DEPARTMENT OF ECOLOGY

March 24, 1994

TO: Mike Kuntz, Toxics Cleanup Program

FROM: Pam Marti, Environmental Investigations & Laboratory Services

SUBJECT: Restover Truck Stop Long-term Monitoring Rounds XI & XII

The attached report summarizes the findings from the latest two sampling events at Restover Truck Stop (Rounds XI and XII) conducted in July and November 1993. As you requested, ground water monitoring has been expanded to quarterly sampling to determine the effectiveness of the vapor extraction system (VES). The VES had operated sporadically from September thru October, therefore it is not expected that the VES had much affect on ground water quality. The April sampling should prove much more informative.

BTEX concentrations decreased slightly in wells WDOE-6A and MW-8A since January 1993, then increased slightly in November 1993. BTEX concentrations exceeded Model Toxic Control Act (MTCA) cleanup levels in wells MW-20A, MW-30 and WDOE-6A in July and MW-8A and WDOE-6A in November.

As we previously discussed I have recommended some additional changes to the routine monitoring. These include:

- Sampling and analysis for dissolved iron should be discontinued. In my opinion, total petroleum hydrocarbon as gasoline (TPH-G) analyses would be more informative.
- Continue sampling well MW-20A instead of sampling MW-27 as recommended by Enviros.
- Monitoring well MW-9A should be included in routine sampling to replace well MW-15A which we can no longer access.
- Include monitoring well MW-12 in the routine sampling if the obstruction can be removed. During the next sample round we will try to remove the obstruction and purge the well until the discharge is sediment free. If the well cannot be rehabilitated, then it should be properly decommissioned.

The next sample round will be conducted in April 1994. If you have any questions or comments, please call me at 407-6768.

PM:krc

cc: Lynn Singleton
Larry Goldstein

RESTOVER TRUCK STOP
GROUND WATER MONITORING ROUNDS XI & XII
JULY 1993 AND NOVEMBER 1993

by
Pamela B. Marti
March 24, 1994

Washington State Department of Ecology
Environmental Investigations and Laboratory Services Program
Toxics, Compliance and Ground Water Investigations Section
Olympia, Washington 98504-7710

Water Body No. WA-13-0030GW
(Segment No. 06-13-03GW)

SUMMARY

This document is one of a series describing the results of ground water sampling at Restover Truck Stop. Ecology has conducted ground water sampling at the site beginning in 1987 to the present. To remediate ground water contamination a vapor extraction system (VES) was constructed in the summer of 1993. To determine the effectiveness of the cleanup, ground water monitoring has been expanded to quarterly sampling. This technical document describes the methods and results of sampling in July and November 1993. Ground water sampling in July (Round XI) was the same as previous years; two water supply and five monitoring wells were sampled. In November (Round XII) only two monitoring wells were sampled due to dry conditions. All samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and dissolved iron. BTEX concentrations have decreased substantially since 1990. Concentrations decreased slightly in wells WDOE-6A and MW-8A since January 1993, then increased slightly in November 1993. BTEX concentrations exceeded Model Toxic Control Act (MTCA) cleanup levels in wells MW-20A, MW-30 and WDOE-6A in July and MW-8A and WDOE-6A in November.

METHODS

Ground Water Sampling

Ground water samples were collected from both an upper and lower aquifer. The upper and lower aquifers consist of recessional outwash and advance outwash, respectively. These units are separated by the Vashon Till which is a regional aquitard. In July static water level measurements were obtained from 11 on-site wells to determine ground water flow direction

in the upper aquifer. Samples for BTEX and dissolved iron analysis were also collected from two water supply wells, one deep monitoring well and four shallow monitoring wells. The July sample round was the same as previous sampling events by Ecology between 1987 to 1993. November samples were collected from shallow monitoring wells near the vapor extraction system to determine the effectiveness of the cleanup.

Prior to sampling, static water level measurements were obtained from monitoring wells using an electronic water level indicator (Figure 1). The meter was rinsed with deionized water and wiped clean between measurements. Well purge volumes were small due to low water levels. Therefore, monitoring wells for both sample rounds were purged and sampled using decontaminated teflon bailers. Wells were purged until pH, temperature, and specific conductance readings stabilized, and a minimum of three well volumes had been removed. Purge water was discharged onto the ground near each well, except for wells MW-30 and WDOE-6A. Purge water from these wells was collected in a 30 gallon barrel and stored with other vapor extraction system (VES) waste in the enclosed tank area. This waste will be transported and disposed of in accordance with State of Washington regulations.

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. Supply wells were sampled at the tap nearest the pump. Samples for volatile organics analysis were collected free of headspace and preserved with 1:1 hydrochloric acid. Samples for dissolved iron were field-filtered using disposable, in-line, 0.45 μm polycarbonate membrane filters and preserved with 1 ml of nitric acid to a pH < 2. Peristaltic pump tubing used for sample filtration was rinsed with 500 mL of 10% nitric acid then 500 mL of deionized water between samples.

Chain-of-custody procedures were followed in accordance with Manchester Laboratory protocol (Ecology, 1991). All samples were analyzed by the Ecology/EPA Laboratory in Manchester.

Quality Assurance

In general, the quality of the data is acceptable for use for both sample rounds, except as qualified.

Quality control samples collected in the field consisted of a transport blank, transfer blank, a filter blank, and blind field duplicates. A transport blank was carried unopened throughout each sampling event. Due to laboratory equipment failure, the November BTEX transport blank was unusable. A transfer blank for BTEX was obtained by running organic-free water through a decontaminated bailer and collecting the rinsate in a sample container. Analytical results for the July transfer blank showed low levels of toluene. A filter blank for dissolved iron analysis was obtained by pumping organic-free water through a peristaltic pump and an in-line filter. Analytical results for the November filter blank showed low levels of iron

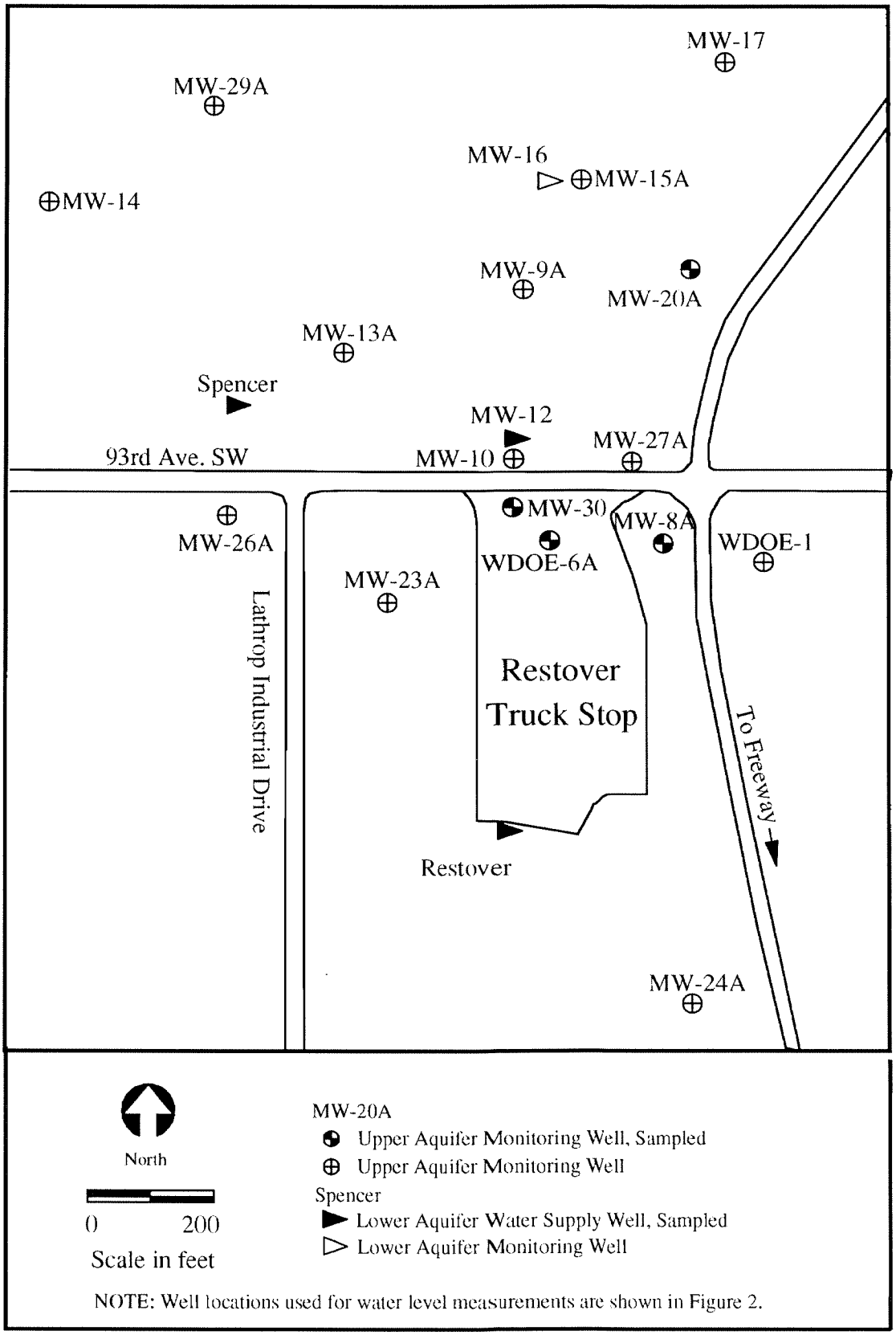

Figure 1: Well Locations, Restover Truck Stop

contamination. Low concentrations of benzene and toluene detected in a November lab blank were considered minimal by the laboratory and did not affect quantitation levels. Duplicate samples for BTEX and iron were obtained from monitoring well MW-8A. The relative percent differences (RPD's) for the July duplicate samples were 15% for ethylbenzene and 2% for total xylenes. The relative percent differences for the November duplicate samples were 20% for benzene, 58% for toluene, 14% for ethylbenzene, 7% for total xylenes, and 1% for dissolved iron. These percentages are based on concentrations near the quantitation limit, and are probably not representative of precision at higher concentrations.

In addition to field quality assurance samples, a matrix spike, a matrix spike duplicate and surrogate compound recoveries were performed in the laboratory. Matrix spike and surrogate recoveries for BTEX and iron were all within acceptable limits. Dickey Huntamer, Greg Perez and Bill Kammin of the Manchester Laboratory conducted the quality assurance review, which has been included in Appendix A.

RESULTS

Field Observations

Depth to water measurements, water level elevations, and stabilized pH, specific conductance, and temperature results for both sampling events are listed in Table 1.

In July static water level measurements were obtained from 11 on-site wells. Depth to water ranged from 11.89 to 18.6 feet with an elevation range from 187.45 to 184.59 mean sea level (MSL). Of the seven wells sampled, field measurements ranged as follows: pH from 5.5 to 6.4 standard units, temperature from 11.0 to 13.7°C, and specific conductance from 90 to 400 umhos/cm. In July, MW-27A was dry. MW-20A was purged dry the first day of sampling, and a sample was collected the following day.

MW-12, a lower aquifer well (56' deep), was sampled in July. This well, recently refurbished, had not been used since 1991 because the well casing top had been broken off. At the time of sampling the purge water contained sediment and fir tree needles. We attempted to measure the well depth and encountered an obstruction at about 20 feet. A sample was collected and tested but it is uncertain whether the sample is representative of ground water quality. Water purged from monitoring wells MW-8A, MW-12, MW-30 and WDOE-6A had a hydrocarbon odor and cloudy appearance. The odor and cloudy appearance in wells MW-8A and WDOE-6A are consistent with previous sample events.

In November wells MW-10, MW-20A, MW-27A and MW-30 were dry. Field measurements from November ranged as follows: pH from 6.1-6.1 standard units, temperature from 11.6-12.7°C, and specific conductance from 240-265 umhos/cm. Water purged from monitoring wells MW-8A and WDOE-6A had a hydrocarbon odor and cloudy appearance.

Table 1: Field Parameter Results for July 27–28, 1993 and November 17, 1993

Well ID	Total Depth From Top of PVC Casing	Aquifer	Depth to Water	Elevation (MSL)	pH (st. units)	Specific Conductance (umhos/cm)	Temperature (°C)	Purge Volume (gallons)
July 1993								
Spencer	60	Lower	++		6.2	90	11.2	75
Restover	60	Lower	++		5.9	90	11.9	100
MW-12	~20	?	15.92		6.4	180	11.6	3
MW-8A	22.3	Upper	15.84	185.5	5.5	162	11.0	3
MW-17	27.0	Upper	12.07	185.58				
MW-18A	22.5	Upper	13.82	184.92				
MW-20A	16.5	Upper	12.89	185.18	NM	NM	NM	0.1
MW-23A	23.7	Upper	13.84	185.46				
MW-24A	14.5	Upper	13.32	187.45				
MW-26A	25.7	Upper	14.21	185.0				
MW-27A	16.7	Upper	DRY					
MW-29A	23.8	Upper	11.89	184.59				
MW-30	19	Upper	14.28	185.73	6.1	400	13.7	9
WDOE-1	25.5	Upper	18.60	185.11				
WDOE-6A	23.9	Upper	16.29	185.52	6.0	215	12.8	4
November 1993								
MW-8A	22.3	Upper	19.82	181.52	6.1	265	11.6	1.5
MW-20A	16.5	Upper	DRY					
MW-27A	16.7	Upper	DRY					
MW-30	19	Upper	DRY					
WDOE-6A	23.9	Upper	20.32	181.49	6.1	240	12.7	2
MW-10	17.5	Upper	DRY					

++ = Private well, no water-level measurement collected.

NM = Not Measured. Insufficient water to collect field parameters.

Analytical Results

Analytical results for BTEX and dissolved iron are shown in Table 2. Detectable concentrations of BTEX were found in all of the shallow monitoring wells sampled in July. Benzene, ethylbenzene and xylene were detected in well MW-8A. Samples from MW-20A, MW-30 and WDOE-6A had all four BTEX compounds, with total concentrations of 162 μg/L, 67 μg/L, and 2620 μg/L, respectively. BTEX concentrations for MW-30 are rejected because of possible dilution error by the laboratory (Appendix A). The data are qualified with an "R" in Table 2. Well WDOE-6A continues to have the highest concentration of the wells sampled. Dissolved iron concentrations in wells MW-8A, MW-20A, MW-30, and WDOE-6A were 4470 μg/L, 3790 μg/L, 4520 μg/L, and 6340 μg/L, respectively.

BTEX was not detected in the Spencer water supply well, but toluene was detected near the quantitation limit in the Restover water supply well. Both wells tap the lower aquifer. Low concentrations of benzene, toluene and xylene were detected in well MW-12. As stated previously it is uncertain if the sample collected from this well is representative of ground water quality.

Of the two wells sampled in November, all four BTEX compounds were detected. Total BTEX concentrations were approximately 41 μg/L in well MW-8A and 3070 μg/L in well WDOE-6A. Dissolved iron concentrations in wells MW-8A and WDOE-6A were 9460 μg/L and 8050 μg/L, respectively.

DISCUSSION

The ground water flow direction in the upper aquifer is toward the west and northwest. A water-table contour map for the upper aquifer is shown in Figure 2. The map was constructed using water levels measured during the July sample round. This is consistent with the flow pattern observed during previous sample events.

BTEX concentrations for sampling events between May 1987 and November 1993 are shown in Table 3. BTEX concentrations in well WDOE-6A decreased substantially from January 1990 (9870 μg/L) to August 1991 (2840 μg/L). Concentrations over the last two years ranged between 2620 to 3830 μg/L. BTEX concentrations for these two rounds of monitoring decreased to 2620 μg/L in July and then increased to approximately 3070 μg/L in November.

The vapor extraction system (VES) was constructed in the summer of 1993 to remediate soil and ground water contamination. The VES operated sporadically for about a month (September-October). Therefore, it is not expected that the VES had any effect on the ground water quality for the November sampling.

Table 2: Analytical Results (ug/L) for July 27-28, 1993 and November 17, 1993

Well Number	Benzene	Toluene	Ethylbenzene	Total Xylene	Total BTEX	Dissolved Iron
July 1993						
Spencer	0.2 U	0.2 U	0.2 U	0.6 U	ND	6.3 P
Restover	0.2 U	0.4	0.2 U	0.6 U	0.4	8.2 P
MW-12	0.6	0.5	0.2 U	0.6	1.7	262
MW-8A	8.3 J	0.2 U	4.8	15.9	29	4470
MW-8B(dup)*	8.3 J	0.2 U	5.6	16.2	30	4470
MW-20A	24.0	32.2	36.0	70.2	162	3790
MW-30	24.6 R	2.1 R	18.8 R	21.4 R	67 R	4520
WDOE-6A	320	530	400	1370	2620	6340
Transfer	0.2 U	0.5	0.2 U	0.6 U	0.5	NA
Transport	---	---	---	---	---	5.0 U
Filter	NA	NA	NA	NA	NA	5.0 U
November 1993						
MW-8A	1.8	1.1	7.4	28.9	39.2	9460
MW-8B(dup)*	2.2	2.0	8.5	30.9	43.6	9490
WDOE-6A	281 J	740 J	667 J	1380 J	3068	8050
Transfer	1.0 U	1.0 U	1.0 U	3.0 U	ND	NA
Filter	NA	NA	NA	NA	NA	6.9 P

U : Not detected at detection limit shown.

J : The analyte was positively identified. The associated numerical value is an estimate.

P : The analyte was detected above the instrument detection limit, but below the minimum quantitation limit.

R : Results are rejected because of possible dilution error by the laboratory (Appendix A).

NA: Not analyzed.

ND: Compounds Not Detected

* : MW-8B is a duplicate sample of MW-8A.

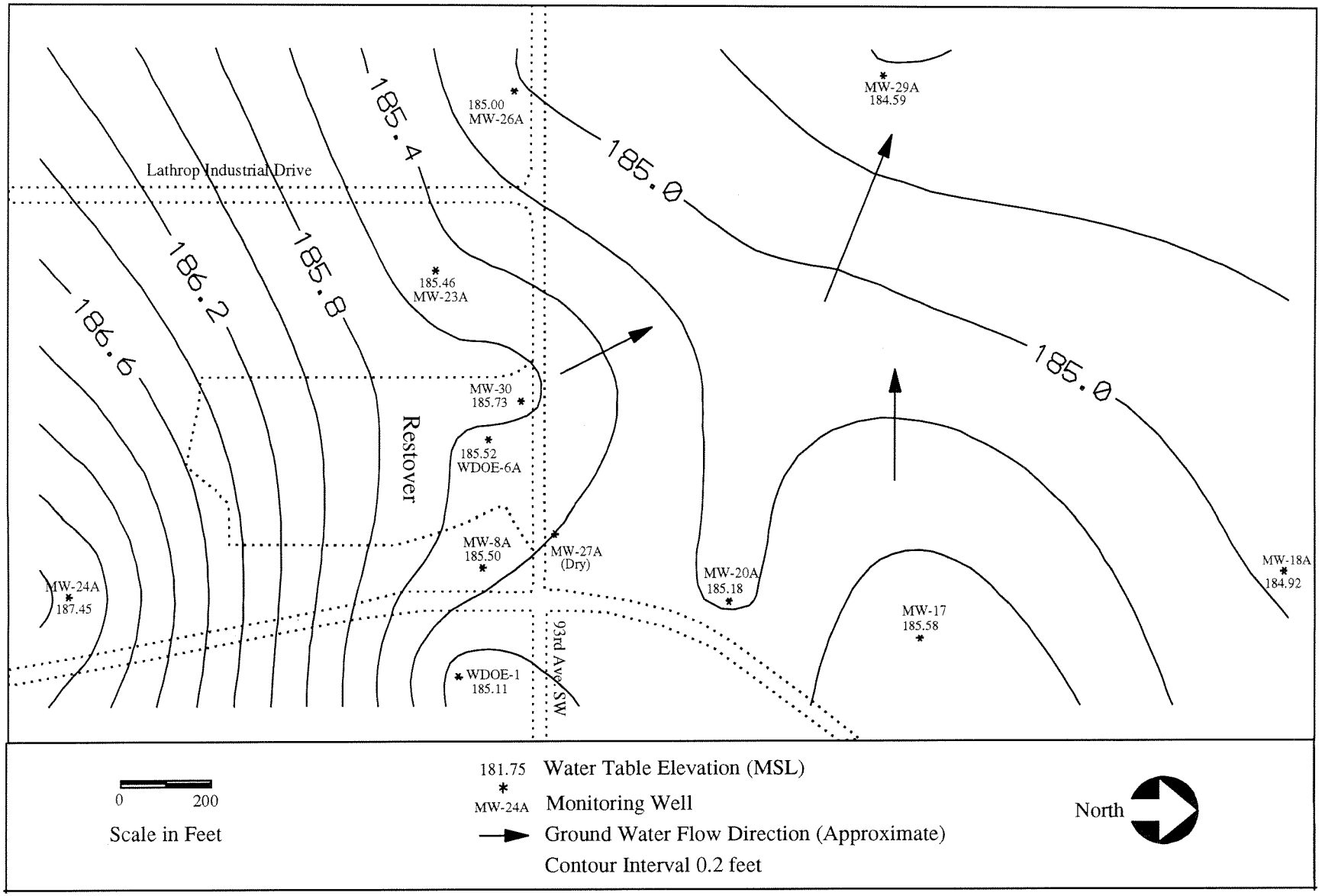

Figure 2: Restover Truck Stop - Water Table Map, July 1993

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
Upper Aquifer														
WDOE-6A	6950	1180	5300	28000	7490	9870	5190	3460	2840	3830	2990	4784	2620	3070
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]
MW-15A	1433	NT	NT	ND	218	NT	285	122	NT	NT	NT	NT	NT	NT
MW-17	ND	ND	ND	ND	ND	NT	NT	ND	ND	NT	2.7	ND	NT	NT
MW-20A	126	NT	NT	NT	NT	20	1400	5	293	11	452	NT(Dry)	162	NT(Dry)
Lower Aquifer														
Restover	NT	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	NT
Spencer	ND	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NT
MW-12	53	5	8	ND	4	ND	6	ND	NT	NT	NT	NT	1.7	NT

ND: Compound Not Detected
NT: Compound Not Tested
[1] : Value is based on one sample.
[2] : Value represents the mean of duplicate samples.

Since 1990 BTEX concentrations in well MW-20A have fluctuated seasonally. In general, concentrations are low in the winter (5 to 20 μg/L) and high in the summer (293 to 1400 μg/L). In July total BTEX concentrations were 162 μg/L, in November this well was dry. Since 1991 BTEX concentrations in well WDOE-6A also appear to have a slight seasonal fluctuation. In general, concentrations are high in the winter (4784 to 3460) and low in the summer (2620-2990). Seasonal fluctuation may be significant. To evaluate the effectiveness of the VES we may need to address seasonal water quality changes.

Ground water cleanup levels under the Model Toxic Control Act (MTCA) for the BTEX compounds are listed as follows: benzene (5.0 μg/L), toluene (40.0 μg/L), ethylbenzene (30.0 μg/L), and xylene (20.0 μg/L). Of the wells sampled in July, MTCA cleanup levels were exceeded in wells MW-20A, MW-30, and WDOE-6A. Benzene and xylene were exceeded in all three wells, ethylbenzene was exceeded in MW-20A and WDOE-6A, and toluene was exceeded in WDOE-6A. In November, sample results from WDOE-6A exceeded all four MTCA cleanup levels; xylene was exceeded in MW-8A.

CONCLUSIONS

1. BTEX concentrations continue to be elevated in well WDOE-6A. Concentrations in this well have decreased since 1990, and appear to have stabilized. Overall, BTEX concentrations in the upper aquifer have decreased. At this time, concentration decreases are probably due to a combination of plume spreading, dispersion, biodegradation, reduction of source loading and/or seasonal variability. Eventually, the VES will reduce source loading to ground water. MTCA cleanup levels were exceeded in wells MW-20A, MW-30 and WDOE-6A in July and MW-8A and WDOE-6A in November for BTEX compounds.

2. The vapor extraction system (VES) operated sporadically for about a month (September-October). Therefore, it is not expected that the VES had any effect on the ground water quality for the November sampling.

3. Low concentrations of benzene, toluene and xylene were detected in the sample from well MW-12. At this time it is uncertain if the sample collected from this well is representative of ground water quality. Toluene was detected near the quantitation limit in the Restover supply well.

4. Dissolved iron continues to be detected at high levels where BTEX contamination is present. The highest concentrations occur near the contamination source.

5. Ground water flows generally toward the northwest, which is consistent with previous sampling events.

RECOMMENDATIONS

1. Routine monitoring should continue to determine the effectiveness of contaminant removal by vapor extraction. Monitoring wells WDOE-6A, MW-8A, MW-20A, MW-30, the Spencer well, and the Restover supply well should continue to be sampled for BTEX. Monitoring well MW-9A should be included in routine sampling to replace well MW-15A.

2. The obstruction in well MW-12 should be removed and the well purged until the discharge is sediment free. If the obstruction can't be removed than the well should be properly decommissioned.

3. Sampling and analysis for dissolved iron should be discontinued. In my opinion, total petroleum hydrocarbon as gasoline (TPH-G) analyses would be more informative. In the next year all wells sampled should be tested for TPH-G.

4. Upper aquifer wells (approximately 8 wells) should be sampled for BTEX and TPH-G to determine the current extent of the contaminant plume. This has not been done since May 1987.

5. Monitoring wells MW-7A, MW-22 and WDOE-2 should be located and properly decommissioned.

REFERENCES

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

Washington State Department of Ecology, 1991. Manchester Environmental Laboratory - Laboratory Users Manual. Edited by D. Huntamer and J. Hyre.

APPENDIX A

Analytical Results
Restover Truck Stop
July 27–28 and November 17, 1993

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive East • Port Orchard, Washington 98366-8204 • (206) 871-8860 • SCAN 871-8860

December 23, 1993

TO: Pam Marti

FROM: Greg Perez

SUBJECT: Restover Truck Stop

In response to your inquiry concerning samples 93318086 and 087 from Restover Truck Stop, I have reviewed the data and found there was indeed an error.

Sample 318087 was diluted during analysis. The dilution was recorded on the original data file, but was not incorporated when the sample was calculated. There is no dilution recorded for sample 318086 and the analyst does not recall having made one. I suspect some dilution may have been made since the results from the most recent analysis of this well were much higher than these. Without any concrete evidence that the analysis was incorrect, I think it would be unwise to make any changes to the results of that sample. It should probably be written off as an anomaly.

Here are the corrected results for sample 318087:

Benzene	320 ug/L
Toluene	530 ug/L
Ethyl Benzene	400 ug/L
Total Xylenes	13,700 ug/L

If you need any further information, please call, and I apologize for any inconvenience.

GP

cc: Bill Kammin
Dickey Huntamer

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive East • Port Orchard, Washington 98366-8204 • (206) 895-4737 • SCAN 744-4737

August 13, 1993

TO: Pam Marti

FROM: Bill Kammin, Environmental_Lab_Director

SUBJECT: Metals Quality Assurance memo for the Restover Iron Project

SAMPLE INFORMATION

The samples from the Restover iron project were received by the Manchester Laboratory on 7/26/93 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits. .

PROCEDURAL BLANKS

The procedural blanks associated with these samples showed no analytically significant levels of analytes.

SPIKED SAMPLE ANALYSES

Spike and duplicate spike sample analyses were performed on this data set. All spike recoveries were within the CLP acceptance limits of +/- 25%.

PRECISION DATA

The results of the spike and duplicate spike samples were used to evaluate precision on this sample set. The Relative Percent Difference (RPD) for all analytes was within the 20% CLP acceptance window for duplicate analysis.

LABORATORY CONTROL SAMPLE (LCS) ANALYSES

LCS analyses were within the windows established for each parameter.

SUMMARY

The data generated by the analysis of these samples can be used noting the data qualifications discussed in this memo.

Please call Bill Kammin at SCAN 206-871-8801 to further discuss this project.

WRK:wrk

Washington State Department of Ecology
*** Lab Analysis Report ***

==> Transaction #: 08090720 Laboratory: (WE) Ecology, Manchester Lab

Work Group: (38) Metals - ICP Scan

Instrument: (ICP) ICP, Jarrell-Ash AtomComp 1100 (DOE)

Method: (EP1-200.7) Inductively Coupled Plasma Atomic Emissions Analysis

Chemist: (JDR) Ross, James DOE Hours Worked:

Project: DOE-581X RESTOVER TRUCK STOP Prg Ele#: D3K01

Prj Off: Marti, Pam DOE Analysis Due: 930729 Revised Due:

*** Sample Records in Transaction ***

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	93318080	LBK1	930727	SPENCER			
02	93318080		930727	SPENCER			
03	93318080	LMX1	930727	SPENCER			
04	93318080	LMX2	930727	SPENCER			
05	93318081		930727	RESTOVER			
06	93318082		930728	MW-12			
07	93318083		930727	MW-8A			
08	93318084		930727	MW-8B			
09	93318085		930727	MW-20A			
10	93318086		930727	MW-30			
11	93318087		930727	WDOE-6A			
12	93318089		930727	FILTER			
13	93318090		930727	TRANSPOR			

Record Type: TRNIN3 Date Verified: 8-11-93 By: Susan Davis
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 9-AUG-93 07:24:04 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 01 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Blank ID : EWPB 32.50
Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: (LBK1) Lab Blank Sample #1 Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss ug/l		5U

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 02 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	6.3P

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 03 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (94) % Recov %Slds:
QA Code: (LMX1) Lab Mtrx Spike #1 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss ug/l	% Recov	96

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 04 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (94) % Recov %Slds:
QA Code: (LMX2) Lab Mtrx Spike #2 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss ug/l	% Recov	95

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 05 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318081 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	8.2P

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 06 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318082 MW-12 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 9

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	262

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 07 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318083 MW-9A Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	4470

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 08 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318084 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	4770

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 09 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318085 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	3790

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 10 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318086 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	4520

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 11 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318087 WDOE-10A Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	6340

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 12 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318089 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	5U

*** Lab Analysis Report ***

Transaction #: 08090720 Seq #: 13 (38) Metals - ICP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318090 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930806 # Days to Ext/Anal: 0/ 10

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	5U

MANCHESTER ENVIRONMENTAL LABORATORY

7411 Beach Drive E , Port Orchard Washington 98366

CASE NARRATIVE

August 23, 1993

Subject: Restover Truck Stop

Samples: 93 - 318080 to -318088

Case No. DOE-581X

Officer: Pam Marti

By: Dickey D. Huntamer
Organics Analysis Unit

BETX ANALYSIS

ANALYTICAL METHODS:

The samples were analyzed by EPA Method SW-846 - 8020. Normal laboratory QA/QC procedures were performed with the analyses.

HOLDING TIMES:

The samples were analyzed within the recommended holding times.

BLANKS:

The EPA five times rule was applied to all target compounds which were found in the blank. Compounds that were found in the sample and in the blank were considered real and not the result of contamination if the levels in the sample are greater than or equal to five times the amount of compounds in the associated method blank. No target compounds were detected in the laboratory blank.

SURROGATES:

All surrogate recoveries were within acceptable limits.

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

A matrix spike and spike duplicate was analyzed using sample -318080. Recoveries and precision data were within acceptable limits.

ANALYTICAL COMMENTS:

No problems were encountered in the analysis of these samples. The data is acceptable to use without additional qualifiers.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
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 3×10^6.
NAF	-	Not analyzed for.
N	-	For organic analytes 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.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
*	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

*** Lab Analysis Report ***

==> Transaction #: 08191632 Laboratory: (WE) Ecology, Manchester Lab

Work Group: (51) VOA - PP Scan

Instrument: (PEPIDFID) Perkin-Elmer PID/FID

Method: (?????????) Unspecified

Chemist: (BLC) Carrell, Bob DOE Hours Worked:

Project: DOE-581X RESTOVER TRUCK STOP Prg Ele#: D3K01

Prj Off: Marti, Pam DOE Analysis Due: 930729 Revised Due:

*** Sample Records in Transaction ***

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	93318080	LBK1	930727	SPENCER			
02	93318080		930727	SPENCER			
03	93318081		930727	RESTOVER			
04	93318082		930728	MW-12			
05	93318083		930727	MW-8A			
06	93318084		930727	MW-8B			
07	93318085		930727	MW-20A			
08	93318086		930727	MW-30			
09	93318087		930727	WDOE-6A			
10	93318088		930727	TRANSFER			
11	93318080	LMX1	930727	SPENCER			
12	93318080	LMX2	930727	SPENCER			

Record Type: TRNIN3 Date Verified: Aug 20, 1993 By: Carrell

Transaction Status: New Transaction...First Printing...Unverified.

Processed: 19-AUG-93 16:38:39 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 01 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Blank ID : BW3221
Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: (LBK1) Lab Blank Sample #1 Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	ug/l	0.2U	
2	108883	Toluene	ug/l	0.2U	
3	100414	Ethylbenzene	ug/l	0.2U	
4	1330207	Total Xylenes	ug/l	0.6U	
5	-540363	p-Difluorobenzene	% Recov	102.1	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 02 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	ug/l	0.2U	
2	108883	Toluene	ug/l	0.2U	
3	100414	Ethylbenzene	ug/l	0.2U	
4	1330207	Total Xylenes	ug/l	0.6U	
5	-540363	p-Difluorobenzene	% Recov	102.6	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 03 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318081 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	ug/l	0.2U	
2	108883	Toluene	ug/l	0.4	
3	100414	Ethylbenzene	ug/l	0.2U	
4	1330207	Total Xylenes	ug/l	0.6U	
5	-540363	p-Difluorobenzene	% Recov	102.5	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 04 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318082 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 13

Line	Par #	Parameter Description	Units	Value	
1	71432	**Benzene**	ug/l	0.6	
2	108883	**Toluene**	ug/l	0.5	
3	100414	**Ethylbenzene**	ug/l	0.2U	
4	1330207	**Total Xylenes**	ug/l	0.6	
5	-540363	p-Difluorobenzene	% Recov	105.4	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 05 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318083 mw-8A Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	ug/l	8.3J	
2	108883	Toluene	ug/l	0.2U	
3	100414	Ethylbenzene	ug/l	4.8	
4	1330207	Total Xylenes	ug/l	15.9	
5	-540363	p-Difluorobenzene	% Recov	INTRFRNCE	(Surr) PR

Transaction #: 08191632 Seq #: 06 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318084 MB Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	ug/l	8.3J	
2	108883	Toluene	ug/l	0.2U	
3	100414	Ethylbenzene	ug/l	5.6	
4	1330207	Total Xylenes	ug/l	16.2	
5	-540363	p-Difluorobenzene	% Recov	INTRFRNCE	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 07 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318085 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	24.0
2	108883	Toluene	ug/l	32.2
3	100414	Ethylbenzene	ug/l	36.0
4	1330207	Total Xylenes	ug/l	70.2
5	-540363	p-Difluorobenzene	% Recov	INTRFRNCE (Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 08 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318086 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	24.6
2	108883	Toluene	ug/l	2.1
3	100414	Ethylbenzene	ug/l	18.8
4	1330207	Total Xylenes	ug/l	21.4
5	-540363	p-Difluorobenzene	% Recov	INTRFRNCE (Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 09 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318087 WDOE 4A Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	100 x 3.2 — 320
2	108883	Toluene	ug/l	100 x 5.3 - 530
3	100414	Ethylbenzene	ug/l	100 x 4.0 - 400
4	1330207	Total Xylenes	ug/l	100 x 13.7 - 1370
5	-540363	p-Difluorobenzene	% Recov	102.7 (Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 10 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318088 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	ug/l	0.2U	
2	108883	Toluene	ug/l	0.5	
3	100414	Ethylbenzene	ug/l	0.2U	
4	1330207	Total Xylenes	ug/l	0.6U	
5	-540363	p-Difluorobenzene	% Recov	102.3	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 11 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (94) % Recov %Slds:
QA Code: (LMX1) Lab Mtrx Spike #1 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	% Recov	99.3	
2	108883	Toluene	% Recov	99.9	
3	100414	Ethylbenzene	% Recov	99.9	
4	1330207	Total Xylenes	% Recov	99.2	
5	-540363	p-Difluorobenzene	% Recov	102.6	(Surr) PR

*** Lab Analysis Report ***

Transaction #: 08191632 Seq #: 12 (51) VOA - PP Scan
Proj Code : DOE-581X RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 318080 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (94) % Recov %Slds:
QA Code: (LMX2) Lab Mtrx Spike #2 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 930810 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value	
1	71432	Benzene	% Recov	98.1	
2	108883	Toluene	% Recov	98.3	
3	100414	Ethylbenzene	% Recov	97.9	
4	1330207	Total Xylenes	% Recov	97.4	
5	-540363	p-Difluorobenzene	% Recov	102.9	(Surr) PR

MANCHESTER ENVIRONMENTAL LABORATORY

7411 Beach Drive E , Port Orchard Washington 98366

CASE NARRATIVE

December 17, 1993

Subject: Restover Truck Stop

Samples: 93- 478105 to -478107 and -478111

Case No. DOE-581V

Officer: Pam Marti

By: Greg Perez
Dickey D. Huntamer
Organics Analysis Unit

BETX

ANALYTICAL METHODS:

These samples were analyzed by Method 8260, Test Methods for Evaluating Solid Waste, United States Environmental Protection Agency, SW-846, 3rd Ed., 1986

HOLDING TIMES:

The samples were extracted and analyzed within recommended holding times.

BLANKS:

Background levels of target analytes in the blank were minimal and did not affect quantitation levels.

SURROGATES:

Surrogate recoveries were acceptable and within the recommended limits.

MATRIX SPIKE AND MATRIX SPIKE :

Matrix spikes were not analyzed with this data set.

ANALYTICAL COMMENTS:

The data is acceptable for use as qualified. However some instrumental problems were encountered. A failure of the instrument's data system caused the loss of the initial analysis of the data set. One of the drawbacks of automation is that frequently samples must be allowed to run unattended. In the event of a system failure the problem may not be discovered until the next morning which makes the samples with punctured septa unusable for a repeat analysis. The samples were reanalyzed using the duplicate sample vials except for the transport blank, which had no duplicate. This sample was lost entirely. The transfer blank was the only sample successfully run during that first analysis and is included in the data.

Results from previous samplings were used to predict analyte levels and anticipate necessary dilutions, however one sample came up significantly higher than on previous occasions and was over the calibration range of the instrument. There was at this point no sample left for a dilution, so these results have been qualified as estimates ("J") in sample -478107.

DATA QUALIFIER CODES:

U	-	The analyte was not detected at or above the reported value.
J	-	The analyte was positively identified. The associated numerical value is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result.
REJ	-	The data are unusable for all purposes.
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 3×10^6.
NAF	-	Not analyzed for.
N	-	For organic analytes 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.
E	-	This qualifier is used when the concentration of the associated value exceeds the known calibration range.
*	-	The analyte was present in the sample. (Visual Aid to locate detected compound on report sheet.)

Washington State Department of Ecology
*** Lab Analysis Report ***

==> Transaction #: 12160819 Laboratory: (WE) Ecology, Manchester Lab

Work Group: (51) VOA - PP Scan

Instrument: (KIRK) GC/MS, HP 5890II/5971 (EPA)

Method: (?????????) Unspecified

Chemist: (GXP) Perez, Greg DOE Hours Worked: _____

Project: DOE-581V RESTOVER TRUCK STOP Prg Ele#: D3K01

Prj Off: Marti, Pam DOE Analysis Due: 931118 Revised Due:

*** Sample Records in Transaction ***

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	93478105	LBK1	931117	MW-8A			
02	93478105	LBK2	931117	MW-8A			
03	93478105		931117	MW-8A			
04	93478106		931117	MW-8B			
05	93478107		931117	WDOE-6A			
06	93478111		931117	TRANSPOR			

Record Type: TRNIN3 Date Verified: 12/16/93 By: D. Perez

Transaction Status: Edited Transaction...First Printing...Unverified.

Processed: 16-DEC-93 08:27:44 Status: E Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 12160819 Seq #: 01 (51) VOA - PP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Blank ID : VBW3328
Sample No.: 93 478105 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: (LBK1) Lab Blank Sample #1 Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	0.12J
2	108883	Toluene	ug/l	0.04J
3	100414	Ethylbenzene	ug/l	1.0U
4	1330207	Total Xylenes	ug/l	3.0U
5	-1330207	m p-XYLENE	ug/l	2.0U
6	95476	o-XYLENE	ug/l	1.0U

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 12160819 Seq #: 02 (51) VOA - PP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Blank ID : VBW3335
Sample No.: 93 478105 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds: ____
QA Code: (LBK2) Lab Blank Sample #2 Peaks Total: ____
Date Extracted: Date Analyzed: 931201 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	1.0U
2	108883	Toluene	ug/l	1.0U
3	100414	Ethylbenzene	ug/l	1.0U
4	1330207	Total Xylenes	ug/l	3.0U
5	-1330207	m p-XYLENE	ug/l	2.0U
6	95476	o-XYLENE	ug/l	1.0U

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 12160819 Seq #: 03 (51) VOA - PP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478105 mw-8A Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 931201 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	1.8
2	108883	Toluene	ug/l	1.1
3	100414	Ethylbenzene	ug/l	7.4
4	1330207	Total Xylenes	ug/l	28.9
5	-1330207	m p-XYLENE	ug/l	28.2
6	95476	o-XYLENE	ug/l	0.96J

*** Lab Analysis Report ***

Transaction #: 12160819 Seq #: 04 (51) VOA - PP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478106 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 931201 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	2.2
2	108883	Toluene	ug/l	2.0
3	100414	Ethylbenzene	ug/l	8.5
4	1330207	Total Xylenes	ug/l	30.9
5	-1330207	m p-XYLENE	ug/l	29.4
6	95476	o-XYLENE	ug/l	1.7

*** Lab Analysis Report ***

Transaction #: 12160819 Seq #: 05 (51) VOA - PP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478107 WD01F-10A Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds: ____
QA Code: ( ) Unspecifed Peaks Total: ____
Date Extracted: Date Analyzed: 931201 # Days to Ext/Anal: 0/ 14

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	281J
2	108883	Toluene	ug/l	740J
3	100414	Ethylbenzene	ug/l	667J
4	1330207	Total Xylenes	ug/l	1380J
5	-1330207	m p-XYLENE	ug/l	916J
6	95476	o-XYLENE	ug/l	462J

Washington State Department of Ecology
*** Lab Analysis Report ***

Transaction #: 12160819 Seq #: 06 (51) VOA - PP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478111 Alternate Keys:

Samp Matrix: (10) Water-Total Units: (11) ug/l %Slds: _____
QA Code: ( ) Unspecifed Peaks Total: _____
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 07 7

Line	Par #	Parameter Description	Units	Value
1	71432	Benzene	ug/l	1.0U
2	108883	Toluene	ug/l	1.0U
3	100414	Ethylbenzene	ug/l	1.0U
4	1330207	Total Xylenes	ug/l	3.0U
5	-1330207	m p-XYLENE	ug/l	2.0U
6	95476	o-XYLENE	ug/l	1.0U

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
MANCHESTER ENVIRONMENTAL LABORATORY
7411 Beach Drive East • Port Orchard, Washington 98366-8204 • (206) 871-8860 • SCAN 871-8860

November 30, 1993

TO: Pam Marti

FROM: Bill Kammin, Environmental_Lab_Director

SUBJECT: Metals Quality Assurance memo for the Restover Project

SAMPLE INFORMATION

These samples from the Restover project were received by the Manchester Laboratory on 11/18/93 in good condition.

HOLDING TIMES

All analyses were performed within the USEPA Contract Laboratory Program (CLP) holding times for metals analysis (28 days for mercury, 180 days for all other metals).

INSTRUMENT CALIBRATION

Instrument calibration was performed before each analytical run and checked by initial calibration verification standards and blanks. Continuing calibration standards and blanks were analyzed at a frequency of 10% during the run and again at the end of the analytical run. All initial and continuing calibration verification standards were within the relevant USEPA (CLP) control limits.

PROCEDURAL BLANKS

The procedural blanks associated with these samples showed no analytically significant levels of analytes.

SPIKED SAMPLE ANALYSES

Spike and duplicate spike sample analyses were performed on this data set. All spike recoveries were within the CLP acceptance limits of +/- 25%.

PRECISION DATA

The results of the spike and duplicate spike samples were used to evaluate precision on this sample set. The Relative Percent Difference (RPD) for all analytes was within the 20% CLP acceptance window for duplicate analysis.

LABORATORY CONTROL SAMPLE (LCS) ANALYSES

LCS analyses were within the windows established for each parameter.

SUMMARY

The data generated by the analysis of these samples can be used noting the data qualifications discussed in this memo.

Please call Bill Kammin at SCAN 206-871-8801 to further discuss this project.

WRK:wrk

*** Lab Analysis Report ***

==> Transaction #: 11291215 Laboratory: (WE) Ecology, Manchester Lab

Work Group: (38) Metals - ICP Scan

Instrument: (ICP) ICP, Jarrell-Ash AtomComp 1100 (DOE)

Method: (EP1-200.7) Inductively Coupled Plasma Atomic Emissions Analysis

Chemist: (JDR) Ross, James DOE Hours Worked:

Project: DOE-581V RESTOVER TRUCK STOP Prg Ele#: D3K01

Prj Off: Marti, Pam DOE Analysis Due: 931118 Revised Due:

*** Sample Records in Transaction ***

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	93478105	LBK1	931117	MW-8A			
02	93478105		931117	MW-8A			
03	93478105	LMX1	931117	MW-8A			
04	93478105	LMX2	931117	MW-8A			
05	93478106		931117	MW-8B			
06	93478107		931117	WDOE-6A			
07	93478110		931117	FILTER			

Record Type: TRNIN3 Date Verified: 11-29-93 By: Susan Davis
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 29-NOV-93 12:22:27 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 01 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Blank ID : EWPB 47.90
Sample No.: 93 478105 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: (LBK1) Lab Blank Sample #1 Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	5U

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 02 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478105 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	9460

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 03 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478105 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (94) % Recov %Slds:
QA Code: (LMX1) Lab Mtrx Spike #1 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss ug/l	% Recov	99

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 04 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478105 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (94) % Recov %Slds:
QA Code: (LMX2) Lab Mtrx Spike #2 (% Rec Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss ug/l	% Recov	98

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 05 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478106 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	9490

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 06 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478107 Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	8050

*** Lab Analysis Report ***

Transaction #: 11291215 Seq #: 07 (38) Metals - ICP Scan
Proj Code : DOE-581V RESTOVER TRUCK STOP PE # : D3K01

Sample No.: 93 478110 FILT Alternate Keys:

Samp Matrix: (11) Water-Filtered Units: (00) %Slds:
QA Code: ( ) Unspecifed Peaks Total:
Date Extracted: Date Analyzed: 931124 # Days to Ext/Anal: 0/ 7

Line	Par #	Parameter Description	Units	Value
1	01046	Iron Fe-Diss	ug/l	6.9P