



Restover Truck Stop Ground Water Monitoring February and July 1998

Summary

This progress report is one in a series describing the results of ground water sampling at Restover Truck Stop. This report describes the results of samples collected for benzene, toluene, ethylbenzene, and total xylenes (BTEX), as well as total petroleum hydrocarbons as gasoline (TPH-G), in February and July 1998. Ecology has conducted ground water sampling at this site from 1987 to the present. To remediate soil and ground water contamination, an Interim Action consisting of an air sparge/vapor extraction system (VES) was initiated in the summer of 1993. Operation of the VES was terminated in the fall of 1997, since BTEX concentrations had substantially decreased and continued operation of the system was no longer cost efficient.

Since monitoring began in 1987, BTEX concentrations have decreased substantially. Well WDOE-6A (Figure 1) is the only well in which BTEX concentrations continue to be elevated. In February and July, Model Toxic Control Act (MTCA) cleanup levels were exceeded in WDOE-6A for benzene and total xylene, as well as for TPH. Cleanup levels were also exceeded for ethylbenzene in February. Data review and laboratory reporting sheets are presented in Appendix A.

Results

In February and July 1998 ground water samples were collected from four upper aquifer wells (Figure 1). The upper aquifer consists of recessional outwash. This unit is underlain by the Vashon Till, which is a regional aquitard, and advance outwash deposits that form a lower aquifer.

Field Observations

Depth-to-water measurements, purge volume, pH, specific conductance, and temperature results for both sample events are listed in Table 1. In February,

depth-to water ranged from 3.30 to 6.94 feet below ground surface (bgs) and in July ranged from 10.70 to 14.31 feet bgs. Well MW-31, which was to be sampled in July, was dry.

Water purged from monitoring well WDOE-6A continues to have a strong hydrocarbon odor and cloudy appearance.

Analytical Results

Analytical results for BTEX and TPH-G, as well as MTCA ground water cleanup levels, are shown in Table 2 for both sample events. In February and July, samples were collected from monitoring wells MW-8A, MW-20A, MW-30 and WDOE-6A. A duplicate sample (MW-6A) was collected from well WDOE-6A. Results for WDOE-6A listed in this memo represent the average concentration of the analytes detected.

In February, all four BTEX compounds were detected in WDOE-6A with an average total concentration of 214 ppb. Benzene, ethylbenzene and total xylene were detected in MW-30 below the quantitation limit. TPH-G concentrations in wells MW-8, MW-30 and WDOE-6A were 120 µg/L, 150 µg/L and 4,850 µg/L, respectively.

In August, all four BTEX compounds were detected in WDOE-6A with an average total concentration of 158 ppb. Well WDOE-6A continues to show the highest volatile organics concentrations of the wells sampled. TPH-G concentrations in wells MW-8A, MW-30 and WDOE-6A were 470 µg/L, 130 µg/L and 8,400 µg/L, respectively.

BTEX concentrations for select monitoring wells from May 1987 to July 1998 are listed in Table 3. Figure 2 shows BTEX concentrations for wells WDOE-6A and MW-8A for the same time period. Concentrations were relatively stable for both wells from August 1991 to February 1995. Since February 1995, BTEX concentrations have been gradually decreasing. In April 1996, high BTEX concentrations were detected in WDOE-6A. There is no apparent explanation for this increase. The next sample round is scheduled for January 1999.

Conclusions

1. BTEX concentrations appear to be gradually decreasing.
2. In February and July, Model Toxic Control Act (MTCA) cleanup levels were exceeded in WDOE-6A for benzene, ethylbenzene, total xylene, and TPH.

Recommendations

1. Monitoring wells WDOE-6A, MW-8A, MW-20A, MW-30, and MW-31 should continue to be sampled for BTEX and TPH-G.
2. Well MW-12A, which is a deep aquifer well, should continue to be sampled periodically.

Methods

Ground Water Sampling

In February and July, samples for benzene, toluene, ethylbenzene, and xylene (BTEX), as well as total petroleum hydrocarbons as gasoline (TPH-G), were collected from four upper aquifer monitoring wells.

Prior to sampling, static water level measurements were obtained from monitoring wells using an electronic water level probe. The probe was rinsed with deionized water and wiped clean between measurements. Based on the purge volume, wells were purged with either a teflon bailer or submersible pump. Wells were purged until pH, specific conductance and temperature readings stabilized, and a minimum of three well volumes had been removed. Purge water was discharged onto the ground near each well, except for well WDOE-6A. Purge water from this well was collected in a 55-gallon barrel and stored with other vapor extraction system waste in the enclosed tank area. This waste will be transported and disposed in accordance with State of Washington regulations (Chapter 173-340-400 WAC).

Monitoring well samples were collected using decontaminated, bottom-emptying teflon bailers. Bailers were pre-cleaned with sequential washes of Liquinox®, hot tap water, 10% nitric acid, distilled-deionized water, and pesticide-grade acetone. After cleaning, bailers were air-dried and wrapped in aluminum foil. Samples for BTEX and TPH-G analysis were collected free of headspace and preserved with 1:1 hydrochloric acid.

Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (Ecology, 1994). The Ecology/EPA Laboratory in Manchester analyzed all samples.

Quality Assurance

In general the quality of the data is acceptable for use for both sample rounds. BTEX samples were analyzed using EPA SW-846 Method 8020 (U.S. EPA, 1986), and WTPH-G samples were analyzed using Washington State Method WTPH-G (Ecology, 1994).

Quality control samples collected in the field consisted of a blind field duplicate. Duplicate samples for BTEX and TPH-G were obtained from monitoring well WDOE-6A. Duplicate samples collected at WDOE-6A provide an estimate of combined sampling and laboratory precision. The numeric comparison of duplicate results is expressed as the relative percent difference or RPD. RPDs are the ratio of the difference and the mean of the duplicate results expressed as a percentage. The RPD for the February duplicate samples were within 14% for toluene, ethylbenzene, total xylene and TPH-G. The RPD for benzene in February was 68%. The RPD for the July BTEX and TPH-G duplicate samples were within 13%.

In addition to field quality control samples, a matrix spike, matrix spike duplicate and surrogate compound recoveries were performed in the laboratory. All surrogate spike recoveries were within the control limits of 50 - 150%. Matrix spikes for BTEX and TPH-G were within acceptable limits. Myrna Mandjikov of the Manchester Laboratory conducted the quality assurance review, which has been included in Appendix A.

Bibliography

Chern, L., 1988. Sampling as the Restover Truck Stop - October 1988. Department of Ecology - Environmental Investigations.

-----, 1989. Restover Truck Stop Monitoring Round II - January 1989. Department of Ecology - Environmental Investigations.

-----, 1989. Restover Truck Stop Monitoring Round III - July 1989. Department of Ecology - Environmental Investigations.

-----, 1990. Restover Truck Stop Monitoring Round IV - January 1990. Department of Ecology - Environmental Investigations.

Enviros, Inc. 1993. Groundwater Sampling and Analysis Restover Truck Stop Thurston County, Washington. E1/921205.06.

Marti, P. and D. Serdar, 1991. Restover Truck Stop Monitoring Round VI - February, 1991. Department of Ecology - Environmental Investigations.

Marti, P., 1992. Restover Truck Stop Monitoring Round VII - August, 1991. Department of Ecology - Environmental Investigations.

-----, 1992. Restover Truck Stop Monitoring Round VIII - February, 1992. Department of Ecology - Environmental Investigations.

-----, 1993. Restover Truck Stop Monitoring Round IX - July, 1992. Department of Ecology - Environmental Investigations.

-----, 1993. Restover Truck Stop Monitoring Round X - January, 1993. Department of Ecology - Environmental Investigations.

-----, 1994. Restover Truck Stop Monitoring - July and November 1993. Department of Ecology - Environmental Investigations.

-----, 1994. Restover Truck Stop Monitoring - January and April 1994. Department of Ecology - Environmental Investigations.

-----, 1995. Restover Truck Stop Monitoring - August and November 1994. Department of Ecology - Environmental Investigations.

-----, 1995. Restover Truck Stop Monitoring - February and April 1995. Department of Ecology - Environmental Investigations.

-----, 1996. Restover Truck Stop Monitoring - August and October 1995. Department of Ecology - Environmental Investigations.

-----, 1996. Restover Truck Stop Monitoring - February and April 1996. Department of Ecology - Environmental Investigations.

-----, 1996. Restover Truck Stop Monitoring - August and November 1996. Department of Ecology - Environmental Investigations.

-----, 1997. Restover Truck Stop Monitoring - February and August 1997. Department of Ecology - Environmental Investigations.

Serdar, D. and P. Marti, 1991. Restover Truck Stop Monitoring Round V - August 1990. Department of Ecology - Environmental Investigations.

U.S. Environmental Protection Agency, 1986. Test Methods for Evaluating Solid Waste, SW-846. Office of Emergency Response, Washington , D.C., 1986.

Washington State Department of Ecology. 1994. Manchester Environmental Laboratory - Laboratory Users Manual.

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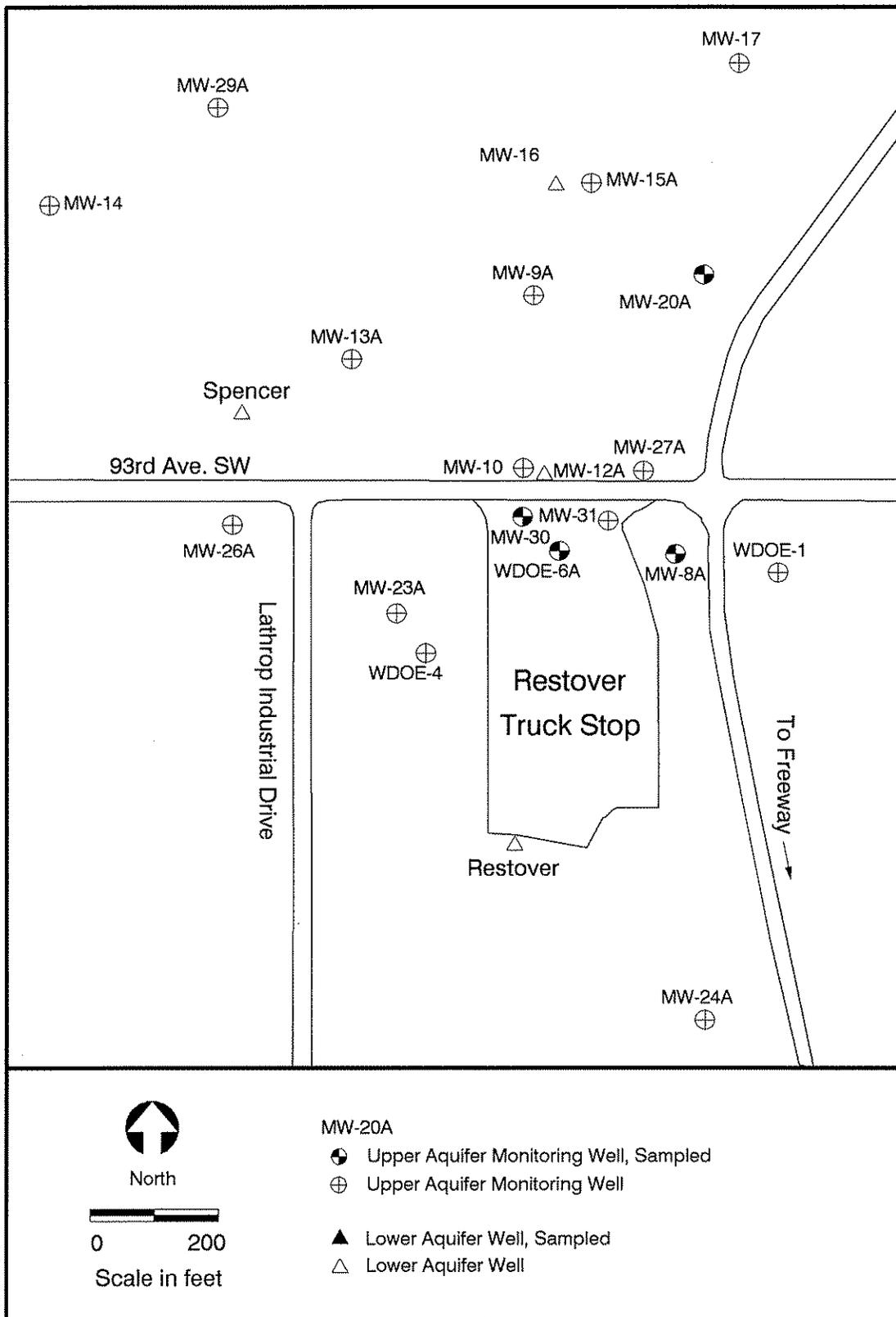


Figure 1: Well Locations, Restover Truck Stop

Table 1: Field Parameter Results for February 3 and July 17, 1998

Monitoring Well	Total Depth (Feet)	Aquifer	Depth to Water (Feet)	pH (standard units)	Specific Conductance (umhos/cm)	Temperature (°C)	Purge Volume (gallons)
February 1998							
MW-8A	21.01	Upper	6.43	4.9	74	7.5	8
MW-20A	13.95	Upper	3.3	5	72	7.2	6
MW-30	16.78	Upper	5.32	5.4	150	9.3	36
WDOE-6A	21.68	Upper	6.94	5.4	131	9.8	7
July 1998							
MW-8A	21.10	Upper	13.82	5.3	122	9	6
MW-20A	13.95	Upper	10.7	5.2	80	8.7	2
MW-30	16.78	Upper	12.27	5.9	159	11.6	9
MW-31	13.47	Upper	Dry	--	--	--	--
WDOE-6A	21.68	Upper	14.31	5.7	180	10.8	4

Table 2: Analytical Results (ug/L) for February 3 and July 17, 1998

Well Number	Benzene	Toluene	Ethylbenzene	Total Xylene	Total BTEX	TPH-G (Total TPH)
MTCA Cleanup Levels	5.0	40.0	30.0	20.0		1000.0
February 1998						
MW-8A	1.0 U	1.0 U	1.0 U	3.0 U	ND	120
MW-20A	1.0 U	1.0 U	1.0 U	3.0 U	ND	120 U
MW-30	0.85 J	1.0 U	0.94 J	0.75 J	2.5	150
WDOE-6A	20	40	34	126	220	4500
MW-6A(dup)*	9.8	37	34	127	208	5200
July 1998						
MW-8A	1.0 U	1.0 U	1.0 U	3.0 U	ND	470
MW-20A	1.0 U	1.0 U	1.0 U	3.0 U	ND	130 U
MW-30	1.0 U	1.0 U	1.0 U	3.0 U	ND	130
WDOE-6A	9.8	33 J	28 J	92	163	7800
MW-6A(dup)*	8.7	29 J	26 J	88	152	8900

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.

ND: Compounds Not Detected

* : MW-6A is a duplicate sample of WDOE-6A.

Table 3: Historical Restover Truck Stop BTEX Concentrations (ug/L)

Well Number	May 1987	September 1987	October 1988	January 1989	July 1989	January 1990	August 1990	February 1991	August 1991	February 1992	July 1992	January 1993	July 1993	November 1993	January 1994
Upper Aquifer															
WDOE-6A	6950	1180	5300	28000	7490	9870	5190	3460	2840	3830	2990	4784	2620	3070	6360
MW-8A	230 ¹	388 ¹	479 ¹	334 ¹	64 ²	20 ²	178 ²	19 ²	20 ²	9 ²	53 ²	47 ²	30 ²	41 ²	36 ²
MW-15A	1433	NT	NT	ND	218	NT	285	122	NT	NT	NT	NT	NT	NT	NT
MW-17	ND	ND	ND	ND	ND	NT	NT	ND	ND	NT	2.7	ND	NT	NT	NT
MW-20A	126	NT	NT	NT	NT	20	1400	5	293	11	452	NT(Dry)	162	NT(Dry)	ND
MW-30	-	-	-	-	-	-	-	-	-	-	-	-	-	NT	NT(Dry)
MW-9A	727	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT(Dry)
Lower Aquifer															
Restover	NT	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	NT	ND
Spencer	ND	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NT	NT
MW-12	53	5	8	ND	4	ND	6	ND	NT	NT	NT	NT	1.7	NT	NT

Well Number	April 1994	August 1994	November 1994	February 1995	April 1995	August 1995	October 1995	February 1996	April 1996	August 1996	November 1996	February 1997	August 1997	February 1998	July 1998
Upper Aquifer															
WDOE-6A	5242	3214	4624	2120	1829	638	646	61	5900	488 ²	664 ²	310 ²	212 ²	214 ²	158 ²
MW-8A	4 ²	8 ¹	32 ²	ND	ND	ND	ND	ND	ND	ND	5	ND	ND	ND	ND
MW-15A	NT	NT	NT	ND	NT	2	NT	ND	NT	NT	NT	ND	NT	NT	NT
MW-17	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-20A	59	NT(Dry)	ND	ND	ND	18	NT(Dry)	ND	ND	1	6	ND	ND	ND	ND
MW-30	2400	NT(Dry)	NT(Dry)	8	8	7	ND	5	19	ND	1	ND	ND	2.5	ND
MW-31	-	-	-	-	-	NT(Dry)	NT(Dry)	7.1	ND	NT(Dry)	NT(Dry)	ND	3.6	NT	NT(Dry)
MW-9A	366	NT	NT	ND	NT	1	NT	ND	NT	NT	NT	ND	NT	NT	NT
Lower Aquifer															
Restover	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Spencer	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-12	NT	NT	NT	1.1	NT	Well Decommissioned									
MW-12A	-	-	-	-	-	0.5	NT	ND	NT	NT	NT	ND	NT	NT	NT

ND: Compound Not Detected

NT: Compound Not Tested

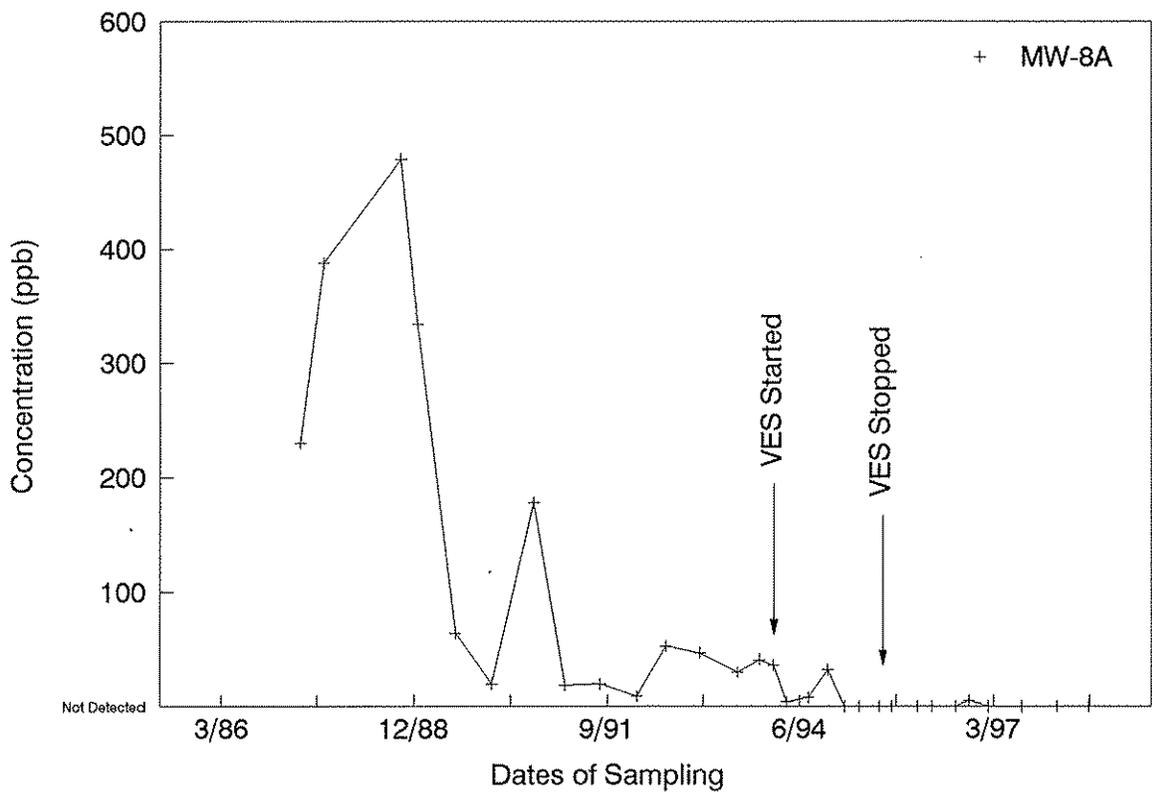
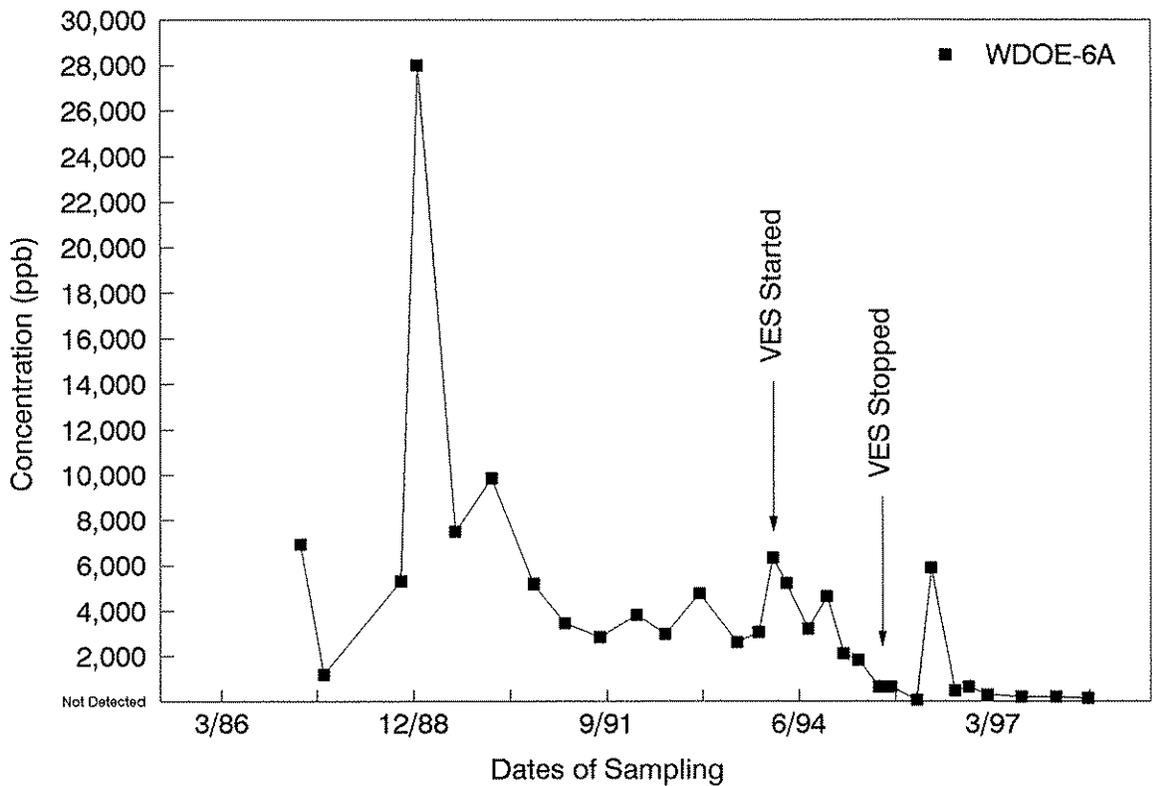
¹ : Value is based on one sample.

² : Value represents the mean of duplicate samples.

The upper and lower aquifers consist of recessional outwash and advance outwash, respectively. These units are separated by the Yashon Till, which is a regional aquitard.

Figure 2

BTEX Concentrations in WDOE-6A and MW-8A from May 1987 to July 1998



APPENDIX A

Analytical Results
Restover Truck Stop
February 3, 1998 and July 17, 1998

Manchester Environmental Laboratory
7411 Beach DR E, Port Orchard Washington 98366

CASE NARRATIVE

February 17, 1998

Subject: Restover Truck Stop
Samples: 98068087 - 98068091
Case No. 108798
Officer: P.Marti
By: M. Mandjиков *M*

WTPH-G/BTEX Analysis of the Restover Truck Stop Water Samples

SUMMARY:

Samples 98068087 – 98068091 were analyzed for gasoline and BTEX. BTEX analytes are detected below the laboratory reporting limit in sample 98068089. They are reported as estimates, “J”, to provide you with supplemental information.

All data are usable as reported.

METHODS:

These water samples were analyzed using purge and trap GC-FID and GC-PID. These methods are modifications of EPA SW- 846 methods 8000, 8015 and 5030.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogate recoveries were within the control limits of 50 – 150%.

DUPLICATE and SPIKED SAMPLES:

Sample 98068090 was analyzed in duplicate to evaluate the precision of the WTPH-G method. Two field replicates of sample 98068089 were spiked with the BTEX components to evaluate accuracy and precision of the BTEX analysis. Since separate field samples were used, the relative percent differences (RPD) between the spikes are a test of the precision of the instrumental portion of the analysis and also a test of the sampling precision.

Two laboratory control samples (LCS) were prepared for the BTEX analysis by spiking two aliquots of reagent water at the same level as the spiked samples. The relative percent difference (RPD) of the LCS is a better measure of the precision of the instrumental portion of the BTEX analysis.

RPD Values

<u>Analyte</u>	<u>98068090</u>	<u>98068089</u>	<u>LCS</u>
Gasoline	5.8 %		
Benzene		44%	18%
Toluene		60%	11%
Ethylbenzene		22%	8%
m&p Xylene		15%	5%
o Xylene		9%	1%

The RPDs show acceptable precision for the WTPH-G and BTEX methods. The RPDs greater than 20% are likely due to the very low amounts of the volatile analytes present in these samples and the difficulty associated with achieving a homogeneous sampling without some loss of volatiles. The results are not qualified.

All spike recoveries are within the control limits of 50 – 150 % of the theoretical value with the exception of toluene in 98068089y, which are high. Results are not qualified since the LCS results are acceptable.

LABORATORY CONTROL SAMPLE (LCS)

An LCS was prepared and analyzed with each analytical set of BTEX which contained spiked samples. All analytes were within the control limits of $\pm 20\%$ with the exception of benzene which was recovered at 74% on 2/9/98. Analyzing a second LCS prepared with a new batch of stock standard determined that this recovery was due to degradation of the standard. The results are unaffected and no qualification is necessary.

HOLDING TIMES:

The samples were analyzed within the recommended holding times.

DATA QUALIFIERS:

Code	Definition
EXP	The result is equal to the number before EXP times 10 to the power of the number after EXP. As an example 3EXP6 equals 3 x 10 ⁶ .
E	Reported result is an estimate because it exceeds the calibration.
J	The analyte was positively identified. The associated numerical result is an estimate.
N	There is evidence the analyte is present in this sample.
NJ	There is evidence that the analyte is present. The associated numerical result is an estimate.
NAF	Not analyzed for.
REJ	The data are unusable for all purposes.
U	The analyte was not detected at or above the reported result.
UJ	The analyte was not detected at or above the reported estimated result.
Bold Type	The analyte was present in the sample. Used as a visual aid to locate detected compounds on the report sheet.

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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068087

Date Received: 02/04/98

Method: SW8020

Field ID: MW-8A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	U
Ethylbenzene	1.0	U
m & p-Xylene	2.0	U
o-Xylene	1.0	U

Surrogate Recoveries

2,5-Dibromotoluene	100	%
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Authorized By: *P. Marti*

Release Date: 2/17/98

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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068088

Date Received: 02/04/98

Method: SW8020

Field ID: MS-20A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

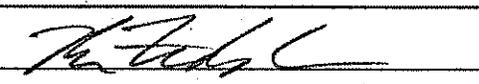
Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	U
Ethylbenzene	1.0	U
m & p-Xylene	2.0	U
o-Xylene	1.0	U

Surrogate Recoveries

2,5-Dibromotoluene	101	%
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Authorized By:



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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068089

Date Received: 02/04/98

Method: SW8020

Field ID: MW-30

Date Prepared: 02/10/98

Matrix: Water

Project Officer: P. Marti

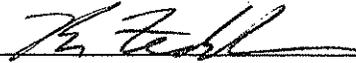
Date Analyzed: 02/10/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	0.85	J
Toluene	1.0	U
Ethylbenzene	0.94	J
m & p-Xylene	0.75	J
o-Xylene	1.0	U

Surrogate Recoveries

2,5-Dibromotoluene	100	%
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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068089 (Matrix Spike - LMX1)

Date Received: 02/04/98

Method: SW8020

Field ID: MW-30

Date Prepared: 02/10/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/10/98

Units: % Recovery

Analyte	Result	Qualifier
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Benzene	87	
Toluene	84	
Ethylbenzene	92	
m & p-Xylene	90	
o-Xylene	89	

Surrogate Recoveries

2,5-Dibromotoluene	96	%
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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068089 (Matrix Spike - LMX2) Date Received: 02/04/98 Method: SW8020
Field ID: MW-30 Date Prepared: 02/10/98 Matrix: Water
Project Officer: P. Marti Date Analyzed: 02/10/98 Units: % Recovery

Analyte	Result	Qualifier
Benzene	136	
Toluene	156	
Ethylbenzene	114	
m & p-Xylene	104	
o-Xylene	97	

Surrogate Recoveries

2,5-Dibromotoluene	101	%
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Manchester Environmental Laboratory

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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068090

Date Received: 02/04/98

Method: SW8020

Field ID: WDOE-6A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

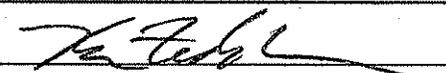
Units: ug/L

Analyte	Result	Qualifier
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Benzene	20	
Toluene	40	
Ethylbenzene	34	
m & p-Xylene	97	
o-Xylene	29	

Surrogate Recoveries

2,5-Dibromotoluene	93	%
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Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068091

Date Received: 02/04/98

Method: SW8020

Field ID: MW-6A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: ug/L

Analyte	Result	Qualifier
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Benzene	9.8	
Toluene	37	
Ethylbenzene	34	
m & p-Xylene	97	
o-Xylene	30	

Surrogate Recoveries

2,5-Dibromotoluene	94	%
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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: BLN80344

Method: SW8020

Blank ID: OBW8040A2

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

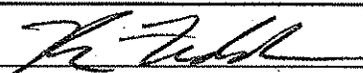
Units: ug/L

Analyte	Result	Qualifier
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Benzene	1.0	U
Toluene	1.0	U
Ethylbenzene	1.0	U
m & p-Xylene	2.0	U
o-Xylene	1.0	U

Surrogate Recoveries

2,5-Dibromotoluene	98	%
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Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: BLN80385

Method: SW8020

Blank ID: OBW8043A1

Date Prepared: 02/12/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/12/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	U
Ethylbenzene	1.0	U
m & p-Xylene	2.0	U
o-Xylene	1.0	U

Surrogate Recoveries

2,5-Dibromotoluene	101	%
--------------------	-----	---

Authorized By: 

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: BLN80386

Method: SW8020

Blank ID: OBW8041A1

Date Prepared: 02/10/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/10/98

Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	1.0	U
Toluene	1.0	U
Ethylbenzene	1.0	U
m & p-Xylene	2.0	U
o-Xylene	1.0	U

Surrogate Recoveries

2,5-Dibromotoluene	105	%
--------------------	-----	---

Authorized By: 

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068087

Date Received: 02/04/98

Method: WTPH-G

Field ID: MW-8A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.12	
----------	------	--

Surrogate Recoveries

2,5-Dibromotoluene	90	%
--------------------	----	---

Authorized By: *Ka. Tell*

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068088

Date Received: 02/04/98

Method: WTPH-G

Field ID: MS-20A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.12	U
----------	------	---

Surrogate Recoveries

2,5-Dibromotoluene	95	%
--------------------	----	---

Authorized By: 

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068089

Date Received: 02/04/98

Method: WTPH-G

Field ID: MW-30

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

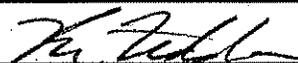
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.15	
----------	------	--

Surrogate Recoveries

2,5-Dibromotoluene	85	%
--------------------	----	---

Authorized By: 

Release Date: 2/17/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068090

Date Received: 02/04/98

Method: WTPH-G

Field ID: WDOE-6A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	4.5	
----------	-----	--

Surrogate Recoveries

2,5-Dibromotoluene	93	%
--------------------	----	---

Authorized By: *P. Marti*

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068090 (Duplicate - LDPI)

Date Received: 02/04/98

Method: WTPH-G

Field ID: WDOE-6A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	4.3	
----------	-----	--

Surrogate Recoveries

2,5-Dibromotoluene	103	%
--------------------	-----	---

Authorized By: *P. Marti*

Release Date: 2/17/98

Page:

2

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: 98068091

Date Received: 02/04/98

Method: WTPH-G

Field ID: MW-6A

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

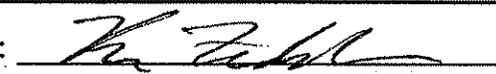
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	5.2	
----------	-----	--

Surrogate Recoveries

2,5-Dibromotoluene	92	%
--------------------	----	---

Authorized By: 

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: BLN80361

Method: WTPH-G

Blank ID: OBW8041A1

Date Prepared: 02/10/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/10/98

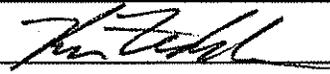
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.12	U
----------	------	---

Surrogate Recoveries

2,5-Dibromotoluene	104	%
--------------------	-----	---

Authorized By: 

Release Date: 2/17/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

TPH as Gasoline

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: BLN80344

Method: WTPH-G

Blank ID: OBW8040A2

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.12	U
----------	------	---

Surrogate Recoveries

2,5-Dibromotoluene	90	%
--------------------	----	---

Authorized By: *Ken Fiddler*

Release Date: 2/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: LCS80347

Method: SW8020

Blank ID: OXS8040A1

Date Prepared: 02/09/98

Matrix: Water

Project Officer: P. Marti

Date Analyzed: 02/09/98

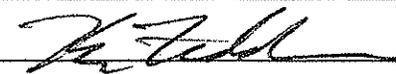
Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	74	
Toluene	82	
Ethylbenzene	85	
m & p-Xylene	88	
o-Xylene	91	

Surrogate Recoveries

2,5-Dibromotoluene	97	%
--------------------	----	---

Authorized By: 

Release Date: 2/17/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 1087-98

Sample: LCS80387

Method: SW8020

Blank ID: OXW8041A1

Date Prepared: 02/10/98

Matrix: Water

Project Officer: P. Marti

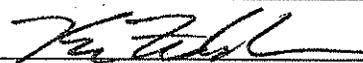
Date Analyzed: 02/10/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	89	
Toluene	92	
Ethylbenzene	92	
m & p-Xylene	92	
o-Xylene	92	

Surrogate Recoveries

2,5-Dibromotoluene	103	%
--------------------	-----	---

Authorized By: 

Release Date: 2/17/98

Page:

1

Manchester Environmental Laboratory

7411 Beach DR E, Port Orchard Washington 98366

CASE NARRATIVE

July 27, 1998

Subject: Restover Truck Stop
Samples: 98298138 - 98298142
Case No. 223198
Officer: P. Marti
By: M. Mandjikov *MM*

BTEX and Gasoline Analysis of the Restover Truck Stop Property

SUMMARY:

Samples 98298138 – 98298142 were analyzed for the presence of BTEX and gasoline.

Results for toluene, ethylbenzene, and o-xylene that are below 2 ug/L and the results of m+p xylenes that are below 4 ug/L are qualified as estimates. The calibration of this analysis gave greater uncertainty below these levels than is normally reported.

Accuracy results for toluene and ethylbenzene are above the acceptable limits and may indicate a high bias for these parameters.

All data are usable as reported. Please contact me at 360-871-8814 if you have any questions concerning the BTEX or gasoline analysis of this project.

METHODS:

The samples were analyzed by purge and trap GC-FID/PID. This method is a modification of EPA SW- 846 methods 8000, 8015, 8020, and 5030.

BLANKS:

No analytes of interest were detected in the blanks.

SURROGATES:

All surrogates gave recoveries within the acceptable limits of this method which are 50 % - 150 %. The recoveries of the second analysis were towards the upper end of the

acceptable range because of an error in the surrogate preparation, but this has no effect upon results of the analytes.

SPIKED SAMPLES:

Field replicates of sample 98298138 were spiked in duplicate with the BTEX parameters to measure the accuracy of the BTEX analysis method. The recoveries ranged from 103% to 145%. Acceptable recovery range for the BTEX instrumental method is $\pm 30\%$ of the theoretical value. Toluene and ethylbenzene had recoveries above 130%. The results for these parameters may have high bias and have been qualified as estimates.

DUPLICATE AND SPIKED DUPLICATE SAMPLES:

Duplicate aliquots from a 1:20 dilution of sample 98298141 were analyzed to assess the precision of the gasoline analysis. The duplicate values of the BTEX spiked samples were compared to assess the precision of the BTEX analysis. Precision control limits for BTEX and NWTPH-Gx petroleum hydrocarbons have not been set by statistical laboratory performance at this time.

Analyte	RSD	Analyte	RSD
Benzene	9%	Toluene	9%
Ethylbenzene	21%	m+p Xylene	1%
o Xylene	2%	Gasoline	7%

HOLDING TIMES:

The samples were analyzed within the recommended holding times.

DATA QUALIFIERS:

Code	Definition
E	Reported result is an estimate because it exceeds the calibration.
J	The analyte was positively identified. The associated numerical result is an estimate.
N	There is evidence the analyte is present in this sample.
NJ	There is evidence that the analyte is present. The associated numerical result is an estimate.
NAF	Not analyzed for.
REJ	The data are unusable for all purposes.
U	The analyte was not detected at or above the reported result.
UJ	The analyte was not detected at or above the reported estimated result.
Bold Type	The analyte was present in the sample. Used as a visual aid to locate detected compounds on the report sheet.

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298138

Date Received: 07/20/98

Method: SW8020

Field ID: MW-8A

Date Prepared: 07/20/98

Matrix: Water

Project Officer: Pam Marti

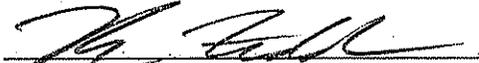
Date Analyzed: 07/20/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	UJ
Ethylbenzene	1.0	UJ
m & p-Xylene	2.0	UJ
o-Xylene	1.0	UJ

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	105	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/19/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298138 (Matrix Spike - LMX1)

Date Received: 07/20/98

Method: SW8020

Field ID: MW-8A

Date Prepared: 07/20/98

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

Units: % Recovery

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	114	
---------	-----	--

Toluene	145	
---------	-----	--

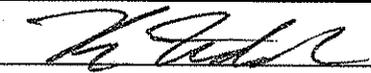
Ethylbenzene	144	
--------------	-----	--

m & p-Xylene	104	
--------------	-----	--

o-Xylene	111	
----------	-----	--

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	94	%
--------------------------------	----	---

Authorized By: 

Release Date: 8/17/98

Page:

2

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298138 (Matrix Spike - LMX2) Date Received: 07/20/98 Method: SW8020

Field ID: MW-8A Date Prepared: 07/20/98 Matrix: Water

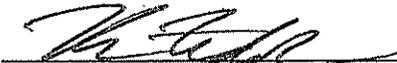
Project Officer: Pam Marti Date Analyzed: 07/20/98 Units: % Recovery

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	105	
Toluene	132	
Ethylbenzene	116	
m & p-Xylene	103	
o-Xylene	108	

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	96	%
--------------------------------	----	---

Authorized By: 

Release Date: 8/17/98

Page:

3

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298139

Date Received: 07/20/98

Method: SW8020

Field ID: MW-20A

Date Prepared: 07/20/98

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

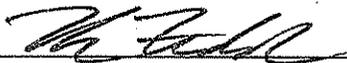
Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	1.0	U
Toluene	1.0	UJ
Ethylbenzene	1.0	UJ
m & p-Xylene	2.0	UJ
o-Xylene	1.0	UJ

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	100	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298140

Date Received: 07/20/98

Method: SW8020

Field ID: MW-30

Date Prepared: 07/20/98

Matrix: Water

Project Officer: Pam Marti

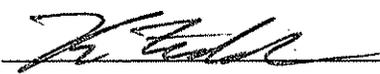
Date Analyzed: 07/20/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	UJ
Ethylbenzene	1.0	UJ
m & p-Xylene	2.0	UJ
o-Xylene	1.0	UJ

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	99	%
--------------------------------	----	---

Authorized By: 

Release Date: 8/17/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298141

Date Received: 07/20/98

Method: SW8020

Field ID: WDOE-6A

Date Prepared: 07/21/98

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/21/98

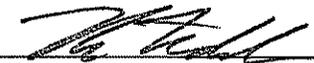
Units: ug/L

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	9.8	
Toluene	33	J
Ethylbenzene	28	J
m & p-Xylene	70	
o-Xylene	22	

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	102	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298142

Date Received: 07/20/98

Method: SW8020

Field ID: MW-6A

Date Prepared: 07/21/98

Matrix: Water

Project Officer: Pam Marti

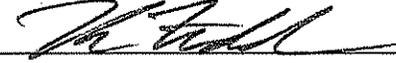
Date Analyzed: 07/21/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	8.7	
Toluene	29	J
Ethylbenzene	26	J
m & p-Xylene	67	
o-Xylene	21	

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	103	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/17/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: OBMW8201A1

Method: SW8020

Blank ID: BLNK

Date Prepared: 07/20/98

Matrix: Water

Project Officer: Pam Marti

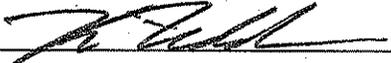
Date Analyzed: 07/20/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	UJ
Ethylbenzene	1.0	UJ
m & p-Xylene	2.0	UJ
o-Xylene	1.0	UJ

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	103	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/12/98

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: OBMW8202B1

Method: SW8020

Blank ID: BLNK

Date Prepared: 07/21/98

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/21/98

Units: ug/L

Analyte	Result	Qualifier
Benzene	1.0	U
Toluene	1.0	UJ
Ethylbenzene	1.0	UJ
m & p-Xylene	2.0	UJ
o-Xylene	1.0	UJ

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	114	%
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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Benzene, Ethylbenzene, Toluene, Xylenes

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: OXMW8202A1

Method: SW8020

Blank ID: LCS-

Date Prepared: 07/21/98

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/21/98

Units: %

Analyte	Result	Qualifier
---------	--------	-----------

Benzene	98	
Toluene	99	
Ethylbenzene	99	
m & p-Xylene	98	
o-Xylene	99	

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	103	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/17/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298138

Date Received: 07/20/98

Method: NWTPH-GX

Field ID: MW-8A

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/21/98

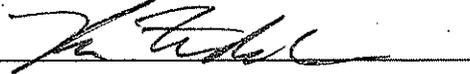
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.47	
----------	------	--

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	130	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/11/98

Page: 1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298139

Date Received: 07/20/98

Method: NWTPH-GX

Field ID: MW-20A

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

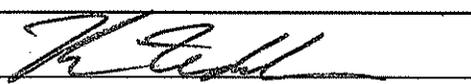
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.13	U
----------	------	---

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	102	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/11/98

Page:

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298140

Date Received: 07/20/98

Method: NWTPH-GX

Field ID: MW-30

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

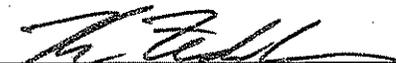
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.13	
----------	------	--

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	105	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/11/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298141

Date Received: 07/20/98

Method: NWTPH-GX

Field ID: WDOE-6A

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	7.8	
----------	-----	--

Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	100	%
--------------------------------	-----	---

Authorized By: 

Release Date: 8/11/98

Page:

1

Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298141 (Duplicate - LDPI) Date Received: 07/20/98

Method: NWTPH-GX

Field ID: WDOE-6A

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	7.3	
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Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	106	%
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Authorized By: 

Release Date: 8/11/98

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: 98298142

Date Received: 07/20/98

Method: NWTPH-GX

Field ID: MW-6A

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

Units: mg/L

Analyte	Result	Qualifier
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Gasoline	8.9	
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Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	118	%
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Authorized By: 

Release Date: 8/11/98

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: OBMW8201A1

Method: NWTPH-GX

Blank ID: BLNK

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/20/98

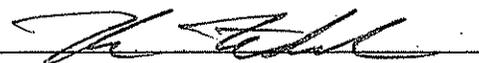
Units: mg/L

Analyte	Result	Qualifier
---------	--------	-----------

Gasoline	0.13	U
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Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	110	%
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Authorized By: 

Release Date: 8/11/98

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: OBMW8202B1

Method: NWTPH-GX

Blank ID: BLNK

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/21/98

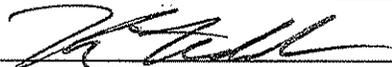
Units: mg/L

Analyte	Result	Qualifier
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Gasoline	0.13	U
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Surrogate Recoveries

Benzene, 1,4-dibromo-2-methyl-	125	%
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Authorized By: 

Release Date: 8/11/98

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Manchester Environmental Laboratory

Department of Ecology

Analysis Report for

Volatile petroleum products

Project Name: Restover Truck Stop

LIMS Project ID: 2231-98

Sample: OXMW8202B1

Method: NWTPH-GX

Blank ID: LCS-

Matrix: Water

Project Officer: Pam Marti

Date Analyzed: 07/21/98

Units: %

Analyte	Result	Qualifier
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Gasoline	99	
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Surrogate Recoveries

1,4-Difluorobenzene	124	%
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