A Department of Ecology Report

Hamilton/Labree Road PCE Site Groundwater Monitoring, February and July 1999

Abstract

Groundwater samples were collected from 15 monitoring wells and five private wells in February and July 1999 at the Hamilton/Labree Roads PCE site. The purpose of this sampling was to evaluate the extent and concentrations of perchloroethylene (PCE) contamination in groundwater surrounding the site. PCE was detected in all but one of the wells tested.

The highest PCE levels (3,000 to 36,000 ug/L) were measured in the seven new monitoring wells installed along Hamilton Road in the spring of 1999. These wells were installed to confirm the presence of PCE in this area, after an investigation in 1998 using temporary borings detected extremely high PCE concentrations.

Concentrations in most of the remaining wells (monitoring and private) ranged from 100 ug/L to 400 ug/L. PCE concentrations in 12 of the monitoring wells and the five private wells exceeded the Model Toxic Control Act Method A cleanup standard for PCE in groundwater of 5 ug/L, as well as the EPA Maximum Contaminant Level of 5 ug/L for PCE in drinking water for adults.

Additional private wells, about one-half mile downgradient of the site, were also sampled in the winter of 1999. PCE was detected near the quantitation limit (1 ug/L) in two of the wells.

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Summary

Groundwater samples were collected in February and July 1999 at the Hamilton/Labree Roads Perchloroethylene (PCE) site, which is located three miles southwest of Chehalis, Washington (Figure 1). Samples were collected from the original eight monitoring wells and five private wells (Figure 2). Due to the migration of PCE, additional private water supply wells, approximately one-half mile downgradient, were sampled in the winter of 1999. In the spring of 1999, seven new monitoring wells were installed along Hamilton Road. These wells were added to the monitoring network in July. All samples were collected and analyzed for volatile organics (VOAs). Results are summarized below.

- PCE was detected in seven of the eight original monitoring wells. PCE concentrations are as follows:

PCE Concentrations (ug/L) in Monitoring Wells MW-1 through MW-8 for February and July 1999

	MW-1	*MW-2*	*MW-3*	*MW-4*	*MW-5*	*MW-6*	*MW-7*	*MW-8*
February 1999	1 U	407	751	385	4.4	251	0.73 J	1910
July 1999	1 U	285	656	363	3.5	169	0.51 J	1370

U : The analyte was not detected at or above the reported value.
J : The analyte was positively identified. The associated numerical result is an estimate.

PCE concentrations in five of the monitoring wells consistently exceeded the Model Toxic Control Act (MTCA) Method A cleanup standard for PCE in groundwater of 5 ug/L (Ecology, 1996).

- Elevated PCE concentrations were detected in the new monitoring wells installed along Hamilton Road. PCE concentrations for July in these wells are as follows:

PCE Concentrations (ug/L) in Monitoring Wells MW-R1 through MW-R7 in July 1999

	MW-R1	*MW-R2*	*MW-R3*	*MW-R4*	*MW-R5*	*MW-R6*	*MW-R7*
July 1999	6740	20,500	16	4890	27,000	36,100	3190

PCE concentrations in all of these monitoring wells exceeded the MTCA Method A cleanup standard for PCE in groundwater of 5 ug/L (Ecology, 1996).

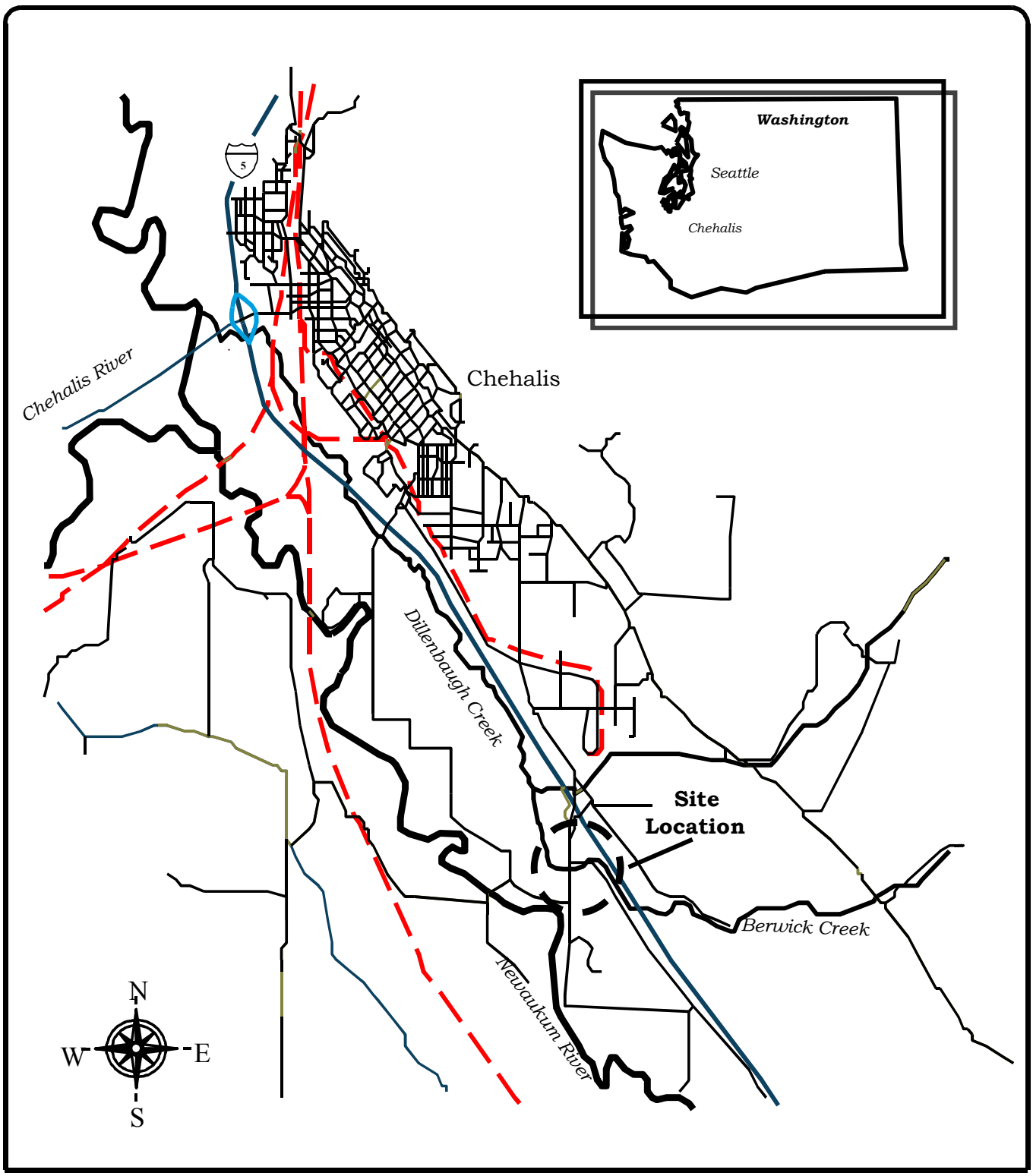

Figure 1	**Hamilton/Labree Roads PCE Site** **Site Location**	

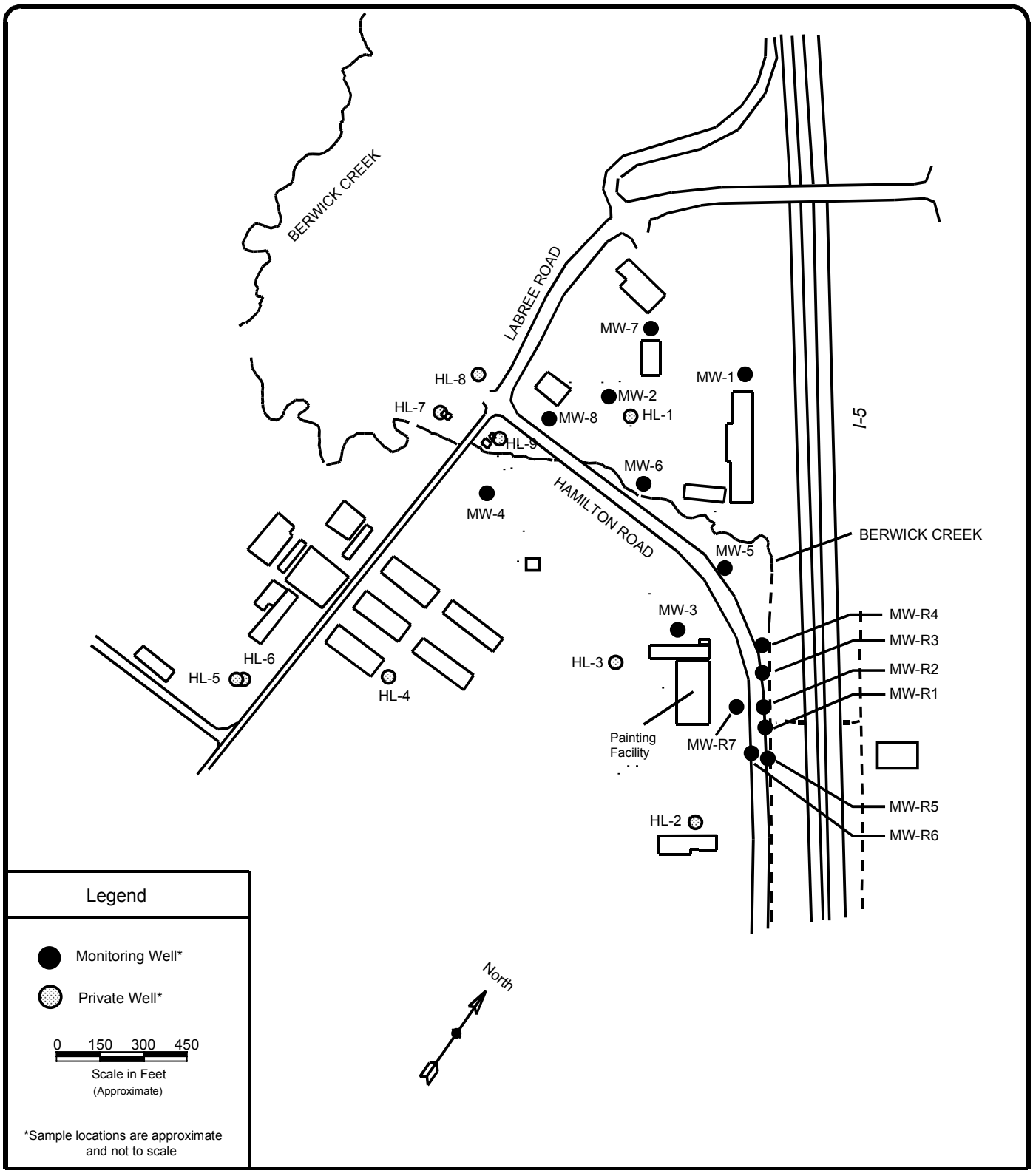

Figure 2	Hamilton/Labree Roads PCE Site Sample Locations	

Base Map Provided By SAIC

- PCE was also detected in the five private wells. PCE concentrations are as follows:

PCE Concentrations (ug/L) in the Private Wells for February and July 1999

	HL-2	*HL-3*	*HL-4*	*HL-5*	*HL-9*
February 1999	93	368	*	7.1	2540
July 1999	73	379	138	5.9	2170

* = Sample result is rejected because it is known not to be representative of site conditions. See explanation in text.

PCE concentrations in the five private wells also exceeded the EPA Maximum Contaminant Level (MCL) of 5 ug/L for PCE in drinking water for adults (EPA, 1999). Of the five private wells, three wells are no longer in use (HL-2, HL-4, HL-5), one well is used for industrial purposes (HL-3), and one well is used as a domestic water supply (HL-9). A wellhead treatment system was installed and began operating at this well in the summer of 1998.

- PCE was detected near the quantitation limit in two of the downgradient water supply wells along Rice Road, which is about one-half mile west of the project area.

PCE concentrations in the monitoring wells and private wells are consistent with data collected from 1993 to 1998 (SAIC, 1997 and Ecology, 1999a). PCE data collected to date support the view that there are two distinct areas of contamination. One area of contamination is centered in the vicinity of the Hamilton/Labree Roads intersection. PCE concentrations in wells HL-9 and MW-8, as well as elevated concentrations of 1,2-cis-DCE and vinyl chloride detected northeast of the Hamilton/Labree Roads intersection, led to the discovery of buried drums of solvent in 1999. These drums have since been removed. Additional sources of contamination are still being investigated in this part of the project area.

The other area of contamination is centered around the new monitoring wells that were installed along Hamilton Road. These wells are about one-fourth mile from where the buried drums were discovered, and are considered to be hydraulically upgradient. PCE concentrations detected in these wells ranged from 3,000 to 36,000 ug/L. A comparison of the reported dissolved concentrations of PCE in these wells to the water solubility of PCE suggests that a dense, non-aqueous phase liquid (DNAPL) is present in the aquifer in this area. Investigations are ongoing to determine the source and extent of the contamination in this part of the project area.

Background

Perchloroethylene (PCE) contamination of six shallow drinking water wells was discovered in 1993 in the vicinity of the Hamilton/Labree Roads intersection. PCE levels in groundwater ranged from 3 ug/L to 2165 ug/L (SAIC, 1997). The EPA MCL for PCE in drinking water for adults is 5 ug/L.

To locate the source of the contamination, eight monitoring wells were installed in 1996. PCE was detected in six of the eight wells at concentrations ranging from 3 ug/L to 1500 ug/L (SAIC, 1997). In 1998 groundwater samples were collected from numerous shallow and deep borings over the project area (Ecology 1999b). Elevated concentrations of PCE were detected in groundwater samples collected from the shallow borings between the industrial painting facility on Hamilton Road and Berwick Creek. PCE concentrations ranged from 6 ppb to 60,000 ppb. Based on these results, seven new monitoring wells were installed east of the painting facility along Hamilton Road in 1999. Elevated concentrations of 1,2-cis-DCE and vinyl chloride were also detected northeast of the Hamilton/Labree Roads intersection. Buried drums of solvent were discovered in 1999 and have since been removed. Additional sources of contamination are still being investigated.

Water quality results over the monitoring period confirm that the surficial aquifer throughout the project area is contaminated with PCE. The project area, as determined by drill logs, is underlain by about 30 to 35 feet of poorly sorted gravel, with varying amounts of fine-to-medium sand in a matrix of silt, a trace of clay, and occasional cobbles. Interbedded within the gravel unit are several discontinuous silt lenses ranging in thickness from one to seven feet. The unit in which the wells are screened, from 30 to 45 feet, is poorly sorted fine-to-medium sand with silt, little to some fine-to-medium gravel, and a trace cobbles. At the base of this sand unit, a bluish-gray clayey silt aquitard is found below 45 feet.

Elevations of the upper surface of the aquitard layer suggest that the unit is dipping in a west-northwest direction, with about three feet of relief across the site. A higher area appears to be located in the vicinity of monitoring well MW-2. PCE contamination has not been detected in any residential wells completed in a deeper aquifer, approximately 150 to 200 feet below ground surface. The surficial aquifer has an average estimated thickness of about 44 feet with an average gradient of 0.0032. A typical hydraulic conductivity for poorly sorted sand would range from $1x10^{-3}$ to $1x10^{-2}$ cm/sec (Freeze and Cherry, 1979). The groundwater flow direction in the shallow aquifer has consistently been measured to the west-northwest (SAIC, 1997).

Methods

Groundwater Sampling

In 1999 groundwater samples were collected in February and July from 15 monitoring wells (MW-1 though MW-8 and MW-R1 through MW-R7) and 13 private wells. Sampling procedures for the monitoring and private wells, as well as analytical methods and quality assurance, are discussed below.

Monitoring Wells

Prior to sample collection, static water level measurements were recorded in each monitoring well to 0.01 feet, using an electronic water level probe. The probe was rinsed with deionized water after each use. All monitoring wells were purged and sampled using a stainless steel submersible pump, with a pump rate of about 0.5-gpm. Samples were collected after pH, specific conductance, and temperature readings stabilized (changes of 10% or less of the mean value of three consecutive measurements). The pump was decontaminated between wells by circulating laboratory grade detergent/water through the pump for fives minutes, followed by a clean water rinse. Purge water from the monitoring wells that exceeded the MTCA Method A cleanup level of 5 ug/L for PCE was collected in 55-gallon barrels and stored at the project site. This waste has been transported and disposed of in accordance with Washington State regulations (Chapter 173-340-400 WAC). Purge water from the remaining wells was discharged to the ground near each well. Samples for VOAs were collected free of headspace and preserved with 1:1 hydrochloric acid.

Private Wells

The 13 private wells were purged and sampled using existing pumps. Purge water was discharged onto the ground near each well. Samples were collected after field parameters had stabilized from the tap nearest the wellhead, prior to any water treatment systems. Samples for VOAs were collected free of headspace and preserved with 1:1 hydrochloric acid.

All samples were stored in coolers on ice at 4°C for transport to the Ecology Headquarters Building. Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (MEL, 1994).

Analysis

Analytes, analytical method, and detection limits are listed in Table 1 for field and laboratory parameters. All samples were analyzed for volatile organics (VOAs) by Manchester Laboratory.

Table 1: Analytical Methods for February and July 1999 Samples

Analytes	Method	Reference	Detection Limit
Field			
Water Level	Solinst Well Probe	NA	0.01 feet
pH	Orion 25A Field Meter	NA	0.1 Std. Units
Temperature	Orion 25A Field Meter	NA	0.1 C
Specific Conductance	Beckman Conductivity Bridge	NA	10 umhos/cm
Laboratory			
VOAs	SW-846 Methods 8260	EPA 1986	1-5 ug/L

In general, the quality of the data is acceptable for use for all sample rounds. Quality control samples collected in the field consisted of blind field duplicates for VOAs, which were obtained

from well MW-3 (MW-3A) over the monitoring period. The numeric comparison of duplicate results is expressed as the relative percent difference (RPD). The RPDs for PCE in February and July duplicate samples were within 7%. In addition to field quality control samples, surrogate compound recoveries, matrix spikes, and matrix spike duplicates were performed in the laboratory. Overall, surrogate recoveries were within acceptable limits of 50-150% for water samples. Matrix spike and spike duplicate recoveries were within acceptable limits of +/-25%. For a more detailed discussion of quality assurance, see the case narratives for individual analysis in Appendix A.

Results

Monitoring Wells

Groundwater samples were collected in February and July 1999 from 15 monitoring wells. Wells MW-1 through MW-8 have been sampled since 1997. In July, seven new monitoring wells were added to the monitoring network (MW-R1 through MW-R7).

Field Observations

Table 2 lists field observations prior to sampling for each monitoring well, including well depth, static water level, pH, specific conductance, temperature, and purged water volume. All field parameters were within expected ranges.

Table 2: Summary of Field Parameters Results in February and July 1999

	pH (std.units)	*Specific Conductance (umhos/cm)*	*Temperature (°C)*	*Total Depth (feet)*[1]	*Depth to Water (feet)*[2]	*Purge Volume (gal)*
Feb/July						
MW-1	6.6-7.1	206-210	12.1-13.2	47	1.95-4.70	12-15
MW-2	6.6-7.0	192-200	11.7-13.9	47	4.24-7.17	13-18
MW-3	6.5-6.9	180-188	11.6-14.4	46	8.35	10-17
MW-4	6.6-6.9	160-175	11.6-12.6	46	3.04-6.28	9-15
MW-5	6.6-6.8	173-187	12.1-12.8	49	6.61-9.70	13-20
MW-6	6.6-6.9	188-192	10.7-12.7	49	4.61-7.92	9-14
MW-7	6.5-6.8	245-250	12.9-13.8	45	1.97-4.95	11-12
MW-8	6.5-6.8	182-182	12.2-13.5	46	2.20-5.41	13-17
July						
MW-R1	7.0	235	15.8	27	5.91	11
MW-R2	6.8	240	14.5	27	6.42	13
MW-R3	7.0	251	15.2	24	5.43	14
MW-R4	6.9	194	13.5	26	5.08	20
MW-R5	7.1	208	14.1	28	5.38	15
MW-R6	6.9	350	15.0	26	3.37	13
MW-R7	6.9	180	15.8	27	4.18	10

[1] *Below ground surface.*
[2] *Measured from top of casing.*

Analytical Results

Analytical results for samples collected from the monitoring wells in 1999 are summarized in Tables 3 and 4.

Table 3: Analytical Results (ug/L) for Monitoring Wells MW-1 through MW-8 in February and July 1999

Well Identification	*MW-1*	*MW-2*	*MW-3*	*MW-4*	*MW-5*	*MW-6*	*MW-7*	*MW-8*
February 1999								
PCE	1 U	407	751	385	4.4	251	0.73 J	1910
TCE	2 U	40 U	5.6 J	40 U	2 U	40 U	2 U	200 U
Cis-DCE	1 U	20 U	20 U	20 U	1 U	20 U	1 U	100 U
July 1999								
PCE	1 U	285	656	363	3.5	169	0.51 J	1370
TCE	2 U	0.21 J	200 U	2	2 U	0.1 J	2 U	200 U
Cis-DCE	1 U	1 U	100 U	0.23 J	1 U	1 U	1 U	100 U

MTCA Method A Cleanup Standard for PCE in groundwater is 5 ug/L (Ecology, 1996)

U : The analyte was not detected at or above the reported value.
J : The analyte was positively identified. The associated numerical result is an estimate.

PCE concentrations in February and July for the original eight monitoring wells ranged from non-detect (MW-1) to 1910 ug/L (MW-8), with the majority of the PCE concentrations between 200 ug/L and 400 ug/L. The highest PCE concentrations consistently occurred in wells MW-3 and MW-8, with average concentrations of 704 ug/L and 1640 ug/L, respectively. PCE detected in wells MW-5 and MW-7 were at concentrations near or below the method detection limit.

In May 1999 seven additional monitoring wells were installed along Hamilton Road in an area identified during an earlier investigation as having exceedingly high PCE concentrations (Ecology, 1999b).

Table 4: Analytical Results (ug/L) for Monitoring Wells MW-R1 through MW-R7 in July 1999

Well Identification	*MW-R1*	*MW-R2*	*MW-R3*	*MW-R4*	*MW-R5*	*MW-R6*	*MW-R7*
July 1999							
PCE	6740	20,500	16	4890	27,000	36,100	3190
TCE	2000 U	2000 U	2 U	1000 U	4000 U	393 J	2000 U

MTCA Method A Cleanup Standard for PCE in groundwater is 5 ug/L (Ecology, 1996)

U : The analyte was not detected at or above the reported value.
J : The analyte was positively identified. The associated numerical result is an estimate.

PCE concentrations ranged from 16 ug/L (MW-R3) to 36,100 ug/L (MW-R6). PCE concentrations in MW-R3 were anomalistically low, considering that this well is located between wells MW-R2 and MW-R4 with PCE concentrations of 20,500 ug/L and 4890 ug/L, respectively (Figure 2).

Private Wells

Groundwater samples were collected in February and July 1999 from 13 private water supply wells. In February eight of the wells were sampled due to the possible migration of PCE contamination to the lower aquifer and to wells downgradient of the project area. Three wells are located in the project area and are screened in the deeper aquifer. Two of the wells are water supply wells (HL-1, HL-6), and the other is an irrigation well (HL-8). The remaining wells are private water supply wells about one-half mile downgradient of the project area and are screened in the shallow aquifer.

Field Observations

Table 5 lists field observations prior to sampling, including pH, specific conductance, temperature, and purge volume. The difference in conductivity indicates which aquifer the well is screened in: low specific conductance (<400 umhos/cm) are from wells screened in the shallow aquifer, and high specific conductance (>1000 umhos/cm) are from wells screened in a deeper aquifer. Field parameters were within expected ranges.

Table 5: Summary of Field Parameters for Private Wells in February and July 1999

	pH (std.units)	*Specific Conductance (umhos/cm)*	*Temperature (°C)*	*Purge Volume (gal)*
Shallow Aquifer				
HL-2	6.6-7.1	271-272	12.1-14.2	200-230
HL-3	6.2-7.1	173-178	11.0-15.5	105-200
HL-4	6.2-6.9	167-227	7.8-15.8	18-40
HL-5	6.6-7.0	308-312	11.2-12.8	35-45
HL-9	6.7-6.9	180-185	10.3-12.2	18-35
Giske	6.8	200	10.7	85
Ellenberger	5.5	96	10.0	65
Pallas	5.8	408	12.0	100
HL-16	--	113	11.5	65
HL-17	--	199	11.1	50
Deep Aquifer				
HL-1	7.7	1174	7.4	150
HL-8	7.5	1103	10.9	600
HL-6	7.9	1156-1170	11.0-12.3	--

Analytical Results

Analytical results for samples collected from private wells in 1999 are summarized in Tables 6 and 7.

Five private wells were sampled in February and July 1999. Well HL-7 was not sampled in 1999 due to pump problems and hazardous sampling conditions.

Table 6: Analytical Results (ug/L) for Private Wells in February and July 1999

Well Identification	*HL-2*	*HL-3*	*HL-4*	*HL-5*	*HL-9*
February 1999					
PCE	93	368	*	7.1	2540
TCE	40 U	3 J	2.6 J	1 U	200 U
Cis-DCE	20 U	10 U	10 U	1 U	42 J
July 1999					
PCE	73	379	138	5.9	2170
TCE	1.7 J	200 U	0.55 J	2 U	1000 U
Cis-DCE	5 U	100 U	1.6	1 U	500 U

MTCA Method A Cleanup Standard for PCE in groundwater is 5 ug/L (Ecology, 1996)
EPA MCL for PCE in drinking water for adults is 5 ug/L. (EPA, 1999)

U : The analyte was not detected at or above the reported value.
J : The analyte was positively identified. The associated numerical result is an estimate.
* = Sample result is rejected because it is known not to be representative of site conditions. See explanation in text.

Average PCE concentrations in the private wells ranged from 6.5 ug/L (HL-5) to 2355 ug/L (HL-9). Well HL-9 consistently has the highest PCE concentration of the sampled private wells, with a maximum concentration of 2540 ug/L in February. The sample result for HL-4 from February 1999 has been rejected, because it is known not to be representative of site conditions. The sample location had been altered and was under pressure at the time of sampling, therefore resulting in the loss of volatiles. This was corrected prior to the July sampling, and PCE concentration returned to the range at which it had previously been detected.

PCE was detected in two of the shallow wells, one-half mile downgradient of the project area, at concentrations near or below the quantitation limit.

Table 7: Analytical Results (ug/L) for Private Wells in February 1999

Well Identification	*HL-1*	*HL-6*	*HL-8*	*HL-16*	*HL-17*	*Ellenberger*	*Giske*	*Pallas*
	Deep Aquifer			*Shallow Aquifer*				
PCE	1 U	1 U	1 U	0.22 J	1 U	1 U	2.2	1 U
TCE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Cis-DCE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

EPA MCL for PCE in drinking water for adults is 5 ug/L (EPA, 1999)

U : The analyte was not detected at or above the reported value.
J : The analyte was positively identified. The associated numerical result is an estimate.

Discussion and Conclusions

PCE concentrations in the original monitoring wells and private wells are consistent with data collected from 1993 to 1998 (SAIC, 1997 and Ecology, 1999a). For comparison, results from the state Department of Health and the Science Applications International Corporation (SAIC) from the fall of 1993 to May 1997, and Ecology from October 1997 to July 1998, have been included in Appendix B. Additional investigations in 1998/1999 identified elevated concentrations of PCE in the new monitoring wells along Hamilton Road.

In 1999 PCE was detected in 14 of the 15 monitoring wells, as shown in Tables 8 and 9. PCE concentrations in 12 of the monitoring wells exceeded the Model Toxic Control Act (MTCA) Method A cleanup standard for PCE in groundwater of 5 ug/L (Ecology, 1996).

Table 8: Average PCE Concentrations (ug/L) in Monitoring Wells MW-1 through MW-8 for February and July 1999

				Exceeds MTCA Method A Standard of 5 ug/L				
	MW-1	*MW-7*	*MW-5*	*MW-6*	*MW-2*	*MW-4*	*MW-3*	*MW-8*
Average PCE (ug/L) Concentration	1 U	0.6	4	210	346	374	704	1640

Table 9: PCE Concentrations (ug/L) in Monitoring Wells MW-R1 through MW-R7 in July 1999

	MW-R3	*MW-R7*	*MW-R4*	*MW-R1*	*MW-R2*	*MW-R5*	*MW-R6*
PCE (ug/L)	16	3190	4890	6740	20,500	27,000	36,100

MTCA Method A Cleanup Standard for PCE in groundwater is 5 ug/L

PCE concentrations in all the private wells exceeded the EPA Maximum Contaminant Level (MCL) of 5 ug/L for PCE in drinking water for adults (EPA, 1999).

Table 10: Average PCE Concentrations (ug/L) in the Private Wells for February and July 1999

	HL-5	*HL-2*	*HL-4*	*HL-3*	*HL-9*
Average PCE (ug/L) Concentration	6.5	83	138	374	2355

MCL for PCE in drinking water for adults is 5 ug/L.

Of the five private wells, three are no longer in use (HL-2, HL-4, HL-5), one is used for industrial purposes (HL-3), and one well is still used as a domestic water supply (HL-9). A wellhead treatment system was installed and began operating at this domestic well in the summer of 1998.

Data collected from 1997 to the present support the view that there are two distinct areas of contamination:

- One is centered in the vicinity of the Hamilton/Labree Roads intersection. PCE concentrations in wells HL-9 and MW-8, as well as elevated concentrations of 1,2-cis-DCE and vinyl chloride detected northeast of the Hamilton/Labree Roads intersection, led to the discovery of buried drums of solvent. These drums have since been removed. Additional sources of contamination are still being investigated in this part of the project area.

- The other is centered in the area of the new monitoring wells that were installed along Hamilton Road. These wells are about one-fourth mile from where the buried drums were discovered, and are considered to be hydraulically upgradient. PCE concentrations detected in these wells ranged from 3,000 to 36,000 ug/L. Figure 3 shows PCE concentration contours in groundwater for July 1999 after the addition of the new monitoring wells. Investigations are ongoing to determine the source and extent of the contamination in this part of the project area.

PCE concentrations in the new monitoring wells also indicate that a dense, non-aqueous phase (DNAPL) is present in this area. Dissolved contaminant concentrations greater than one percent of the contaminant aqueous solubility limit suggest the presence of the DNAPL phase of that contaminant in the vicinity of the sampled well (EPA, 1992). In this case, the aqueous solubility of PCE is 150 mg/L (150,000 ug/L). If PCE concentrations in groundwater are greater than 1500 ug/L, there is the possibility that a DNAPL phase is present in this area of the aquifer. PCE concentrations detected in groundwater collected from the new monitoring wells east of the painting facility ranged from 3,190 ppb to 36,100 ppb, and indicate that a DNAPL phase is present in this area. A DNAPL phase may also be present in the area of wells HL-9 and MW-8.

PCE detected in two of the water supply wells, about one-half mile west of the project area, indicates that the PCE is migrating downgradient.

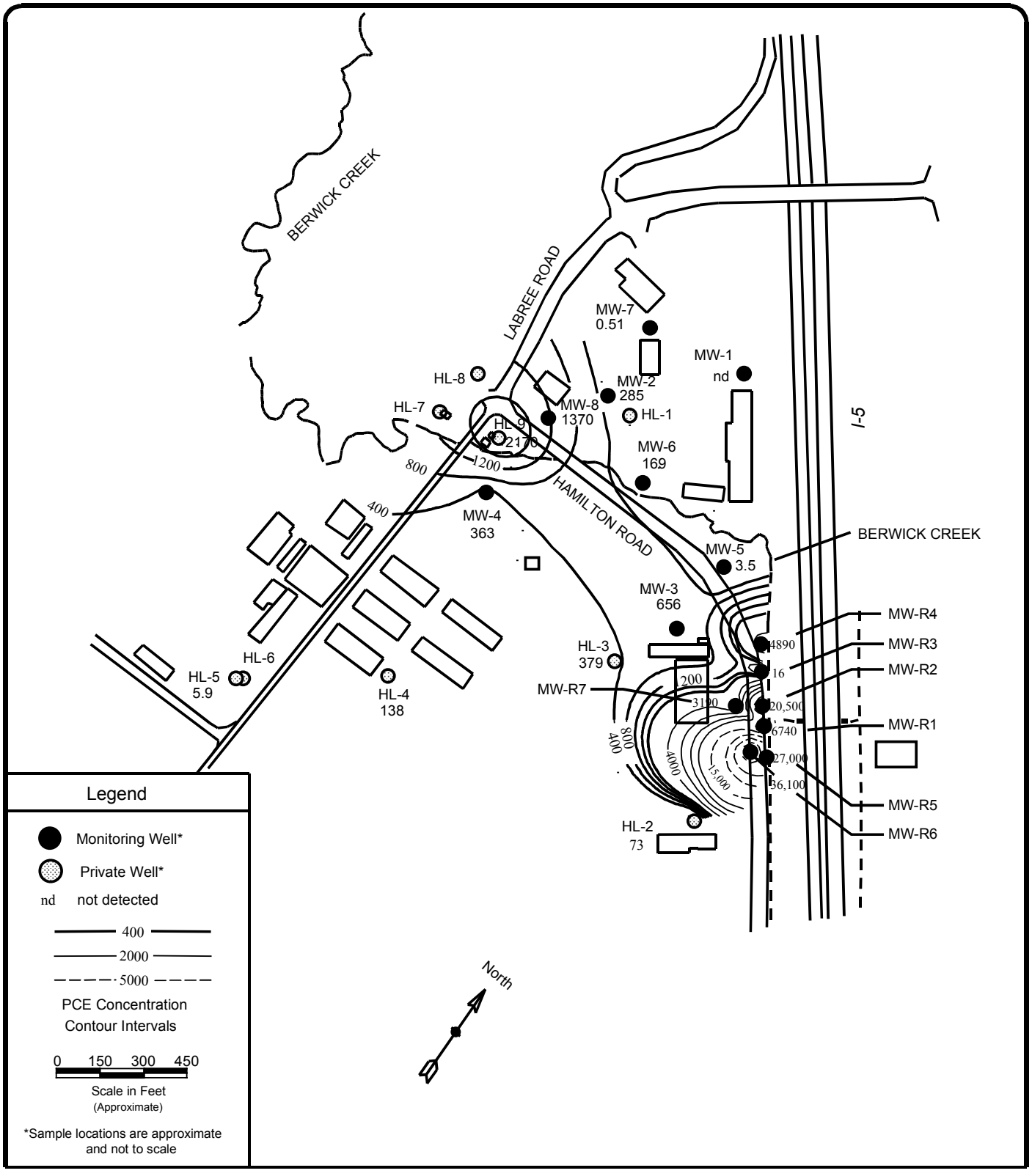

Figure 3 *Base Map Provided By SAIC*	**Hamilton/Labree Roads PCE Site** **PCE (ug/L) in Groundwater - July 1999**	

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Appendix A

Manchester Environmental Laboratory Case Narratives

Appendix A is not available electronically.
For a printed copy, call 360-407-6764.

Appendix B

Hamilton/Labree Roads PCE Site, PCE Results (ug/L) from 1993 to 1998

		Ecology				*SAIC*	*DOH*		
	Average Concent.	July 1998	April 1998	January 1998	October 1997	May 1997	June 1996	March 1994	Fall 1993
MW-1	0.75 J	1 U	0.87 J	0.66 J	1 U	3 U	--	--	--
MW-2	228	142	229	285	257	300	--	--	--
MW-3	1153	1170	1350	811	1280	640	--	--	--
MW-4	327	264	396	344	304	250	--	--	--
MW-5	4.5	3.5	7	4.2	3.1	3	--	--	--
MW-6	171	119	170	200	196	170	--	--	--
MW-7	1.1	0.76 J	1.8	1.2	0.74 J	3 U	--	--	--
MW-8	1850	--	2000	1850	1700	1500	--	--	--
HL-2	96	62	87	140	--	130	130	--	119
HL-3	364	349	381	380	347	270	284	--	122
HL-4	200	151	242	188	219	210	204	--	204
HL-5	9	7.9	11	7.6	7.7	7	5.8	--	3.3
HL-7	656	540	762	708	613	570	--	--	572
HL-9	3215	2690	*	*	3740	2700	3009	2165	--

MTCA Method A Cleanup Standard for PCE in groundwater is 5 ug/L

U = The analyte was not detected at or above the reported value.

J = The analyte was positively identified. The associated numerical result is an estimate.

-- = Not tested.

* = Sample result is rejected because it is known not to be representative of site conditions. See explanation in text.

Sample results for HL-9 from January and April 1998 have been rejected because they are known not to be representative of site conditions. During this time the residence was provided with an alternate water supply, which diluted water coming from the contaminated well. Once the well was back in use, PCE concentrations returned to historic levels from samples collected prior to an installed wellhead treatment system.