2004	**98**	220	<0.0005
SB-53	6.5	10/1/2004	**460**	1200	<0.0030
SB-54	6.5	10/1/2004	**74**	690	<0.0005
SB-55	5.5	10/1/2004	<1.0	<3.0	<0.0005

Table 1. Soil Analytical Results Summary

Soil Boring	Sample Depth (ft)	Sample Date	Gasoline-Range Hydrocarbons (mg/kg)	Diesel-Range Hydrocarbons (mg/kg)	Benzene (mg/kg)
MTCA Method A Cleanup Levels			***30***	***2000***	***0.03***

Notes:

-- = Not analyzed

< = Analyte not detected at or above the laboratory reporting limit

Gasoline-Range Hydrocarbons by method NWTPG-Gx

Diesel- and Oil-Range Hydrocarbons by method NWTPH-Dx ext with silica gel cleanup

BTEX by method 8260

Some samples analyzed by WA-VPH. Benzene value is highest detection or lowest DL.

Table 2. Groundwater Analytical Results Summary

Monitoring Well	Date	Depth to Water (ft BTOC)	Water-table Elevation (ft)	Gasoline-Range Hydrocarbons (µg/L)	Diesel-Range Hydrocarbons (µg/L)	Benzene (µg/L)
MW-1	7/9/2004	3.92	93.70	<50	**630**	<0.5
	10/11/2004	1.79	95.83	<50	120	<0.5
	1/25/2005	2.01	95.61	<48	<79	<0.5
	4/13/2005	1.19	96.43	<48	450	<0.5
	7/11/2005	2.38	95.24	<48	380	<0.5
MW-2	7/9/2004	5.06	94.12	**2500**	**1800**	**1100**
	10/11/2004	2.68	96.50	**2500**	**560**	**1100**
	1/25/2005	2.82	96.36	**2200**	**1700**	**880**
	4/13/2005	2.31	96.87	**2800**	**960**	**1100**
Duplicate	4/13/2005	2.31	96.87	**2700**	**960**	**1100**
	7/11/2005	3.16	96.02	**2300**	**1400**	**760**
Duplicate	7/11/2005	3.16	96.02	**2100**	**1500**	**810**
MW-3	7/9/2004	6.03	93.97	80	290	**22**
Duplicate	7/9/2004	6.03	93.97	100	300	**23**
	10/11/2004	4.27	95.73	<50	<79	2
	1/25/2005	4.13	95.87	<48	**670**	2
	4/13/2005	3.78	96.22	<48	89	1.7
	7/11/2005	4.69	95.31	<48	<87	1.7
MW-4	7/9/2004	5.30	92.58	**1600**	**1700**	**160**
	10/11/2004	1.66	96.22	**1800**	**520**	**140**
	1/25/2005	1.79	96.09	**2000**	410	**140**
	4/13/2005	1.40	96.48	**2100**	**1300**	**120**
	7/11/2005	2.18	95.70	**1800**	**1200**	**54**
MW-5	10/11/2004	2.79	95.52	90	130	<0.5
	1/25/2005	2.79	95.52	100	**860**	<0.5
	4/13/2005	2.23	96.08	110	**530**	<0.5
	7/11/2005	3.38	94.93	64	**560**	<0.5
MW-6	10/11/2004	2.26	96.04	1000	**600**	1
	1/25/2005	2.46	95.84	**1100**	**1600**	1
Duplicate	1/25/2005	2.46	95.84	**1100**	**1700**	1
	4/13/2005	1.78	96.52	**860**	**900**	<2.0
	7/11/2005	3.16	95.14	1000	**1200**	2.3
MW-7	10/11/2004	3.79	96.10	200	**570**	<0.5
	1/25/2005	3.27	96.62	190	**1500**	<0.5
	4/13/2005	4.28	95.61	73	**880**	<0.5
	7/11/2005	4.02	95.87	140	**1100**	<0.5

Table 2. Groundwater Analytical Results Summary

Monitoring Well	Date	Depth to Water (ft BTOC)	Water-table Elevation (ft)	Gasoline-Range Hydrocarbons (µg/L)	Diesel-Range Hydrocarbons (µg/L)	Benzene (µg/L)
MW-8	10/11/2004	2.81	96.40	**1200**	330	**6**
	1/25/2005	2.63	96.58	**1300**	**740**	5
	4/13/2005	2.44	96.77	**1000**	470	**5.6**
	7/11/2005	3.23	95.98	**1400**	**670**	**6.4**
MW-9	10/11/2004	1.90	95.62	<50	<80	<0.5
	1/25/2005	1.68	95.84	<48	<78	<0.5
	4/13/2005	1.57	95.95	<48	<81	<0.5
	7/11/2005	2.25	95.27	<48	<83	<0.5
MW-10	10/11/2004	2.09	96.69	**1800**	**560**	**51**
Duplicate	10/11/2004	2.09	96.69	**1900**	500	**51**
	1/25/2005	2.08	96.70	**1700**	**540**	**37**
	4/13/2005	1.64	97.14	**1700**	**760**	**24**
	7/11/2005	2.54	96.24	**1500**	**910**	**31**
MW-11	10/11/2004	2.92	95.00	<50	<80	<0.5
	1/25/2005	2.95	94.97	<48	<79	<0.5
	4/13/2005	2.21	95.71	<48	<79	<0.5
	7/11/2005	3.20	94.72	<48	<93	<0.5
MW-12	10/11/2004	2.64	95.61	<50	<79	<0.5
	1/25/2005	2.70	95.55	<48	<79	<0.5
	4/13/2005	2.34	95.91	<48	<84	<0.5
	7/11/2005	3.25	95.00	<48	<81	<0.5
MTCA Method A Cleanup Levels				***800/1000***	***500***	***5***

Notes:

-- = Not analyzed

< = Analyte not detected at or above the laboratory method detection limit

BTOC = below top of well casing

Bolded values indicate that the concentration is greater than the MTCA Method A cleanup levels.

Benzene by method 8260

Gasoline-Range Hydrocarbons by method NWTPH-Gx

Diesel- and Oil-Range Hydrocarbons by method NWTPH-Dx ext with silica gel cleanup

Table 3. Water Wells Within One Mile of the Site

Well Owner	Well Address	Well Depth (ft)	Comments
David and Debbie Clevenger	420-26 Meinars Road	83	SE ¼ NE ¼, Section 35, Township 13, Range 4E
Cowlitz Stud	302 Washington State Road	Range of 23-100	NW ¼ SE ¼, Section 35, Township 13, Range 4E
Robert Lyle	Address not provided	137	NW ¼ NW ¼, Section 1, Township 12, Range 4E
Robert Coy	387 Davis Lake Road	36	Listed as "Robert *Coy*" in well log database
Kevin Winslow	389 Davis Lake Road	200	
Kevin Winslow	Davis Lake Road (no street number provided)	100	Assumed to be same address as this owner's other well log
Northwest Forest Fiber Products	324 Davis Lake Road	350	
A.C. Brown	Address not provided	46	Same ¼ ¼, Section as wells above. Assumed to be on Davis Lake Road.
Edward Crim	973 Davis Lake Road	60	
Mrs. L. J. Williams	Address not provided	137	SW ¼ SW ¼, Section 1, Township 12, Range 4E
Duane Church	267 Priest Road	160	
James Keen	Address not provided	70	NE ¼ SE ¼, Section 34, Township 13, Range 4E
Donald Balmer	211 O'Neil Road	177	
Mike Collins	O'Neil Road (no street number provided)	245	SE ¼ NE ¼, Section 34, Township 13, Range 4E
Town of Morton	Address not provided	44	SE ¼ NE ¼, Section 35, Township 13, Range 4E

Information from Ecology Well Log Search and Retrieval System. Table does not include abandoned wells or resource protection wells.

Table 4. Results of the Soil Excavation Confirmation Samples

Soil Sample ID[1]	Sample Depth (ft)	Sample Date	Aromatic Hydrocarbons[2] (mg/kg)				Gasoline-Range Hydrocarbons[3] (mg/kg)	Diesel-Range Hydrocarbons[4] (mg/kg)
			Benzene	Toluene	Ethylbenzene	Xylenes		
EX-W1-3	3	10/07/05	nd	nd	nd	nd	nd	850
EX-W2-6	6	10/07/05	nd	nd	nd	nd	nd	120
EX-W3-4	4	10/07/05	**0.42**	2.1	1.1	5.3	**53**	1,200
EX-W4-4	4	10/11/05	**2.3**	0.85	1.8	0.89	**240**	990
EX-W5-5	5	10/12/05	**0.05**	nd	nd	0.4	**110**	590
EX-W6-5	5	10/12/05	**0.07**	nd	0.15	nd	13	20
EX-W7-4	4	10/13/05	nd	nd	nd	nd	nd	nd
EX-W8-14	14	10/13/05	nd	nd	nd	nd	nd	nd
EX-W9-4	4	10/13/05	nd	nd	nd	nd	nd	nd
EX-W10-3	3	10/13/05	nd	nd	nd	nd	nd	nd
EX-F1-9	9	10/07/05	nd	nd	nd	nd	nd	nd
EX-F2-11	11	10/07/05	nd	nd	nd	nd	24	250
EX-F3-13	13	10/07/05	nd	nd	nd	nd	nd	nd
EX-F4-13	13	10/07/05	nd	nd	nd	nd	nd	nd
EX-F5-8	8	10/11/05	nd	nd	nd	nd	nd	nd
EX-F6-12	12	10/11/05	nd	nd	nd	nd	nd	nd
EX-F7-7	7	10/12/05	nd	nd	nd	nd	nd	nd
EX-F8-8	8	10/12/05	nd	nd	nd	nd	nd	nd
EX-F9-7	7	10/12/05	nd	nd	nd	nd	nd	40
EX-F10-6	6	10/12/05	nd	nd	nd	nd	nd	nd

Table 4. Results of the Soil Excavation Confirmation Samples

Soil Sample ID[1]	Sample Depth (ft)	Sample Date	Aromatic Hydrocarbons[2] (mg/kg)				Gasoline-Range Hydrocarbons[3] (mg/kg)	Diesel-Range Hydrocarbons[4] (mg/kg)
			Benzene	Toluene	Ethylbenzene	Xylenes		
EX-F11-4	4	10/13/05	nd	nd	nd	nd	16	190
EX-F12-6	6	10/13/05	nd	nd	nd	nd	nd	nd
EX-F13-4	4	10/13/05	nd	nd	nd	nd	nd	20
EX-F14-4	4	10/13/05	nd	nd	nd	nd	nd	nd
MTCA Method A Cleanup Levels			***0.03***	***7***	***6***	***9***	***30 / 100***	***2000***

Notes:

[1]Soil sample locations are shown on Figure 3.

[2]Analyzed by method 8021b

[3]Analyzed by method NWTPG-Gx

[4]Analyzed by method NWTPH-Dx ext with a silica gel cleanup

Bolded values indicate that the concentration is greater than the MTCA Method A cleanup levels

nd = Not detected at or above the laboratory reporting limit

FIGURES

APPENDICES