APPENDIX A

Technical Memoranda

Parametrix ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

TASK ORDER SUBMITTAL
R-10 AES (SMALL BUSINESS)
CONTRACT NO. 68-S7-03-04; TASK ORDER 024

TECHNICAL MEMORANDUM

Date:	January 19, 2006
To:	Alan Goodman, EPA Region 10
From:	David B. Mayfield, Parametrix Scott Elkind, Parametrix
Subject:	Data Evaluation Results for the Hamilton/Labree Groundwater Contamination Site
cc:	Mike Warfel, Parametrix
Project Number:	415-2328-007 (024/DE02)
Project Name:	Hamilton Labree Roads Fund-Lead RI/FFS

INTRODUCTION

EPA Region 10 has requested the Parametrix Team (Contractor) provide technical support for the development of a Remedial Investigation/Focused Feasibility Study (RI/FFS) for the Hamilton/Labree Roads Groundwater Contamination Site (Site) in Chehalis, Washington. The goal of this technical memorandum is to present an evaluation of the available environmental data for the site. Included is a discussion of the development of the database, the available data sets, and identification of additional data needs.

DATABASE DEVELOPMENT

Parametrix compiled a database of environmental data collected through various sampling programs for the project area. The following describes the data sources used to develop the database and the actions undertaken to refine the data for use in the remedial investigations.

Data Sources: Databases and other files containing historic chemical and physical data were received from the EPA contractor (URS) and the S.C. Breen Construction Company (Breen) contractor Farallon Consulting (Farallon). These databases and files contained data pertaining to contaminant evaluations conducted between 1993 and 2004 on or in the vicinity of the Breen Property and the Hamilton Labree Roads Impact Area (HRIA) by Washington State Department of Ecology (Ecology) and contractors, EPA Region 10 and contractors, and Breen and contractors. In addition, a file search was completed at Ecology's Southwest Regional Office to obtain any relevant data; reports and other information not previous included the databases and files.

Data Reduction and Organization: Data was received in various formats between August and December 2005 from URS and Farallon. Approximately 134 directories and 1007 files were reviewed for usability. Data formats included Excel, PDF, Access database, Word, WordPerfect, and hard copy.

A master database was produced using the URS Access database as a basis. Because the data will be used outside of the URS developed system, many of the fields used internally by URS were excluded. For many data sets, only summary information was provided. Additional supporting information such as analytical method, laboratory batch number, laboratory name, and laboratory IDs were not provided. Laboratory reference and original source names were added in order to track the data to reports. Other identifiers necessary to review the data were added from reports if missing from the original data source (such as matrix or sample type). Only data that would be comparable between all original data sources was included in the master database.

All data, other then the URS database, had to be altered to a format suitable for inclusion into the database. The data was then loaded into appropriate fields in the master database. Duplication of records was checked after all data had been loaded. Duplicates were determined by comparing records by sample ID, chemical name, date sampled, and result. In many cases, no sample ID was provided, so data was compared using the location identifier. Once duplicates were identified, records were reviewed using all common fields in order to determine which record source had more complete information, and also to avoid removing data that was misidentified as a duplicate.

Location identifiers were changed between data sources, and these were standardized in order to be usable in the database. Many other fields were standardized including matrix, sample type, and lab identifiers.

The data was further compared against reports to assess completeness and accuracy of master data set. Additional duplication was found during this comparison and removed.

A summary of the data by investigator and media type present in the current project database is presented in Table 1.

DATA EVALUATION

The following is a summary of the available data describing the distribution of contaminants in various media within the project area. A site map containing historical soil, groundwater, surface water, and sediment sampling locations referenced in this technical memorandum is currently being compiled and will be submitted to EPA once complete.

Groundwater

Groundwater samples have been collected periodically from permanent monitoring wells and private wells from 1993 through 2004 (Ecology 1999a, 1999b, 2000; SAIC 1997; EPA 2000, 2001, 2002b, Farallon 2003; URS 2004). In addition, groundwater samples from shallow and deep zones have been collected from temporary soil borings located on the Breen Property and HRIA (Ecology 1999a; SAIC 1997; GeoEngineers 2001; EPA 2000, 2001, 2002b; URS 2004). Farallon (2003) conducted additional groundwater monitoring from reconnaissance samples located downgradient from the Breen and HRIA sites to examine groundwater and contaminant flow. A brief summary of the groundwater investigations is presented below in chronological order:

- ***Washington Department of Health*** (Fall 1993 through June 1996): In 1993 and 1994, eighteen private water supply wells (PW-1 through PW-18) were sampled for volatile organic compounds (Ecology 1999a, 1999b). Tetrachloroethylene (PCE) was detected at six of these wells (PW-2, PW-3, PW-4, PW-5, PW-7, PW-9) ranging from 3.3 to 2,165 micrograms per liter (ug/L). Five

of these wells were re-sampled (PW-2, PW-3, PW-4, PW-5, PW-9) in June of 1996 and PCE concentrations ranged from 5.75 to 3,009 ug/L.

- ***Washington Department of Ecology*** (March 1997 through September 2000): Ecology conducted various investigations of the project area (SAIC 1997; Ecology 1999a; Ecology 1999b; Ecology 2000; Ecology 2001). Ecology began investigations in 1997 through the installation of several monitoring wells and sampling of private wells (SAIC 1997). PCE was detected in monitoring wells (MW-1 through MW-8) at concentrations ranging from 3 to 1,500 ug/L and in private wells (PW-2, PW-3, PW-4, PW-5, PW-7, PW-9) at concentrations ranging from 7 to 2,700 ug/L. In March and April of 1998, Ecology contracted Transglobal Environmental Geosciences Northwest, Inc (TEG) to conduct additional site investigation. TEG collected shallow and deep groundwater samples from temporary borings (B1 through B27) near the intersection of Hamilton and Labree roads (Ecology 2000). PCE concentrations from groundwater ranged from 1 to 60,000 ug/L. Ecology continued quarterly monitoring of permanent monitoring wells (MW-1 through MW-9), monitoring and recovery wells (MWR-1 through MWR-7), and private wells (PW-2 through PW-22) from October 1997 to September 2000. PCE concentrations generally remained stable or decreased over this time period.

- ***GeoEngineers*** (August and September 1999): On behalf of Breen, GeoEngineers (2001) conducted subsurface investigations, drum removal and other remedial activities on the Breen property. Groundwater samples were collected from stratoprobe sampling locations at depths of 15 and 40 feet (SP-1 through SP-08). PCE concentrations ranged from <1.0 to 941 ug/L. The highest concentrations were found near the equipment cleaning area.

- ***U.S. EPA START Investigations*** (June 2000 through October 2001): The EPA START contractor (Ecology and Environment, Inc.) conducted four phases of investigations in the vicinity of the HRIA study area. Data collection efforts included soil and groundwater from temporary borings, groundwater from monitoring wells and sampling of new monitoring wells. Phase I investigations occurred during June through July 2000 and included groundwater samples collected from subsurface boreholes (AB1 through AB10, GP1 through GP3, and GPA3 through GPA4). PCE concentrations ranged from <1 to 190,000 ug/L. Phase II assessment was conducted in August 2000 and included sampling of existing monitoring (MW-1 through MW-10, MWR-1 through MWR-7) and private wells (PW-2, PW-9, and PW-14) and newly installed monitoring wells (MWR-8 through MWR-11). PCE concentrations ranged from <1 to 44,000 ug/L. Phase III investigations occurred in January and February 2001 and included the collection of soil borings and sampling of monitoring and private groundwater wells. PCE concentrations in monitoring wells (MW-1 through MW-16), monitoring/recovery wells (MWR-1 through MWR-11), and private wells (PW-2, PW-6, PW-9 and PW-20) ranged from <1 to 56,000 ug/L. Two additional rounds of groundwater monitoring were conducted as part of Phase IV investigations during May and October of 2001. In May, PCE concentrations from private wells (PW-4, PW-6, PW-16, PW-17, PW-21, and PW-22) ranged from <1 to 710 ug/L. In October, PCE concentrations from monitoring wells (MW-1 through MW-10), monitoring/recovery wells (MWR-1 through MWR-11), and private wells (PW-1, PW-3 through PW-9, PW-16, PW-17, and PW-21 through PW 37) ranged from <1 to 61,000 ug/L.

- ***Farallon*** (June 2002 through June 2004): Breen contracted with Farallon Consulting L.L.C (Farallon) to conduct remedial investigations of the Breen property. Two phases of field data collections were conducted during these investigations. Groundwater monitoring occurred during June/July 2002, November 2002, August/September 2003, November 2003, April 2004, and June

2004. Samples were collected from existing and new monitoring wells (MW-1 through MW-25, MWR-1 through MWR-11), private wells (PW-7, PW-21) and reconnaissance groundwater stations on or down-gradient of the Breen property (RS-1 through RS-24). Concentrations from existing wells were comparable or less than previous investigations (e.g., Ecology or START). PCE concentrations from reconnaissance samples ranged from <0.2 to 2400 ug/L.

- ***URS Group, Inc.*** (August 2004 through January 2004): URS completed an engineering evaluation and cost analysis report for the EPA (URS 2004). This document examined various removal alternatives for the HRIA study area. During this investigation groundwater samples were collected from new monitoring wells and from geoprobe/auger samples. The sampling event targeted the projected PCE source area north of Hamilton Road around Berwick Creek. PCE concentrations from new wells (MW-600 through MW-608) ranged from 55 – 83,500 ug/L. PCE concentrations from geoprobe and augur samples had a mean concentration of 302,000 ug/L and a maximum concentration of 2,720,000 ug/L.

These investigations have been used to identify the nature and extent (i.e., vertical and horizontal distribution) of contamination. While varying depth intervals, sampling methods and laboratory methods have been employed during groundwater sampling, the data has generally met quality assurance standards and are acceptable for use in future investigations (Parametrix 2006). The available data provides enough information to describe source areas, and current and historic concentrations of contaminants. Adequate chemical and physical data are also available for completing the fate and transport analysis, including three-dimensional groundwater modeling. Available groundwater data is considered sufficient for completing the baseline risk assessment, remedial investigation, and feasibility study. No additional data collection is required at this time.

Soil

Soil samples have been collected during the various investigations conducted within the project area (Ecology 1999a, GeoEngineers 2001; SAIC 1997; EPA 2000, 2001, 2002b, Farallon 2003; URS 2004). A brief summary of soil investigations is presented below in chronological order:

- ***Washington Department of Ecology*** (March 1997 through April 1998): Ecology conducted various investigations of the project area (SAIC 1997; Ecology 1999a; Ecology 1999b) with a goal to locate the source(s) of PCE contamination. As a contractor for Ecology, SAIC (1997) collected subsurface soil samples throughout the HRIA study area. PCE concentrations from soil borings (SB-001 through SB-008) ranged from <4 to 23 micrograms per kilogram (ug/kg). Ecology (1999b) collected six soil samples near PW-9 in January of 1998 and found all non-detected concentrations of PCE (<2 milligrams per kilogram [mg/kg]). TEG for Ecology (1999a) collected several soil samples (B21 through B27) in April 1998 near PW-3 and found PCE concentrations ranging from 0.05 to 5.24 mg/kg.

- ***GeoEngineers*** (August and September 1999): On behalf of Breen, GeoEngineers (2001) conducted subsurface investigations, drum removal and other remedial activities on the Breen property. Soil samples were collected from stratoprobe sampling locations at various depths (SP-1 through SP-08). PCE concentrations in soil ranged from <0.05 to 0.0586 mg/kg. Soil samples were also collected at the site of drum removal (Building B) and PCE concentrations ranged from <0.05 to 190 mg/kg. The soil containing the highest PCE concentrations was removed by GeoEngineers and confirmatory soil samples collected indicated that contaminated soil beneath Building B was successfully removed.

- ***U.S. EPA START Investigations*** (June 2000 through October 2001): The EPA START contractor (Ecology and Environment) conducted four phases of investigations in the HRIA study area. Data collection efforts included soil and groundwater from temporary borings, groundwater from monitoring wells and sampling of new monitoring wells. Phase I investigations occurred during June and July 2000 and included soil subsurface soil samples (AB1 through AB 10, GP1 through GP4, and GPA3 through GPA4). PCE concentrations ranged from <0.001 to 13 ug/kg. Phase II assessment was conducted in August 2000 and included sampling from soil borings (AB11) and monitoring wells (MW9, MW10, MWR-8 – MWR-11). PCE concentrations ranged from <0.06 to 53 mg/kg. Phase III investigations occurred in January and February 2001 and included the collection of several soil samples from new monitoring wells (MW-11 through MW-16). PCE was not detected in the soil samples (<71 mg/kg). Phase IV soil investigations were conducted to assist in the evaluation of a proposed water supply piping route. Ninety soil borings were installed (GP-102 through GP-191) and samples collected every 50 feet along Hamilton Road North to the intersection with Labree Road. PCE concentrations ranged from 1 to 110 ug/kg.

- ***Farallon*** (June 2002 through June 2004): Breen contracted with Farallon (2004) to conduct remedial investigations of the Breen property. Two phases of field data collections were conducted during these investigations and soil samples were collected in June through September 2002 and April 2004. Soil samples were collected at reconnaissance points (RS-1, RS-2, RS-5, RS-8, RS-9, RS-12, RS-16) and monitoring wells (MW-18, MW-19, MW-12, MW-23, MW-24, and MW-25) on the Breen property. PCE concentrations ranged from <1 to 350 ug/kg.

- ***URS Group, Inc.*** (August 2004 through January 2004): URS conducted an engineering evaluation and cost analysis report for the US EPA (URS 2004). This document examined various removal alternatives for the HRIA study area. During this investigation soil samples were collected from beneath Berwick creek (39 samples) and at various locations around Berwick Creek using geoprobes or auger sampling methods (359 samples). The average concentration of PCE in all stream bed soil samples was 195,000 ug/kg and the average for discrete samples was 23,700 ug/kg.

The available soil data provides information on the nature and extent contamination within the Breen and HRIA study area. Adequate chemical and physical data are available for completing the fate and transport analysis, including three-dimensional groundwater modeling. Sufficient subsurface soil data (0 to 10 feet) are available for use in describing and evaluating exposure to occupational, recreational and ecological receptors. Therefore, the current database contains adequate information for completing the baseline risk assessment, remedial investigation, and feasibility study. No additional data collection is required at this time.

Surface Water

Surface water samples have been collected from Berwick Creek by Ecology (1999a, 1999b) and Farallon (2004). Ten locations have been periodically sampled from April 1998 to February 2003. PCE concentrations over the sampling period have ranged from <0.2 to 40 ug/L. The surface water stations are primarily located near the Breen property or in the vicinity of the HRIA study area. PCE concentrations have been decreasing or are remaining stable over the period of study. The current dataset is sufficient for completing the baseline risk assessment, remedial investigations, and feasibility study. No additional data collection is required at this time.

Sediment

Bed and bank sediment samples from Berwick Creek were collected by URS at various depths (0-12 ft bgs) to aid in source identification. The available data is sufficient for describing near surface sediment contaminant concentrations at Berwick Creek near the suspected source area. Therefore, the sediment database is adequate for completing the baseline risk assessment, remedial investigation, and feasibility and no additional sampling is recommended at this time. No additional data collection is required at this time.

Soil Gas

Soil gas samples have been collected from limited areas in the vicinity of the Breen property (Farrallon 2003) and the HRIA study area (URS 2004). Farallon conducted a qualitative soil gas survey in November 2002 at two areas (RS-1, RS-2 and RS-7) to better define potential PCE sources. None of the soil gas samples detected PCE above the detection limit and these areas were determined to not contain a PCE source. URS (2004) collected 38 soil gas samples from the vicinity of Berwick Creek and Interstate-5 north of the HRIA. PCE concentrations from these samples were generally non-detectable to low (<3.2 parts per million). The results of the URS investigation supported the elimination of a release scenario related to a spill from Interstate-5. No additional soil gas data collection is recommended.

CONCLUSIONS

Numerous environmental investigations have occurred throughout the project area since 1993. These investigations included collection of physical and chemical data related to groundwater, surface and subsurface soils, surface water, creek bed soil and sediments, and soil gas. These data have been compiled into one database that will be used to complete the baseline risk assessment, remedial investigation, and feasibility study. The available data is generally sufficient to characterize the nature and extent of contamination in soil, groundwater, sediment, and surface water at the Site, and to complete the baseline risk assessment, remedial investigation, and feasibility study. No further environmental sampling is required at this time.

Table 1. Summary of Previous Investigations

Date Range	Investigated by	Scope of Investigation	Key Findings	References and Data Sources	File Source Received	Number of samples with VOC analysis by matrix[1]
1993-1994	Washington State Department of Health (WDOH)	Sampled 18 private water-supply wells in the Hamilton/Labree Roads area.	Tetrachloroethylene PCE detected in 6 wells screened in the shallow aquifer	Ecology 1999b	WA DOH Data.xls	18 (Groundwater)
1996	WDOH	Re-sampled 5 of 6 wells previously exhibiting Tetrachloroethylene PCE.	Slight increase in PCE concentrations from 1993-1994 sampling event	Ecology 1999b	WA DOH Data.xls	5 (Groundwater)
1996	Geo-Recon and SAIC (for Washington Department of Ecology [Ecology])	Geophysical reconnaissance investigation on the Breen property for sources, sampled private water-supply wells, and installed monitoring wells in the upper aquifer.	Some geophysical anomalies detected, but no obvious cache of buried drums. PCE concentrations have ranged from 500 to 1,350 µg/L in MW-3 and 2.4 to 7 µg/L in MW-5.	SAIC 1997 and Geo-Recon 1996	H1w1.xls RAWP Final Tables and Figs.xls Missing Soil.xls	14 (Groundwater) 31 (Soil)
1997-2001	Ecology	Quarterly sampling of monitoring wells and private water-supply wells. Installed 7 wells intended for monitoring and remediation, all within the HRIA study area. Sampling of surface water in Berwick Creek.	Generated data for tracking of contaminant concentrations.	Ecology 2000; Ecology 1999b; Ecology 2001	Hamilton-Results.csv RAWP Final Tables and Figs.xls H1w1.xls Missing Soil.xls	182 (Groundwater) 5 (Surface Water)
1998	Transglobal Environmental Geosciences Northwest, Inc. [TEG] (for Ecology)	Sampled soil and groundwater from 28 temporary borings in the Hamilton/Labree Roads area.	Highest concentration of PCE in groundwater was 60,000 µg/L at location B2.	Ecology 1999a	RAWP Final Tables and Figs.xls Missing TEG Soil.xls	40 (Groundwater) 9 (Soil)
August 1999	Northwest Geophysical Associates and GeoEngineers for Breen	Located and removed 70 drums and several small containers, and contaminated soil from beneath a building on the Breen property.	Buried drums were a source of PCE in groundwater.	GeoEngineers 2001	RAWP Final Tables and Figs.xls Missing Soil.xls	21 (Groundwater) 67 (Soil)
2000 – 2001	START contractor (Ecology and Environment, Inc.) for EPA	Four phases of work as part of a time-critical removal action. Installed and sampled temporary borings, monitoring wells, and combined monitoring and recovery wells. All temporary and permanent sampling locations assessed the shallow aquifer, with various sampling and screen depths. Evaluated removal action alternatives.	Implemented the alternative drinking water supply alternative, connecting affected residences and businesses to the City of Chehalis municipal water supply.	USEPA 2000, 2001, 2002	START db2 + FASP results.mdb Hamilton-Labree Phase 3.mdb RAWP Final Tables and Figs.xls H1w1.xls	181 (Groundwater) 246 (Soil)
2002	Farallon Consulting for Breen	Phase I investigation work for preparation of a site-wide remedial investigation/feasibility study. Within the HRIA study area, collected surface water from Berwick Creek and groundwater from existing monitoring and private water supply wells. Outside of HRIA study area, installed and sampled temporary borings and permanent monitoring wells, collected stream-bed soil samples from Berwick Creek, collected soil gas samples on Breen property.	To date, eliminated some potential sources areas on the Breen property from consideration. Added to understanding of distribution of PCE in soil and groundwater. Found greater downgradient extent of PCE in groundwater than previous investigations.	Farallon 2003	EPA Query Divided.xls URS Field Parameters Query.xls RAWP Final Tables and Figs.xls	192 (Groundwater) 29 (Soil) 14 (Surface Water)
2003-2004	Response Action Contract (RAC) Contractor (URS Group) for EPA	Engineering evaluation/cost analysis investigation for HRIA study area. Performed geophysical survey to look for targets and characterize subsurface. Collected soil gas samples, stream bed and bank soil samples from Berwick Creek, sampled soil and groundwater from temporary Geoprobe borings to 30 feet bgs, sampled soil and groundwater from auger borings to 50 feet bgs, installed and sampled permanent monitoring wells, performed two constant-discharge aquifer performance tests.	Identified source as dumping to Berwick Creek. Delimited dense nonaqueous-phase liquid zone and zone of highest PCE concentrations. Obtained soil, groundwater, and aquifer characteristics for screening and design of removal and remedial technologies. Installed wells for use in future remediation and monitoring.	EE/CA August 2004	Template.mdb	166 (Groundwater) 400 (Soil) 35 (Soil Gas)
2003-2004	Farallon Consulting	Collected soil, groundwater, surface water data to support the RI/FS on the Breen property. Data collected but not reported.		Farallon Phase 2 Data	eim export all data.xls EPA Query Divided.xls Template.mdb URS Field Parameters Query.xls	138 (Groundwater) 18 (Soil) 9 (Surface Water)

[1] The number of samples refers to the number of samples with VOC analysis conducted. The database includes additional samples or data describing the sampling locations, depth, or other environmental or physical variables relevant to the previous investigations.

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CONTRACT SUBMITTAL
R-10 AES (SMALL BUSINESS)
CONTRACT NO. 68-S7-03-04; TASK ORDER 024

TECHNICAL MEMORANDUM

Date:	November 7, 2005
To:	Lynda Priddy, EPA Region 10
From:	Scott Elkind
Subject:	Breen Property Surface Soil Data Review
cc:	Alan Goodman, EPA Region 10 Mike Warfel, Parametrix David B. Mayfield, Parametrix
Project Number:	415-2328-007 (024/DE02)
Project Name:	Hamilton Labree Roads Fund-Lead RI/FFS

INTRODUCTION

EPA Region 10 requested the Parametrix Team (the Contractor) conduct a brief review available soil data related to the Hamilton/Labree Roads Superfund Site in Chehalis, Washington. The goal of this task was to identify and review available surface and near surface soil chemical data for two source areas on the Breen Property.

The Contractor reviewed the following technical documents and chemical data as part of this task:

- *Phase I Investigation Work Plan.* Prepared by Farallon Consulting, May 24, 2002
- *Remedial Investigation Feasibility Study Work Plan.* Prepared by Farallon Consulting, July 10, 2003.
- *Chemical data collected during investigations conducted by Washington State Department of* Ecology (Ecology), EPA, and Breen. These data were supplied to the Contractor by URS and Farallon Consulting in Microsoft Excel and Access format and hard copy.

In addition, Peter Jewett of Farallon Consulting was contacted regarding available data because of his personal knowledge of the previous investigations conducted at the Site.

The following documents summarizing historical investigations at the Breen Property were not available for review:

- *Interim Remedial Action Report, Breen Property, Chehalis, Washington.* Prepared by GeoEngineers, 1991.

- *Phase I and II Data Presentation Report for Hamilton/Labree Roads PCE in Groundwater Site.* Prepared by SAIC, 1987.

Analytical results from these two documents were summarized in the Farallon work plans listed in the previous section. This included a soil data summary table provided in Appendix F of the RI/FS Work Plan (Farallon 2003).

RESULTS

Based on a review of available data and a discussion with Peter Jewett of Farallon (Jewett 2005) limited surface (0 to 2 feet below ground surface [bgs]) or near surface (2 to 5 feet bgs) soil data was collected on the Breen Property. The majority of the chemical data collected at the Breen Property was related to groundwater. Soil data was sometimes collected during installation of reconnaissance borings and groundwater monitoring wells, but appears to be mostly subsurface (greater than 5 feet bgs).

The following sections briefly discuss the available surface and shallow surface soil data for the two source areas: Building B (drum removal area) and the wash-down pad. Sample locations are shown on the attached figure. Analytical results and sampling depth for surface and near surface samples collected at the two source areas is presented in Table 1.

Analytical results for all samples were compared to applicable Ecology Model Toxics Control Act (MTCA) Method A and B Soil Cleanup Levels for unrestricted land use (WAC 173-340, Ecology, 2001). Laboratory detection limits were also compared to the appropriate MTCA cleanup level to assess if adequate detection limits were used for analysis. For The Method B comparison, the carcinogenic cleanup value was used, where available. A summary of the appropriate MTCA Method A and B values obtained for Ecology's CLARC database (Ecology 2005) for the primary contaminants of concern at the Breen Property is attached.

Wash-down Pad Area

The wash-down pad is located in the southwest portion of the Breen Property. According to Peter Jewett, the wash-down pad was identified as a potential source area based on shallow groundwater sampling results. No tetrachloroethylene (PCE) soil source has been identified in this area.

According to historical accounts, wastewater and sediment from the steam-cleaning operation conducted at the pad were collected in an adjacent 5-foot deep pit (Farallon 2002). This pit was not located during previous site investigations

In 1997, SAIC collected soil samples during installation of MW-8, located approximately 20 feet west of the wash-down pad. Soil samples were collected at the surface and approximately 5 feet bgs (see Table 1). Analytical result for PCE for the sample collected at the surface was below the laboratory detection limit of 0.004 milligrams per kilogram (mg/kg). PCE was detected in the 5-foot sample at an estimated value of 0.001 mg/kg. Methylene chloride was detected above laboratory detection limit in both samples, but at concentrations below MTCA Method A and B soil cleanup levels (see Table 1). Several other volatile organic compounds (VOCs) including 2-butanone, acetone, and 4-methyl-2-pentanone were also detected in other the surface and 5-foot samples above laboratory detection limits.

Four soil borings (SP-1 through 4) were installed and sampled in the area of the wash-down pad by GeoEngineers in 1999. The shallow soil samples were collected between 2.5 and 6.5 feet bgs from the borings. PCE was not detected in any of these samples above the laboratory detection limit of 0.05

mg/kg. However, methylene chloride was detected at 0.528 mg/kg in boring SP-1, located approximately 5 feet west of the wash-down pad, at approximately 2.5 feet bgs. This value exceeds the MTCA Method A cleanup level of 0.02 mg/kg, but is below the MTCA Method B cleanup level of 130 mg/kg.

During the Phase I Investigation conducted by Farallon, soil boring RS-12 was installed in the wash-down pad area. Reconnaissance boring RS-12 was located west of the pad. One soil sample was collected at approximately 5 feet bgs from this boring. No PCE was detected above the laboratory detection limit of 0.0013 mg/kg in the sample, which was below the MTCA Method A or B cleanup levels.

Building B Area

A total of 70 drums and several small containers containing oil, grease and solvent were removed from beneath Building B in 1999. Approximately 600 cubic yards of contaminated soil was removed. Several confirmation soil samples were collected from the excavation sidewalls at approximately 4 feet bgs. These samples are shown as EX-# on Table 1. According to the Phase I Work Plan, final confirmation sampling results were below MTCA Method A and B soil cleanup levels for PCE and other volatile organic compounds (VOCs) (Farallon 2002). However, several results shown in Table 1 exceed MTCA Method A cleanup levels. No information was available to show the sequencing of confirmation sampling and if the soil containing the exceedance was actually removed.

Seven test pits (TP-1 through 7) were excavated around Building B by GeoEngineers in 1999. Three of the seven test pits (TP-5, 6, and 7) were sampled between 1.5 to 3 feet bgs. None of the samples contained PCE above the laboratory detection limit of 0.05 mg/kg. However, methylene chloride was detected in TP-6 and TP-7 at 1.5 feet bgs and 3 feet bgs, respectively. Both these values exceed the MTCA Method A cleanup level of 0.02 mg/kg, but are below the MTCA Method B cleanup level of 130 mg/kg.

Four soil borings (SP-5 through 8) were also installed around Building B in 1999, prior to completion of drum remediation. However, all soil samples were collected at greater than 5 feet bgs.

During the Phase I Investigation, one boring (RS-8) and monitoring well MW-18 were installed west of Building B. Soil samples were collected from each location at approximately 5 feet bgs. The samples collected from RS-8 did not contain PCE above laboratory detection limit of 0.05 mg/kg, which is equal to the MTCA Method A cleanup level. However, acetone was detected above the laboratory detection limit in this sample. The sample from MW-18 contained PCE at a concentration of 0.0018 mg/kg. No other VOCs were detected above laboratory PQLs.

CONCLUSIONS

Limited surface or near surface soil data is available for the Breen Property. Most historical investigations conducted at the site focused on groundwater. Some soil data was collected during previous site investigations, but appears to be primarily subsurface.

Based on the brief data review conducted, PCE contamination at the two source area at the Breen Property may be primarily related to subsurface sources (buried drums at Building B, collection pit at the wash-down area). Available surface and near surface soil data collected in the area of Building B and the wash-down pad showed little to no PCE or other VOCs detected above laboratory detection limits or PQLs. In general, the laboratory detection limits were below applicable MTCA Method A and B cleanup levels. However, the laboratory detection limit for trichloroethylene for Building B confirmation

samples, and the SP and TP samples collected at Building B and the wash-down pad were above the MTCA Method A cleanup level of 0.02 mg/kg. In addition, much of this data was collected at greater than 5 feet bgs. Only one sample, which was collected near the wash-down pad, was actually collected at the surface.

Additional surface soil chemical data will be required to assess the direct contact pathway for the baseline risk assessment for the Breen Property.

ATTACHMENTS

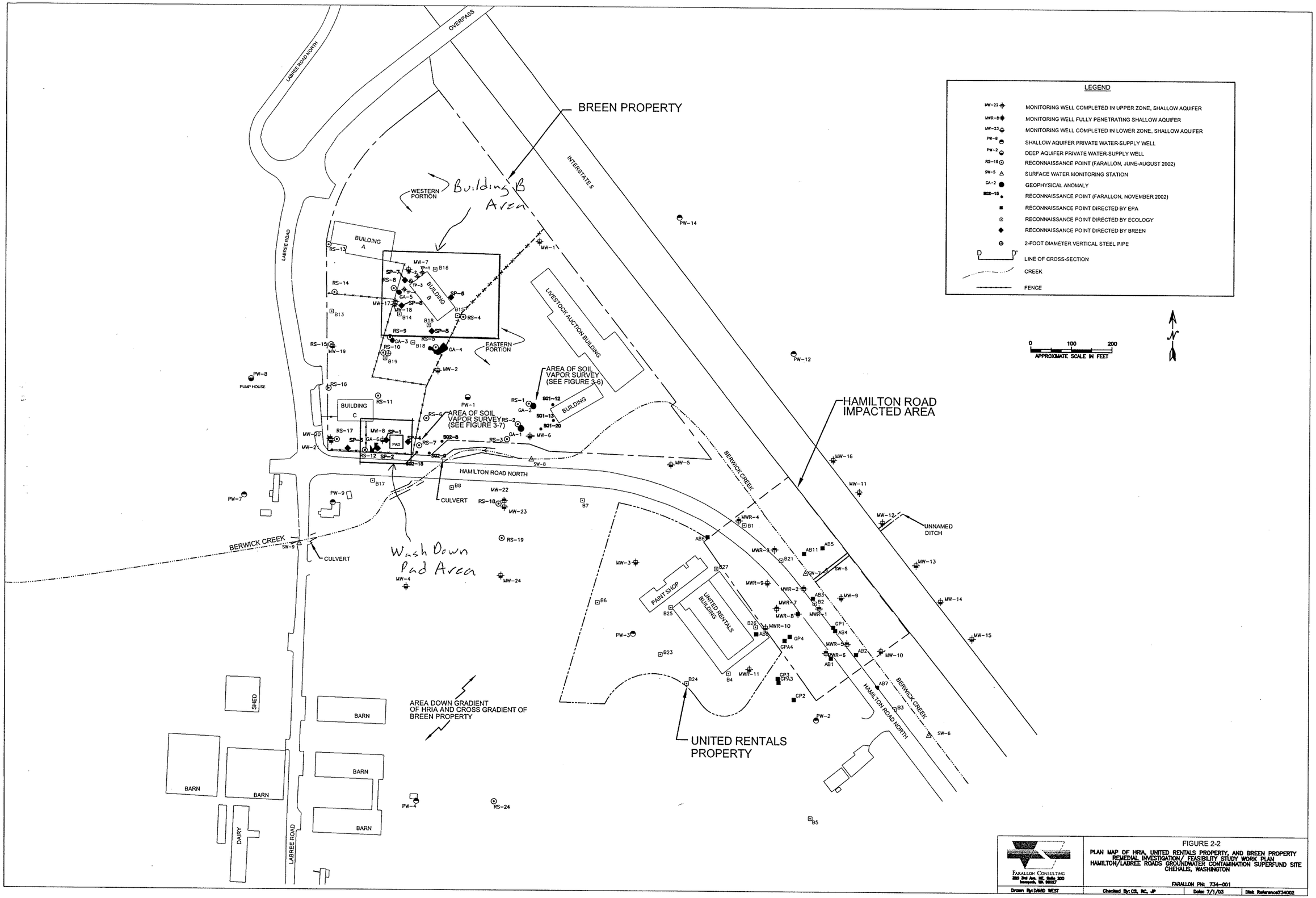


FIGURE 2-2

PLAN MAP OF HRIA, UNITED RENTALS PROPERTY, AND BREEN PROPERTY
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY WORK PLAN
HAMILTON/LABREE ROADS GROUNDWATER CONTAMINATION SUPERFUND SITE
CHEHALIS, WASHINGTON

FARALLON PN: 734-001

TABLE 1
Summary of Analytical Results for Surface and Near Surface Soil Samples

Location	Sample Depth (feet)	Sample Date	1,1-Dichloro ethane	1,1- Dichloro ethylene	1,1,1-Trichloro ethane	1,1,1,2-Tetrachloro ethane	1,1,2-Trichloro ethane	1,1,2,2-Tetrachloro ethane	1,2-Dichloro ethane	2-Butanone	4-Methyl- 2-Pentanone	Acetone	Benzene	Carbon Disulfide	Chloro benzene	Chloro ethane	cis-1,2-Dichloro ethene	Methylene Chloride	Ethyl benzene	Tetrachloro ethene
EX-01	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-02	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-03	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-04	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				**0.18**		< 0.05 U	< 0.05 U
EX-05	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-06	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-10	4	9/15/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	**0.05**
EX-12	4	9/15/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	**0.28**
EX-13	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-14	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				**0.16**		< 0.05 U	**0.1**
EX-15	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				**0.05**		< 0.05 U	**0.06**
EX-16	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-17	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
EX-21	4	9/15/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U	< 0.05 U				< 0.05 U				< 0.05 U		< 0.05 U	< 0.05 U
MW-8	0	5/6/1997	< 0.004 U	< 0.004 U	< 0.004 U		< 0.004 U	< 0.004 U	< 0.004 U	**0.02**	**0.005 J**	**0.13**	< 0.004 U	**0.023**	< 0.004 U	< 0.004 U	< 0.004 U	**0.008**	**0.002 J**	< 0.004 U
MW-8	5	5/6/1997	< 0.004 U	< 0.004 U	< 0.004 U		< 0.004 U	< 0.004 U	< 0.004 U	**0.004 J**	**0.001 J**	**0.033**	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U	**0.01**	< 0.004 U	**0.001 J**
MW-18	5	7/18/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0065 U	< 0.0065 U	< 0.0065 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0065 U	< 0.0013 U	**0.0018**
RS-8	5	6/10/2002	< 0.0013 U	< 0.0013 UJ	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0064 U	< 0.0064 U	**0.055**	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0064 U	< 0.0013 U	< 0.0013 U
RS-8A	5	6/24/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0064 U	< 0.0064 U	< 0.018 UJB	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0064 U	< 0.0013 U	< 0.0013 U
RS-12	5	7/12/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0065 U	< 0.0065 U	< 0.0065 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0065 U	< 0.0013 U	< 0.0013 U
SP-1	2.5	8/12/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	**0.528**		< 0.05 U
SP-1	5	8/12/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	< 0.5 U		< 0.05 U
SP-2	4	8/12/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	< 0.5 U		< 0.05 U
SP-3	3.5	8/12/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	< 0.5 U		< 0.05 U
TP-5	1.5	8/19/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	< 0.5 U		< 0.05 U
TP-6	1.5	8/19/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	**0.772**		< 0.05 U
TP-7	3	8/19/1999	< 0.05 U	< 0.05 U				< 0.05 U	< 0.05 U						< 0.05 U	< 0.05 U	< 0.05 U	**1.06**		< 0.05 U

Source: RI/FS Work Plan (Farallon 2003)

Notes:
All data is in milligrams per kilogram (mg/kg).

< 0.05 U = Analyte was not detected at the given laboratory detection limit.
BOLD = Analyte detected above laboratory detection limits.
B = analyte present in laboratory method blank.
J = estimated concentration.

TABLE 1
Summary of Analytical Results for Surface and Near Surface Soil Samples

Location	Sample Depth (feet)	Sample Date	Toluene	trans-1,2-Dichloro ethene	Trichloro ethylene	Vinyl Chloride	Xylene (Total)	Xylene, m-	Xylene, o-	Xylene, p- &m-
EX-01	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-02	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-03	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-04	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-05	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-06	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-10	4	9/15/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-12	4	9/15/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-13	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-14	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-15	4	9/22/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-16	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-17	4	9/28/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
EX-21	4	9/15/1999	< 0.05 U	< 0.05 U	< 0.05 U	< 0.25 U	< 0.05 U			
MW-8	0	5/6/1997	**0.004**	< 0.004 U	< 0.004 U	< 0.004 U			< 0.004 U	**0.001 J**
MW-8	5	5/6/1997	< 0.004 U	< 0.004 U	< 0.004 U	< 0.004 U			< 0.004 U	< 0.004 U
MW-18	5	7/18/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U		< 0.0026 U	< 0.0013 U	
RS-8	5	6/10/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U		< 0.0026 U	< 0.0013 U	
RS-8A	5	6/24/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U		< 0.0026 U	< 0.0013 U	
RS-12	5	7/12/2002	< 0.0013 U	< 0.0013 U	< 0.0013 U	< 0.0013 U		< 0.0026 U	< 0.0013 U	
SP-1	2.5	8/12/1999		< 0.05 U	< 0.05 U	< 0.05 U				
SP-1	5	8/12/1999		< 0.05 U	< 0.05 U	< 0.05 U				
SP-2	4	8/12/1999		< 0.05 U	< 0.05 U	< 0.05 U				
SP-3	3.5	8/12/1999		< 0.05 U	< 0.05 U	< 0.05 U				
TP-5	1.5	8/19/1999		< 0.05 U	< 0.05 U	< 0.05 U				
TP-6	1.5	8/19/1999		< 0.05 U	< 0.05 U	< 0.05 U				
TP-7	3	8/19/1999		< 0.05 U	< 0.05 U	< 0.05 U				

Source: RI/FS Work Plan (Farallon 2003)

Notes:
All data is in milligrams per kilogram (mg/kg).

< 0.05 U = Analyte was not detected at the given laboratory detection limit.
BOLD = Analyte detected above laboratory detection limits.
B = analyte present in laboratory method blank.
J = estimated concentration.

Summary of MCTA Method A and B Cleanup Levels for Contaminants of Concern

CLARC Summary		methylene chloride (CAS #: 75-09-2)	tetrachloroethylene (CAS #: 127-18-4)	trichloroethane;1,1,1- (CAS #: 71-55-6)	trichloroethylene (CAS #: 79-01-6)
MTCA Standard Formula and Table Values	Soil, Method A, Industrial Land Use, Table Value (mg/kg)	2e-02	5e-02	2e+00	3e-02
	Soil, Method A, Unrestricted Land Use, Table Value (mg/kg)	2e-02	5e-02	2e+00	3e-02
	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted land use (mg/kg)	1.3e+02	1.9e+00	Not Researched	2.5e+00
	Soil, Method B, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted land use (mg/kg)	4.8e+03	8e+02	7.2e+04	2.4e+01

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Parametrix ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

TASK ORDER SUBMITTAL
R-10 AES (SMALL BUSINESS)
CONTRACT NO. 68-S7-03-04; TASK ORDER 024

DRAFT TECHNICAL MEMORANDUM

Date:	February 17, 2006
To:	Alan Goodman, EPA Region 10
From:	Scott Elkind, Parametrix
Subject:	Updated Conceptual Site Model for the Hamilton-Labree Site
cc:	Mike Warfel, Parametrix David B. Mayfield, Parametrix
Project Number:	415-2328-007 (024/DE09)
Project Name:	Hamilton Labree Roads Fund-Lead RI/FFS

INTRODUCTION

EPA Region 10 has requested the Parametrix Team (Contractor) to provide technical support for the development of a Remedial Investigation/Focused Feasibility Study (RI/FFS) for the Hamilton/Labree Roads Groundwater Contamination Superfund Site in Chehalis, Washington. The goal of this technical memorandum is to present an updated Conceptual Site Model (CSM), which includes both the Hamilton Road Impact Area (HRIA) and Breen Property, for use in preparation of the Baseline Risk Assessment and the Remedial Investigation (RI) report.

Development of a CSM is an integral component of a RI because it guides the documentation of the nature and extent of contamination at a release site and assessment of potential risks posed to human health and the environment by the release. The CSM provides a logical and sequential view of the chemicals of potential concern (COPCs) from the original source and release areas, during migration through environment media, and to potential human and environmental receptors.

OBJECTIVES

The objectives of this updated CSM for the Hamilton/Labree Roads site are as follows:

- Utilize information from the CSMs prepared by SLR International Corp and Farallon Consulting (2003) for the Breen Property and by URS (2004) for the HRIA to develop an updated CSM for the overall site.

- Develop a CSM that incorporates both the HRIA and the Breen contaminant source areas, accounts for potential pathways to receptors, and provides the Contractor toxicology staff with a generalized model for development of more detailed pathway and receptor models as part of the risk assessment.

OVERVIEW OF THE CSM

The updated CSM is shown diagrammatically in Figure 1. Brief descriptions of the elements of the CSM are provided in the following sections.

Primary Sources of Contamination and Primary Release Mechanisms

The two primary sources of contamination at the Hamilton/Labree Roads site appear to be:

- Liquid tetrachloroethene (PCE) released directly into Berwick Creek within the HRIA.
- PCE leaked or spilled onto the soil at both the HRIA and Breen Property. The form of the PCE released (concentrated liquid or PCE dissolved in solutions) is unknown.

Secondary Sources of Contamination

Upon contact with the water in Berwick Creek, some of the PCE immediately dissolved into the water and was carried downstream with the flow of the creek. The bulk of the PCE remained in liquid form and migrated quickly through the water column into the creek sediments under the influence of gravity, since the density of PCE is greater than water. Once in the creek sediments, the PCE continued to migrate vertically downward through the porous creek sediments until constrained by the lower-permeability silt and clay strata that occur beneath the stream channel and directly above the shallow groundwater aquifer in the HRIA. The PCE would slowly migrate through the low permeability silt and would slowly leach to groundwater.

PCE introduced into the soils beneath the HRIA and Breen Property would have behaved in accordance with the nature of the soils. Fine-grained surficial soils would tend to retain the PCE. More permeable soils would allow PCE to migrate vertically downward more quickly.

In areas near the contamination sources, PCE present in liquid form as a dense non-aqueous-phase liquid (DNAPL) may collect on top of low-permeability zones in strata below the water table. The DNAPL would gradually dissolve to groundwater providing an additional source of PCE contamination in groundwater.

Secondary Release Mechanisms

When a released contaminant is retained in an environmental medium such as soil or sediment, the medium functions as a secondary source for further release of the chemical. The following paragraphs discuss the release mechanisms from the secondary sources.

Sediment Migration in Berwick Creek

Contaminated sediment in Berwick Creek has the potential to migrate downstream under the influence of the stream current. The timing and magnitude of migration depends upon surface water flow conditions that change seasonally under the influence of precipitation.

Leaching from Contaminated Berwick Creek Sediment to Surface Water

Contaminated sediment that migrates downstream is in constant contact with surface water, creating the potential for leaching of PCE to surface water at points downstream from the original release to Berwick Creek.

Volatilization from Surface Water to Air

PCE that may become dissolved in Berwick Creek water via sediment contact would be subject to volatilization from the water into the ambient air. The magnitude of this volatilization would depend upon the concentrations in the stream and ambient weather conditions.

Volatilization from Soil to Air

Soil contaminated with PCE provides the potential for volatilization and release of PCE to ambient air, depending upon soil concentration, distance between the contamination and the surface of the soil, and weather conditions.

Leaching to Groundwater

Precipitation infiltrating through soil contaminated with PCE is a mechanism for migration of PCE to groundwater. Groundwater occurs at relatively shallow depths in the study area, and the rate and magnitude of migration depends on the nature of the soils above the water table and the amount of seasonal precipitation.

Volatilization from Groundwater through Soil to Air

Volatilization of PCE in groundwater has the potential to migrate to the soil and ultimately to ambient air. Such releases would be dependent upon the concentration in groundwater, the depth of groundwater below land surface, presence or absence of a low-permeability layer above the groundwater table, and weather conditions.

Downgradient Discharge from Groundwater to Berwick Creek

Hydrogeologic data collected in the study area indicates that the reach of Berwick Creek that flows through the HRIA and Breen areas is underlain by fine-grained silt and clay, which separates the stream from groundwater. If this layer is absent or breached by the Berwick Creek downstream (west) of the HRIA and Breen areas, the potential exists for PCE-contaminated groundwater to enter the stream. A flow gradient from shallow groundwater to the creek would be required for this to occur, which appears to be unlikely based on the prevailing groundwater gradient to the west, parallel to the creek and the Newaukum River.

Exposure Media

Contact with PCE contamination from the HRIA and Breen areas of the site has the potential to occur in the following environmental media:

- Indoor Air

- Outdoor Air
- Soil
- Groundwater
- Surface Water
- Creek Sediments

Exposure Pathways

Contaminants in the exposure media described above require a completed exposure pathway to come in contact with human health or environmental receptors. Potential exposure pathways potentially present within the study area consist of direct contact, inhalation, and ingestion. The likelihood that any of these pathways are complete with respect to receptors on and in the vicinity of the site is addressed in the following section.

Receptors

Potential receptors of contaminant exposure originating from the Hamilton/Labree Roads site have been separated in two major categories for the CSM: human health and biota. In addition, subcategories for human health and biota also appear in the CSM. Brief descriptions of these grouping are provided below.

Human Health

Occupational
People who are working full days at a location are considered in the occupational exposure scenario. This population would include employees at local businesses and construction workers involved in excavation or grading projects.

Residential/Recreational

Residential exposures involve people who live in an area with potential exposure to contamination. Examples of this scenario for the site include residents who use groundwater for water supply west of the source areas (i.e., not connected to a public water supply). Recreation exposures pertain to potential intermittent contact with contaminated media during recreational outings, such as while visiting a park.

Biota

Aquatic

This subcategory of environmental receptor applies to organisms that live in the waters and sediments of Berwick Creek. Such life forms could include fish, insects, and crustaceans.

Terrestrial

Wildlife in the upland environment comprise the terrestrial subcategory and include mammals, birds, reptiles, insects, and worms.

Complete Versus Incomplete Pathways

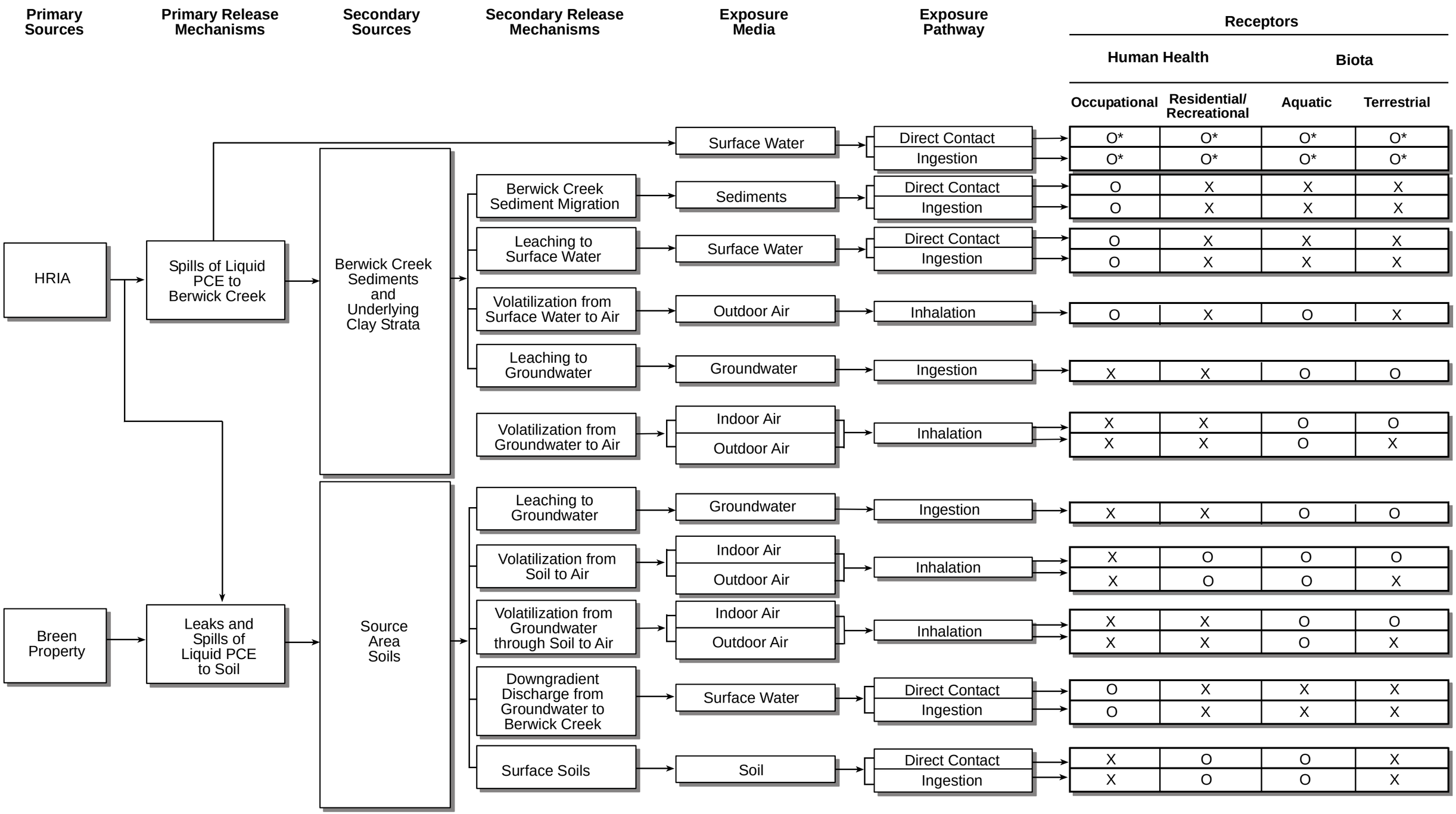
The "X" and "O" symbols in the boxes under the receptors columns in the CSM (see Figure 1) indicate potentially complete and likely incomplete exposure pathways, respectively. The part of the CSM will serve as the starting point for the Risk Assessment. If the Risk Assessment identifies exposure pathway information that differs from the CSM of Figure 1, the CSM will be modified appropriately.

REFERENCES

Farallon Consulting. 2003. *Remedial Investigation/Feasibility Study Work Plan, Hamilton/Labree Roads Groundwater Contamination Superfund Site, Chehalis, Washington*. Prepared for S.C. Breen Construction Company. Issaquah, Washington. July.

URS. 2004. *Draft (Revision 1) Engineering Evaluation/Cost Analysis Report, Hamilton Road Impact Area, Hamilton-Labree Roads Superfund Site, Chehalis, Washington*. Prepared for USEPA Region 10 under RAC Contract 68-W-98-228. August.

FIGURE 1



Parametrix 415-2328-007/024(DE09) 2/06 (B)

NOTES:
X = Potentially Complete Exposure Pathway
O = Incomplete Exposure Pathway
* Initial mass of dissolved PCE in surface water moved downstream and is no longer present

Figure 1
Conceptual Site Model
Hamilton Labree Superfund Site
Chehalis, Washington