STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
7171 Cleanwater Lane, Building 8, P.O. Box 47710 • Olympia, Washington 98504-7710

January 13, 1993

TO: Mike Kuntz
Toxics Cleanup Program

FROM: Pam Marti PM
Environmental Investigations & Laboratory Services

SUBJECT: Restover Truck Stop Long-term Monitoring Round IX

The attached report summarizes the findings from the latest sampling at Restover Truck Stop, Round IX conducted on July 20 and 21, 1992. BTEX concentrations in the upper aquifer have decreased substantially since 1990, but now appear to be stabilizing. Model Toxic Control Act (MTCA) cleanup levels for BTEX were exceeded in wells WDOE-6A, MW-20A, and MW-8A. Sample Round X was conducted in January 1993. Results from Round X should be reported by June 1993. If you have any questions or comments, please call me at 586-8138.

PM:krc
Attachment

cc: Lynn Singleton
Bill Yake
Denis Erickson
Kathy Reed, TCP Library
Bob Kievit, EPA
Bert Bowen, Water Quality

RESTOVER TRUCK STOP
GROUND WATER MONITORING ROUND IX
JULY 20 & 21, 1992

by Pamela B. Marti
January 13, 1993

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

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

SUMMARY

Ground water samples were collected at the Restover Truck Stop on July 20 and 21, 1992, as part of routine monitoring. Two water supply and five monitoring wells were sampled for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and dissolved iron. BTEX concentrations in the upper aquifer have decreased substantially since 1990, but now appear to be stabilizing. Concentrations decreased slightly in well WDOE-6A and increased in wells MW-8A and MW-20A. BTEX concentrations in these three wells exceeded Model Toxic Control Act (MTCA) cleanup levels.

METHODS

Ground Water Sampling

Five monitoring wells and two water supply wells were sampled (Figure 1). Prior to sample collection, static water level measurements were obtained from 11 on-site wells using an electronic water level indicator. The meter was rinsed with deionized water and wiped clean between measurements. Due to low water levels and small purge volumes, monitoring wells were purged and sampled using decontaminated teflon bailers. Wells were purged until pH,

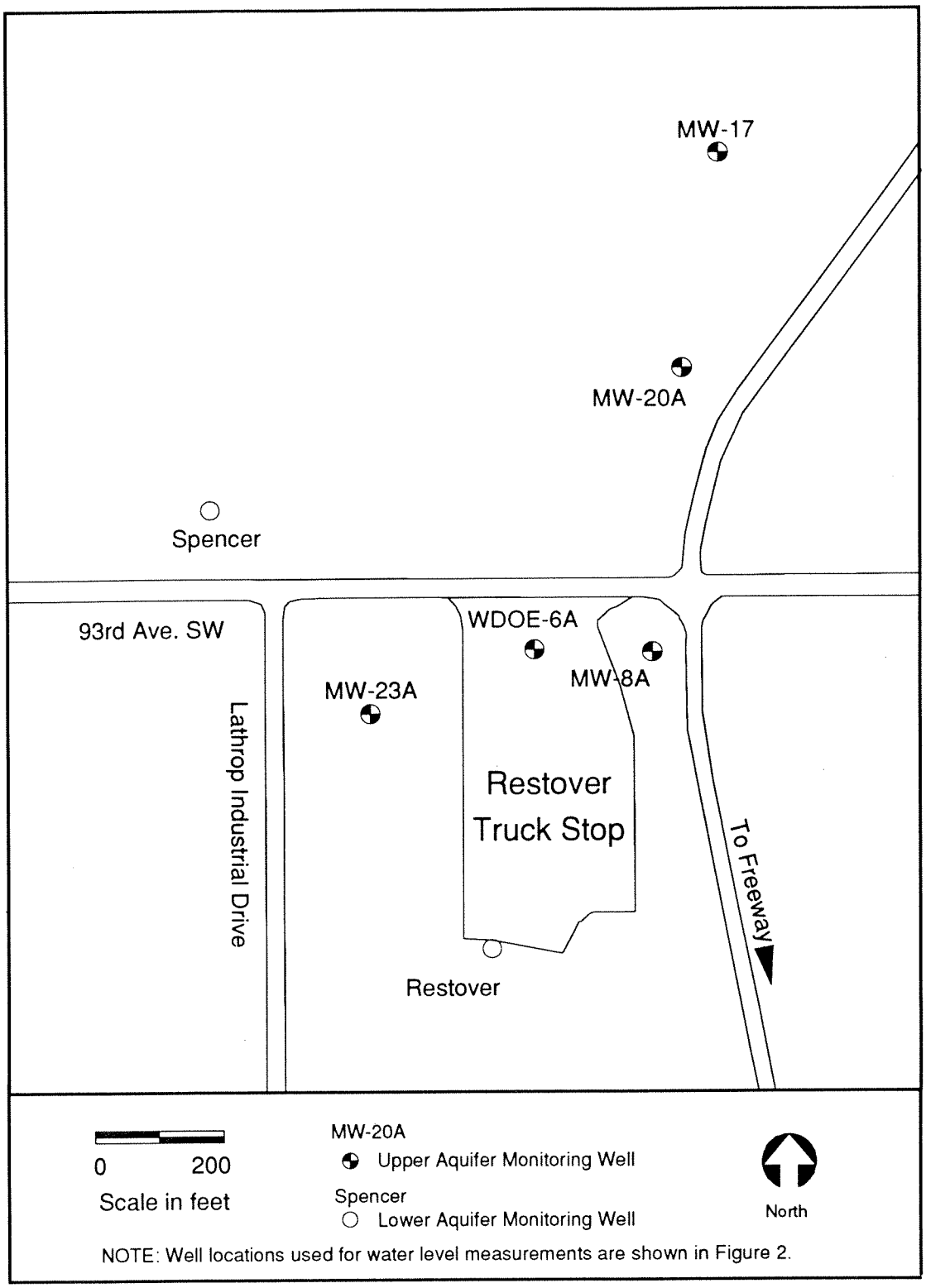

Figure 1: Sampling Locations, Restover Truck Stop

Round IX - July 1992

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 well WDOE-6A. Purge water from WDOE-6A was collected and treated by pumping it through a series of activated granulated carbon filters.

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 metals were field-filtered using dedicated, 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). Volatile organic samples were analyzed by Analytical Resources Inc. in Seattle. The Ecology/EPA Laboratory in Manchester analyzed the metal samples.

Quality Assurance

In general the quality of the data is good and acceptable for use. Quality control samples collected in the field consisted of a transfer blank, a filter blank, and blind field duplicates. A transfer blank for BTEX was obtained by running organic-free water through a decontaminated bailer and collecting the rinsate in a sample container. Ethylbenzene and total xylenes were detected in the transfer blank results at 1.4 μg/L and 6.5 μg/L. Results with concentrations less than four times the blank concentration are qualified with a "B." The detection of these two analytes is attributed to carry over from a previous laboratory analysis. 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 filter blank showed low levels of iron contamination. Iron results labeled with a "P" indicates the analyte was detected above the instrument detection limit, but below the minimum quantitation limit. Duplicate samples for BTEX and iron (labeled MW-8B) were obtained from monitoring well MW-8A. The relative percent differences for duplicate samples collected from MW-8A were 2% for benzene, 13% for toluene, 22% for ethylbenzene, 13% for total xylenes, and 1% for dissolved iron.

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. Stuart Magoon and Despina Strong of the Manchester Laboratory conducted the quality assurance review, which has been included in Appendix A.

RESULTS

Field Observations

Depth to water measurements and water level elevations for on-site wells are shown in Table 1. Depth to water ranged from 13.83 to 18.84 feet with an elevation range from 179.53 to 178.14 mean sea level (MSL). Wells MW-24A and MW-27A were dry. Table 2 lists stabilized pH, temperature and specific conductance readings. Field measurements ranged as follows: pH from 6.0 to 6.4 standard units, temperature from 10.5 to 14.3°C, and specific conductance from 33 to 210 umhos/cm. Water purged from monitoring wells MW-8A and WDOE-6A had a hydrocarbon odor and cloudy appearance. The odor and cloudy appearance are consistent with previous sample events. Well MW-20A was purged dry; less than one-half gallon of water was collected. While first purging well MW-23A the bailer pulled up what appeared to be grass. As purging continued the the bailer came up clean and the well seemed to produce more water.

Analytical Results

Analytical results for BTEX and dissolved iron are shown in Table 3. Detectable concentrations of BTEX were found in four of the seven wells sampled; WDOE-6A, MW-8A, MW-17, and MW-20A. All wells with detected BTEX are screened in the upper aquifer. BTEX was not detected in the two water supply wells, which tap the lower aquifer. Samples from WDOE-6A had all four BTEX compounds, with a total concentration of 2990 μg/L. Well WDOE-6A continues to have the highest concentration of the wells sampled. Total BTEX concentrations measured at MW-8A, MW-17, and MW-20A were 49.3 μg/L, 2.7 μg/L and 452 μg/L, respectively.

Monitoring wells MW-17 and MW-23A were sampled this round to help define the extent of the contaminant plume. MW-17 is approximately 1000 feet north of Restover Truck Stop. MW-23A, which had not been sampled since September 1987, is directly west of Restover. Total xylene was detected in MW-17 at 2.7 μg/L. No BTEX contamination was detected in MW-23A.

Dissolved iron concentrations in wells WDOE-6A, MW-8A, and MW-20A were 6200 μg/L, 6020 μg/L, and 2120 μg/L, respectively. The remainder of the iron data was either qualified due to blank contamination or non-detect.

DISCUSSION

A water-table contour map for the upper aquifer is shown in Figure 2. The map, constructed using water levels measured during this sample round, depicts ground water flow direction. Ground water moves perpendicular to the contour lines from high to low potential. Based on Figure 2, ground water in the upper aquifer flows toward the west and northwest. This is consistent with the flow pattern observed during previous sample events.

Table 1: Water Table Elevations (MSL)

Well ID Upper Aquifer	Depth to Water (Feet)	Elevation (MSL)
WDOE-1	18.84	179.13
WDOE-6A	16.54	179.53
MW-8A	18.78	179.21
MW-17	15.05	178.75
MW-18A	13.83	179.17
MW-20A	14.73	178.89
MW-23A	16.45	179.05
MW-24A	DRY	----
MW-26A	14.39	179.08
MW-27A	DRY	----
MW-29A	14.12	178.14

Table 2: Field Sampling Results (In Order Sampled)

Well ID	pH (standard units)	Specific Conductance (umhos/cm)	Temp. (°C)	Purge Volume (gals)	Aquifer (Upper/ Lower)
Spencer	6.0	74	12.0	96	Lower
MW-17	6.0	52	10.5	6	Upper
MW-23A	6.2	33	10.8	5	Upper
MW-8A	6.1	190	11.2	4	Upper
Restover	6.4	85	10.8	180	Lower
MW-20A	6.2	148	14.3	0.50	Upper
WDOE-6A	6.2	210	12.9	5	Upper

Table 3: Analytical Results (ug/L)

Well Number	Benzene	Toluene	Ethylbenzene	Total Xylene	Total BTEX	Dissolved Iron
Lower Aquifer						
Spencer	1 U	1 U	1 U	2 U	ND	5.0 U
Restover	1 U	1 U	1 U	2 U	ND	9.6 P
Upper Aquifer						
MW-8A	6.0	5.7	9.6	28	49	6020
MW-8B	6.1	6.5	12	32	57	6000
MW-17	1 U	1 U	1 U	2.7 B	2.7	5.0 P
MW-20A	30	21	81	320	452	2120
MW-23A	1 U	1 U	1 U	2 U	ND	12 P
WDOE-6A	330	360	400	1900	2990	6200
Transfer	1 U	1 U	1.4	6.5	7.9	NA
Filter	NA	NA	NA	NA	NA	9.7 P

U : Not detected at detection limit shown.
P : Analyte detected above instrument detection limit but below quantitation limit.
NA: Not analyzed.
ND: Compounds Not Detected

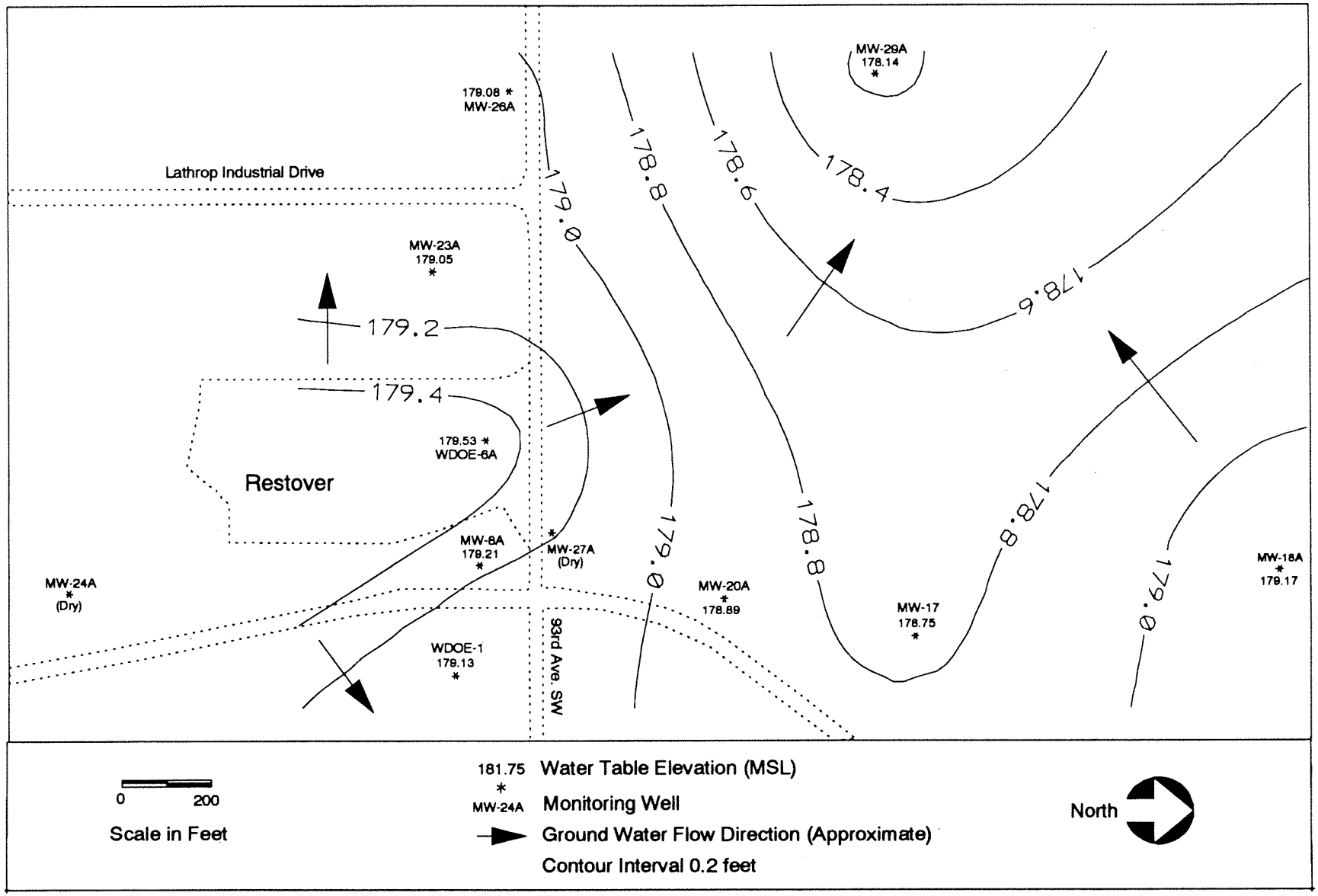

Figure 2: Restover Truck Stop - Water Table Map, July 1992

BTEX concentrations for sampling events between May 1987 and July 1992 are shown in Table 4. BTEX concentrations in well WDOE-6A decreased substantially from January 1990 (9870 μg/L) to July 1992 (2990 μg/L). Concentrations over the last two years ranged between 2840 to 3830 μg/L.

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). Concentrations increased from 11 μg/L to 452 μg/L between the February and July 1992 sample rounds.

Ground water cleanup levels under the Model Toxic Control Act (MTCA) for the BTEX compounds are; 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 during this round, MTCA cleanup levels were exceeded in wells WDOE-6A, MW-8A, and MW-20A. Benzene and xylene cleanup levels were exceeded in all three wells; toluene was exceeded in WDOE-6A; and ethylbenzene was exceeded in MW-20A and WDOE-6A.

CONCLUSIONS

1. BTEX concentrations continue to be elevated in WDOE-6A although concentrations have decreased since 1990. BTEX concentrations in the upper aquifer have decreased, but now appear to be stabilizing. Concentration decreases are probably due to a combination of plume spreading, dispersion, biodegradation, reduction of source loading and/or seasonal variability. MTCA cleanup levels were exceeded in wells WDOE-6A, MW-8A, and MW-20A for BTEX compounds.

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

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

RECOMMENDATIONS

1. Monitoring wells WDOE-6A, MW-8A, MW-20A, the Spencer well, and the Restover supply well should continue to be sampled for BTEX and dissolved iron. Approval for property access should be obtained to sample MW-15A.

2. All of the upper aquifer wells (8 wells) should be sampled for BTEX and dissolved iron to determine the current extent of the contaminant plume. This has not been done since May 1987.

Table 4: 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
Upper Aquifer											
WDOE-6A	6950	1180	5300	28000	7490	9870	5190	3460	2840	3830	2990
MW-8A	230	388	479	334	58	14	178	19	20	9	49
MW-15A	1433	NT	NT	ND	218	NT	285	122	NT	NT	NT
MW-17	ND	ND	ND	ND	ND	NT	NT	ND	ND	NT	2.7
MW-20A	126	NT	NT	NT	NT	20	1400	5	293	11	452
Lower Aquifer											
Restover	NT	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND
Spencer	ND	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND
MW-12	53	5	8	ND	4	ND	6	ND	NT	NT	NT

ND: Compound Not Detected
NT: Compound Not Tested

3. Wells should be inspected and evaluated for possible maintenance work or decommisioning. Monitoring wells MW-7A, MW-22 and WDOE-2 should be located and properly abandoned. MW-12A should be either rehabilitated or abandoned.

REFERENCES

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 20–21, 1992

State of Washington Department of Ecology
Manchester Environmental Laboratory
7411 Beach Dr. East Port Orchard WA. 98366

Data Review
August 17, 1992

Project: **Restover Truck Stop**

Samples: 308050 308051 308052 308053 308054
308055 308056 308057 308060

Laboratory: Analytical Resources Inc. B308

By: Stuart Magoon

Case Summary

The review is for BETX analysis.

These samples were received at the Manchester Environmental Laboratory on July 22, 1992. They were transported to ARI on July 29, 1992 for analysis.

These analyses were reviewed for qualitative and quantitative accuracy, validity, and usefulness.

There is no need to assimilate the "dilution factor" or "sample wt/vol" into the final values reported; these calculations have already been figured into the reported values.

DATA QUALIFIER DEFINITIONS

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.

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

R - The result is unusable for all purposes

X - The presence of this analyte is most likely due to laboratory contamination and not native to the sample.

BETX

Holding Times:

These samples were analyzed within the SW-846 recommended holding time.
The "dup" is an abbreviation for duplicate.

Method Blank:

No target analytes were detected in either method blank.

Surrogates:

Surrogate recoveries for these samples, and the associated method blanks are reasonable, acceptable, and within advisory QC limits.

Duplicate:

Sample 308050 was chosen for a laboratory duplicate analysis. There were no analytes detected in this sample or the duplicate which means that the analyses were in 100% agreement or the percent difference was 0%.

Sample Data:

Ethylbenzene and total xylenes were detected in the transfer blank (sample 308057). The detection of these two analytes in sample 308057 are most likely due to carry over from the previous analysis of the undiluted analysis for sample 308056. Unfortunately ARI did not perform a method blank, as per protocol, after the analysis of a high level sample.

This data is acceptable for use with the additional data qualifiers where appropriate.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

12 August 1992

Stuart Magoon
Wash. State Department of Ecology
7411 Beach Drive East
Port Orchard, WA 98366-8204

RE: Project No. Restover Truck Stop / ARI Job No. B308

Dear Mr. Magoon:

Please find enclosed original reports and sample deliverables for the above-referenced project. Nine water samples were received intact on July 29, 1992. The chain-of-custody indicated that ten samples were sent. There was no sample received for sample number *308059. As you indicated a new sample would be provided at a later date. Two samples (308055 & 56) were also labeld incorrectly according to the sample tags. As you instructed, all samples were logged according to the sample tags and sampling times.

The submitted samples were analyzed for BETX compounds following EPA method 602/8020 using a PID/FID-GC instrument. The required calibration criteria was met prior to analysis.

A dilution and reanalysis was required for sample **308055** and **308056.** The remaining sample analyses were routine and no additional analytical problems were noted.

As always, copies of these reports and the associated raw data will remain on file with ARI. If you have any questions or require additional information, please feel free to contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Bryan D. Anderson

Bryan D. Anderson
Project Coordinator

* determined that there was no sample 308059 for BETX.

Enclosures
cc: File B308

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET - Method 602/8020 GC/PID FOR BETX

Matrix: Waters
Level: Low

Client Project No: Restover Truck Stop

QC Report No: B308 - WDOE
Date Received: 07/29/92

Data Release Authorized: _____
Report prepared: 08/04/92 *MAC:X jjr*

CAS Number	Sample No.	Meth Blank	308050	308050dup	308051	308052
	ARI ID	MB 07/30	B308A	B308Adup	B308B	B308C
	Date Analyzed	07/30/92	07/31/92	07/31/92	07/31/92	07/31/92
	Amt Analyzed	5.0 ml	5.0 ml	5.0 ml	5.0 ml	5.0 ml
	Units	µg/L	µg/L	µg/L	µg/L	µg/L
71-43-2	Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
108-88-3	Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
100-41-4	Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1330-20-7	Total Xylenes	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
	Trifluorotoluene	*100%*	*95.0%*	*96.7%*	*97.5%*	*96.7%*
	Bromobenzene	*95.9%*	*91.5%*	*93.8%*	*94.8%*	*93.1%*

CAS Number	Sample No.	308053	308054	308057	308060
	ARI ID	B308D	B308E	B308H	B308J
	Date Analyzed	07/31/92	07/31/92	07/31/92	07/31/92
	Amt Analyzed	5.0 ml	5.0 ml	5.0 ml	5.0 ml
	Units	µg/L	µg/L	µg/L	µg/L
71-43-2	Benzene	**6.0**	**6.1**	1.0 U	1.0 U
108-88-3	Toluene	**5.7**	**6.5**	1.0 U	1.0 U
100-41-4	Ethylbenzene	**9.6**	**12**	**1.4** X	1.0 U
1330-20-7	Total Xylenes	**28**	**32**	**6.5** X	**2.7**
	Trifluorotoluene	*106%*	*104%*	*98.4%*	*95.9%*
	Bromobenzene	*107%*	*115%*	*103%*	*97.6%*

Advisory QC limits
Trifluorotoluene 80-130
Bromobenzene 80-130

Data Reporting Qualifiers

U Indicates compound was analyzed for, but not detected at the given detection limit.
J Indicates an estimated value when that value is less than the calculated detection limit.
X Indicates a value above the linear range of the detector. Dilution required.
S Indicates no value reported due to saturation of the detector.
D Indicates the surrogate was diluted out.
NR Indicates no recovery due to matrix interference and/or dilution.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, WA 98109-518
(206) 621-6490
(206) 621-7523 (FAX)

ORGANICS ANALYSIS DATA SHEET - Method 602/8020
GC/PID FOR BETX

Matrix: Waters
Level: Low

Client Project No: Restover Truck Stop

QC Report No: B308 - WDOE
Date Received: 07/29/92

Data Release Authorized:
Report prepared: 08/04/92 *MAC:X jjr*

CAS Number		Sample No.	Meth Blank	308056	308055
		ARI ID	MB 07/31	B308F	B308G
		Date Analyzed	07/31/92	07/31/92	07/31/92
		Amt Analyzed	5.0 ml	5.0 ml	5.0 ml
		Dilution	1:1	1:25	1:10
		Units	µg/L	µg/L	µg/L
71-43-2	Benzene		1.0 U	**330**	**30**
108-88-3	Toluene		1.0 U	**360**	**21**
100-41-4	Ethylbenzene		1.0 U	**400**	**81**
1330-20-7	Total Xylenes		2.0 U	**1900**	**320**
		Trifluorotoluene	*104%*	*105%*	*106%*
		Bromobenzene	*100%*	*107%*	*106%*

Data Reporting Qualifiers

U	Indicates compound was analyzed for, but not detected at the given detection limit.
J	Indicates an estimated value when that value is less than the calculated detection limit.
X	Indicates a value above the linear range of the detector. Dilution required.
S	Indicates no value reported due to saturation of the detector.
D	Indicates the surrogate was diluted out.
NR	Indicates no recovery due to matrix interference and/or dilution.

WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENVIRONMENTAL INVESTIGATIONS AND LABORATORY SERVICES
MANCHESTER LABORATORY

August 7, 1992

TO: Project Officer

FROM: Despina Strong

SUBJECT: Restover Truck Stop Iron Data

SAMPLE RECEIPT:

The samples from the Restover Truck Stop project were received by the Manchester Laboratory on 7/14/92 in good condition.

HOLDING TIMES:

All analyses were performed within the specified holding times for metals analysis.

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 control limits of +/- 10%.

PROCEDURAL BLANKS:

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

SPIKED SAMPLE ANALYSIS:

Spiked sample and duplicate spiked sample analysis were performed on one sample in the batch. All spike recoveries were within the acceptable limits of +/- 25% for water sample analysis.

PRECISION DATA:

The duplicate results of the spiked and duplicate spiked sample were used to calculate precision related to the analysis of these samples. The % RPD for all parameters was well within the +/- 20% window for duplicate analysis.

STANDARD REFERENCE MATERIAL:

Standard reference material or external verification standards were all within the windows established for each parameter.

ICP SERIAL DILUTION ANALYSIS:

The Relative Percent Difference (RPD) between sample results and the results for a serial dilution of the same sample were less than 10%.

SUMMARY:

The data generated by the analysis of the above referenced samples can be used without qualification.

If you have any questions about the results or the methods used to obtain these results please call me at SCAN 744-4737.

*** Lab Analysis Report ***

==> Transaction #: 08051733 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: (AGH) Hedley, Art DOE Hours Worked:

Project: DOE-405Y RESTOVER TRUCK STOP Prg Ele#: D3K01

Prj Off: Marti, Pam DOE Analysis Due: 920722 Revised Due:

*** Sample Records in Transaction ***

Parameter Form File: ICP381101 Title: ICP Scan, Water Dissolved

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	92308052	LBK1	920721	MW-23A			
02	92308052		920721	MW-23A			
03	92308050		920720	SPENCER			
04	92308051		920721	RESTOVER			
05	92308053		920721	MW-8A			
06	92308054		920721	MW-8B			
07	92308055		920721	MW-20A			
08	92308056		920721	WDOE-6A			
09	92308058		920721	FILTER			
10	92308059		920721	TRANSPORT			
11	92308052	LMX1	920721	MW-23A			
12	92308052	LMX2	920721	MW-23A			

Record Type: TRNIN1 Date Verified: 8-6-92 By: Susan Davis
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 5-AUG-92 17:49:59 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 08051733 (38) Metals - ICP Scan
Proj Code : DOE-405Y RESTOVER TRUCK STOP PE # : D3K01

Blank ID:			EWPB 30.19				
Sample Number:			92308052	92308052	92308050	92308051	92308053
Sample Description:			MW-23A	MW-23A	SPENCER	RESTOVER	MW-8A
Matrix:			Water-Fil	Water-Fil	Water-Fil	Water-Fil	Water-Fil
Units:							
% Slds:							
QA Code:			LBK1				
Date Extract:							
Date Analyzd:			920727	920727	920727	920727	920727
1	Aluminum	Al-Diss ug/l					
2	Antimony	Sb-Diss ug/l					
3	Arsenic	As-Diss ug/l					
4	Barium	Ba-Diss ug/l					
5	Berylium	Be-Diss ug/l					
6	Boron	B -Diss ug/l					
7	Cadmium	Cd-Diss ug/l					
8	Calcium	Ca-Diss ug/l					
9	Chromium	Cr-Diss ug/l					
10	HexChrom	Cr6Diss ug/l					
11	Cobalt	Co-Diss ug/l					
12	Copper	Cu-Diss ug/l					
13	Iron	Fe-Diss ug/l	5.0U	12P	5.0U	9.6P	6020
14	Lead	Pb-Diss ug/l					
15	Mgnsium	Mg-Diss ug/l					
16	Mangnese	Mn-Diss ug/l					
17	Molybdnm	Mo-Diss ug/l					
18	Nickel	Ni-Diss ug/l					
19	Potassium	K -Diss ug/l					
20	Selenium	Se-Diss ug/l					
21	Silicon	Si-Diss ug/l					
22	Silver	Ag-Diss ug/l					
23	Sodium	Na-Diss ug/l					
24	Strntium	Sr-Diss ug/l					
25	Thallium	Tl-Diss ug/l					
26	Tin	Sn-Diss ug/l					
27	Titanium	Ti-Diss ug/l					
28	Tungsten	W -Diss ug/l					
29	Vanadium	V -Diss ug/l					
30	Zinc	Zn-Diss ug/l					

*** Lab Analysis Report ***

Transaction #: 08051733 (38) Metals - ICP Scan
Proj Code : DOE-405Y RESTOVER TRUCK STOP PE # : D3K01

Sample Number:			92308054	92308055	92308056	92308058	92308059
Sample Description:			MW-8B	MW-20A	WDOE-6A	FILTER	TRANSPORT
Matrix:			Water-Fil	Water-Fil	Water-Fil	Water-Fil	Water-Fil
Units:							
% Slds:							
QA Code:							
Date Extract:							
Date Analyzd:			920727	920727	920727	920727	920727
1 Aluminum	Al-Diss	ug/l					
2 Antimony	Sb-Diss	ug/l					
3 Arsenic	As-Diss	ug/l					
4 Barium	Ba-Diss	ug/l					
5 Berylium	Be-Diss	ug/l					
6 Boron	B -Diss	ug/l					
7 Cadmium	Cd-Diss	ug/l					
8 Calcium	Ca-Diss	ug/l					
9 Chromium	Cr-Diss	ug/l					
10 HexChrom	Cr6Diss	ug/l					
11 Cobalt	Co-Diss	ug/l					
12 Copper	Cu-Diss	ug/l					
13 Iron	Fe-Diss	ug/l	6000	2120	6200	9.7P	5.0U
14 Lead	Pb-Diss	ug/l					
15 Mgnsium	Mg-Diss	ug/l					
16 Mangnese	Mn-Diss	ug/l					
17 Molybdnm	Mo-Diss	ug/l					
18 Nickel	Ni-Diss	ug/l					
19 Potassium	K -Diss	ug/l					
20 Selenium	Se-Diss	ug/l					
21 Silicon	Si-Diss	ug/l					
22 Silver	Ag-Diss	ug/l					
23 Sodium	Na-Diss	ug/l					
24 Strntium	Sr-Diss	ug/l					
25 Thallium	Tl-Diss	ug/l					
26 Tin	Sn-Diss	ug/l					
27 Titanium	Ti-Diss	ug/l					
28 Tungsten	W -Diss	ug/l					
29 Vanadium	V -Diss	ug/l					
30 Zinc	Zn-Diss	ug/l					

*** Lab Analysis Report ***

Transaction #: 08051733 (38) Metals - ICP Scan
Proj Code : DOE-405Y RESTOVER TRUCK STOP PE # : D3K01

Sample Number:			92308052	92308052
Sample Description:			MW-23A	MW-23A
Matrix:			Water-Fil	Water-Fil
Units:			% Recov	% Recov
% Slds:				
QA Code:			LMX1	LMX2
Date Extract:				
Date Analyzd:			920727	920727
1 Aluminum	Al-Diss	ug/l		
2 Antimony	Sb-Diss	ug/l		
3 Arsenic	As-Diss	ug/l		
4 Barium	Ba-Diss	ug/l		
5 Berylium	Be-Diss	ug/l		
6 Boron	B -Diss	ug/l		
7 Cadmium	Cd-Diss	ug/l		
8 Calcium	Ca-Diss	ug/l		
9 Chromium	Cr-Diss	ug/l		
10 HexChrom	Cr6Diss	ug/l		
11 Cobalt	Co-Diss	ug/l		
12 Copper	Cu-Diss	ug/l		
13 Iron	Fe-Diss	ug/l	97	98
14 Lead	Pb-Diss	ug/l		
15 Mgnsium	Mg-Diss	ug/l		
16 Mangnese	Mn-Diss	ug/l		
17 Molybdnm	Mo-Diss	ug/l		
18 Nickel	Ni-Diss	ug/l		
19 Potassium	K -Diss	ug/l		
20 Selenium	Se-Diss	ug/l		
21 Silicon	Si-Diss	ug/l		
22 Silver	Ag-Diss	ug/l		
23 Sodium	Na-Diss	ug/l		
24 Strntium	Sr-Diss	ug/l		
25 Thallium	Tl-Diss	ug/l		
26 Tin	Sn-Diss	ug/l		
27 Titanium	Ti-Diss	ug/l		
28 Tungsten	W -Diss	ug/l		
29 Vanadium	V -Diss	ug/l		
30 Zinc	Zn-Diss	ug/l		

*** Lab Analysis Report ***

==> Transaction #: 09221537 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: (AGH) Hedley, Art DOE Hours Worked:

Project: DOE-405Y RESTOVER TRUCK STOP Prg Ele#: D3K01

Prj Off: Marti, Pam DOE Analysis Due: 920722 Revised Due:

*** Sample Records in Transaction ***

Parameter Form File: ICP381101 Title: ICP Scan, Water Dissolved

Seq#	Sample #	QA	Date/Time	Description	Alternate Keys		
01	92308060		920721	MW-17			

Record Type: TRNIN1 Date Verified: 9-23-92 By: Susan Davis
Transaction Status: New Transaction...First Printing...Unverified.
Processed: 22-SEP-92 15:38:45 Status: N Batch: (In CUR DB)

*** Lab Analysis Report ***

Transaction #: 09221537 (38) Metals - ICP Scan
Proj Code : DOE-405Y RESTOVER TRUCK STOP PE # : D3K01

Sample Number:				92308060
Sample Description:				MW-17
Matrix:				Water-Fil
Units:				
% Slds:				
QA Code:				
Date Extract:				
Date Analyzd:				920927
1	Aluminum	Al-Diss	ug/l	
2	Antimony	Sb-Diss	ug/l	
3	Arsenic	As-Diss	ug/l	
4	Barium	Ba-Diss	ug/l	
5	Berylium	Be-Diss	ug/l	
6	Boron	B -Diss	ug/l	
7	Cadmium	Cd-Diss	ug/l	
8	Calcium	Ca-Diss	ug/l	
9	Chromium	Cr-Diss	ug/l	
10	HexChrom	Cr6Diss	ug/l	
11	Cobalt	Co-Diss	ug/l	
12	Copper	Cu-Diss	ug/l	
13	Iron	Fe-Diss	ug/l	5.0P
14	Lead	Pb-Diss	ug/l	
15	Mgnsium	Mg-Diss	ug/l	
16	Mangnese	Mn-Diss	ug/l	
17	Molybdnm	Mo-Diss	ug/l	
18	Nickel	Ni-Diss	ug/l	
19	Potassium	K -Diss	ug/l	
20	Selenium	Se-Diss	ug/l	
21	Silicon	Si-Diss	ug/l	
22	Silver	Ag-Diss	ug/l	
23	Sodium	Na-Diss	ug/l	
24	Strntium	Sr-Diss	ug/l	
25	Thallium	Tl-Diss	ug/l	
26	Tin	Sn-Diss	ug/l	
27	Titanium	Ti-Diss	ug/l	
28	Tungsten	W -Diss	ug/l	
29	Vanadium	V -Diss	ug/l	
30	Zinc	Zn-Diss	ug/l	