GROUNDWATER INVESTIGATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION - (OLD) RIMROCK MAINTENANCE FACILITY JUNCTION OF US ROUTE 12 AND STATE ROUTE 410 RIMROCK, WASHINGTON

August 4, 1999

Prepared by WSDOT - FOSSC - Environmental Service Branch

GENERAL INFORMATION

SITE NAME: WSDOT (Old) ~~Wilbur~~ Maintenance Facility

LOCATION: Junction of US Route 12 and State Route 410
Yakima County

OWNER: Washington State Department of Transportation

CONTACT: Norm Payton
Washington State Department of Transportation
FOSSC - Environmental Service Branch
PO. Box 47358
Olympia, WA 98504-7358
(360) 705-7848

1.0 Introduction and Background. The Washington State Department of Transportation (WSDOT) Old Rimroc Maintenance Facility is located at the junction of US Route 12 and State Route 410 (see Appendix A). WSDOT utilized the site for storage and maintenance of highway equipment. On May 7, 1991, the Washington State Department of Transportation (WSDOT) and its contractor removed one (1) 500 gallon unleaded underground storage tank (UST) and one (1) 1,500 gallon diesel UST. The unleaded tank had two holes in it's north end. Soil ar groundwater surrounding the tanks were obviously contaminated. Contaminated soil was removed from the excavation on this date and during three ensuing remediation efforts. Results of soil samples obtained during these remediation efforts showed that contamination still remained under the maintenance building (see Appendix B - Rimrock Cleanup Action Report). It was determined that additional excavation would undermine the foundation of the existing building and jeopardize its structural integrity. At the time of the UST removal, a new facility was scheduled for construction. It was decided that this remaining contamination was to be remediated after the maintenance building was vacated and demolished. In a letter dated March 1, 1994, the Department of Ecology informed WSDOT that a hazard ranking of 5 was given to the WSDOT - Rimrock site.

In October 1995 and April 1996, approximately 800 cubic yards of petroleum contaminated soil was excavated fr this site. Petroleum floating on top of the groundwater had impacted a greater extent of soil than originally anticipated. Based on laboratory results the soils remaining on site after excavation were below the Model Toxics Control Act (MTCA) method A cleanup levels. The contaminated soil was bioremediated off site and since has be approved for reuse on roadside maintenance projects by the Yakima Health District.

Since groundwater was in contact with contaminated soil, testing for the presence of groundwater contamination would be necessary. This report documents the installation and sampling of four groundwater wells installed at thi site.

2.0 Groundwater Assessment. This phase of work performed by the WSDOT Environmental Service Branch consisted of drilling and installing four groundwater monitoring wells, for the purpose of collecting soil and groundwater samples for analysis, and to provide information on groundwater at the site.

2.1 Subsurface Drilling. Four on-site groundwater monitoring wells were installed on October 7, 1997. The wells were placed in locations believed to be either up and/or down gradient of potential sources. They were also located such that they would be away from both above and below ground utilities, and not be damaged by the weight of heavy equipment. The monitoring well locations are shown on Figure 1.

The wells were drilled by Environmental West Exploration of Spokane, Washington. Drilling was performed using a truck mounted tubex drill rig and 6-inch I.D. casing. Soil samples were generally collected at five foot intervals from the surface of each boring while drilling. All samples were screened in the field with a photoionization detector (PID) for the presence of volatile hydrocarbons.

The augers were steam cleaned prior to drilling each bore hole. Samples were collected using a 140-pound hammer with a 30-inch drop and, oversized split-spoon sampler. The sampler was washed with a Alconox solution and rinsed with tap and distilled water prior to collecting each sample. Soil samples were transferred directly from the sampler to the sample containers using a stainless steel spoon to avoid loss of volatile components. The stainless steel spoon was washed in the same manner as the split-spoon sampler. Samples were stored and transported on ice. These samples were transported under chain of custody procedures to Sound Analytical, Inc., in Tacoma, WA for analysis.

Groundwater monitoring wells were constructed with flush-mount and above ground monuments and consist of threaded, 2-inch Schedule 40 polyvinyl chloride (PVC) casing and screen. The well screen has machined slots with openings of 0.020-inch. The wells have a total depth of 10 feet and are approximately screened between 3 and 10 feet below surface grade. A gravel pack consisting of 10/20 silica sand was placed around and extended above the top of the screen. A bentonite seal was placed at the top of the filter pack. The annulus above the bentonite seal was filled with concrete. The bentonite and concrete were hydrated with potable water. The tops of the wells were sealed with expansion plugs. Monitoring well construction logs and well completion diagrams are presented in Appendix A.

Groundwater level measurements were obtained from the site monitoring wells by Environmental Service Branch personal on prior to removing any water from each well. The measurements were made to the nearest 0.01 foot from the top of well. The depth to groundwater for each quarter is shown in Table 1. All drill cuttings, decontamination water and water generated during monitoring well development were temporarily stored on site.

Monitoring	Ground	Monument	PVC	Groundwater Elevation				Groundwater Depth From Top of PVC			
Well ID	Elevation	Elevation	Elevation	10/8/1997	2/4/1998	4/28/1998	8/10/1998	10/8/1997	2/4/1998	4/28/1998	8/10/1998
MW1	94.54	94.7	94.31	92.29	92.3	92.19	92.41	2.02	2.01	2.12	1.9
MW2	93.75	93.96	93.39	90.19	91.3	90.21	90.62	3.2	2.09	3.18	2.77
MW3	90.135	92.79	92.98	85.13	86.68	86.09	85.26	7.85	6.3	6.89	7.72
MW4	90.005	93.15	92.77	86.67	87.37	86.88	86.75	6.1	5.4	5.89	6.02

Table 1.

Groundwater elevation data was subsequently contoured to determine the groundwater gradient at the site. Suspected groundwater flow is generally from northwest to southeast (See Figure 3).

Groundwater samples were obtained by WSDOT - Environmental Service Branch staff on 10/8/97, 2/4/98, 4/28/98, and 8/10/98. Wells were checked for the presence of free product prior to purging. Following measurement of groundwater levels, each monitoring well was purged of approximately three casing volumes or bailed dry. Where possible, the monitoring wells were purged until the parameters including groundwater pH, electrical conductivity, and temperature had stabilized.

After purging groundwater samples were collected for BTEX, TPH, and total lead analysis using a Grundfos Redi-flo 2 submergible pump, and were placed in 40 milliliter Volatile Organic Analysis (VOA) vials, one liter amber containers with Teflon septa, and 500 milliliter plastic containers. The amber containers and plastic containers were acidified with hydrochloric and nitric acid respectively. The samples were transported under chain-of-custody procedures, to Sound Analytical Inc., located in Tacoma, Washington.

All purge waters were containerized in labeled 55 gallon drums until analytical results were received from the laboratory. Based upon these results the decontamination water and purge water was discharged to an oil-water separator connected to sanitary sewer. Soil cuttings were placed with the contaminated soil generated during the removal of underground storage tanks at the WSDOT facility in Electric City.

2.2 Subsurface Conditions. The subsurface soil in the upper 10 feet generally consists of gray gravely sand with cobbles or gravel with cobbles. Water was encountered between 2 and 6 feet below surface in all of the wells.

2.3 Monitoring Well Soil Boring Results. Two soil samples were collected from the four monitoring well borings (RMW1 through RMW4). Attempts were made to collect additional soil samples, but soil conditions did not allow recovery. The soil samples collected were analyzed for total petroleum hydrocarbons (TPH) as heavy oil, diesel, and gasoline, along with BTEX. All of the soil samples collected had non-detectable results. A summary of the results is shown in Table 2. Refer to Appendix B for copies of the analytical results as reported by Sound Analytical, Inc.

Summary of Analytical Results -Monitoring Well Soil Borings
(Old) WSDOT Rimrock Maintenance Facility

Sample	Date	Matrix	WTPH- D Ext. (mg/kg)		TPH-G	Benzene	Toluene	E-Benzene	Xylene
I.D.	(mo/day/yr)		Diesel	Heavy Oil	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
RMW1-10	10/7/1997	Soil	ND	ND	ND	ND	ND	ND	ND
RMW2-10	10/7/1997	Soil	ND	ND	ND	ND	ND	ND	ND
MTCA Method A Cleanup Levels			**200**	**200**	**100**	**0.5**	**40**	**20**	**20**

ND - Not Detected
NA - Not Analyzed

Table 2.

2.4 Monitoring Well Groundwater Results. Samples collected during four quarters of groundwater monitoring were analyzed for TPH as heavy oil, diesel, and gasoline, along with BTEX. Water collected from the first quarter of sampling was also analyzed for total lead. Toluene was detected in RMW1, RMW2, and RMW4 during the 4/28/1998 sampling event, although well below cleanup levels. All other parameters

were below detection levels. A summary of the results is shown in Table 3. Refer to Appendix C for copies of the analytical results as reported by Sound Analytical, Inc.

Summary of Analytical Results -Monitoring Well Groundwater
(Old) WSDOT Rimrock Maintenance Facility

Sample	Date	Matrix	WTPH- D Ext. (mg/L)		TPH-G	Benzene	Toluene	E-Benzene	Xylene	Total Pb
I.D.	(mo/day/yr)		Diesel	Heavy Oil	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
RMW1	10/8/1997	Water	ND	ND	ND	ND	ND	ND	ND	ND
RMW2	10/8/1997	Water	ND	ND	ND	ND	ND	ND	ND	ND
RMW3	10/8/1997	Water	ND	ND	ND	ND	ND	ND	0.002	ND
RMW4	10/8/1997	Water	ND	ND	ND	ND	ND	ND	ND	ND
RMW1	2/4/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW2	2/4/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW3	2/4/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW4	2/4/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW1	4/28/1998	Water	ND	ND	ND	ND	0.00071	ND	ND	NA
RMW2	4/28/1998	Water	ND	ND	ND	ND	0.00057	ND	ND	NA
RMW3	4/28/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW4	4/28/1998	Water	ND	ND	ND	ND	0.00069	ND	ND	NA
RMW1	8/10/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW2	8/10/1998	Water	0.22	ND	ND	ND	ND	ND	ND	NA
RMW3	8/10/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
RMW4	8/10/1998	Water	ND	ND	ND	ND	ND	ND	ND	NA
MTCA Method A Cleanup Levels			1 0.5	1 0.5	1 0.8/1	**0.005**	0.04 1	0.03 0.7	0.02 1	**0.005** 0.015

ND - Not Detected
NA - Not Analyzed

Table 3.

3.0 Conclusions and Recommendations. The results of the four quarters of sampling conducted at this site indicate that petroleum contamination levels in groundwater at this site are below the Model Toxics Control Act method A cleanup levels. No further action is planned for this site.

Prepared by:

Norman Payton
Hazardous Materials Specialist
WSDOT - Environmental Service Branch

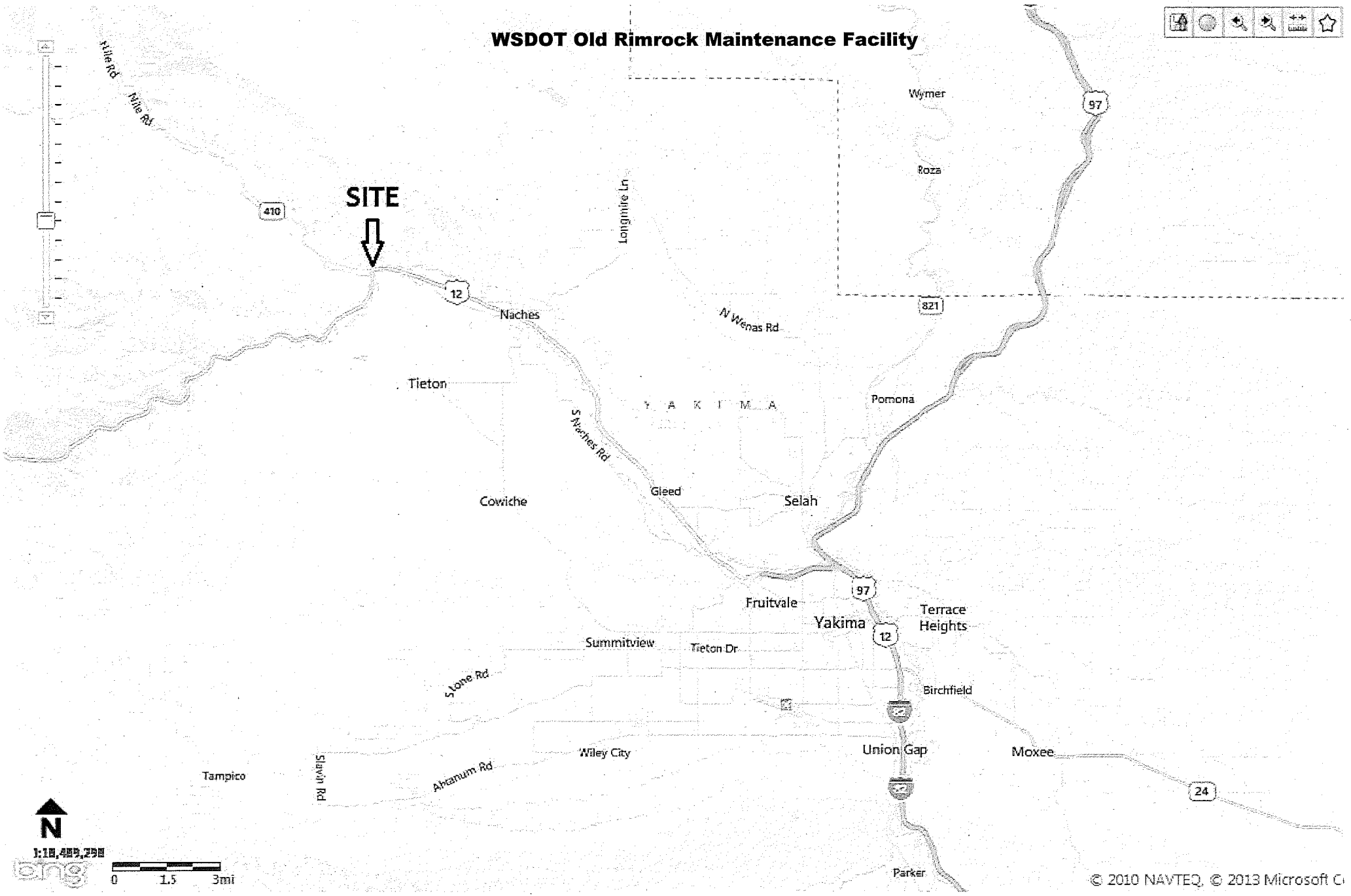

Rimrock Monitoring Wells
410
12
Groundwater Flow
MW-1
Former USTs
Former Maintenance Bldg.
MW-2
MW-4
MW-3
12
N
0 50 100
Feet

APPENDIX A

Vicinity Map

Geologic Boring/Well Construction Logs

WSDOT Old Rimrock Maintenance Facility



ENVIRONMENTAL BOREHOLE LOG

Date Started 10/7/97	Location SW1/4, NE1/4, SEC.35, T15N, R16E	Depth Water First Encountered (Ft) 2.15
Date Completed 10/7/97	Drilling Company Environmental West	Drilling Method Tubex
Total Depth (Ft) 10	Sampling Method Exploration 3" O.D. Split-Spoon	Hammer Weight (lbs) 140
Borehole Diam. (In) 6	Ground Elev. (Ft) 94.54	Monument Elev. (Ft) 94.7 / PVC Elev. (Ft) 94.31

Depth (Ft)	Sample Number	Interval	Blow Counts/6 in.	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							1.0	Gray, gravelly SAND with cobbles, damp.	SP			1.0
												2.0
											ATD 10/8/97	3.0
5			30, 50 FOR 3"	10%	ND	0858	5.0	Gray, GRAVEL with cobbles, wet.	GP			
10	RMW1-10		50 FOR 5"	25%	ND	0917	10.0	Gray, gravelly SAND wet.	SP			10.0
								Bottom of Boring				
15												
20												
25												

Remarks: Refer to key for explanation of terminology and symbols.

*USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- 2" O.D. Split-Spoon Sample
- 3" O.D. Split-Spoon Sample
- Water Level and Date Measured
- Water Levels at Time of Drilling

WA State Department of Transportation

Old Rimrock Groundwater Monitoring Well Installation

Log of Boring

MW-1

Logged By	Reviewed By	
NP	NP	WSDOT Environmental Service Branch

Fig. C-1

ENVIRONMENTAL BOREHOLE LOG

Date Started 10/7/97	Location SW1/4, NE1/4, SEC.35, T15N, R16E	Depth Water First Encountered (Ft) 2.15
Date Completed 10/7/97	Drilling Company Environmental West Exploration	Drilling Method Tubex
Total Depth (Ft) 10	Sampling Method 3' O.D. Split-Spoon	Hammer Weight (lbs) 140
Borehole Diam. (In) 6	Ground Elev. (Ft) 93.75 / Monument Elev. (Ft) 93.96	PVC Elev. (Ft) 93.39

Depth (Ft)	Sample Number	Interval	Blow Counts/6 in.	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							1.0	Gray, gravelly SAND with cobbles, damp.	SP			1.0
									SP			2.0
												3.0
5			50 FOR 5'	0%	NA	1120	5.0	Split spoon was wet. No petroleum odor.	SP			
10	RMW2-10		50 FOR 5'	25%	ND	1144	10.0	Gray, SAND, wet. No petroleum odor.	SP			10.0
								Bottom of Boring				
15												
20												

Remarks: Refer to key for explanation of terminology and symbols.

*USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

— 2" O.D. Split-Spoon Sample
III 3" O.D. Split-Spoon Sample
▼ Water Level and Date Measured
▽ Water Levels at Time of Drilling

WA State Department of Transportation

Old Rimrock Groundwater Monitoring Well Installation

Log of Boring

MW-2

Logged By	Reviewed By	
NP	NP	WSDOT Environmental Service Branch

Fig. C-1

ENVIRONMENTAL BOREHOLE LOG

Date Started 10/7/97	Location SW1/4, NE1/4, SEC.35, T15N, R16E	Depth Water First Encountered (Ft) 4.8
Date Completed 10/7/97	Drilling Company Environmental West Exploration	Drilling Method Tubex
Total Depth (Ft) 10	Sampling Method 3" O.D. Split-Spoon	Hammer Weight (lbs) 140
Borehole Diam. (In) 6	Ground Elev. (Ft) 90.135 / Monument Elev. (Ft) 92.79	PVC Elev. (Ft) 92.98

Depth (Ft)	Sample Number	Interval	Blow Counts/6 in.	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							1.0	Gray, gravelly SAND with cobbles, damp.	SP			1.0
								GRAVEL with cobbles. Wet at 4.8'.	GP			
5			50 FOR 5"	0%	NA	1315	5.0				ATD 10/8/97	3.0
10								Bottom of Boring				10.0
15												
20												

Remarks: Refer to key for explanation of terminology and symbols.

*USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- 2" O.D. Split-Spoon Sample
- 3" O.D. Split-Spoon Sample
- Water Level and Date Measured
- Water Levels at Time of Drilling

WA State Department of Transportation

Old Rimrock Groundwater Monitoring Well Installation

Log of Boring

MW-3

Logged By	Reviewed By	
NP	NP	WSDOT Environmental Service Branch

Fig. C-1

ENVIRONMENTAL BOREHOLE LOG

Date Started 10/7/97	Location SW1/4, NE1/4, SEC.35, T15N, R16E	Depth Water First Encountered (Ft) 4.8	
Date Completed 10/7/97	Drilling Company Environmental West Exploration	Drilling Method Tubex	
Total Depth (Ft) 10	Sampling Method 3" O.D. Split-Spoon	Hammer Weight (lbs) 140	
Borehole Diam. (In) 6	Ground Elev. (Ft) 90.005	Monument Elev. (Ft) 93.15	PVC Elev. (Ft) 92.77

Depth (Ft)	Sample Number	Interval	Blow Counts/6 in.	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							1.0	Gray, gravelly SAND with cobbles, damp.	SP			1.0
								GRAVEL with cobbles. Wet at 8.91'.	GP			3.0
5			50 FOR 6"	0%	NA	1342	5.0				10/8/97 ATD	
10								Bottom of Boring				10.0
15												
20												

Remarks: Refer to key for explanation of terminology and symbols.

*USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- 2" O.D. Split-Spoon Sample
- 3" O.D. Split-Spoon Sample
- Water Level and Date Measured
- Water Levels at Time of Drilling

WA State Department of Transportation

Old Rimrock Groundwater Monitoring Well Installation

Log of Boring

MW-4

Logged By	Reviewed By	
NP	NP	WSDOT Environmental Service Branch

Fig. C-1

APPENDIX B

Rimrock Cleanup Action Reports

Soil Boring Sample Results

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION
P. O. Box 1709
4200 Main Street
Vancouver, WA 98663
(206) 696-6518

SUPPLEMENT

Cleanup Action
for the WSDOT Property at

RIMROCK

Junction U.S. 12 & SR 410
Naches, Washington

Fuel Tank Replacement
Phase 3 1990
August 1992

Rimrock DOT Facility
Junction US 12 & SR 410
Naches, Washington

In June and July 1991, a land farm was created on the DOT property known as Rimrock using the contaminated soil that was excavated from the fuel tank area.

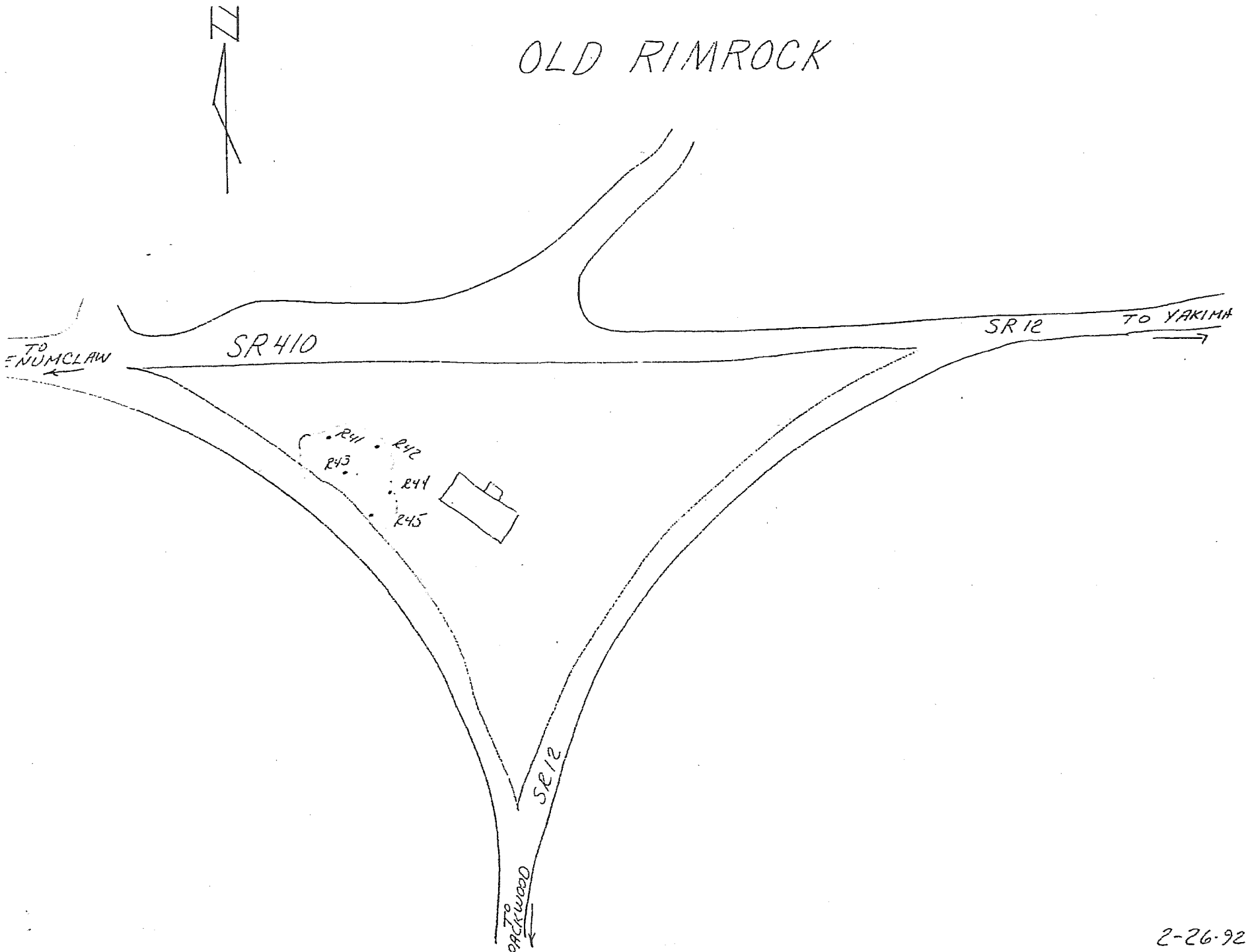
This material was spread out in a layer less than one foot thick. A front end loader was used to rotate and mix the soil.

On February 26, 1992, five soil samples were taken from the land farm. A WRPH-HCID test was performed on all five samples. The gasoline content was less than 20 mg/kg for all five samples. The heavy petroleum oils were less than 100 mg/kg for all five samples. The diesel content was less than 50 mg/kg for samples R-41 and R-42. Sample R-43 was 240 mg/kg, R-44 was 160 mg/kg and R-45 was 58 mg/kg as diesel.

By using Appendix E of Guidance for Remediation of Releases from Underground Storage Tanks, it can be shown that the TPH levels in the land farm are in compliance with cleanup standards. The mean for the five samples of 50, 50, 240, 160, and 58 is 111.6. The standard deviation is 85.6. The results of the formula in Appendix E is 170.3 mg/kg as diesel which is below the cleanup standard of 200 mg/kg.

The material from the land farm was used to fill a low area on site.

APPENDIX


OLD RIMROCK
N
SR 410
TO ENUMCLAW
SR 12
TO YAKIMA
R41
R42
R43
R44
R45
SR 12
TO PACKWOOD

2-26-92

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA St. Dept. of Transportation Date: March 17, 1992

Report On: Analysis of Soil Lab No: 22943

IDENTIFICATION:
Samples received on 02-28-92
Project: Rimrock

ANALYSIS:

Lab Sample No.	1	2	3
Client ID	R-41	R-42	R-43
Units	mg/kg	mg/kg	mg/kg
WTPH-HCID			
Gasoline (C7 - C12)	< 20	< 20	< 20
Diesel (> C12 - C24)	< 50	< 50	> 50
Heavy Petroleum Oils (C24+)	< 100	< 100	< 100
SURROGATE RECOVERIES			
WTPH-HCID			
1-Chlorooctane %	98	92	102
Perylene %	87	89	99

ND = None detected
< = less than
> = greater than

Results are reported on a dry weight basis.

Continued . . .

SOUND ANALYTICAL SERVICES, INC.

WA St. Dept. of Transportation
Project: Rimrock

Lab No. 22943
March 17, 1992

Lab Sample No.	4	5
Client ID	R-44	R-45
Units	mg/kg	mg/kg
WTPH-HCID		
Gasoline (C7-C12)	< 20	< 20
Diesel (> C12-C24)	> 50	> 50
Heavy Petroleum Oils (C24+)	< 100	< 100
SURROGATE RECOVERIES		
WTPH-HCID		
1-Chlorooctane %	91	101
Perylene %	85	100

ND = None detected
< = less than
> = greater than

Results are reported on a dry weight basis.

Continued . . .

SOUND ANALYTICAL SERVICES, INC.

WA St. Dept. of Transportation
Project: Rimrock

Lab No. 22943
March 17, 1992

Lab Sample No.	3	4	5
Client Identification	R-43	R-44	R-45
Units	mg/kg	mg/kg	mg/kg
WTPH-D Diesel (> C12 - C24)	240	160	58
SURROGATE RECOVERIES WTPH-D Perylene %	68	66	68

Results are reported on a dry weight basis.

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

ANALYTICAL NARRATIVE

Client: WA St. Dept. of Transportation Date: March 17, 1992

Project: Rimrock Lab No.: 22943

Delivered by: Harry Horne

Date Sampled: 02-27-92

Condition of Samples on Receipt:

Samples were received cold and in good condition. Chain-of-custody was in order.

EXTRACTION AND ANALYSIS DATES

Samples were analyzed for diesel range hydrocarbons per WA State DOE method WTPH-D. Samples were extracted on 03-12-92. The extracts were analyzed on 03-16-92 and reported on a dry weight basis.

Samples were qualitatively screened for total petroleum fuel hydrocarbons in accordance with WA State DOE Method WTPH-HCID. Samples were extracted on 03-01-92. The extracts were analyzed on 03-06-92 and reported on a dry weight basis.

All Quality Control was within acceptable limits.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206) 922-2310 - FAX (206) 922-5047

QUALITY CONTROL REPORT

Client: WA St. Dept. of Transportation
Project: Rimrock
Lab No: 22943
Matrix: Soil
Units: mg/kg
Date: March 17, 1992

DUPLICATES

Lab No: 22943 (1) Client ID: R-41

Parameter	Sample(S)	Duplicate(D)	RPD
WTPH-HCID			
Gasoline (C7 - C12)	< 20	< 20	0.0
Diesel (>C12 - C24)	< 50	< 50	0.0
Heavy Petroleum Oils (>C24)	< 100	< 100	0.0
SURROGATE RECOVERIES			
WTPH-HCID			
1-Chlorooctane %	98	92	
Perylene %	87	87	

Lab No: 22943 (3) Client ID: R-43

Parameter	Sample(S)	Duplicate(D)	RPD
WTPH-D			
Diesel (>C12-C24)	240	230	4.3
SURROGATE RECOVERIES			
WTPH-D			
Perylene	68	73	

< = less than

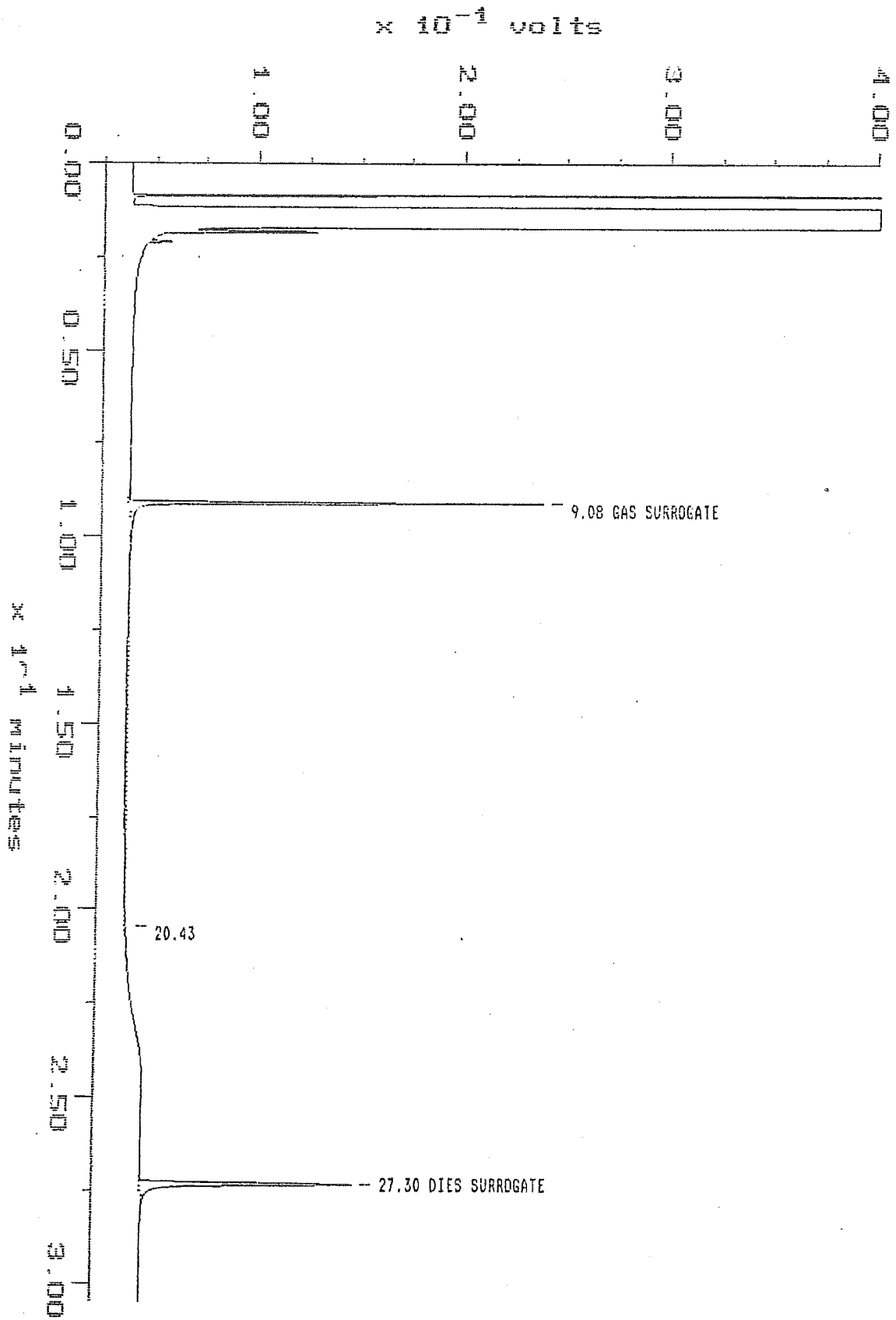
Results reported on a dry weight basis.

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

Sample: 22943-1
Acquired: 07-MAR-92 9:17
Dilution: 1 : 10.000

Channel: HP 5890-II
Method: C:\MAX\DATA2\8015D
Amount: 10.657

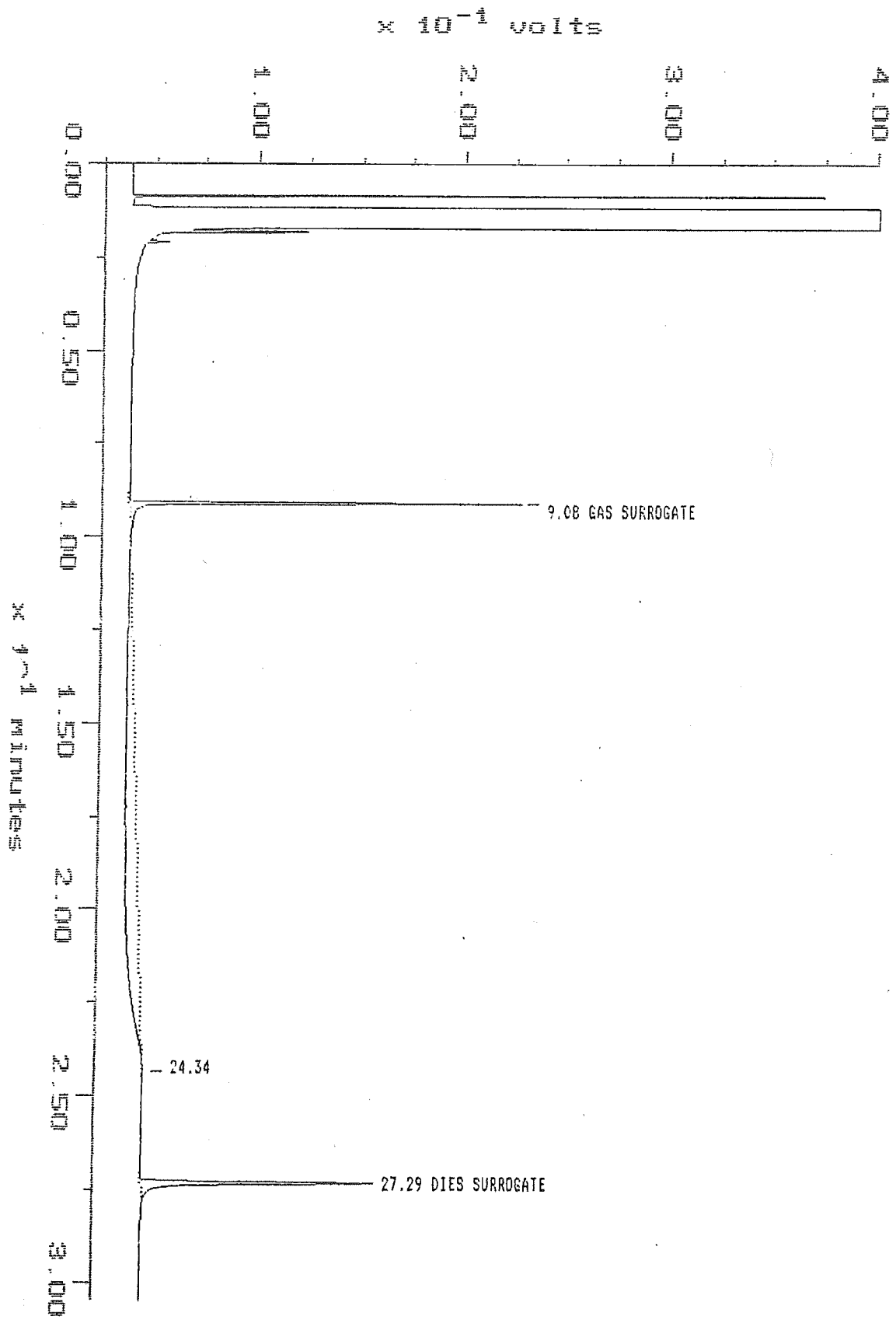
Filename: 22943-1
Operator: DAS



Sample: 22943-1D
Acquired: 07-MAR-92 9:56
Dilution: 1 : 10.000

Channel: HP 5890-II
Method: C:\MAX\DATA2\B015D
Amount: 10.260

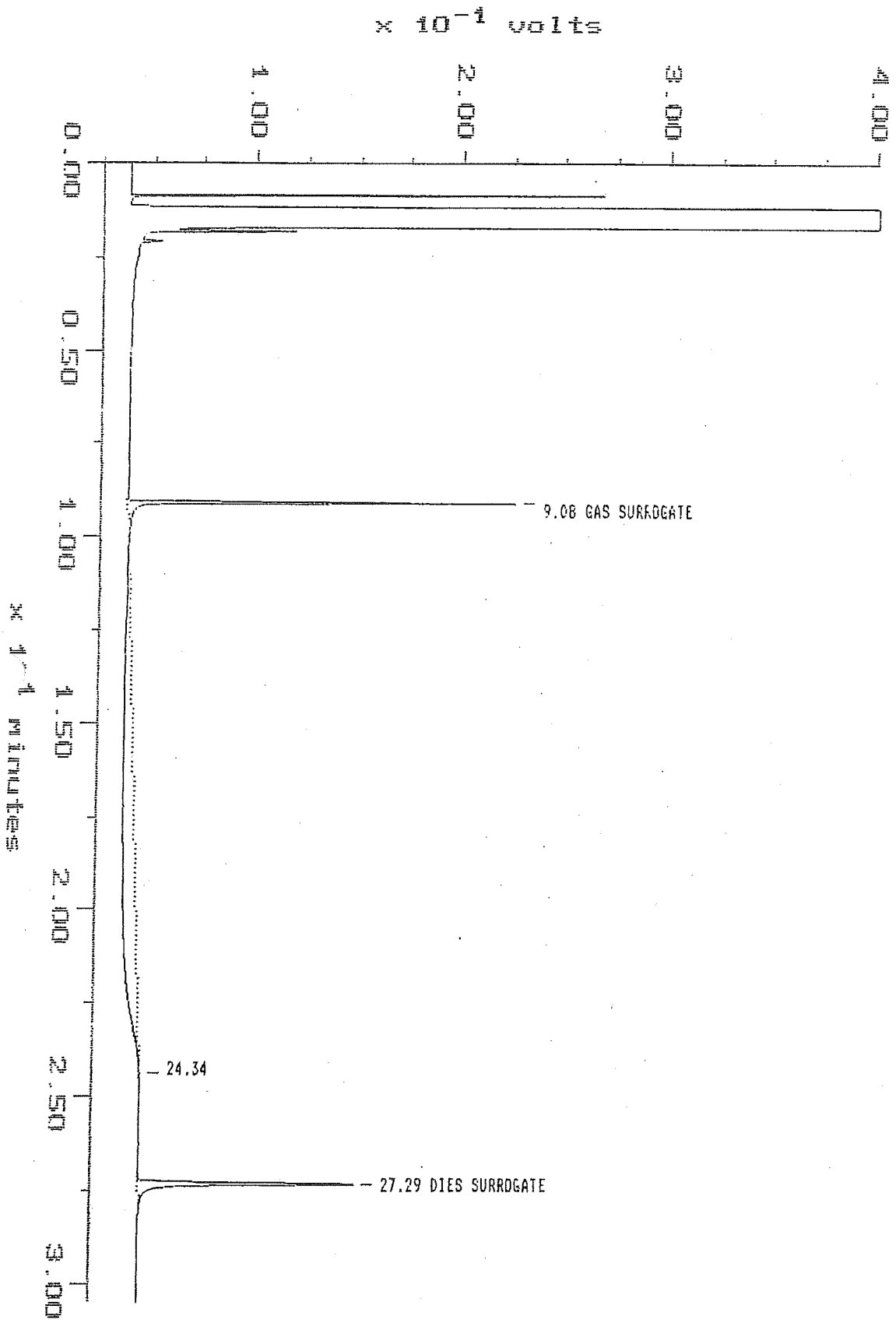
Filename: 22943-1D
Operator: DAS



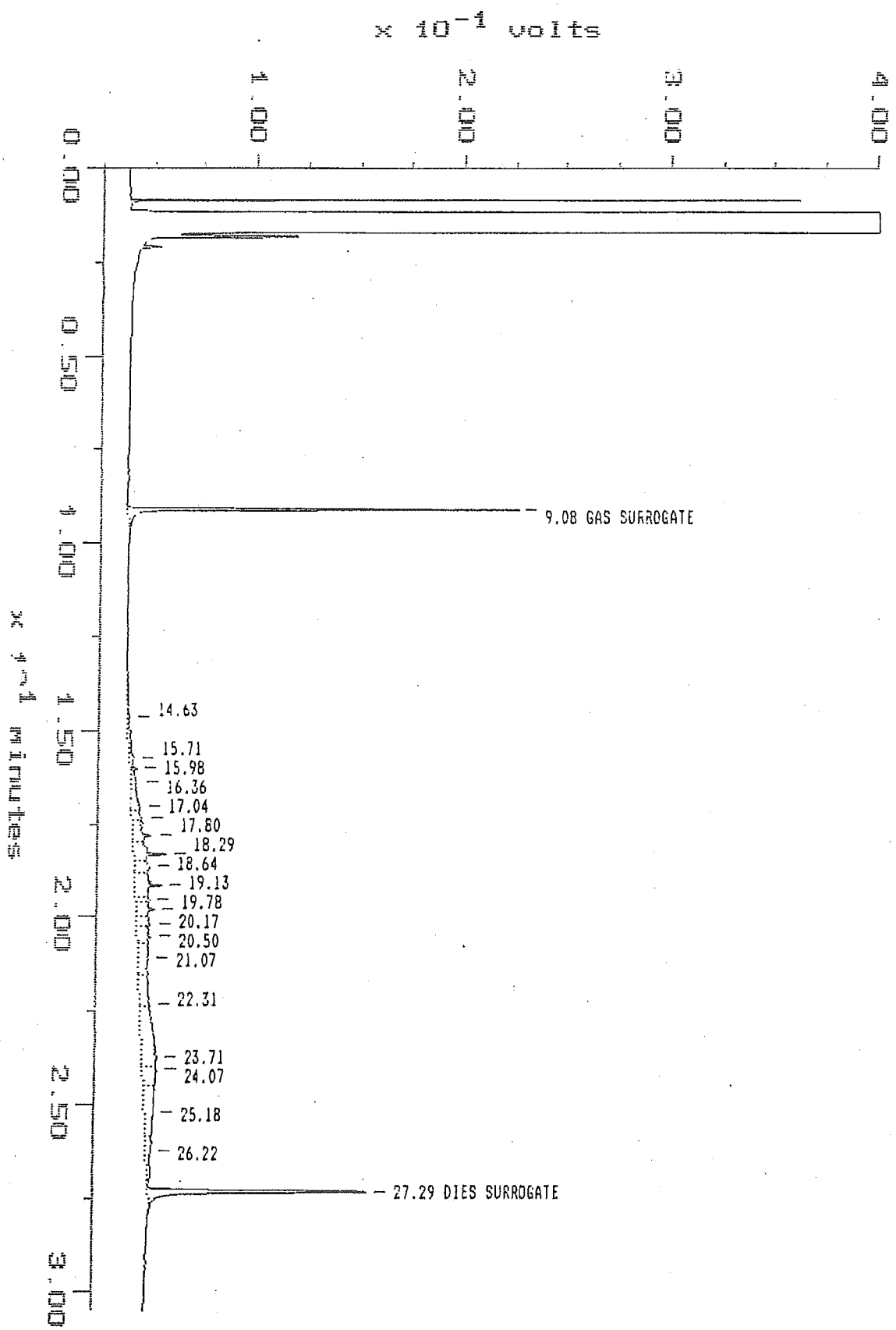
Sample: 22943-2
Acquired: 07-MAR-92 10:35
Dilution: 1 : 10.000

Channel: HP 5890-II
Method: C:\MAX\DATA2\8015D
Amount: 10.385

Filename: 22943-2
Operator: DAS



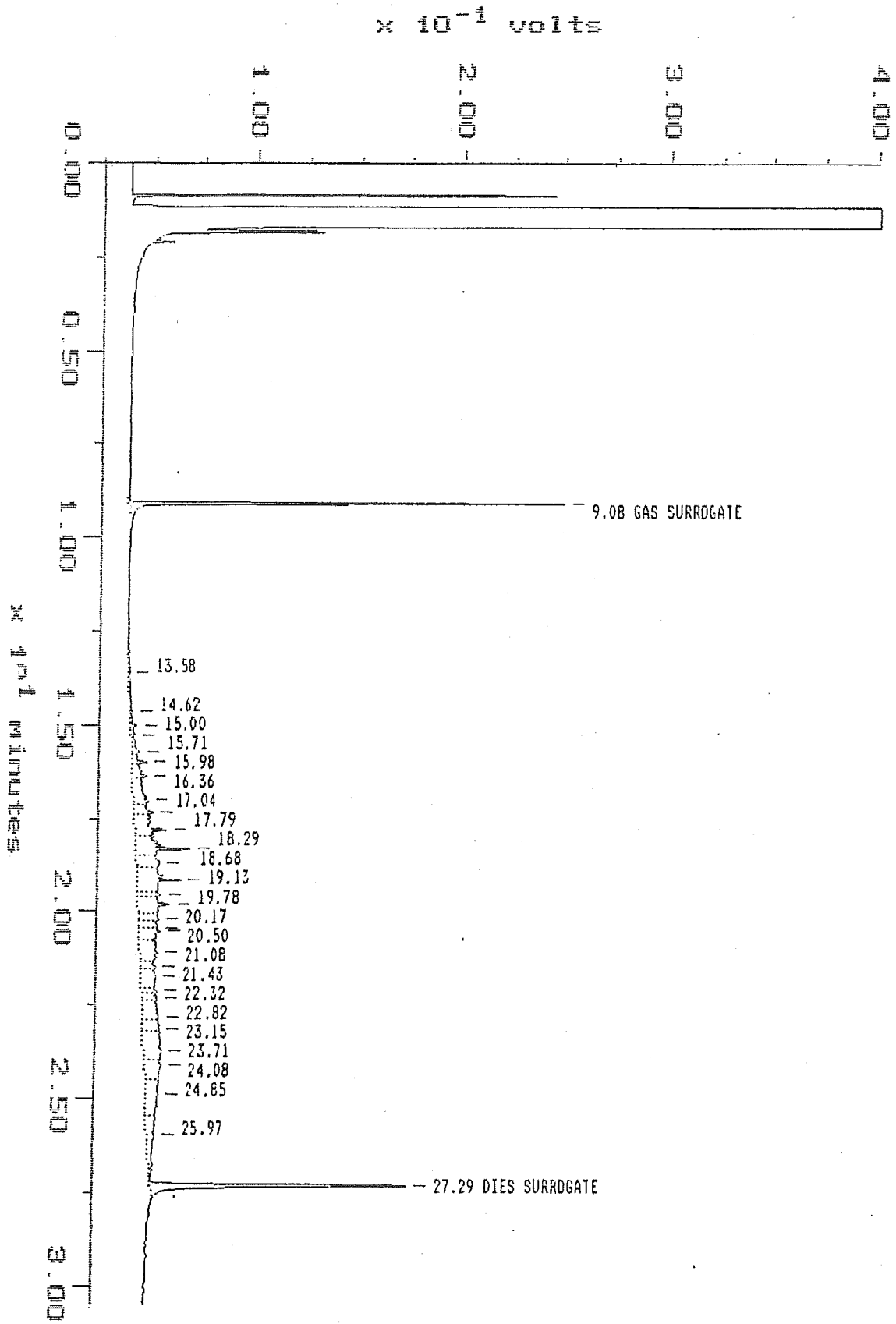
Sample: 22943-4 Channel: HP 5890-II Filename: 22943-4
Acquired: 07-MAR-92 11:53 Method: C:\MAX\DATA2\8015D Operator: DAS
Dilution: 1 : 10.000 Amount: 10.053



Sample: 22943-3
Acquired: 07-MAR-92 11:14
Dilution: 1 : 10.000

Channel: HP 5890-II
Method: C:\MAX\DATA2\8015D
Amount: 10.549

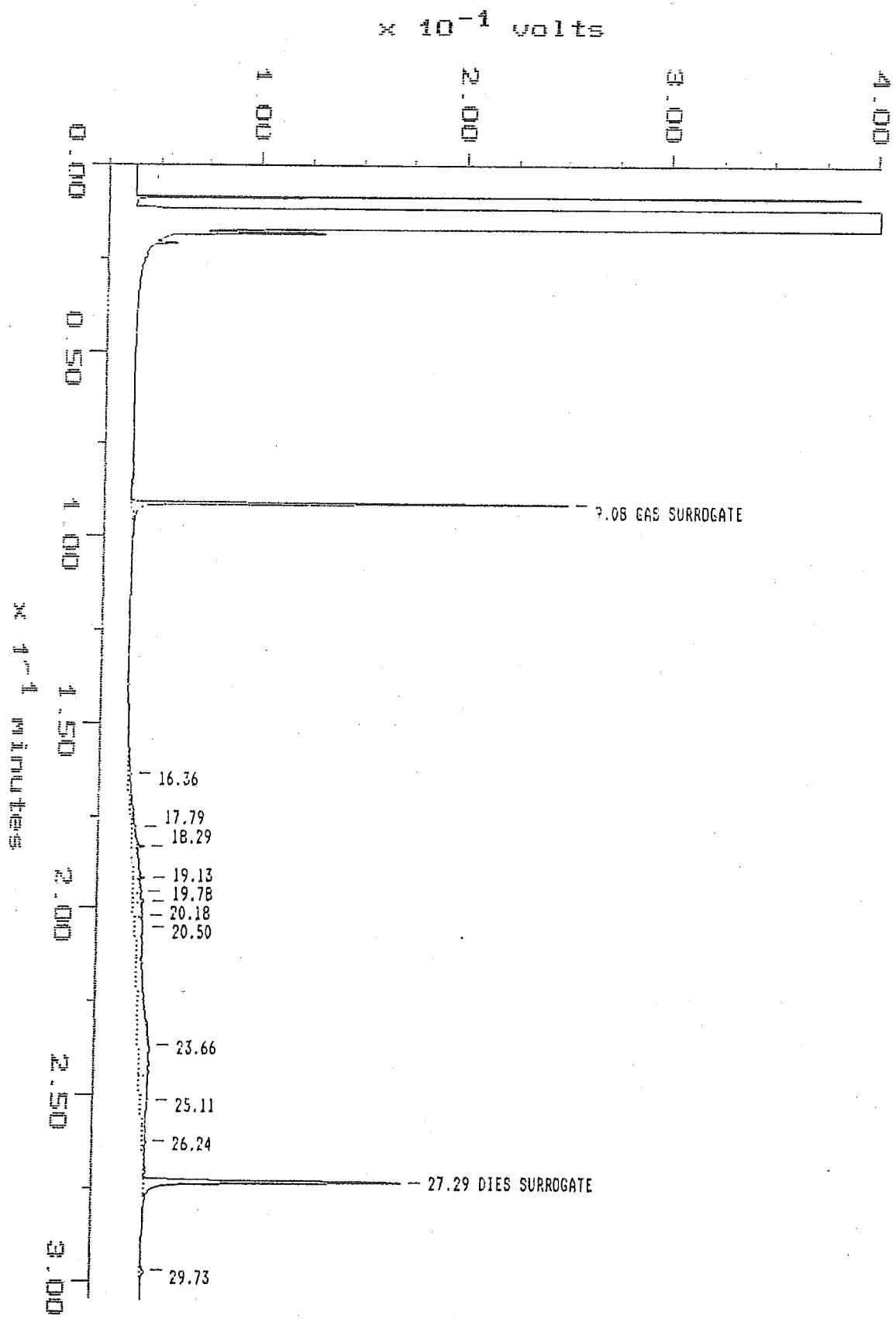
Filename: 22943-3
Operator: DAS



Sample: 22943-5
Acquired: 07-MAR-92 12:32
Dilution: 1 : 10.000

Channel: HP 5890-II
Method: C:\MAX\DATA2\8015D
Amount: 10.177

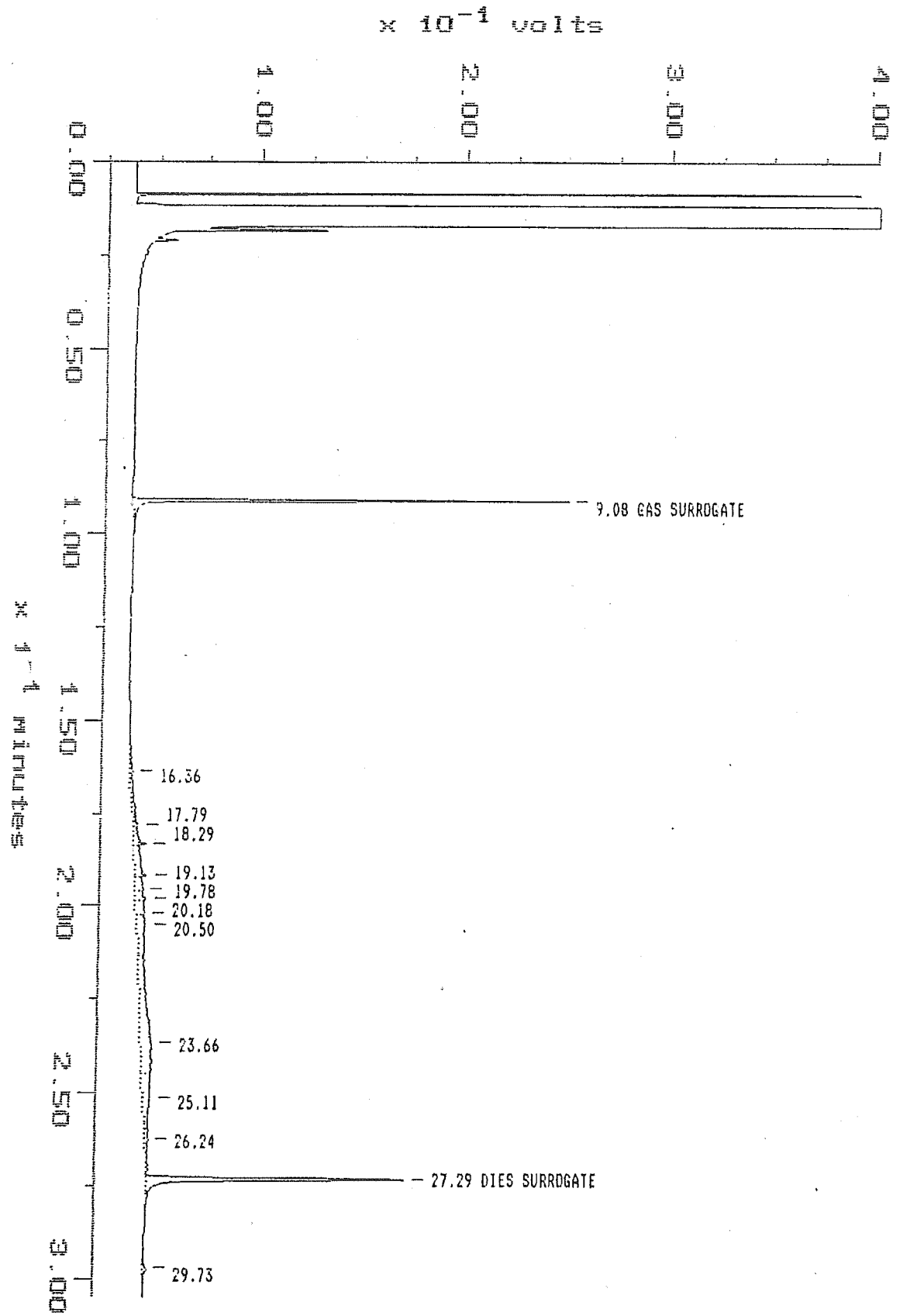
Filename: 22943-5
Operator: DAS



Sample: 22943-5
Acquired: 07-MAR-92 12:32
Dilution: 1 : 10.000

Channel: HP 5890-II
Method: C:\MAX\DATA2\80150
Amount: 10.177

Filename: 22943-5
Operator: DAS



36

UNDERGROUND STORAGE TANK
Site Check/Site Assessment Checklist

The purpose of this form is to certify the proper investigation of an UST site for the presence of a release. These activities shall be conducted in accordance with Chapter 173.360 WAC. A description of the various situations requiring a site check or site assessment is provided in the guidance document for UST site checks and site assessments.

This Site Check/Site Assessment Checklist shall be completed and signed by a person registered with the Department of Ecology to perform site assessments.

Two copies of the results of the site check or site assessment should be included with this checklist according to the reporting requirements in the guidance document for UST site checks and site assessments.

For further information about completing this form, please contact the Department of Ecology UST Program.

The completed checklist should be mailed to the following address:

Underground Storage Tank Section
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

1. UST SYSTEM OWNER AND LOCATION

UST Owner/Operator: W.S.D.O.T.

Owners Address: Transportation Bldg KF-01 (Street)

Olympia (City) Wa (State) 98504 (ZIP-Code) P.O. Box

Telephone: (206) 753-7062

Site ID Number (on invoice or available from Ecology if tank is registered): 012216

Site/Business Name: WSDOT- OLD Rimrock Maintenance Site

Site Address: Jct SR 12 & SR 410 (Street) Yakima (County)

Naches (City) Wa (State) (ZIP-Code)

2. SITE CHECK/SITE ASSESSMENT CONDUCTED BY:

Registered Person: Harry Horn

Address: 4200 Main S.T. (Street) 1709 P.O. Box

Vancouver (City) Wa (State) 98668 (ZIP-Code)

Telephone: (206) 696-6518

3. TANK INFORMATION

1. Tank ID Number (as registered with Ecology): _____ 2. Year installed: _____

3. Tank capacity in gallons: _____ 4. Last substance stored: _____

4. REASON FOR CONDUCTING SITE CHECK/SITE ASSESSMENT

Check one:

_____ Investigate suspected release due to on-site environmental contamination

_____ Investigate suspected release due to off-site environmental contamination

_____ Extend temporary closure of UST system for more than 12 months

_____ UST system undergoing change-in-service

_____ UST system permanently closed-in-place

_____ UST system permanently closed with tank removed

_____ Required by Ecology or delegated agency for UST system closed before December 22, 1988

_____ Other (describe): _____

5. CHECKLIST

Each item of the following checklist shall be initialed by the person registered with the Department of Ecology whose signature appears below.

	Yes	No
1. Has the site check/site assessment been conducted according to applicable procedures specified in the UST site check/site assessment guidance issued by the Department of Ecology?	HH	
2. Has a release from the UST system been confirmed? *NOTE: Owners/operators must report all confirmed releases to the Department of Ecology or delegated agency within 24 hours.*	HH	
3. Are the results of the site check/site assessment enclosed with this checklist? *NOTE: Two copies of the site check/site assessment results must be submitted to the Department of Ecology according to the reporting requirements specified in the UST site check/site assessment guidance.*	HH	

I hereby certify that I have been in responsible charge of performing the site check/site assessment described above. Persons submitting false information are subject to penalties under Chapter 173.360 WAC.

11-6-91 Harry Horn

Date — Signature of Person Registered with Ecology

6. OWNER'S SIGNATURE

11-6-91 Harry Horn

Date — Signature of Tank Owner or Authorized Representative

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION
P. O. Box 1709
4200 Main Street
Vancouver, WA 98663
(206) 696-6518

Cleanup Action
for the WSDOT Property at

RIMROCK

Junction U.S. 12 & SR 410
Naches, Washington

Fuel Tank Replacement
Phase 3 1990
October 1991

Rimrock DOT Facility
Junction US 12 & SR 410
Naches, Washington

On May 7, 1991, Washington State Department of Transportation (DOT) and its contractor, Stokes Construction, Inc. of Seattle, WA removed a 500 gallon unleaded tank and a 1,500 gallon diesel tank. The unleaded tank had two holes in the north end of the tank.

Because of the odors present during tank removal, additional excavation of contaminated soils was done. The contaminated material was stockpiled on site.

Seven soil samples were taken from the excavation and one water sample was taken from the ponding area to the west of the site. The soil samples yielded results up to 4,800 ppm gas and up to 270 ppm as diesel. High levels of BTEX were also present. No contamination was found in the water sample.

On June 14, 1991, additional excavation of contaminated soils was performed using a DOT backhoe and operator. Soil samples 21, 22, and 23 were taken from the excavated area at the end of the day. Sample 22 yielded 8,400 ppm as aged gas/diesel.

On June 25, 1991, excavation was again performed using a DOT backhoe and operator. The excavated material was stockpiled on site. At the end of the day, samples 41 through 49 were taken. The results of these samples showed that high levels of contamination still existed in the center area and the south end of the excavation.

On July 11, 1991, additional excavation was done using a DOT backhoe and operator. At the end of the day, samples 51 through 55 were taken. The results of these samples showed the high levels of contamination had finally been removed. However, sample 51 was 110 ppm as aged gas/diesel and sample 54 was 340 ppm as aged gas/diesel. These samples were taken adjacent to the shop building. Further excavation in the direction of the remaining contamination would damage the building.

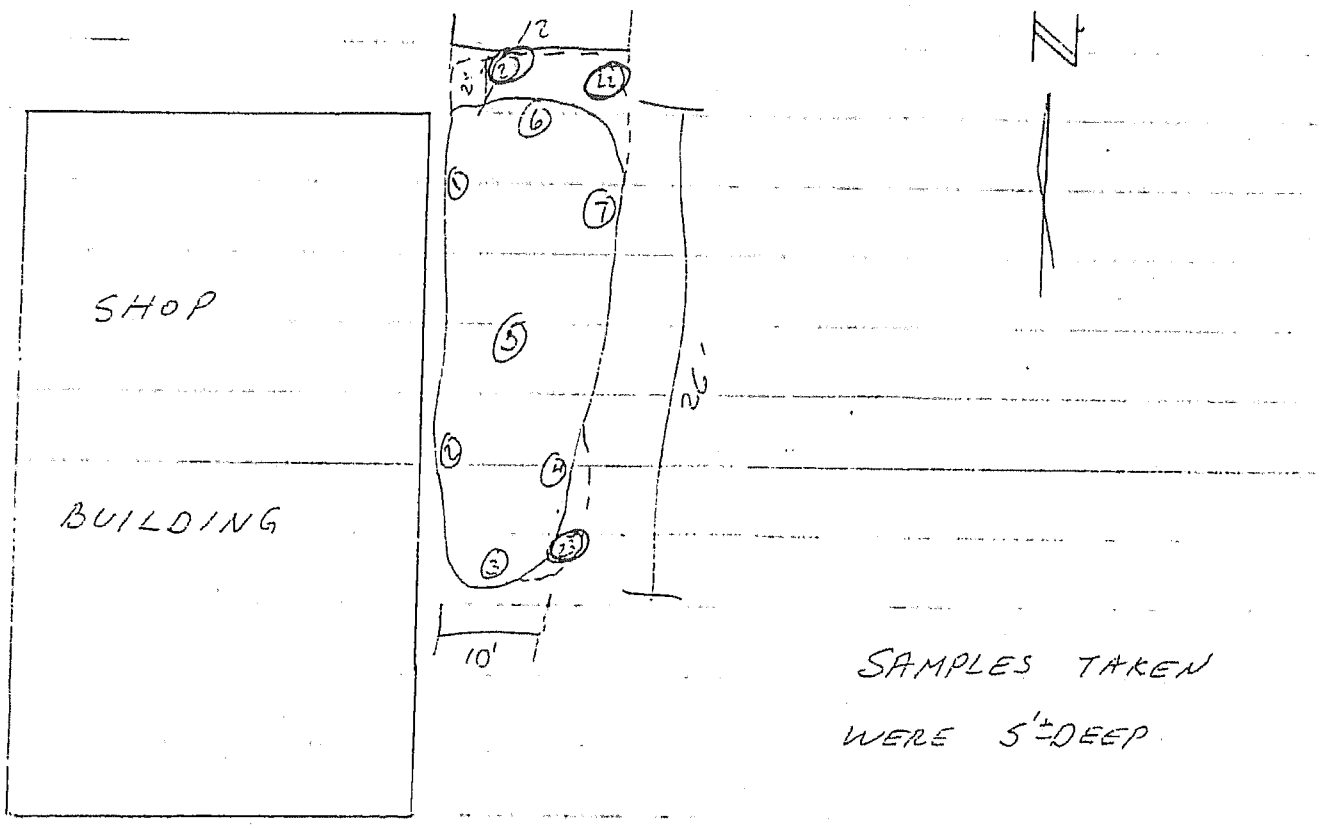
The excavated contaminated soil was placed into a land farm on site. The material was spread out into a layer about 12" thick.

The DOT is requesting a conditional closure of this site due to the contamination extending under the shop building. When the shop building is removed or before the property is sold, the contaminated areas will be re-excavated, tested, and treated in accordance with regulations then in place. A copy of this report shall be kept in the DOT facility file at all times.

Soil samples will be taken from the land farm. When the Total Petroleum Hydrocarbons (TPH) results due to diesel contamination are all below 200 ppm and/or due to gasoline contamination are all below 100 ppm, the land farm will be considered closed and a supplemental report will be prepared.

APPENDIX

RIM ROCK (OLD)



REMOVED:

1-500 gal unleaded

1-1500 gal diesel

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA State Dept. of Transportation

Date: May 17, 1991

Report On: Analysis of Soil & Water

Lab No.: 17508

IDENTIFICATION:
Samples Received on 05-08-91
Project: Rim Rock

ANALYSIS:

Lab Sample No.	1	2	3	4
Client Identification	#1	#2	#3	#4
Matrix/Units	Soil mg/kg	Soil mg/kg	Soil mg/kg	Soil mg/kg
Benzene	5.5	< 0.05	< 0.05	0.41
Toluene	130	< 0.05	0.20	2.7
Ethyl Benzene	32	< 0.05	< 0.05	0.73
Xylenes	340	< 0.05	0.62	6.9
BTEX by EPA SW-846 Method 8020				
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	1,500	< 10.0	94	270
TPH as	Aged Gas		Diesel	Diesel

Note - BTEX and TPH 8015 soil results reported on an as received basis.

Continued . . . . .

SOUND ANALYTICAL SERVICES, INC.

WA State Dept. of
Transportation
Project: Rim Rock

Lab No. 17508
May 17, 1991

Lab Sample No.	5	6	7	8
Client Identification	#5	#6	#7	#8
Matrix/Units	Soil mg/kg	Soil mg/kg	Soil mg/kg	Water mg/l
Benzene	0.44	0.51	9.0	< 0.001
Toluene	5.3	14	190	< 0.001
Ethyl Benzene	1.3	3.1	62	< 0.001
Xylenes	15.	62	420	< 0.001
BTEX by EPA SW-846 Method 8020				
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	49	380	4,800	< 1.0
TPH as	Aged Gas	Aged Gas	Aged Gas	

Note - BTEX and TPH 8015 soil results reported on an as received basis.

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA State Dept. of Transportation

Date: June 18, 1991

Report On: Analysis of Soil

Lab No.: 18155

IDENTIFICATION:
Samples Received on 06-14-91
Project: Rim Rock

ANALYSIS:

Lab Sample No.	Client ID	*Total Petroleum Fuel Hydrocarbons, mg/kg
1	~~#1~~ 21	< 10
2	~~#2~~ 22	8,400 as Aged Gas/Diesel
3	~~#3~~ 23	< 10

*TPH by EPA SW-846 Modified Method 8015

Note - Results reported on an as received basis.

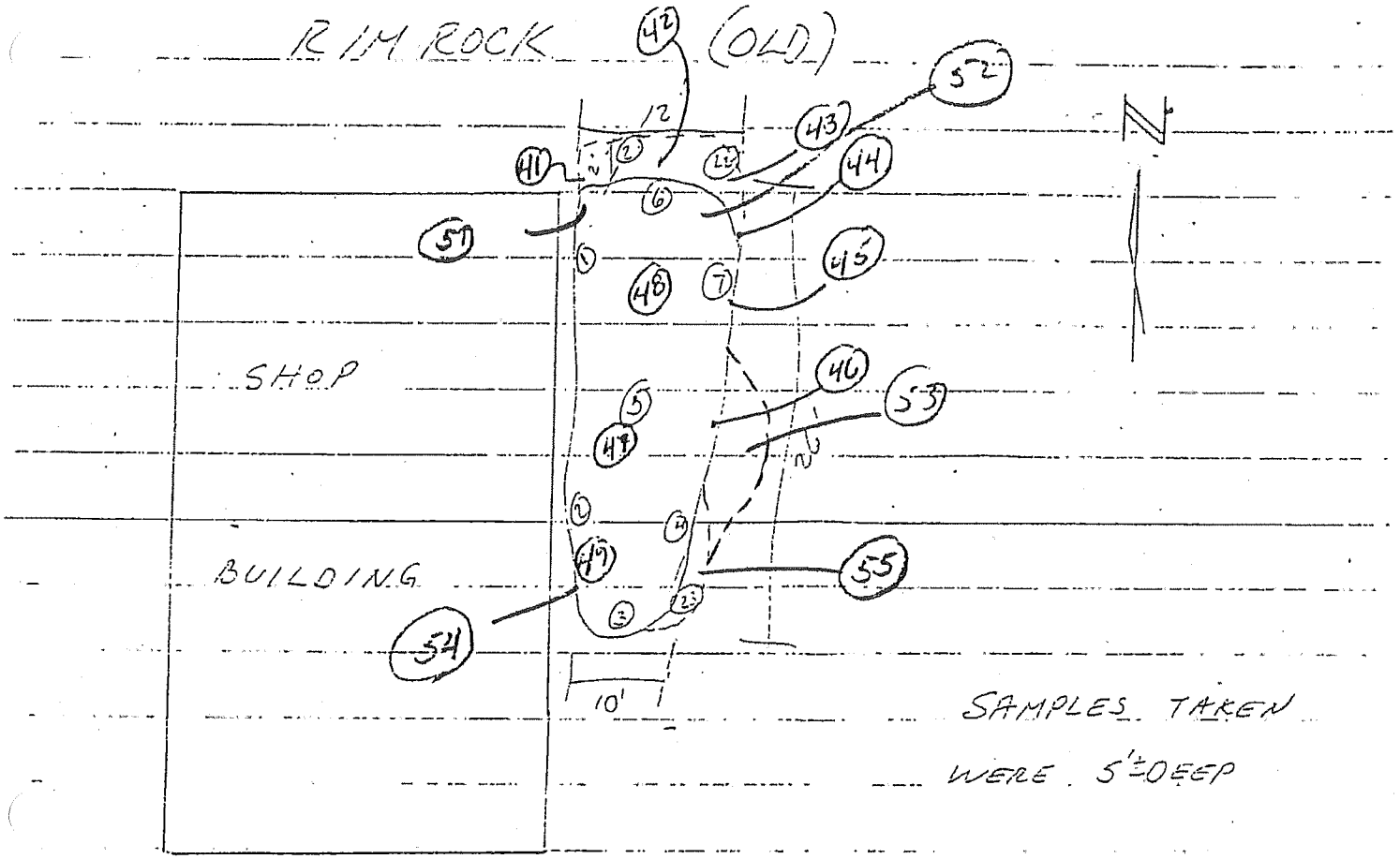
SURROGATE RECOVERY, %

Lab Sample No.	1	2	3
TPH by Mod 8015			
1-Chlorooctane	89	249*	93
Perylene	72	76	75

*Surrogate recovery invalid due to matrix interference.

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW



REMOVED:

1-500 gal unleaded

1-1500 gal. diesel

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA State Dept. of Transportation

Date: July 3, 1991

Report On: Analysis of Soil

Lab No.: 18422

IDENTIFICATION:
Samples Received on 06-28-91
Project: Rim Rock

ANALYSIS:

Lab Sample No.	Client ID	*Total Petroleum Fuel Hydrocarbons, mg/kg
1	41	< 10.0
2	42	22 Aged Gas
3	43	29 Aged Gas/Diesel
4	~~44 1210~~	210 Aged Gas/Diesel
5	45	140 Aged Gas/Diesel
6	46	7,600 Aged Gas/Diesel
7	47	7,100 Gas/Diesel
8	48	720 Aged Gas/Diesel
9	49	1,200 Aged Gas/Diesel

*TPH by EPA SW-846 Modified Method 8015

Note - Results reported on an as received basis.

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA State Dept. of Transportation

Date: July 15, 1991

Report On: Analysis of Soil

Lab No.: 18642

IDENTIFICATION:
Samples Received on 07-11-91
Project: Rimrock

ANALYSIS:

Lab Sample No.	Client ID	*Total Petroleum Fuel Hydrocarbons, mg/kg
1	51	110 * Aged Gas/Diesel
2	52	45 Aged Gas/Diesel
3	53	85 Aged Gas/Diesel
4	54	340 * Aged Gas/Diesel
5	55	58 Aged Gas/Diesel

*TPH by EPA SW-846 Modified Method 8015 * NEXT TO BLDG.

Note - Results reported on an as received basis.

SURROGATE RECOVERY, %

Lab Sample No.	1	2	3	4	5
TPH by Mod 8015	106	86	101	104	84
1-Chlorooctane	84	72	65	73	75
Perylene					

SOUND ANALYTICAL SERVICES

C. LARRY ZURAW

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

October 27, 1991

OLD RIM ROCK

Dear Underground Storage Tank Owner:

We recently received information on the following site which indicates that tank(s) have been closed:

Site Number: 012216 Tank ID#s: 66E01020 and 66E01021

Site Address: SR12, MP 185.5, JCT With SR 410,

Until we receive documentation that the tank(s) have been permanently closed in accordance with federal and state regulations, we are unable to consider them closed for regulatory and billing purposes. If such closure has been completed, please fill out the enclosed form(s) as marked below and return them to our office as soon as possible. We will then be able to correct our records and resolve any outstanding fee payment issues relating to this site.

For tanks closed before March 1, 1991:

_____ Permanent Closure/Change-in-Service Checklist

For tanks closed after March 1, 1991:

✓ Permanent Closure/Change-in-Service Checklist Sent to Stokes 11-22-91

✓ Site Check/Site Assessment Checklist

✓ Two copies of Site Assessment Report 7 Sent 11-6-91

Please complete the forms and return them to:

Washington State Department of Ecology
Underground Storage Tank Section
Mail Stop PV-11
Olympia, WA 98504-8711

Thank you for your cooperation. If you have any questions, please call me at (206) 438-7764.

Sincerely,

Joyce M. Smith

Joyce M. Smith
Data Management Unit

Enclosures

UNDERGROUND STORAGE TANK
Permanent Closure/Change-In-Service Checklist

The purpose of this form is to certify the proper closure/change-in-service of underground storage tank (UST) systems. These activities must be conducted in accordance with Chapter 173.360 WAC. Washington State UST rules require the tank owner or operator to notify Ecology in writing 30 days prior to closure or change-in-service of tanks. This must be done by completing the 30 Day Notice form (ECY 010-155).

This Permanent Closure Checklist shall be completed and signed by a **Licensed Decommissioning Supervisor.** The supervisor shall be on site when all tank permanent closure/change-in-service activities are being conducted. The firm which employs the licensed supervisor shall also be licensed by the Washington State Department of Ecology as a **Service Provider.** If any of the activities listed below have been supervised by a different licensed supervisor, a separate checklist must be filled out and signed by the licensed supervisor performing those activities.

For further information about completing this form, please contact the Department of Ecology UST Program.

A separate checklist must be completed for each UST system (tank and associated piping), except that UST systems at one site may be reported together by completing page 2 of this form separately for each system. The completed checklist should be mailed to the following address within 30 days of the completion of the closure or change-in-service.

Underground Storage Tank Section
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711

1. UST SYSTEM OWNER AND LOCATION

Site Owner/Operator: W.S.D.O.T

Owners Address: _____ (Street) _____ (P.O. Box)

_____ (City) _____ (State) _____ (ZIP-Code)

Telephone: ( )

Site ID Number (on invoice or available from Ecology if tank is registered): WAD # 988-480-778

Site/Business Name: W.S.D.O.T. Rimrock (OLD site)

Site Address: Jct USR 12 & SR 410 (Street) _____ (County)

Naches (City) WA (State) _____ (ZIP-Code)

2. TANK PERMANENT CLOSURE/CHANGE-IN-SERVICE PERFORMED BY:

Firm: Stokes Construction INC. License Number: STOKECL 108OD

Address: _____ (Street) P.O. Box 16527 (P.O. Box)

Seattle (City) WA (State) 98116 (ZIP-Code)

Telephone: (206) 935-8278

Licensed Supervisor: Chuck Stokes Decommissioning License Number: W000567

...shall be completed separately for each tank permanently closed (decommissioned) or change-in-service at the site. For additional tanks you may photocopy this form prior to completing.

3. TANK CLOSURE/CHANGE-IN-SERVICE INFORMATION

1. Tank ID Number (as registered with Ecology): _____
2. Year Installed: 1960's
3. Tank capacity in gallons: 1-500 gal UL / 1-1,500 gal Diesel
4. Date of last use: 5-6-91
5. Last substance stored: UL & Diesel
6. Date of closure/change-in-service: 5-7-91
7. Type of closure: Closure with Tank Removal [X] In-place Closure [ ] Change-In-Service [ ]
8. If in-place closure is used, the tank has been filled with the following substance: _____
9. If change-in-service, indicate new substance stored in tank: _____
10. Local permit(s) (if any) obtained from: YAKIMA CO.

Always contact local authorities regarding permit requirements.

11. Has a site assessment been completed? Yes [ ] No [X]

Unless an external release detection system is operating at the time of closure or change in service, and a report is provided as specified in WAC 173-360-390, a site assessment must be conducted. This site assessment must be conducted by a person registered with the Department of Ecology to perform site assessments. Results of the site assessment must be included with the Site Assessment Checklist (ECY 010-158).

4. CHECKLIST

Each item of the following checklist shall be initialed by the licensed supervisor whose signature appears below.

	Yes	No	NA*
1. Has all liquid been removed from product lines?	X		
2. Has all product piping been capped or removed?	X		
3. Have all non-product lines been capped or removed?	X		
4. Have all liquid and accumulated sludges been removed from the tank?	X		
5. Has the tank been properly purged or inerted?	X		
6. Have the drop tube, fill pipe, gauge pipe, pumps and other tank fixtures been removed?	X		
7. Have all tank openings been plugged or capped? NOTE: One plug should have 1/8 inch vent hole.	X		
8. Have all sludges removed from the tank been designated and disposed of in accordance with the state of Washington's dangerous waste regulations (Chapter 173-303 WAC)? 5/9/91	X		
9. If removed, was tank properly labeled and disposed of in accordance with all applicable local, state and federal regulations?	X		

*Item not applicable

I hereby certify that I have been the licensed supervisor present on site during the above listed permanent closure activities and to the best of my knowledge they have been conducted in compliance with all applicable state and federal laws, regulations and procedures pertaining to underground storage tanks.

Persons submitting false information are subject to penalties under Chapter 173-360 WAC.

5-7-91
Date

Signature of Licensed Supervisor

5. ADDITIONAL REQUIRED SIGNATURES

5-7-91
Date

Billy R Mumma (G.N. Stokes)
Signature of Licensed Service Provider (firm) Owner or Authorized Representative

5-7-91
Date

Billy R Mumma
Signature of Tank Owner or Authorized Representative

Sound Analytical Services, Inc.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy East • Tacoma, WA 98424
(253) 922-2310 • FAX (253) 922-5047
e-mail: SoundL@aol.com

TRANSMITTAL MEMORANDUM

DATE: October 24, 1997

TO: Norm Payton
WSDOT - Operations, Olympia
P.O. Box 47358
Olympia, WA 98504-7358

PROJECT: Rimrock Monitoring Wells

REPORT NUMBER: 68083

Enclosed are the test results for six samples received at Sound Analytical Services on October 13, 1997.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Dawn Werner
Project Manager

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 3
Lab ID:	68083-01
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 4
Lab ID:	68083-02
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2
Lab ID:	68083-03
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1
Lab ID:	68083-04
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 3
Lab ID:	68083-01
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	111		57	153
Trifluorotoluene (FID)	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	0.001	0.001	
o-Xylene	0.00094	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 4
Lab ID:	68083-02
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	107		57	153
Trifluorotoluene (FID)	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2
Lab ID:	68083-03
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	107		57	153
Trifluorotoluene (FID)	108		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1
Lab ID:	68083-04
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	109		57	153
Trifluorotoluene (FID)	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2 - 10
Lab ID:	68083-05
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
% Solids	75.39

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	72		37	125
Trifluorotoluene (FID)	72		50	150

Sample results are on a dry weight basis.

Analyte	**Result (mg/kg)**	**PQL**	**Flags**
Benzene	ND	0.026	
Toluene	ND	0.026	
Ethylbenzene	ND	0.026	
m,p-Xylene	ND	0.053	
o-Xylene	ND	0.026	
Gasoline	ND	2.6	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1 - 10
Lab ID:	68083-06
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
% Solids	77.31

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	71		37	125
Trifluorotoluene (FID)	69		50	150

Sample results are on a dry weight basis.

Analyte	**Result (mg/kg)**	**PQL**	**Flags**
Benzene	ND	0.026	
Toluene	ND	0.026	
Ethylbenzene	ND	0.026	
m,p-Xylene	ND	0.051	
o-Xylene	ND	0.026	
Gasoline	ND	2.6	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 3
Lab ID:	68083-01
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	67		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 4
Lab ID:	68083-02
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	64		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.63	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2
Lab ID:	68083-03
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-Terphenyl	64		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1
Lab ID:	68083-04
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/17/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	68		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2 - 10
Lab ID:	68083-05
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/18/97
% Solids	75.39

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-Terphenyl	71		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	ND	16	
Heavy Oil (>nC24-nC32)	ND	41	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1 - 10
Lab ID:	68083-06
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/18/97
% Solids	77.31

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-Terphenyl	82		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	ND	15	
Heavy Oil (>nC24-nC32)	ND	37	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - T213
Date Received:	-
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID:	RMW 3
Lab ID:	68083-01
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
QC Batch ID:	T213

Metals by ICP - USEPA Method 6010

Parameter Name	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD %	Flag
Lead	0	0	NC	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike Report

Client Sample ID:	RMW 3
Lab ID:	68083-01
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
QC Batch ID:	T213

Metals by ICP - USEPA Method 6010

Parameter Name	Sample Result (mg/L)	Spike Amount (mg/L)	MS Result (mg/L)	MS % Rec.	Flag
Lead	0	1	1.01	101	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1274
Date Received:	-
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	107		57	153
Trifluorotoluene (FID)	105		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1274
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
QC Batch ID:	GB1274

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Benzene	ND	0.025	0.0227	91	0.0237	94.8	4.1	
Toluene	ND	0.025	0.0241	96.4	0.0246	98.2	1.8	
Ethylbenzene	ND	0.025	0.0236	94.5	0.0245	98.1	3.7	
m,p-Xylene	ND	0.05	0.0478	95.7	0.0495	98.9	3.3	
o-Xylene	ND	0.025	0.0239	95.5	0.0244	97.7	2.3	
Gasoline	ND	0.668	0.707	106	0.726	109	2.8	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1275
Date Received:	-
Date Prepared:	10/15/97
Date Analyzed:	10/18/97
% Solids	

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	80		37	125
Trifluorotoluene (FID)	81		50	150

Sample results are on an as received basis.

Analyte	**Result (mg/kg)**	**PQL**	**Flags**
Benzene	ND	0.02	
Toluene	ND	0.02	
Ethylbenzene	ND	0.02	
m,p-Xylene	ND	0.04	
o-Xylene	ND	0.02	
Gasoline	ND	2	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID:	RMW 2 - 10
Lab ID:	68083-05
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
QC Batch ID:	GB1275

ombination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 802

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Benzene	ND	ND	NC	
Toluene	ND	ND	NC	
Ethylbenzene	ND	ND	NC	
m,p-Xylene	ND	ND	NC	
o-Xylene	ND	ND	NC	
Gasoline	ND	ND	NC	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	RMW 2 - 10
Lab ID:	68083-05
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
QC Batch ID:	GB1275

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Gasoline	ND	35.3	30.4	86.1	31.1	88.1	2.3	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	RMW 2 - 10
Lab ID:	68083-05
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
QC Batch ID:	GB1275

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Benzene	ND	1.32	0.846	63.9	0.905	68.4	6.8	
Toluene	ND	1.32	0.972	73.4	0.959	72.5	1.2	
Ethylbenzene	ND	1.32	1	75.9	0.985	74.4	2	
m,p-Xylene	ND	2.65	2.08	78.5	2.04	77	1.9	
o-Xylene	ND	1.32	1.01	76.2	0.977	73.8	3.2	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1359
Date Received:	-
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	65		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.63	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	DI1359
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
QC Batch ID:	DI1359

Extended Diesel Range by WTPH-D Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	0	5.01	4.37	87.3	4.11	82.1	6.1	
Heavy Oil (>nC24-nC32)	0	5	5.04	101	4.79	95.7	5.4	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1357
Date Received:	-
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
% Solids	

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	86		50	150

Sample results are on an as received basis.

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	ND	13	
Heavy Oil (>nC24-nC32)	ND	31	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike Report

Lab ID:	DI1357
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
QC Batch ID:	DI1357

Extended Diesel Range by WTPH-D Modified

Parameter Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	Flag
Diesel (>nC12-nC24)	0	250	220	89	
Heavy Oil (>nC24-nC32)	0	250	240	95	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID:	WB1-45'
Lab ID:	68084-05
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
QC Batch ID:	DI1357

Extended Diesel Range by WTPH-D Modified

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Diesel (>nC12-nC24)	42	33	24.0	X4a
Heavy Oil (>nC24-nC32)	55	43	24.0	X4a

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	WB1-45'
Lab ID:	68084-05
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
QC Batch ID:	DI1357

Extended Diesel Range by WTPH-D Modified

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	42	252	230	74.8	225	71.2	4.9	

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE: (253) 922-2310 - FAX: (253) 922-5047

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C: Additional confirmation performed.

D: The reported result for this analyte is calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

N: See analytical narrative.

U: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____ .

X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.

X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.

X4: RPD for duplicates outside advisory QC limits. Sample was re-analyzed with similar results.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike was diluted out during analysis.

X6: Recovery of matrix spike was outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery of matrix spike outside advisory QC limits. Matrix interference is indicated by blank spike recovery data.

X7a: Recovery and/or RPD values for MS/MSD outside advisory QC limits due to high contaminant levels.

X8: Surrogate was diluted out during analysis.

X9: Surrogate recovery outside advisory QC limits due to matrix composition.

SOUND ANALYTICAL SERVICES, INC.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy. East
Tacoma, Washington 9[illegible]4
(253) 922-2310 • FAX (25[illegible] 922-5047

68083 (pH vs 8)

11/2, 10

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS

Water hold time: extract by 14 days for water

GLIENT: WSDOT-Oper. Oly

PROJECT NAME: RIMROCK MONITORING WELLS

CONTACT: NORM PAYTON

PHONE NO: (360) 705-7848

ANALYSIS REQUESTED: WH

LAB #	SAMPLE I.D.	DATE	TIME	MATRIX	# of Containers	Halogenated Volatiles EPA 601/8010	Aromatic Volatiles EPA 602/8020	Chlorinated Pest., PCB's EPA 608/8080	PAH's	Volatile Organics EPA 624/8240 (GC/MS)	Semi-volatiles EPA625/8270 (GC/MS)	TPH 418.1	Oil & Grease	Total Metals (Specify below)	TCLP Extraction: 8 Metals	TCLP Extraction: Volatiles	TCLP Extraction: Semi-volatiles	TCLP Extraction: Pesticides & Herbicides	WTPH-G BTEX	* WTPH-D EXT	Total Pb
1	RMW 3	10/8/97	1432	WATER	4														✓	✓	✓
2	RMW 4	10/8/97	1514	WATER	4														✓	✓	✓
3	RMW 2	10/8/97	1600	WATER	4														✓	✓	✓
4	RMW 1	10/8/97	1625	WATER	4														✓	✓	✓
5	RMW 2-10	10/7/97	1144	Soil	1														✓	✓	
6	RMW 1-10	10/7/97	0917	Soil	1														✓	✓	

	Signature	Printed Name	Firm	Time / Date
Relinquished By	Norman E. Payton	Norman E. Payton	WSDOT	0817 / 10-13-97
Received By	SGiang	Giang	SAS	0817 10/13/97
Relinquished By				
Received By				
Relinquished By				
Received By				

SPECIAL INSTRUCTIONS/COMMENTS:

These samples will be disposed of 45 days after receipt.
Check this box to have samples returned ☐.

WSDOT Copy

SOUND ANALYTICAL SERVICES, INC.

4813 Pacific Highway East • Tacoma, Washington 98424 • (253) 922-2310

INVOICE #: 680830

WA DOT Operations Dept-Olympia
P.O. Box 47358
Olympia, WA 98504-7358

REFERENCE:
Contract 94-2 Rimrock Monitor
Wells (Norm Payton)

PURCHASE ORDER:

ACCT #:	TERMS:	DATE	PAGE:
0052	Net 30	10/30/97	1

QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
6	BTEX/TPHG	75.00	$450.00
6	TPH-D	65.00	$390.00
4	Sample Digestion Or Filtering	8.00	$32.00
4	Metals By ICP	6.00	$24.00

SUBTOTAL:	$896.00
SALES TAX:	$.00
TOTAL DUE:	$896.00

White - Original, Canary - Remittance, Pink - File, Goldenrod - Accounting

APPENDIX C

Groundwater Sample Results

Sound Analytical Services, Inc.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy East • Tacoma, WA 98424
(253) 922-2310 • FAX (253) 922-5047
e-mail: SoundL@aol.com

TRANSMITTAL MEMORANDUM

DATE: October 24, 1997

TO: Norm Payton
WSDOT - Operations, Olympia
P.O. Box 47358
Olympia, WA 98504-7358

PROJECT: Rimrock Monitoring Wells

REPORT NUMBER: 68083

Enclosed are the test results for six samples received at Sound Analytical Services on October 13, 1997.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Dawn Werner
Project Manager

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 3
Lab ID:	68083-01
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 4
Lab ID:	68083-02
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2
Lab ID:	68083-03
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1
Lab ID:	68083-04
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags
Lead	ND	0.15	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 3
Lab ID:	68083-01
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	111		57	153
Trifluorotoluene (FID)	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	0.001	0.001	
o-Xylene	0.00094	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 4
Lab ID:	68083-02
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	107		57	153
Trifluorotoluene (FID)	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2
Lab ID:	68083-03
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	107		57	153
Trifluorotoluene (FID)	108		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1
Lab ID:	68083-04
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	109		57	153
Trifluorotoluene (FID)	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2 - 10
Lab ID:	68083-05
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
% Solids	75.39

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	72		37	125
Trifluorotoluene (FID)	72		50	150

Sample results are on a dry weight basis.

Analyte	**Result (mg/kg)**	**PQL**	**Flags**
Benzene	ND	0.026	
Toluene	ND	0.026	
Ethylbenzene	ND	0.026	
m,p-Xylene	ND	0.053	
o-Xylene	ND	0.026	
Gasoline	ND	2.6	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1 - 10
Lab ID:	68083-06
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
% Solids	77.31

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	71		37	125
Trifluorotoluene (FID)	69		50	150

Sample results are on a dry weight basis.

Analyte	**Result (mg/kg)**	**PQL**	**Flags**
Benzene	ND	0.026	
Toluene	ND	0.026	
Ethylbenzene	ND	0.026	
m,p-Xylene	ND	0.051	
o-Xylene	ND	0.026	
Gasoline	ND	2.6	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 3
Lab ID:	68083-01
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	67		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 4
Lab ID:	68083-02
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-Terphenyl	64		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.63	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2
Lab ID:	68083-03
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-Terphenyl	64		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1
Lab ID:	68083-04
Date Received:	10/13/97
Date Prepared:	10/15/97
Date Analyzed:	10/17/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	68		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 2 - 10
Lab ID:	68083-05
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/18/97
% Solids	75.39

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	71		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	ND	16	
Heavy Oil (>nC24-nC32)	ND	41	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW 1 - 10
Lab ID:	68083-06
Date Received:	10/13/97
Date Prepared:	10/14/97
Date Analyzed:	10/18/97
% Solids	77.31

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-Terphenyl	82		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	ND	15	
Heavy Oil (>nC24-nC32)	ND	37	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - T213
Date Received:	-
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
Dilution Factor	1

Metals by ICP - USEPA Method 6010

Analyte	Result (mg/L)	PQL	Flags

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID:	RMW 3
Lab ID:	68083-01
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
QC Batch ID:	T213

Metals by ICP - USEPA Method 6010

Parameter Name	Sample Result (mg/L)	Duplicate Result (mg/L)	RPD %	Flag
Lead	0	0	NC	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike Report

Client Sample ID:	RMW 3
Lab ID:	68083-01
Date Prepared:	10/14/97
Date Analyzed:	10/15/97
QC Batch ID:	T213

Metals by ICP - USEPA Method 6010

Parameter Name	Sample Result (mg/L)	Spike Amount (mg/L)	MS Result (mg/L)	MS % Rec.	Flag
Lead	0	1	1.01	101	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1274
Date Received:	-
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
% Solids	-

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	107		57	153
Trifluorotoluene (FID)	105		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylene	ND	0.001	
o-Xylene	ND	0.0005	
Gasoline	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1274
Date Prepared:	10/15/97
Date Analyzed:	10/15/97
QC Batch ID:	GB1274

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Benzene	ND	0.025	0.0227	91	0.0237	94.8	4.1	
Toluene	ND	0.025	0.0241	96.4	0.0246	98.2	1.8	
Ethylbenzene	ND	0.025	0.0236	94.5	0.0245	98.1	3.7	
m,p-Xylene	ND	0.05	0.0478	95.7	0.0495	98.9	3.3	
o-Xylene	ND	0.025	0.0239	95.5	0.0244	97.7	2.3	
Gasoline	ND	0.668	0.707	106	0.726	109	2.8	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1275
Date Received:	-
Date Prepared:	10/15/97
Date Analyzed:	10/18/97
% Solids	

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene (PID)	80		37	125
Trifluorotoluene (FID)	81		50	150

Sample results are on an as received basis.

Analyte	**Result (mg/kg)**	**PQL**	**Flags**
Benzene	ND	0.02	
Toluene	ND	0.02	
Ethylbenzene	ND	0.02	
m,p-Xylene	ND	0.04	
o-Xylene	ND	0.02	
Gasoline	ND	2	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID:	RMW 2 - 10
Lab ID:	68083-05
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
QC Batch ID:	GB1275

ombination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 802

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Benzene	ND	ND	NC	
Toluene	ND	ND	NC	
Ethylbenzene	ND	ND	NC	
m,p-Xylene	ND	ND	NC	
o-Xylene	ND	ND	NC	
Gasoline	ND	ND	NC	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	RMW 2 - 10
Lab ID:	68083-05
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
QC Batch ID:	GB1275

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Gasoline	ND	35.3	30.4	86.1	31.1	88.1	2.3	

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	RMW 2 - 10
Lab ID:	68083-05
Date Prepared:	10/15/97
Date Analyzed:	10/19/97
QC Batch ID:	GB1275

Combination Gasoline/BTEX Analysis by Method WTPH-G/USEPA Method 8020

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Benzene	ND	1.32	0.846	63.9	0.905	68.4	6.8	
Toluene	ND	1.32	0.972	73.4	0.959	72.5	1.2	
Ethylbenzene	ND	1.32	1	75.9	0.985	74.4	2	
m,p-Xylene	ND	2.65	2.08	78.5	2.04	77	1.9	
o-Xylene	ND	1.32	1.01	76.2	0.977	73.8	3.2	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1359
Date Received:	-
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	65		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.63	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	DI1359
Date Prepared:	10/15/97
Date Analyzed:	10/16/97
QC Batch ID:	DI1359

Extended Diesel Range by WTPH-D Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	0	5.01	4.37	87.3	4.11	82.1	6.1	
Heavy Oil (>nC24-nC32)	0	5	5.04	101	4.79	95.7	5.4	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1357
Date Received:	-
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
% Solids	

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	86		50	150

Sample results are on an as received basis.

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	ND	13	
Heavy Oil (>nC24-nC32)	ND	31	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike Report

Lab ID:	DI1357
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
QC Batch ID:	DI1357

Extended Diesel Range by WTPH-D Modified

Parameter Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	Flag
Diesel (>nC12-nC24)	0	250	220	89	
Heavy Oil (>nC24-nC32)	0	250	240	95	

SOUND ANALYTICAL SERVICES, INC.

Duplicate Report

Client Sample ID:	WB1-45'
Lab ID:	68084-05
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
QC Batch ID:	DI1357

Extended Diesel Range by WTPH-D Modified

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Diesel (>nC12-nC24)	42	33	24.0	X4a
Heavy Oil (>nC24-nC32)	55	43	24.0	X4a

SOUND ANALYTICAL SERVICES, INC.

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:	WB1-45'
Lab ID:	68084-05
Date Prepared:	10/14/97
Date Analyzed:	10/17/97
QC Batch ID:	DI1357

Extended Diesel Range by WTPH-D Modified

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg)	MS Result (mg/kg)	MS % Rec.	MSD Result (mg/kg)	MSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	42	252	230	74.8	225	71.2	4.9	

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE: (253) 922-2310 - FAX: (253) 922-5047

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C: Additional confirmation performed.

D: The reported result for this analyte is calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

N: See analytical narrative.

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____ .

X2: Contaminant does not appear to be "typical" product. Further testing is suggested for identification.

X3: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is recommended.

X4: RPD for duplicates outside advisory QC limits. Sample was re-analyzed with similar results.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike was diluted out during analysis.

X6: Recovery of matrix spike was outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery of matrix spike outside advisory QC limits. Matrix interference is indicated by blank spike recovery data.

X7a: Recovery and/or RPD values for MS/MSD outside advisory QC limits due to high contaminant levels.

X8: Surrogate was diluted out during analysis.

X9: Surrogate recovery outside advisory QC limits due to matrix composition.

SOUND ANALYTICAL SERVICES, INC.
ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 Pacific Hwy. East
Tacoma, Washington 98
(253) 922-2310 • FAX (253) 922-5047

6 7083
PH VSS
11/2, VOA

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS

Water hold time extract by 15th for water

GLIENT: WSDOT-Oper. Oly
PROJECT NAME: RINROCK MONITORING WELLS
CONTACT: NORM PAYTON
PHONE NO: (360) 705-7848

ANALYSIS REQUESTED: WA

LAB #	SAMPLE I.D.	DATE	TIME	MATRIX	# of Containers	Halogenated Volatiles EPA 601/8010	Aromatic Volatiles EPA 602/8020	Chlorinated Pest., PCB's EPA 608/8080	PAH's	Volatile Organics EPA 624/8240 (GC/MS)	Semi-volatiles EPA625/8270 (GC/MS)	TPH 418.1	Oil & Grease	Total Metals (Specify below)	TCLP Extraction: 8 Metals	TCLP Extraction: Volatiles	TCLP Extraction: Semi-volatiles	TCLP Extraction: Pesticides & Herbicides	WTPH-G BTEX	* WTPH-D EXT	Pb Total						
1	RMW 3	10/8/97	1432	WATER	4														✓	✓	✓						
2	RMW 4	10/8/97	1514	WATER	4														✓	✓	✓						
3	RMW 2	10/8/97	1600	WATER	4														✓	✓	✓						
4	RMW 1	10/8/97	1625	WATER	4														✓	✓	✓						
5	RMW 2-10	10/7/97	1144	Soil	1														✓	✓							
6	RMW 1-10	10/7/97	0917	Soil	1														✓	✓							

	Signature	Printed Name	Firm	Time / Date
Relinquished By	Norman E. Payton	Norman E. Payton	WSDOT	0817 / 10-13-97
Received By	SGiang	Giang	SAS	0817 10/13/97
Relinquished By				
Received By				
Relinquished By				
Received By				

SPECIAL INSTRUCTIONS/COMMENTS:

These samples will be disposed of 45 days after receipt.
Check this box to have samples returned ☐.

WSDOT Copy

SOUND ANALYTICAL SERVICES, INC.

4813 Pacific Highway East • Tacoma, Washington 98424 • (253) 922-2310

INVOICE #: 680830

WA DOT Operations Dept-Olympia
P.O. Box 47358
Olympia, WA 98504-7358

REFERENCE:
Contract 94-2 Rimrock Monitor
Wells (Norm Payton)

PURCHASE ORDER:

ACCT #:	TERMS:	DATE	PAGE:
0052	Net 30	10/30/97	1

QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
6	BTEX/TPHG	75.00	$450.00
6	TPH-D	65.00	$390.00
4	Sample Digestion Or Filtering	8.00	$32.00
4	Metals By ICP	6.00	$24.00

SUBTOTAL:	$896.00
SALES TAX:	$.00
TOTAL DUE:	$896.00

White - Original, Canary - Remittance, Pink - File, Goldenrod - Accounting

Sound Analytical Services, Inc.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy East • Tacoma, WA 98424
(253) 922-2310 • FAX (253) 922-5047
e-mail: SoundL@aol.com

TRANSMITTAL MEMORANDUM

DATE: February 19, 1998

TO: Norm Payton
WSDOT - Operations, Olympia
P.O. Box 47358
Olympia, WA 98504-7358

PROJECT: Rimrock Monitoring Wells

REPORT NUMBER: 70473

Enclosed are the test results for four samples received at Sound Analytical Services on February 6, 1998.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Dawn Werner
Project Manager

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R1
Lab ID:	70473-01
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Gasoline Range Organic Compounds by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	102		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R2
Lab ID:	70473-02
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Gasoline Range Organic Compounds by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	104		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R3
Lab ID:	70473-03
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Gasoline Range Organic Compounds by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	101		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R4
Lab ID:	70473-04
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Gasoline Range Organic Compounds by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	100		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R1
Lab ID:	70473-01
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	91		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylenes	ND	0.001	
o-Xylene	ND	0.0005	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R2
Lab ID:	70473-02
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	97		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylenes	ND	0.001	
o-Xylene	ND	0.0005	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R3
Lab ID:	70473-03
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	99		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylenes	ND	0.001	
o-Xylene	ND	0.0005	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R4
Lab ID:	70473-04
Date Received:	2/6/98
Date Prepared:	2/10/98
Date Analyzed:	2/12/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	97		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylenes	ND	0.001	
o-Xylene	ND	0.0005	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R1
Lab ID:	70473-01
Date Received:	2/6/98
Date Prepared:	2/11/98
Date Analyzed:	2/16/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	104		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R2
Lab ID:	70473-02
Date Received:	2/6/98
Date Prepared:	2/11/98
Date Analyzed:	2/16/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	124		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.63	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R3
Lab ID:	70473-03
Date Received:	2/6/98
Date Prepared:	2/11/98
Date Analyzed:	2/16/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	112		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R4
Lab ID:	70473-04
Date Received:	2/6/98
Date Prepared:	2/11/98
Date Analyzed:	2/16/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	121		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.64	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1370
Date Received:	-
Date Prepared:	2/10/98
Date Analyzed:	2/11/98
% Solids	-

Gasoline Range Organic Compounds by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	102		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1370
Date Prepared:	2/10/98
Date Analyzed:	2/11/98
QC Batch ID:	GB1370

Gasoline Range Organic Compounds by WSDOE Method WTPH-G Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Gasoline Range Organics	0	1.25	1.1	88.3	1.1	88.3	0	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1370
Date Received:	-
Date Prepared:	2/10/98
Date Analyzed:	2/11/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
Trifluorotoluene	145		57	153

Analyte	Result (mg/L)	PQL	Flags
Benzene	ND	0.0005	
Toluene	ND	0.0005	
Ethylbenzene	ND	0.0005	
m,p-Xylenes	ND	0.001	
o-Xylene	ND	0.0005	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1370
Date Prepared:	2/10/98
Date Analyzed:	2/11/98
QC Batch ID:	GB1370

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Benzene	0	0.025	0.0208	83.2	0.0255	102	20	
Toluene	0	0.025	0.0186	74.4	0.0234	93.6	23	
Ethylbenzene	0	0.025	0.0212	84.8	0.0261	104	20	
m,p-Xylenes	0	0.05	0.0435	87	0.0533	107	21	
o-Xylene	0	0.025	0.0211	84.4	0.0258	103	20	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1465
Date Received:	-
Date Prepared:	2/11/98
Date Analyzed:	2/16/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	124		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.63	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

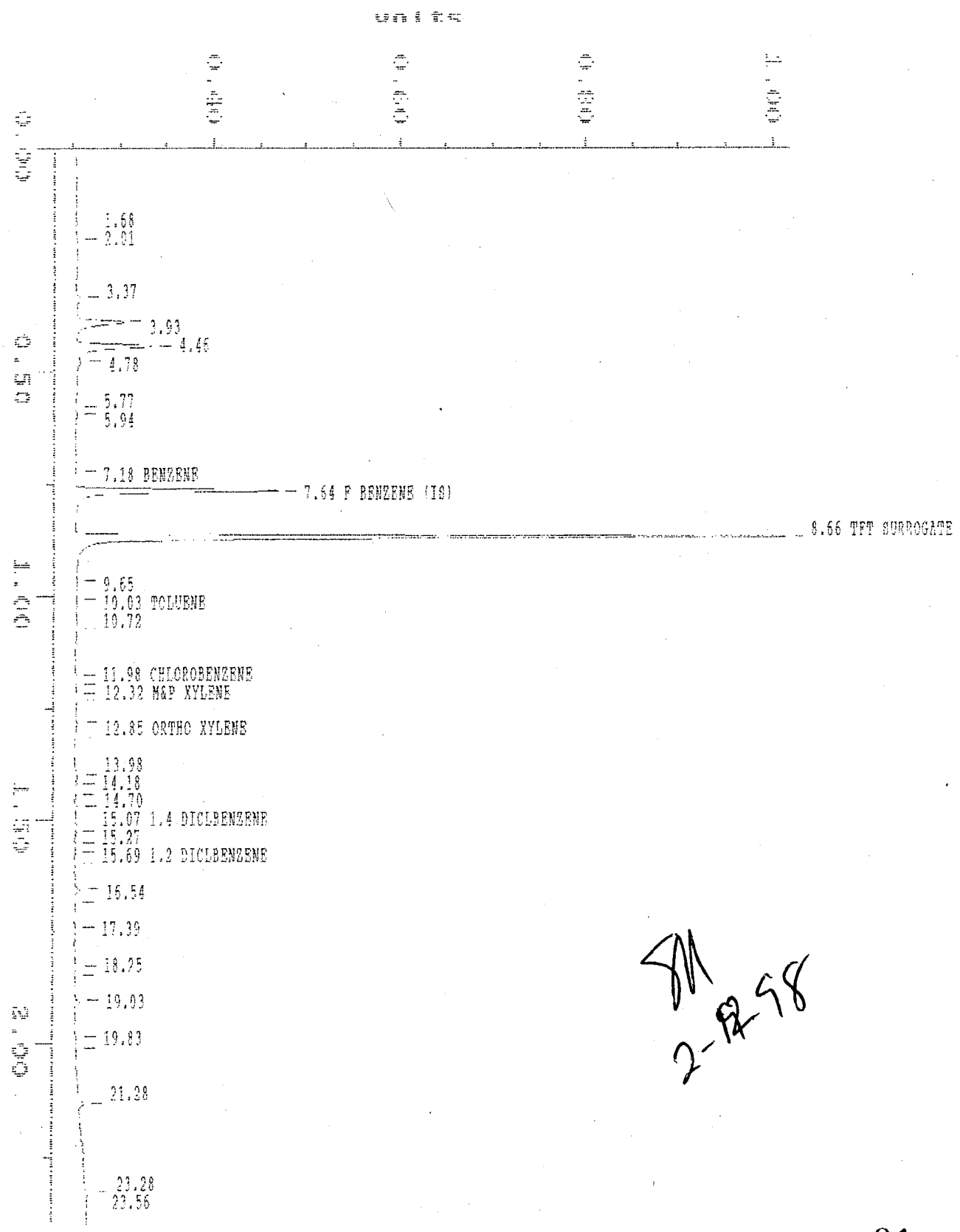
Lab ID:	DI1465
Date Prepared:	2/11/98
Date Analyzed:	2/16/98
QC Batch ID:	DI1465

Extended Diesel Range by WTPH-D Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	0	5.01	5.49	110	5.62	112	1.8	
Heavy Oil (>nC24-nC32)	0	5	4.85	97	4.67	93.3	3.9	

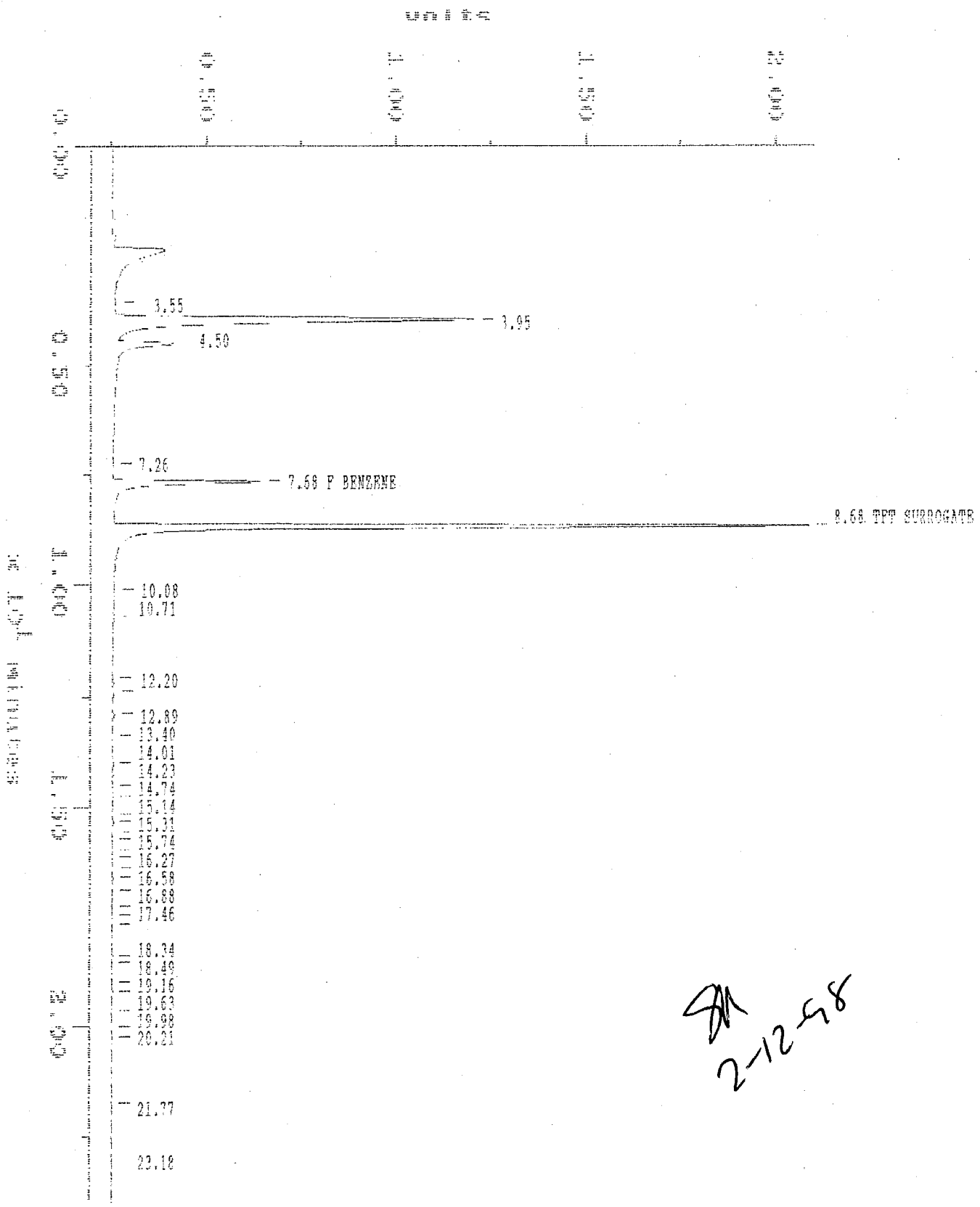
TPH-G DATA PACKAGE

Sample: 70473 01 GB1370 Channel: PID Filename: C339?
Acquired: 12 FEB 98 8:32 Method: C:\MAX\DATA1\980210A Operator: JMC



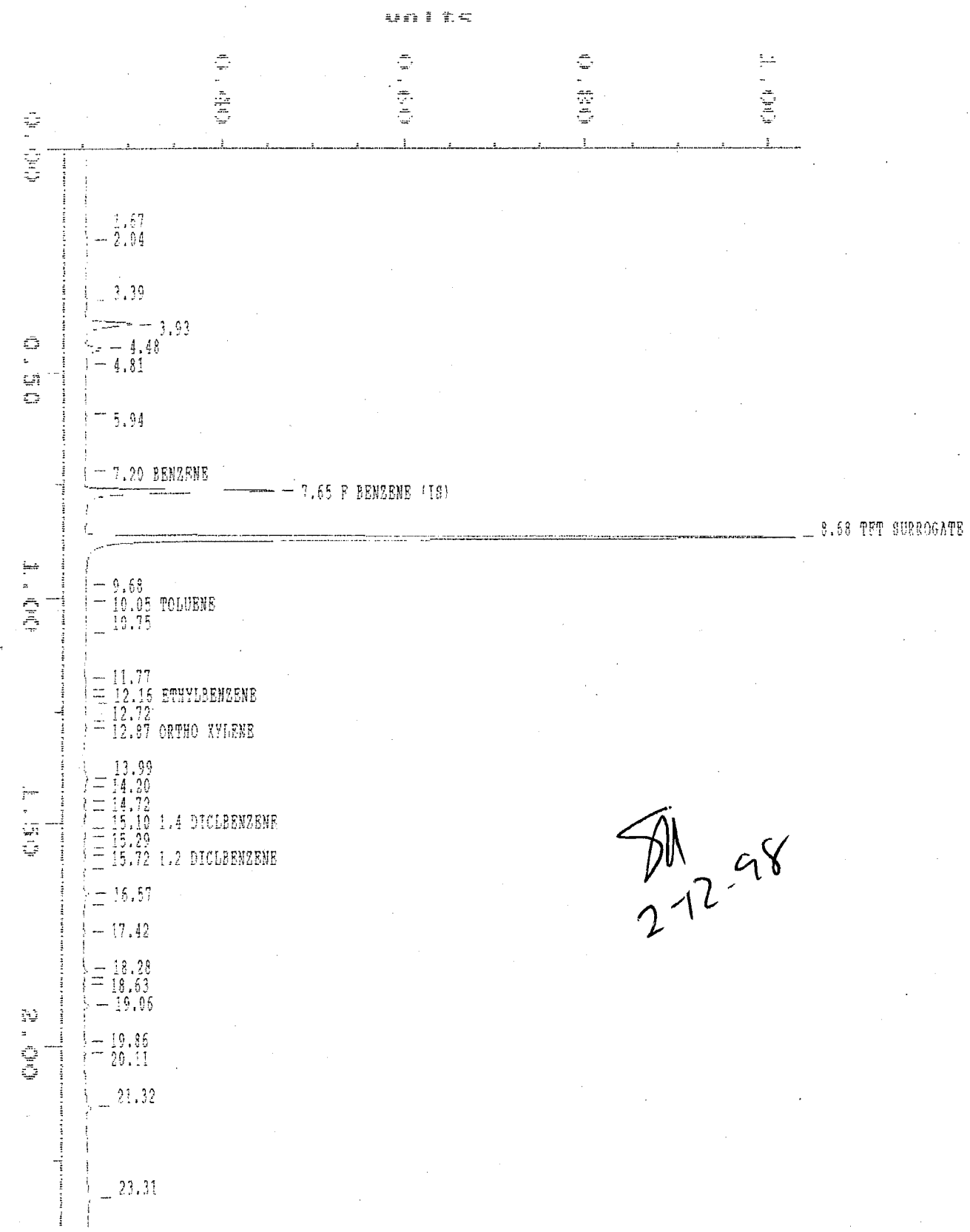
2-12-98

Sample: 70473 01 GB1370 Channel: PID Filename: C3393
Acquired: 12 FEB 98 8:32 Method: C:\MAX\DATA1\980210A Operator: JMC



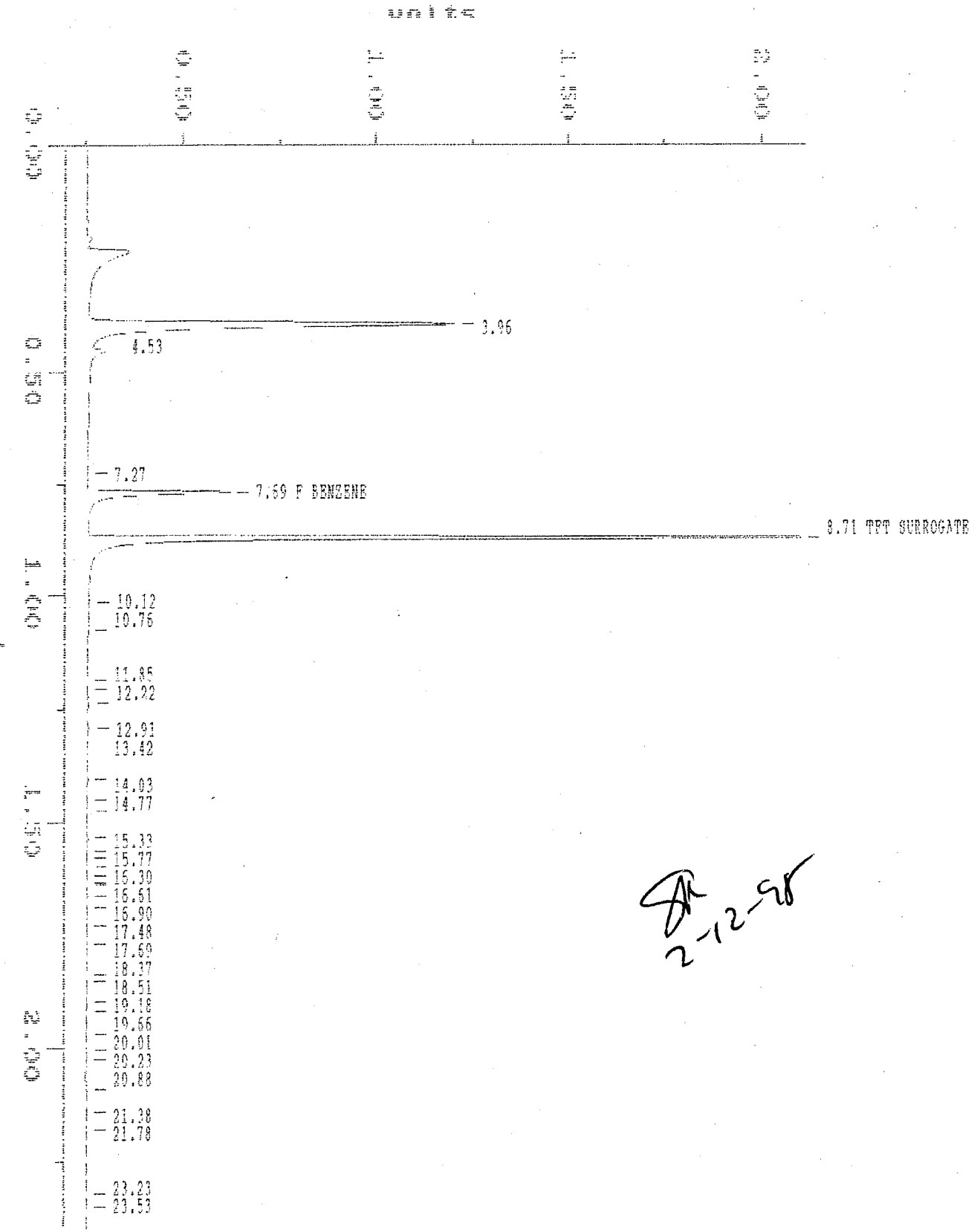
2-12-98

Sample: 70473 02 GB1370 Channel: PID Filename: C3394
Acquired: 12 FEB 98 9:03 Method: C:\MAX\DATA1\980210A Operator: JMC



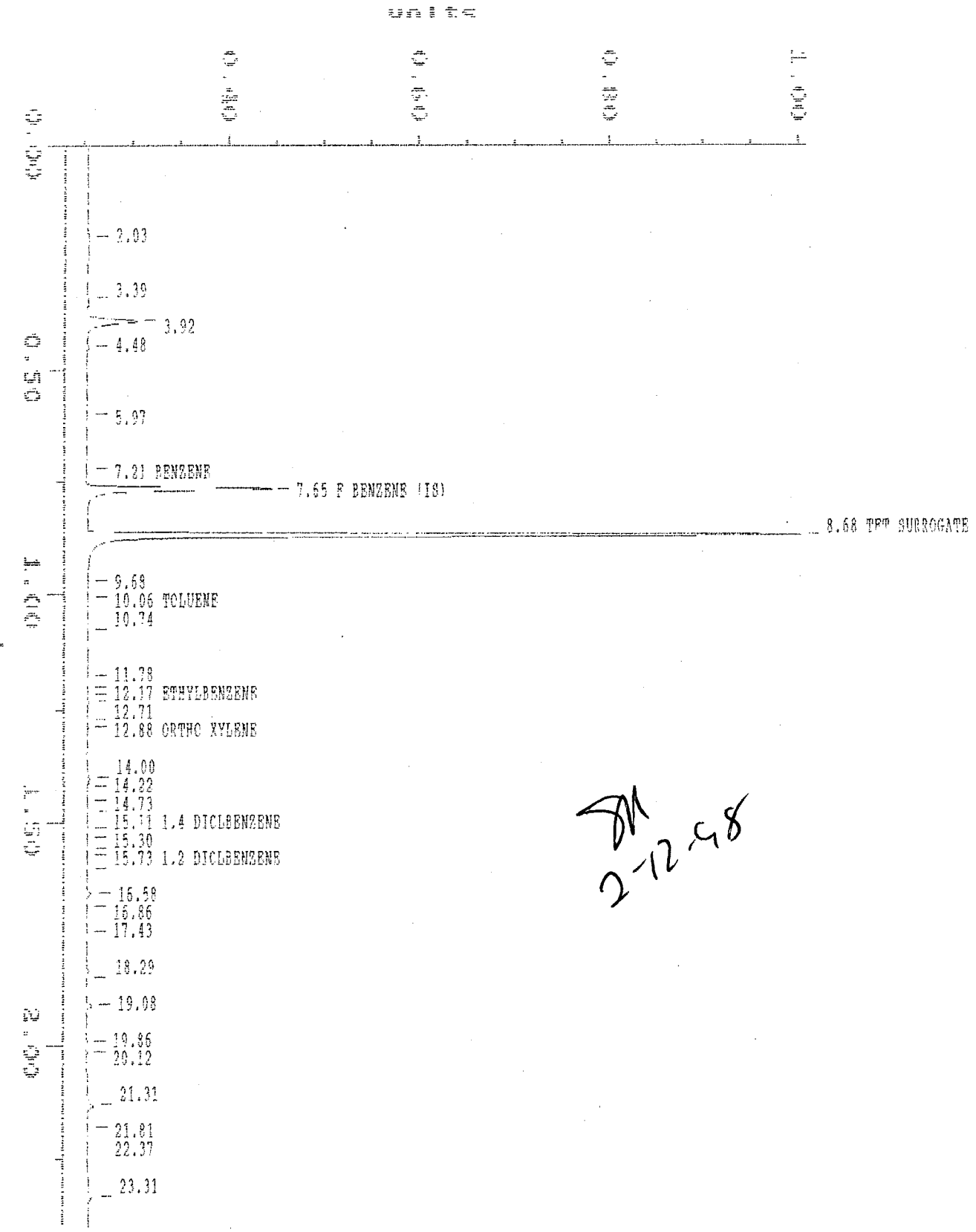
SM 2-12-98

Sample: 70473 02 GB1370 Channel: FID Filename: C3394
Acquired: 12 FEB 98 9:03 Method: C:\MAX\DATA1\980210A Operator: JMC



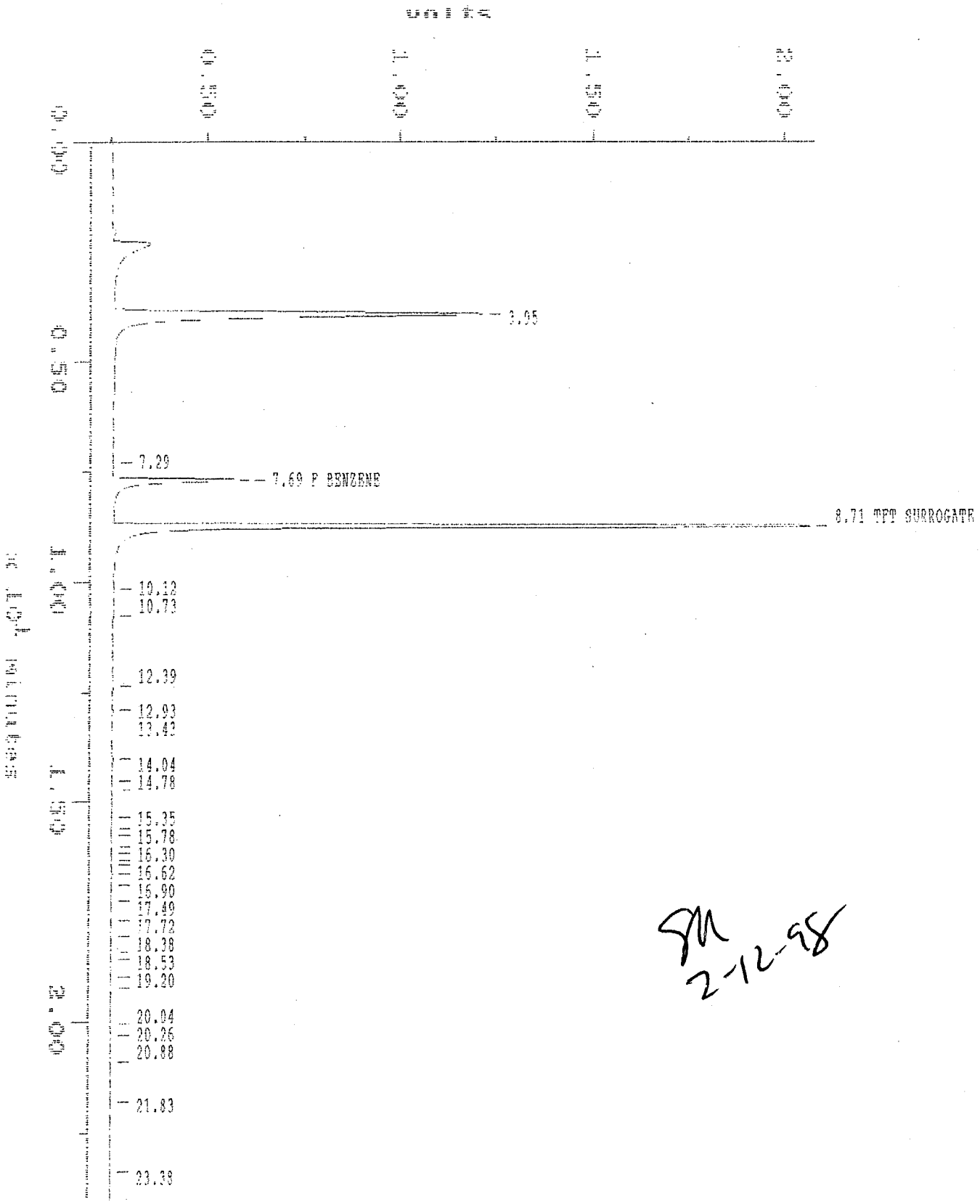
2-12-98

Sample: 70473 03 GB1370 Channel: PID Filename: C3395
Acquired: 12 FEB 98 9:34 Method: C:\MAX\DATA1\980210A Operator: JMC



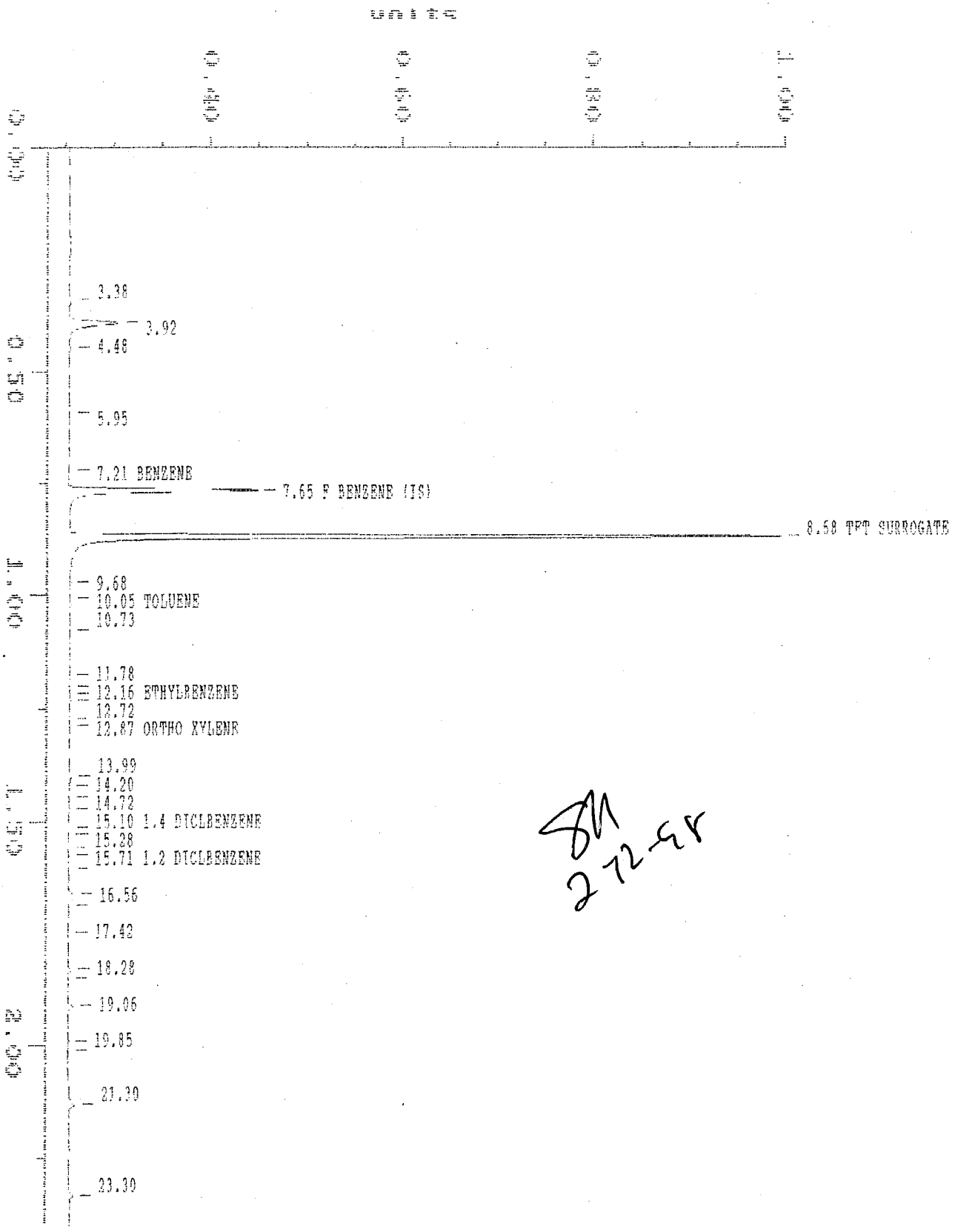
2-12-98

Sample: 70473 03 GB1370 Channel: PID Filename: C3395
Acquired: 12 FEB 98 9:34 Method: C:\MAX\DATA1\980210A Operator: JMC



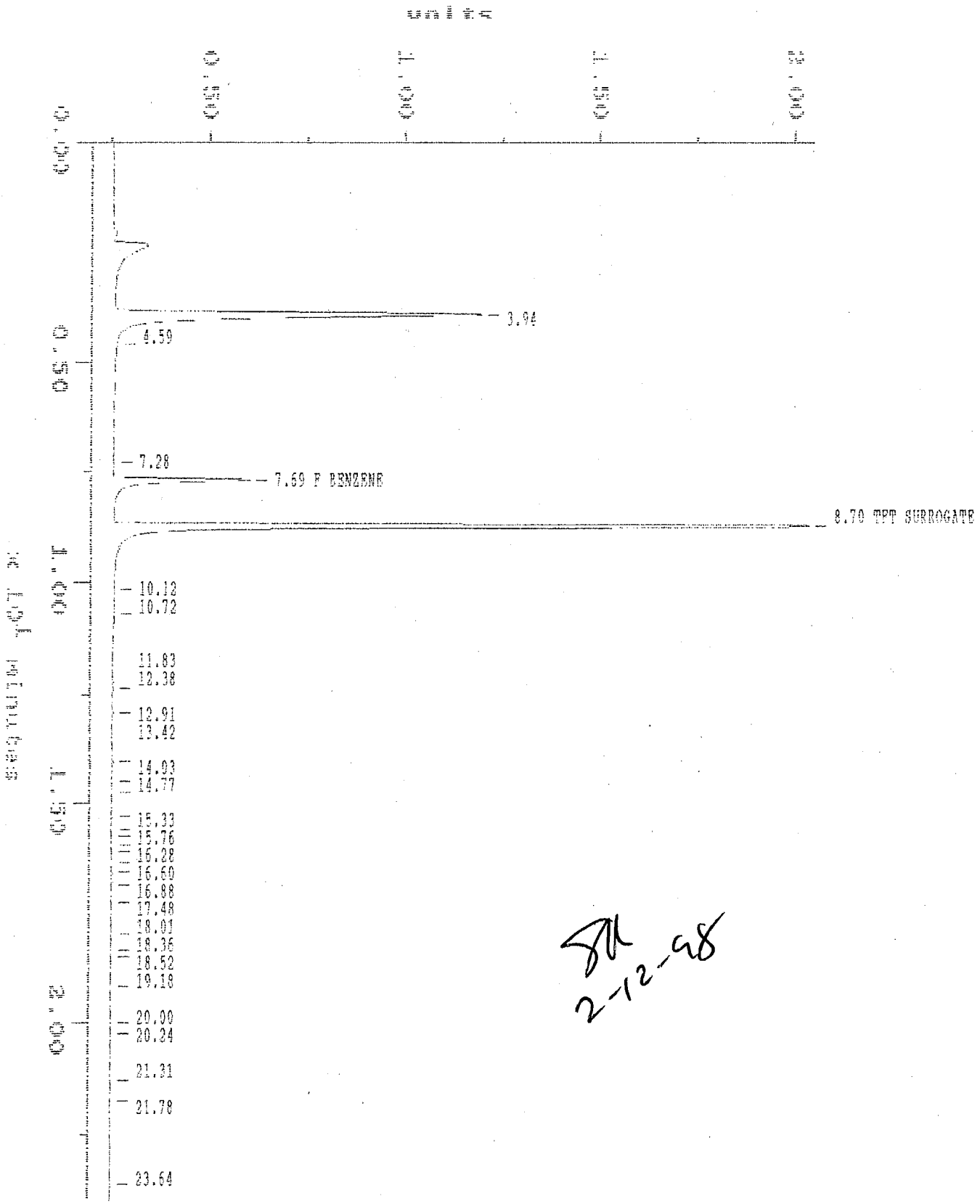
SM 2-12-98

Sample: 70473 04 GR1370 Channel: PID Filename: C3396
Acquired: 12 FEB 98 10:04 Method: C:\MAX\DATA1\980210A Operator: JMC



SM 2-12-98

Sample: 70473 04 GB1370 Channel: PID Filename: C3396
Acquired: 12 FEB 98 10:04 Method: C:\MAX\DATA\9802100 Operator: JMC



2-12-98

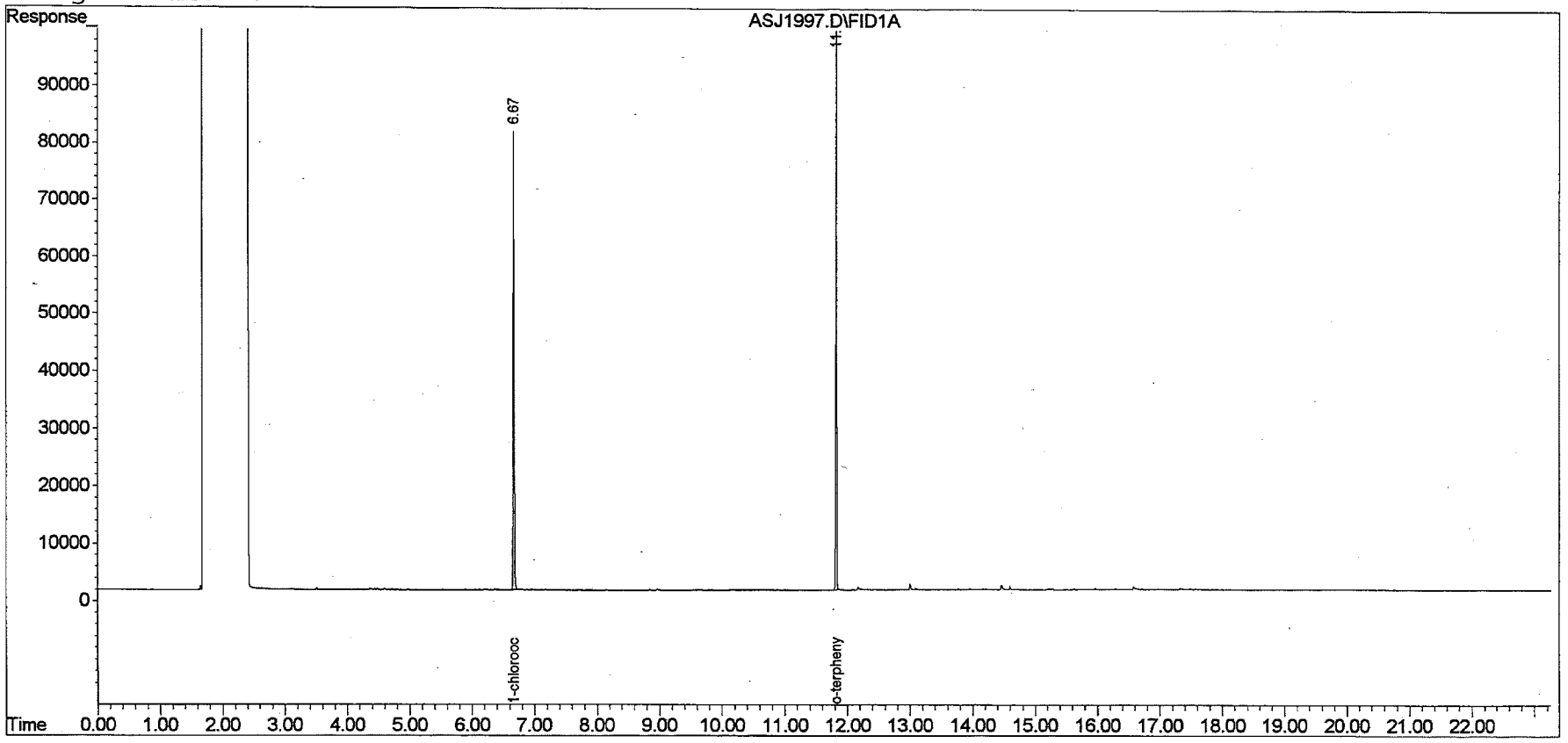
TPH-D DATA PACKAGE

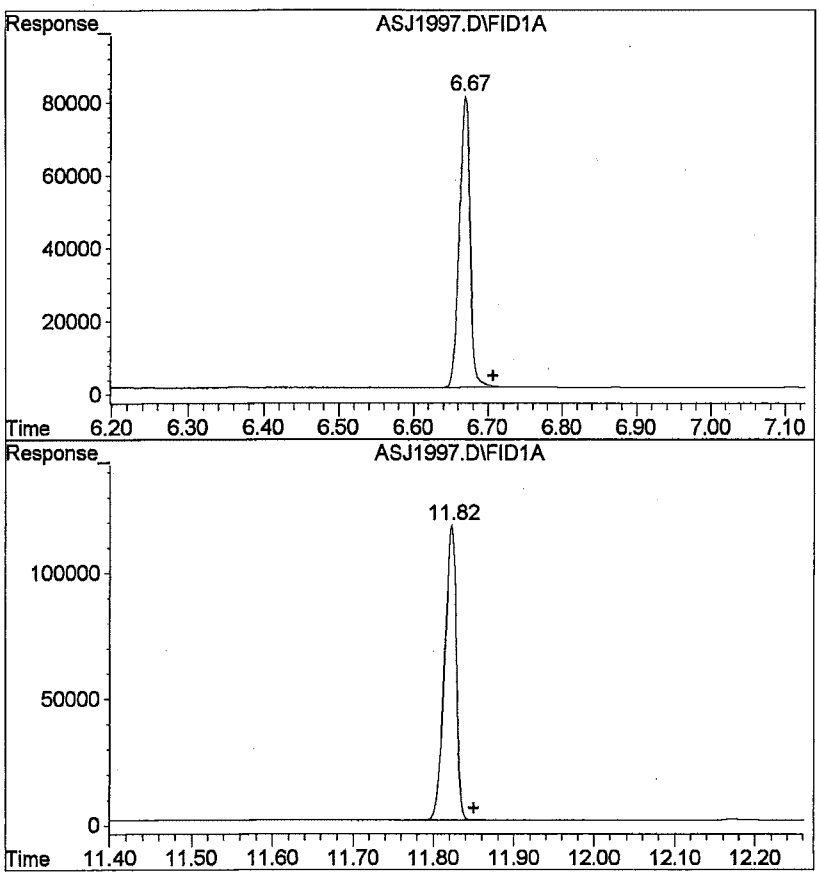
Quantitation Report

Data File : C:\HPCHEM\1\DATA\021598_A\ASJ199?.D Vial: 15
Acq On : 16 Feb 1998 7:14 am Operator:
Sample : 70473-1 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: Feb 17 9:19 1998 Quant Results File: WDXF0115.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0115.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Sun Feb 15 22:25:15 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :





#1 1-chlorooctane (surrogate

R.T.: 6.669 min
Delta R.T.: -0.038 min
Response: 779289
Conc: 213.60 ng/ul

#2 o-terphenyl (surrogate)

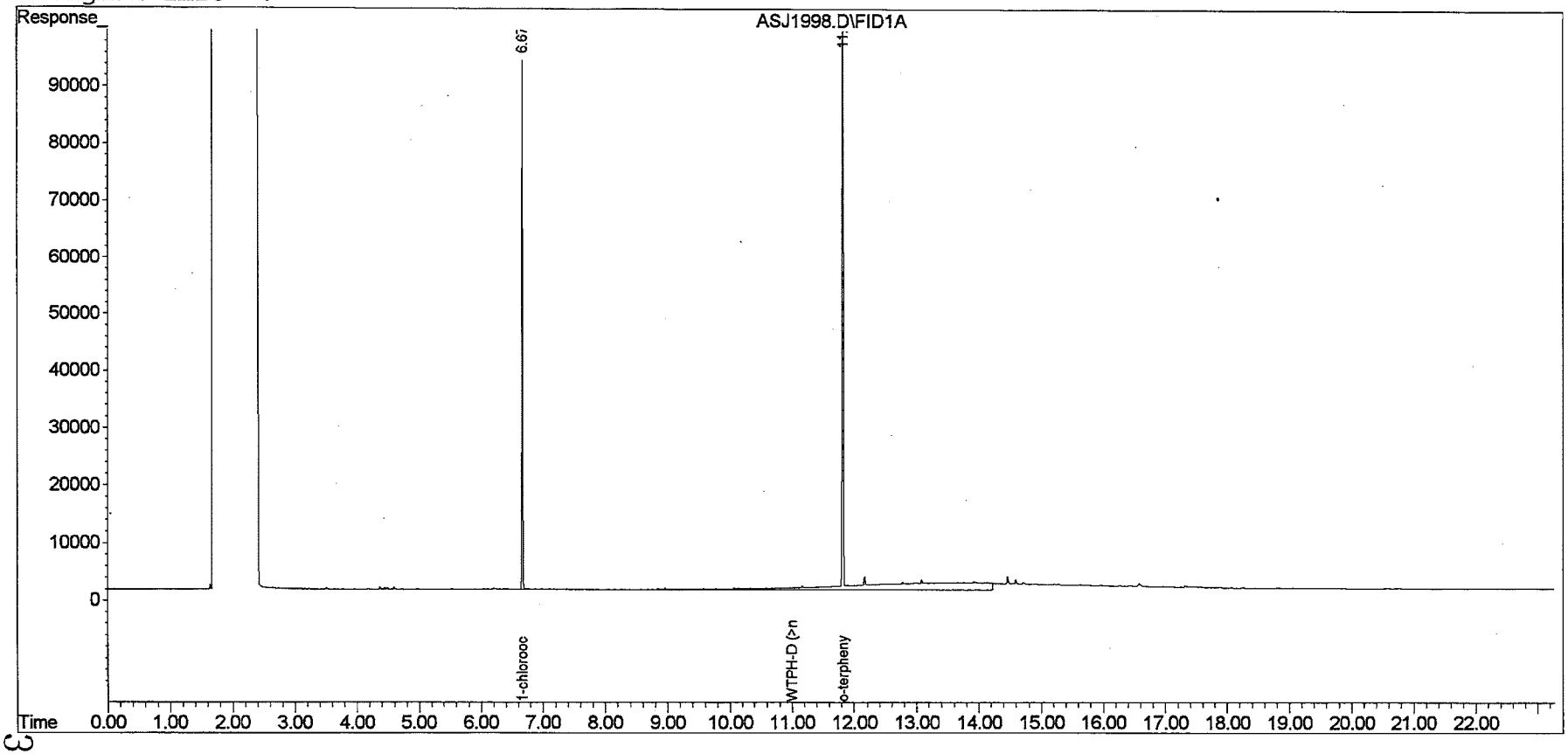
R.T.: 11.821 min
Delta R.T.: -0.029 min
Response: 1178516
Conc: 207.09 ng/ul

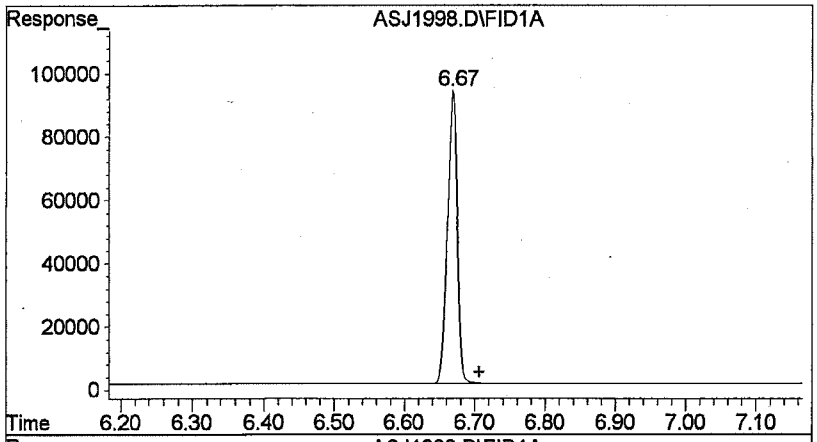
Quantitation Report

Data File : C:\HPCHEM\1\DATA\021598_A\ASJ1998.D Vial: 16
Acq On : 16 Feb 1998 7:45 am Operator:
Sample : 70473-2 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: Feb 17 9:20 1998 Quant Results File: WDXF0115.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0115.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Sun Feb 15 22:25:15 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

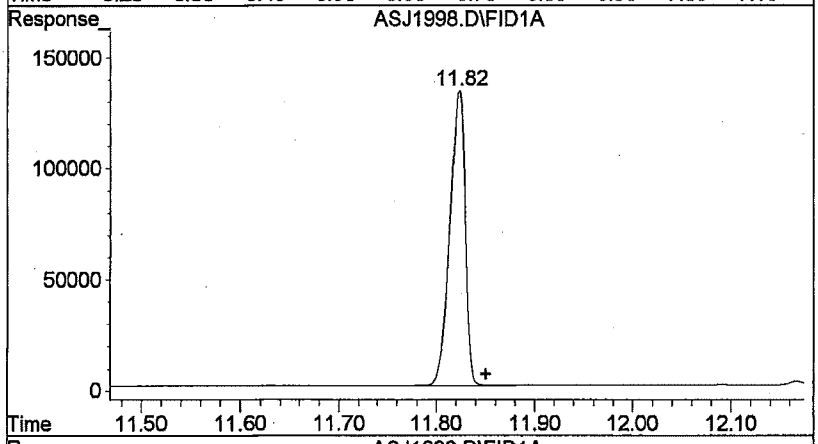
Volume Inj. :
Signal Phase :
Signal Info :





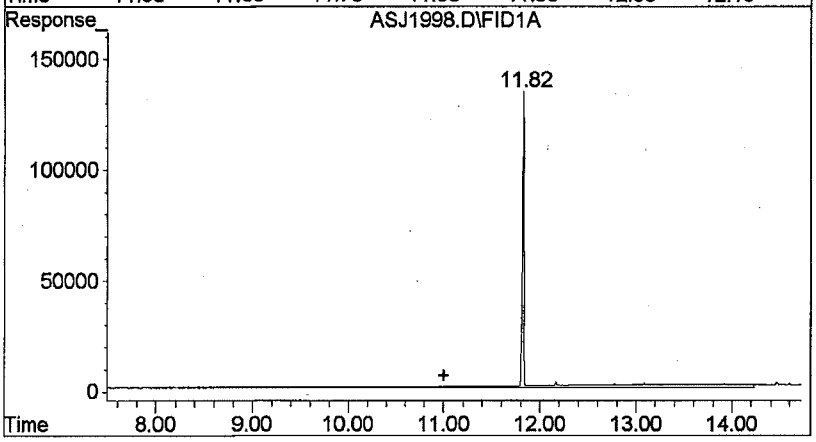
#1 1-chlorooctane (surrogate

R.T.: 6.669 min
Delta R.T.: -0.037 min
Response: 897581
Conc: 244.90 ng/ul



#2 o-terphenyl (surrogate)

R.T.: 11.823 min
Delta R.T.: -0.027 min
Response: 1419145
Conc: 248.13 ng/ul



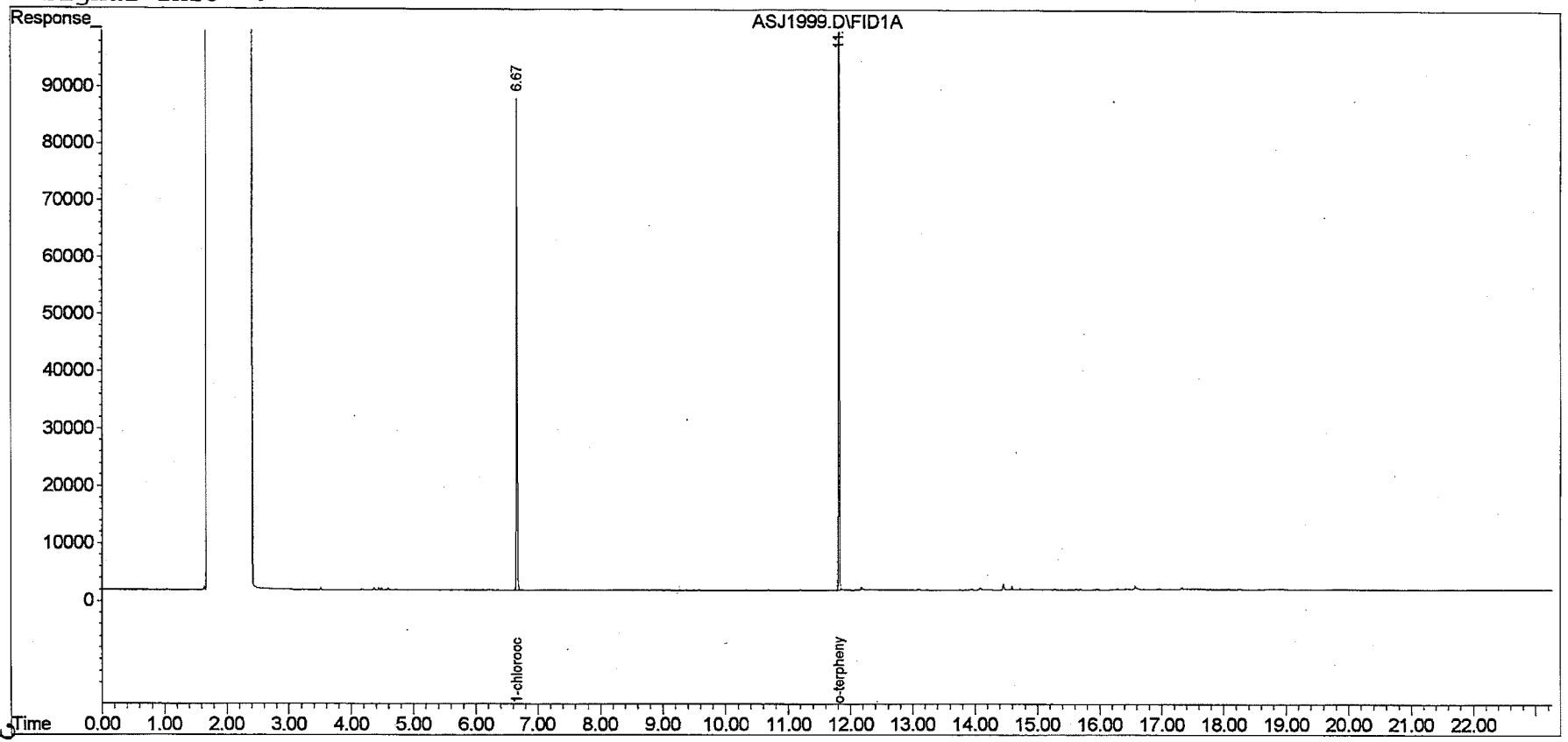
#3 WTPH-D (>nC12-nC24)

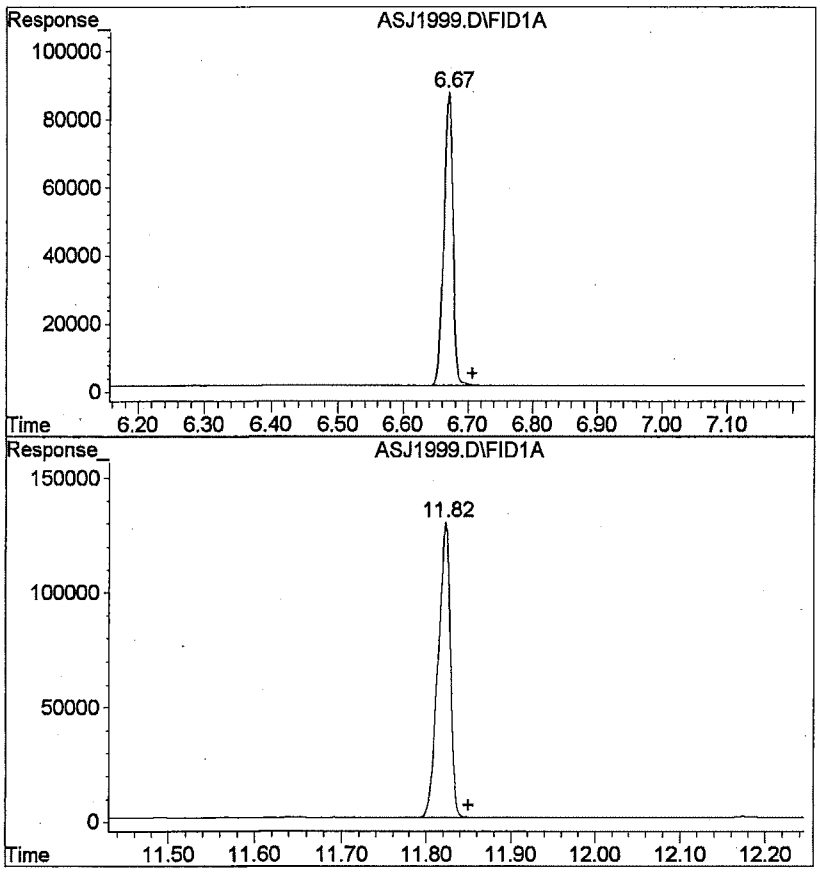
R.T.: 11.000 min
Delta R.T.: 0.000 min
Response: 2038633
Conc: 37.37 ng/ul m

Data File : C:\HPCHEM\1\DATA\021598_A\ASJ1999.D Vial: 17
Acq On : 16 Feb 1998 8:16 am Operator:
Sample : 70473-3 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: Feb 17 9:20 1998 Quant Results File: WDXF0115.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0115.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Sun Feb 15 22:25:15 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :





#1 1-chlorooctane (surrogate

R.T.: 6.669 min
Delta R.T.: -0.037 min
Response: 822661
Conc: 225.07 ng/ul

#2 o-terphenyl (surrogate)

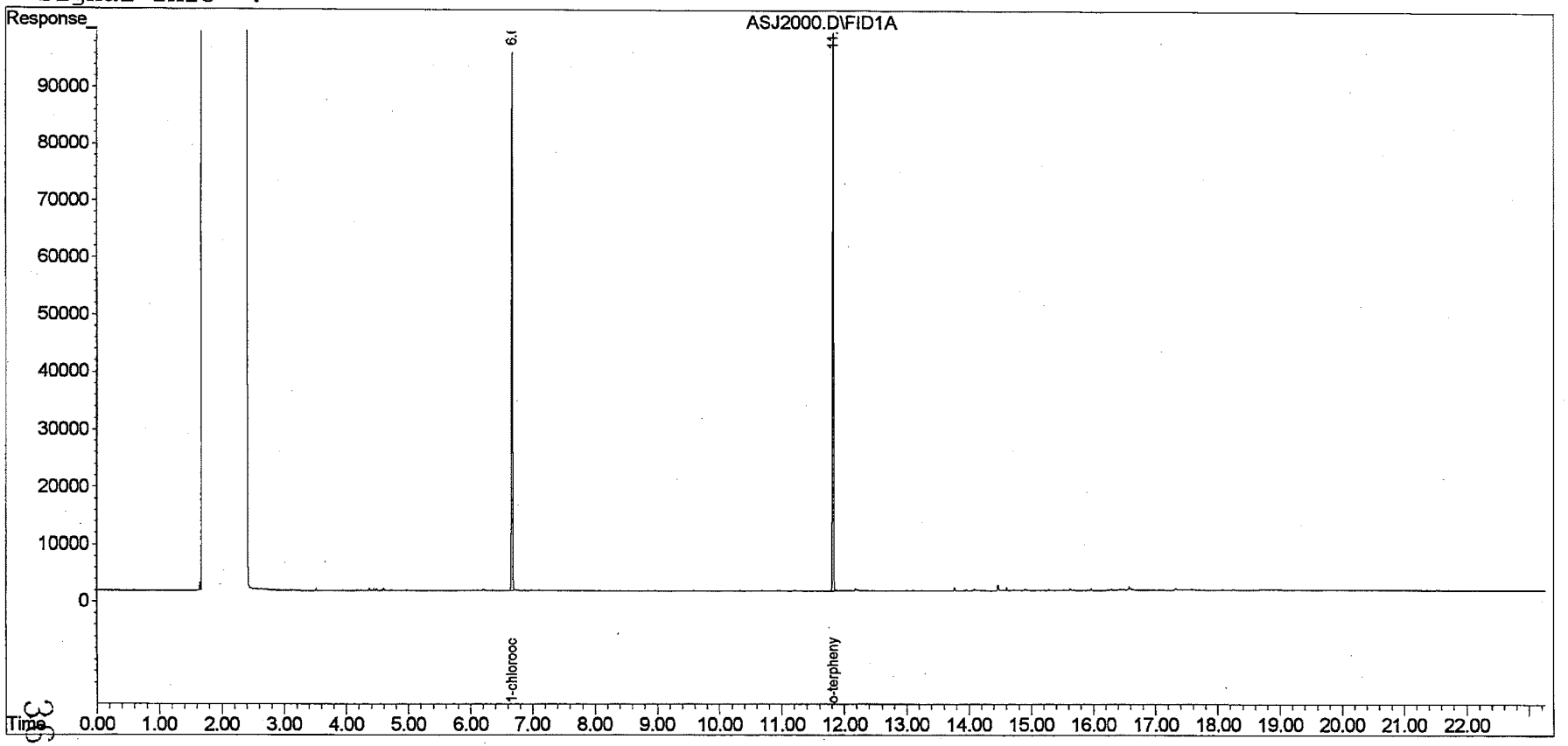
R.T.: 11.822 min
Delta R.T.: -0.028 min
Response: 1272119
Conc: 223.05 ng/ul

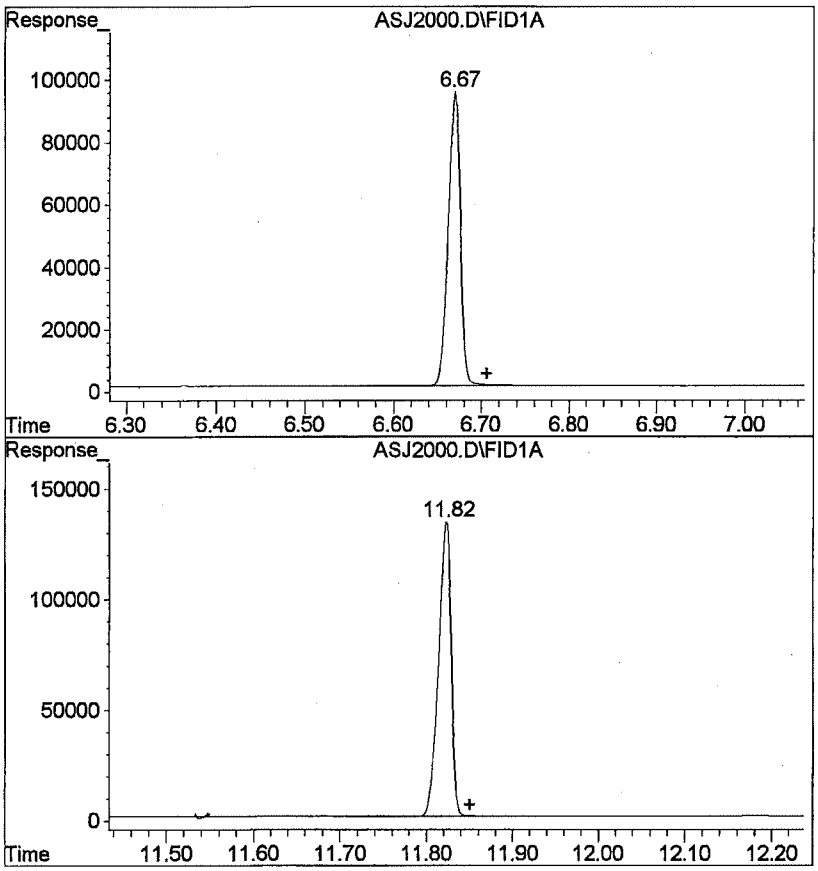
Quantitation Report

Data File : C:\HPCHEM\1\DATA\021598_A\ASJ2000.D Vial: 18
Acq On : 16 Feb 1998 8:47 am Operator:
Sample : 70473-4 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: Feb 17 9:20 1998 Quant Results File: WDXF0115.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0115.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Sun Feb 15 22:25:15 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :





#1 1-chlorooctane (surrogate

R.T.: 6.670 min
Delta R.T.: -0.037 min
Response: 904722
Conc: 246.79 ng/ul

#2 o-terphenyl (surrogate)

R.T.: 11.822 min
Delta R.T.: -0.028 min
Response: 1378893
Conc: 241.26 ng/ul

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE: (253) 922-2310 - FAX: (253) 922-5047

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be $\leq$ 40%.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be > 40%. The higher result was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

N: See analytical narrative.

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____ .

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

X6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.

SOUND ANALYTICAL SERVICES, INC.
ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 Pacific Hwy. East
Tacoma, Washington 98
(253) 922-2310 • FAX (253) 922-5047

70473 SAS, vol

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS

CLIENT: WSDoT - oper
PROJECT NAME: Rimrock Monitoring Wells
CONTACT: Norm Payton
PHONE NO: 360-705-7848

ANALYSIS REQUESTED: WA (A) B C

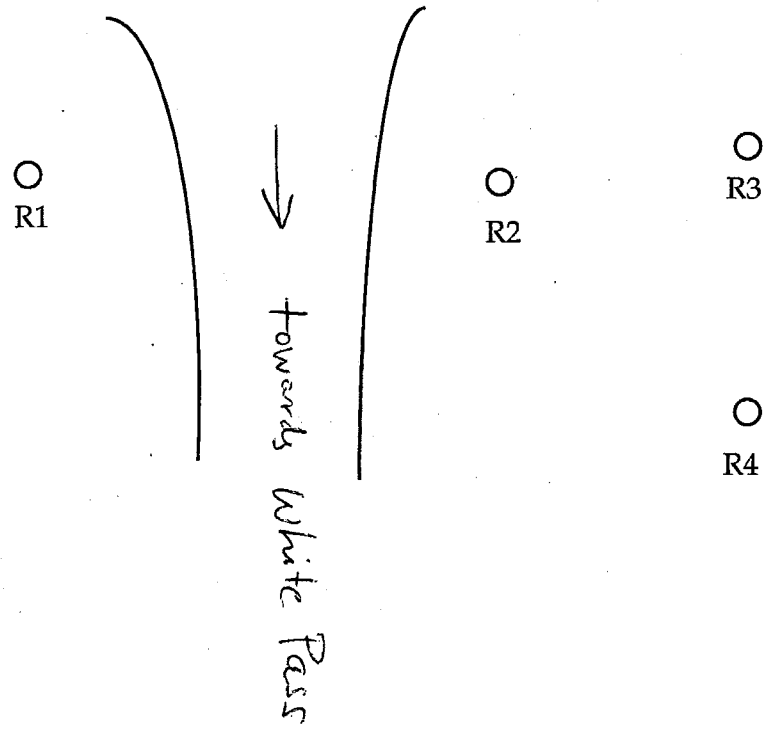
LAB #	SAMPLE I.D.	DATE	TIME	MATRIX	# of Containers	Halogenated Volatiles EPA 601/8010	Aromatic Volatiles EPA 602/8020	Chlorinated Pest., PCB's EPA 608/6080	PAH's	Volatile Organics EPA 624/8240 (GC/MS)	Semi-volatiles EPA625/8270 (GC/MS)	TPH 418.1	Oil & Grease	Total Metals (Specify below)	TCLP Extraction: 8 Metals	TCLP Extraction: Volatiles	TCLP Extraction: Semi-volatiles	TCLP Extraction: Pesticides & Herbicides	Diesel Extended	Gas - BTEX
	R1	2-4-98	10Am	Water	3														XX	X
	R2	"	"	"	3														X	X
	R3	"	"	"	3														XX	X
	R4	"	"	"	3														X	X

	Signature	Printed Name	Firm	Time / Date
Relinquished By		Thanh Nguyen	WSDOT	8:10 / 2-6-98
Received By	SGiang	Giang	SAS	810 2/6/98
Relinquished By				
Received By				
Relinquished By				
Received By				

SPECIAL INSTRUCTIONS/COMMENTS:

These samples will be disposed of 45 days after receipt.
Check this box to have samples returned ☐.

RIMROCK 4-28-98



R1 - Water level 2.12', 12:00am sample taken.

R2 - Water level 3.18', 12:27pm sample taken.

R3 - Water level 5.89', 1:00pm sample taken.

R4 - Water level 6.89', 1:15pm sample taken.

Approximately 7 gallons of water was purged from each well before samples were obtained. A groundwater pump was used to obtain all samples. The samples were analyzed using Diesel extended test and the Gasoline with BTEX test.

SOUND ANALYTICAL SERVICES, INC.
ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 Pacific Hwy. East
Tacoma, Washington 98424
(253) 922-2310 • FAX (253) 922-5047

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS

CLIENT: WSDOT / OPERATIONS
PROJECT NAME: Pimrock Monitoring Wells
CONTACT: Norm Peyton
PHONE NO: 360-705-7848

LAB #	SAMPLE I.D.	DATE	TIME	MATRIX	# of Containers	Halogenated Volatiles EPA 601/8010	Aromatic Volatiles EPA 602/8020	Chlorinated Pest., PCB's EPA 608/8080	PAH's	Volatile Organics EPA 624/8240 (GC/MS)	Semi-volatiles EPA625/8270 (GC/MS)	TPH 418.1	Oil & Grease	Total Metals (Specify below)	TCLP Extraction: 8 Metals	TCLP Extraction: Volatiles	TCLP Extraction: Semi-volatiles	TCLP Extraction: Pesticides & Herbicides	WTPH-Gx/Dx	CTHS, BTEX
	R1	4-28		water	3														X	X
	R2	"		"	3														X	X
	R3	"	12:57	"	3														X	X
	R4	"	1:15	"	3														X	X

ANALYSIS REQUESTED:

	Signature	Printed Name	Firm	Time / Date
Relinquished By		Thanh Nguyen	WSDOT	1:09 / 4-30-98
Received By			SAS	1:09 4-30-98
Relinquished By				
Received By				
Relinquished By				
Received By				

SPECIAL INSTRUCTIONS/COMMENTS:

These samples will be disposed of 45 days after receipt.
Check this box to have samples returned ☐.

Sound Analytical Services, Inc.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy East • Tacoma, WA 98424
(253) 922-2310 • FAX (253) 922-5047
e-mail: SoundL@aol.com

TRANSMITTAL MEMORANDUM

DATE: May 6, 1998

TO: Norm Payton
WSDOT - Operations, Olympia
P.O. Box 47358
Olympia, WA 98504-7358

PROJECT: Rimrock Monitoring Wells

REPORT NUMBER: 72409

Enclosed are the test results for four samples received at Sound Analytical Services on April 30, 1998.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Analytical Narrative: N flag: The percent recoveries of the blank spike and blank spike duplicate were outside the acceptance limits. No action was taken because there was no additional sample volume to reextract.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Dawn Werner
Project Manager

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R1
Lab ID:	72409-01
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	89		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R2
Lab ID:	72409-02
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	89		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R3
Lab ID:	72409-03
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	89		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R4
Lab ID:	72409-04
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	91		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R1
Lab ID:	72409-01
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	92		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R2
Lab ID:	72409-02
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	91		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R3
Lab ID:	72409-03
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	89		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R4
Lab ID:	72409-04
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	92		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R1
Lab ID:	72409-01
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/4/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	95		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.51	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R2
Lab ID:	72409-02
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/4/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	73		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	0.22	0.25	J
Heavy Oil (>nC24-nC32)	ND	0.51	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R3
Lab ID:	72409-03
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/4/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	84		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.51	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	R4
Lab ID:	72409-04
Date Received:	4/30/98
Date Prepared:	5/4/98
Date Analyzed:	5/4/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-Terphenyl	98		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.26	
Heavy Oil (>nC24-nC32)	ND	0.52	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1424
Date Received:	-
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	77		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1424
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
QC Batch ID:	GB1424

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Gasoline Range Organics	0	1.25	1.08	86.5	1.12	89.8	3.7	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1424
Date Received:	-
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Trifluorotoluene	72		57	153

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1424
Date Prepared:	5/4/98
Date Analyzed:	5/5/98
QC Batch ID:	GB1424

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Benzene	0	0.025	0.0244	97.6	0.0268	107	9.2	
Toluene	0	0.025	0.0251	100	0.0265	106	5.8	
Ethylbenzene	0	0.025	0.0267	107	0.024	96	11	
m,p-Xylenes	0	0.05	0.0467	93.4	0.0515	103	9.8	
o-Xylene	0	0.025	0.0262	105	0.0247	98.8	6.1	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1536
Date Received:	-
Date Prepared:	5/4/98
Date Analyzed:	5/4/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-Terphenyl	82		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.25	
Heavy Oil (>nC24-nC32)	ND	0.5	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	DI1536
Date Prepared:	5/4/98
Date Analyzed:	5/4/98
QC Batch ID:	DI1536

Extended Diesel Range by WTPH-D Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	0	5.01	3.47	69.4	3.02	60.2	14	N
Heavy Oil (>nC24-nC32)	0	5.01	3.71	74.2	3.5	69.9	6	N

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE: (253) 922-2310 - FAX: (253) 922-5047

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be $\leq 40\%$.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be $> 40\%$. The higher result was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

N: See analytical narrative.

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____ .

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

X6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.

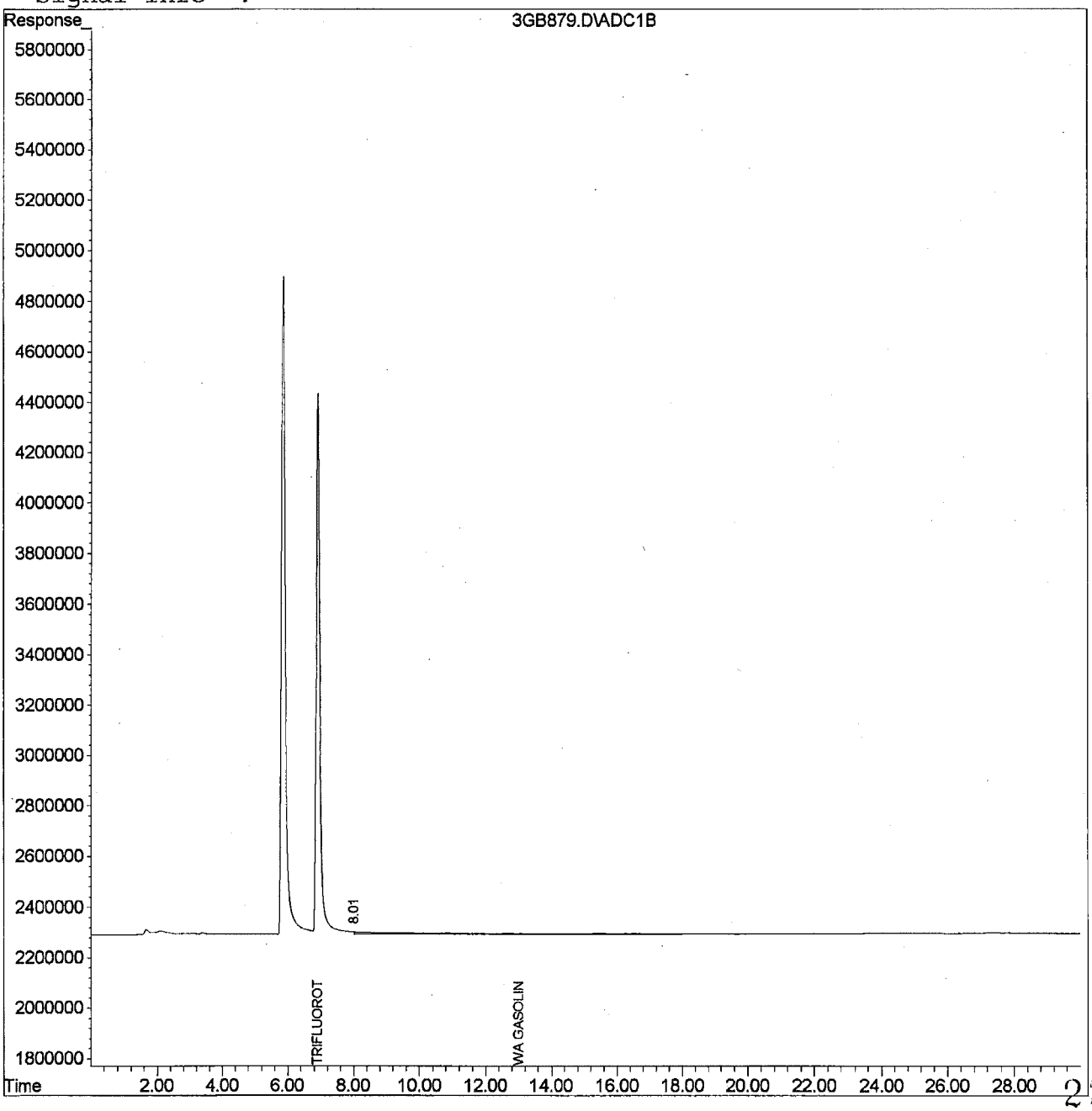
TPH-G DATA PACKAGE

Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A.SEC\3GB879.D Vial: 5
Acq On : 5 May 1998 9:24 am Operator: SJL
Sample : 72409-1 GB1424 Inst : 3400_3
Misc : Multiplr: 1.00
IntFile : events.e
Quant Time: May 5 10:44 1998 Quant Results File: GAS0501.RES

Quant Method : C:\HPCHEM\1\METHODS\GAS0501.M (Chemstation Integrator)
Title :
Last Update : Mon May 04 09:58:28 1998
Response via : Single Level Calibration
DataAcq Meth : GAS.M

Volume Inj. :
Signal Phase :
Signal Info :

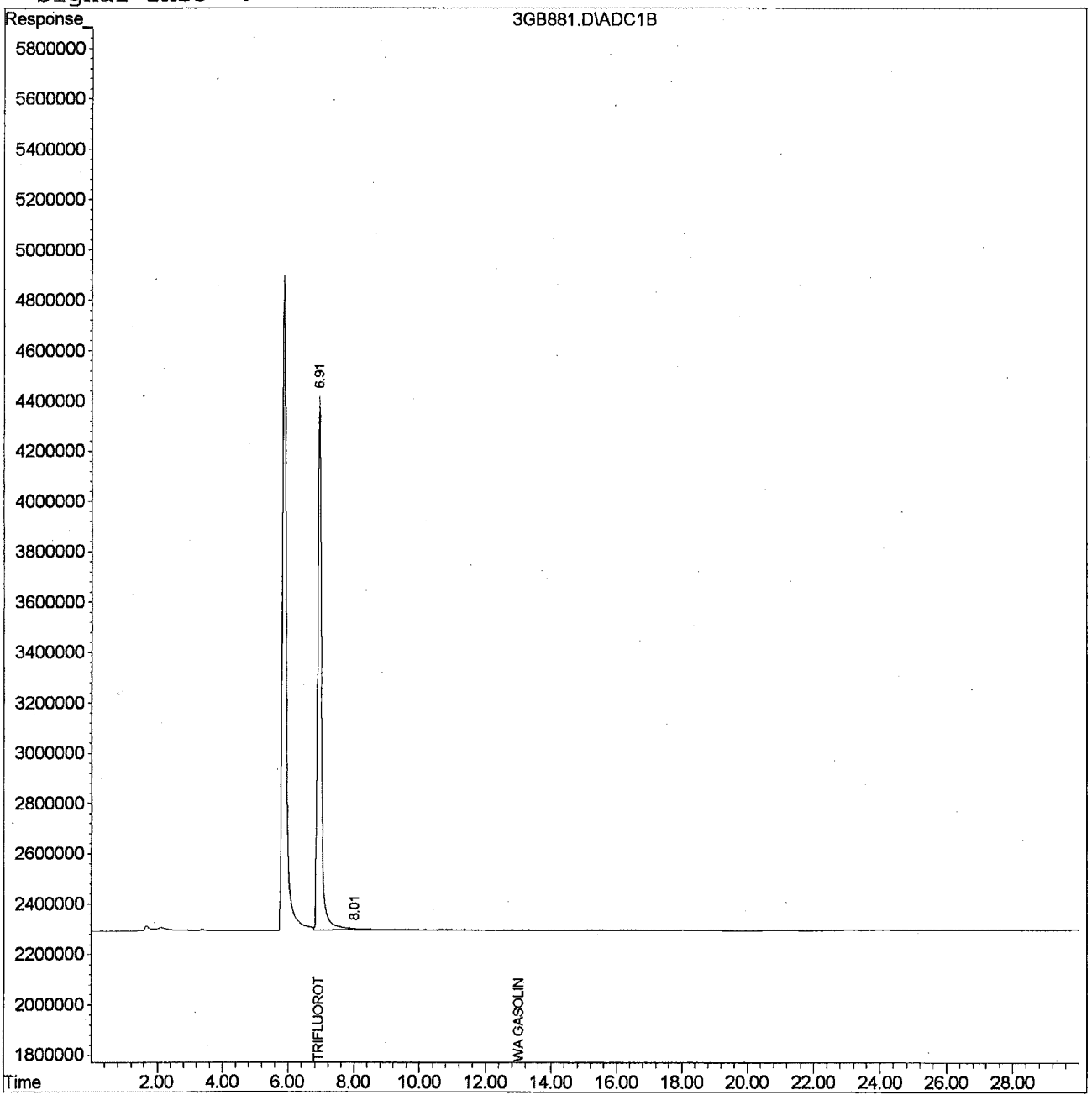


Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A.SEC\3GB881.D Vial: 6
Acq On : 5 May 1998 9:58 am Operator: SJL
Sample : 72409-2 GB1424 Inst : 3400_3
Misc : Multiplr: 1.00
IntFile : events.e
Quant Time: May 5 10:45 1998 Quant Results File: GAS0501.RES

Quant Method : C:\HPCHEM\1\METHODS\GAS0501.M (Chemstation Integrator)
Title :
Last Update : Mon May 04 09:58:28 1998
Response via : Single Level Calibration
DataAcq Meth : GAS.M

Volume Inj. :
Signal Phase :
Signal Info :



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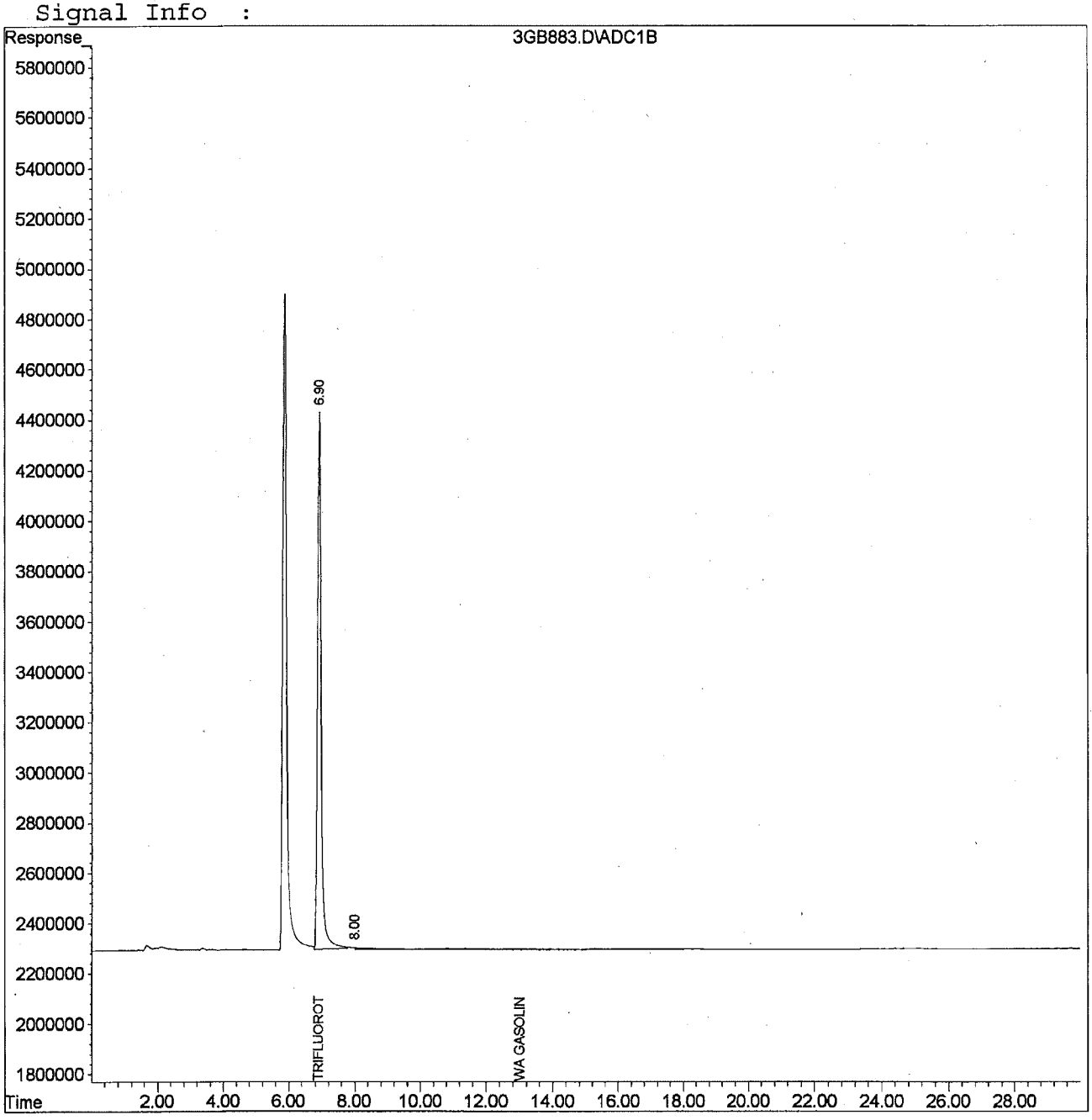
Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A.SEC\3GB883.D Vial: 7
Acq On : 5 May 1998 10:32 am Operator: SJL
Sample : 72409-3 GB1424 Inst : 3400_3
Misc : Multiplr: 1.00
IntFile : events.e
Quant Time: May 5 11:42 1998 Quant Results File: GAS0501.RES

Quant Method : C:\HPCHEM\1\METHODS\GAS0501.M (Chemstation Integrator)
Title :
Last Update : Mon May 04 09:58:28 1998
Response via : Single Level Calibration
DataAcq Meth : GAS.M

Volume Inj. :
Signal Phase :
Signal Info :



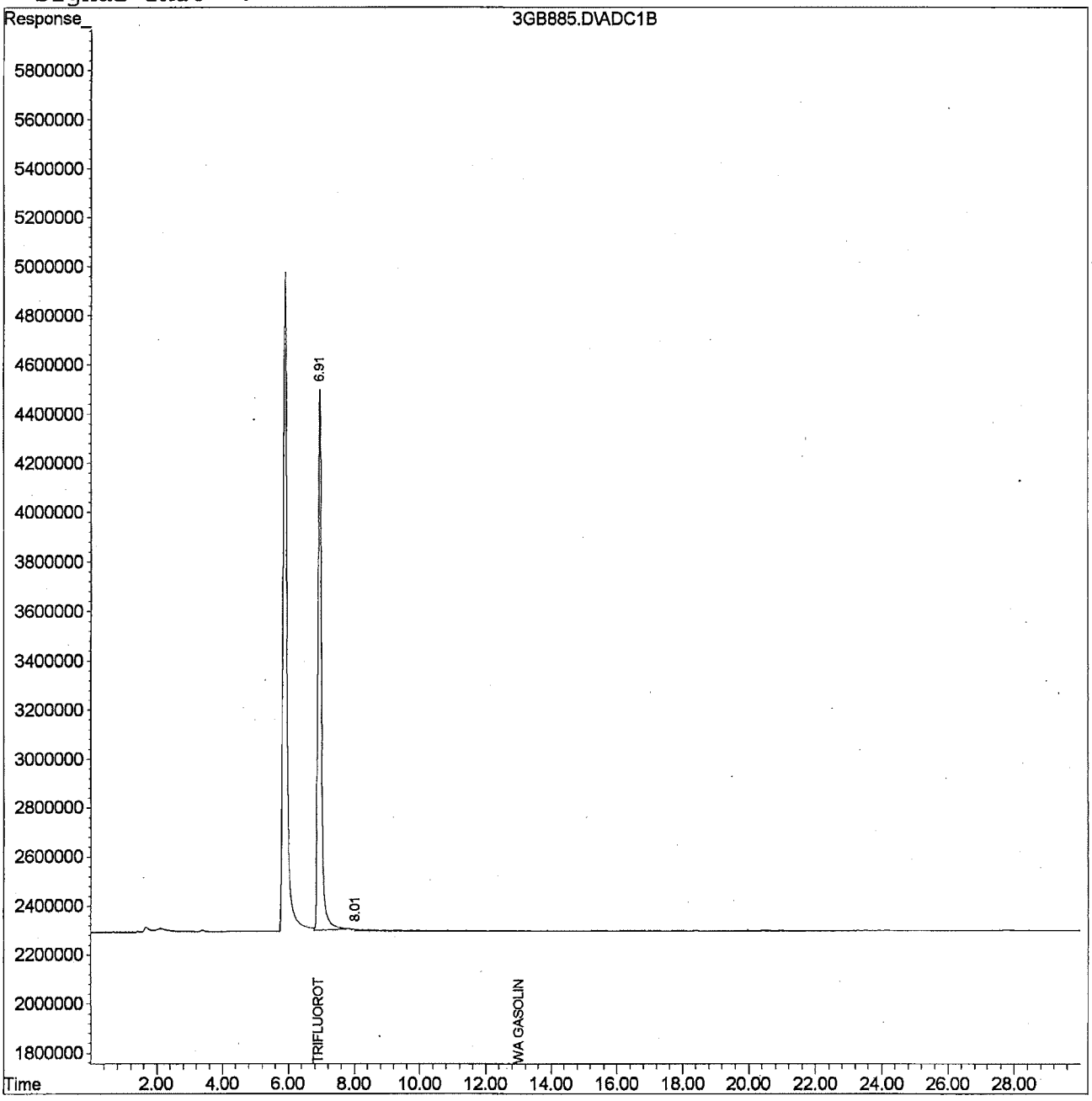
2

Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A.SEC\3GB885.D Vial: 8
Acq On : 5 May 1998 11:06 am Operator: SJL
Sample : 72409-4 GB1424 Inst : 3400_3
Misc : Multiplr: 1.00
IntFile : events.e
Quant Time: May 5 11:43 1998 Quant Results File: GAS0501.RES

Quant Method : C:\HPCHEM\1\METHODS\GAS0501.M (Chemstation Integrator)
Title :
Last Update : Mon May 04 09:58:28 1998
Response via : Single Level Calibration
DataAcq Meth : GAS.M

Volume Inj. :
Signal Phase :
Signal Info :



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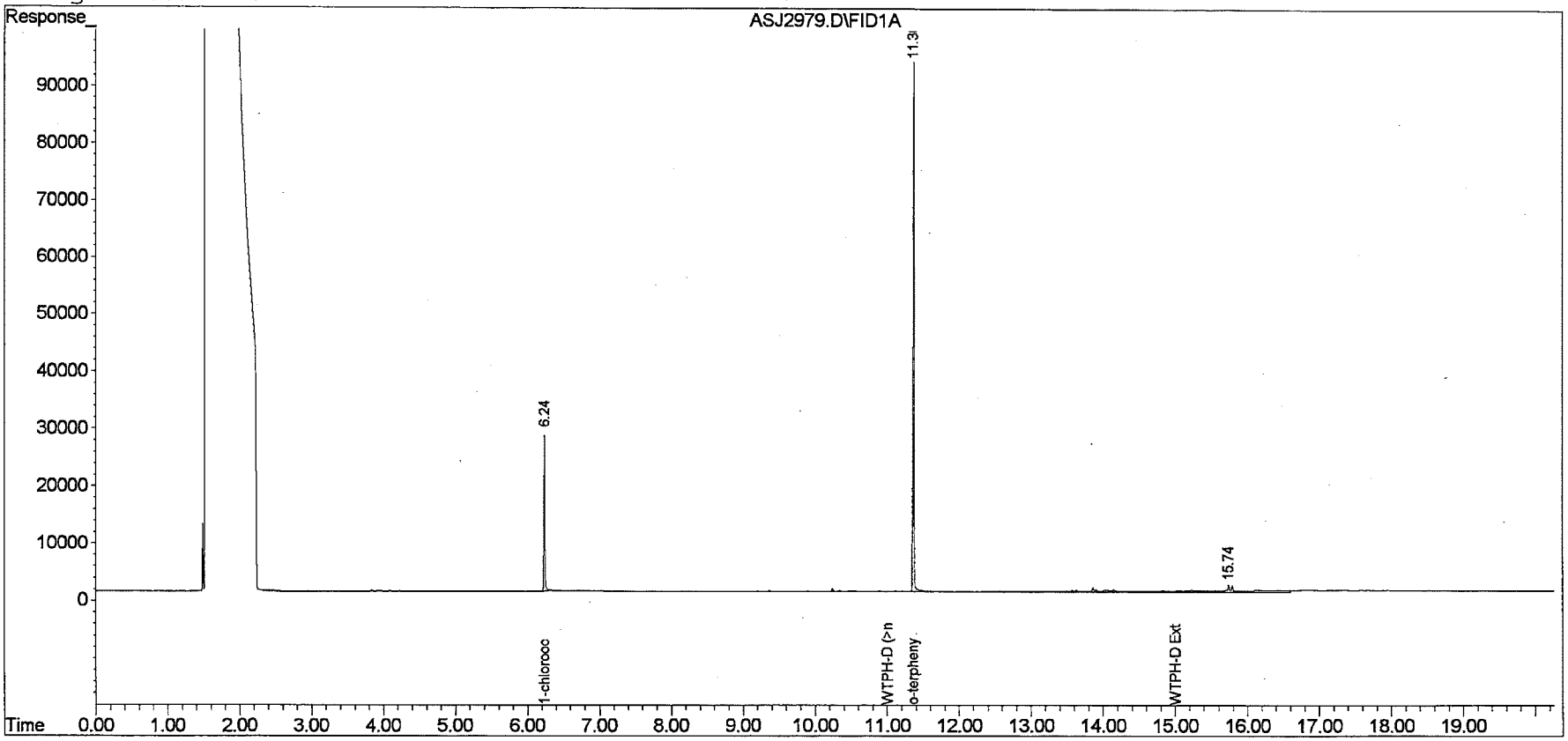
TPH-D DATA PACKAGE

Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A\ASJ2979.D Vial: 24
Acq On : 4 May 1998 9:20 pm Operator:
Sample : 72409-1 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: May 5 14:41 1998 Quant Results File: WDXF0429.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0429.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Thu Apr 30 10:40:26 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :

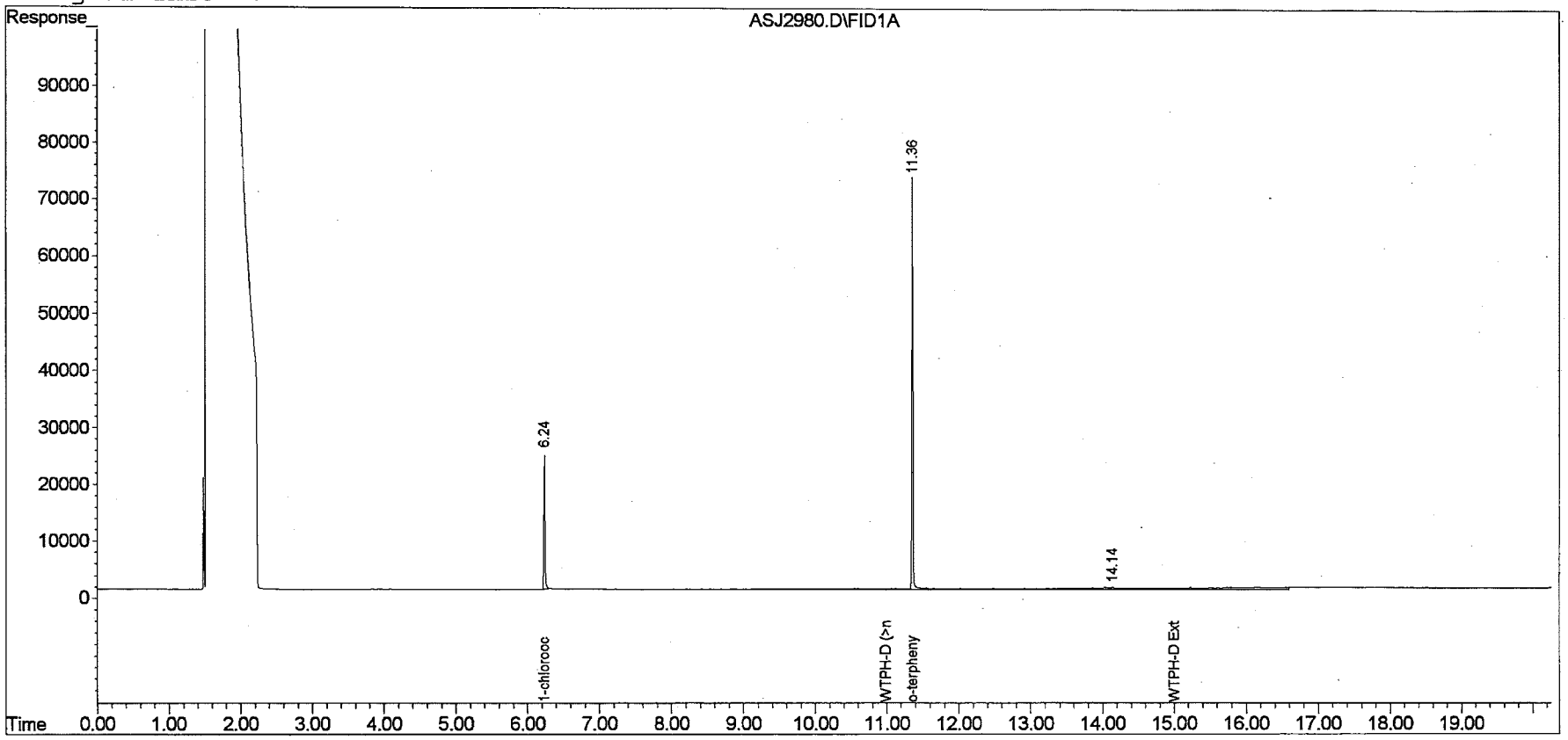


Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A\ASJ2980.D Vial: 25
Acq On : 4 May 1998 9:48 pm Operator:
Sample : 72409-2 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: May 5 14:41 1998 Quant Results File: WDXF0429.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0429.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Thu Apr 30 10:40:26 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :



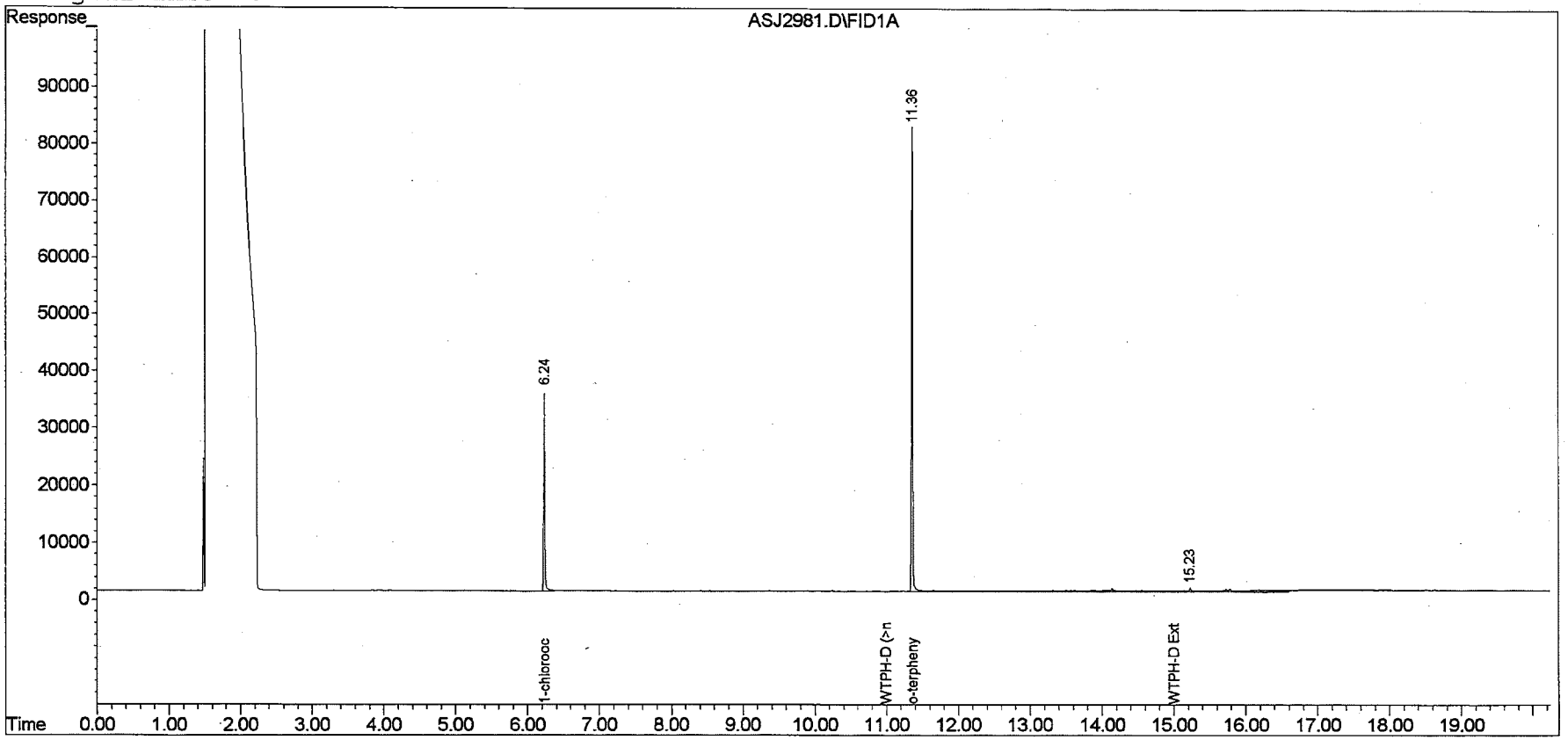
23

Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A\ASJ2981.D Vial: 26
Acq On : 4 May 1998 10:16 pm Operator:
Sample : 72409-3 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: May 5 14:42 1998 Quant Results File: WDXF0429.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0429.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Thu Apr 30 10:40:26 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :

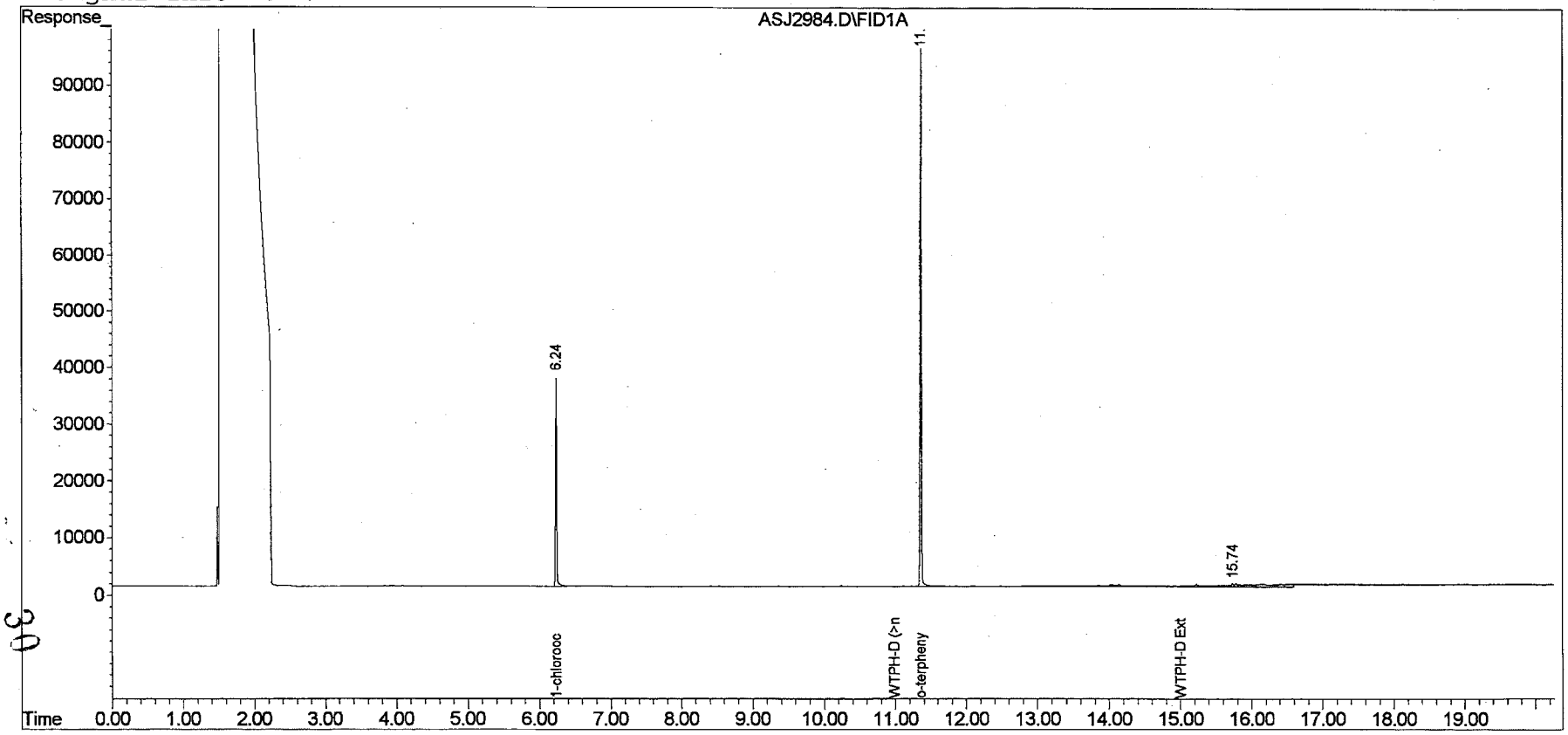


Quantitation Report

Data File : C:\HPCHEM\1\DATA\050498_A\ASJ2984.D Vial: 29
Acq On : 4 May 1998 11:46 pm Operator:
Sample : 72409-4 Inst : HP 5890-I
Misc : Multiplr: 1.00
IntFile : WTPH-D.E
Quant Time: May 5 14:44 1998 Quant Results File: WDXF0429.RES

Quant Method : C:\HPCHEM\1\METHODS\WDXF0429.M (Chemstation Integrator)
Title : WTPH-D (nC12-nC24)
Last Update : Thu Apr 30 10:40:26 1998
Response via : Multiple Level Calibration
DataAcq Meth : FACQ.M

Volume Inj. :
Signal Phase :
Signal Info :



SOUND ANALYTICAL SERVICES, INC.
ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 Pacific Hwy. East
Tacoma, Washington 9842
(253) 922-2310 • FAX (253) 922-5047

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS

CLIENT: WSDOT / OPERATIONS
PROJECT NAME: Rimrock Monitoring Wells
CONTACT: Norm Payton
PHONE NO: 360-705-7848

LAB #	SAMPLE I.D.	DATE	TIME	MATRIX	# of Containers	Halogenated Volatiles EPA 601/8010	Aromatic Volatiles EPA 602/8020	Chlorinated Pest., PCB's EPA 608/8080	PAH's	Volatile Organics EPA 624/8240 (GC/MS)	Semi-volatiles EPA625/8270 (GC/MS)	TPH 418.1	Oil & Grease	Total Metals (Specify below)	TCLP Extraction: 8 Metals	TCLP Extraction: Volatiles	TCLP Extraction: Semi-volatiles	TCLP Extraction: Pesticides & Herbicides	WTPH-D Extended	GTAS - BTEX
72409-1	R1	4-28		water	3														X	X
2	R2	"		"	3														X	X
3	R3	"	12:57	"	3														X	X
4	R4	"	1:15	"	3														X	X

	Signature	Printed Name	Firm	Time / Date
Relinquished By		Thanh Nguyen	WSDOT	11:09 / 4-30-98
Received By		Giang	SAS	1105 4-30-98
Relinquished By				
Received By				
Relinquished By				
Received By				

SPECIAL INSTRUCTIONS/COMMENTS:

These samples will be disposed of 45 days after receipt.
Check this box to have samples returned ☐.

5/3 V01

SOUND ANALYTICAL SERVICES, INC.

4813 Pacific Highway East • Tacoma, Washington 98424 • (253) 922-2310

INVOICE #: 724090

WA DOT Operations Dept-Olympia
P.O. Box 47358
Olympia, WA 98504-7358

REFERENCE:
Contract 94-2 Rimrock Monitor
Wells (Norm Payton)

PURCHASE ORDER:

ACCT #:	TERMS:	DATE	PAGE:
0052	Net 30	05/07/98	1

QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
4	TPH-D	65.00	$260.00
4	BTEX/TPHG	75.00	$300.00

SUBTOTAL:	$560.00
SALES TAX:	$.00
TOTAL DUE:	$560.00

Sound Analytical Services, Inc.
ANALYTICAL & ENVIRONMENTAL CHEMISTS
4813 Pacific Hwy East • Tacoma, WA 98424
(253) 922-2310 • FAX (253) 922-5047
e-mail: SoundL@aol.com

TRANSMITTAL MEMORANDUM

DATE: August 21, 1998

TO: Norm Payton
WSDOT - Operations, Olympia
P.O. Box 47358
Olympia, WA 98504-7358

PROJECT: Rimrock Groundwater Monitoring Wells

REPORT NUMBER: 74874

Enclosed are the test results for four samples received at Sound Analytical Services on August 12, 1998.

The report consists of this transmittal memo, analytical results, quality control reports, a copy of the chain-of-custody, a list of data qualifiers and analytical narrative when applicable, and a copy of any requested raw data.

Should there be any questions regarding this report, please contact me at (253) 922-2310.

Sincerely,

Dawn Werner

Dawn Werner
Project Manager

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW1
Lab ID:	74874-01
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
Bromofluorobenzene	106		63	141

Analyte	Result (mg/L)	PQL	Flags
Benzene	ND	0.001	
Toluene	0.00071	0.001	J
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW2
Lab ID:	74874-02
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
Bromofluorobenzene	105		63	141

Analyte	Result (mg/L)	PQL	Flags
Benzene	ND	0.001	
Toluene	0.00057	0.001	J
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW3
Lab ID:	74874-03
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Bromofluorobenzene	115		63	141

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW4
Lab ID:	74874-04
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
Bromofluorobenzene	111		63	141

Analyte	Result (mg/L)	PQL	Flags
Benzene	ND	0.001	
Toluene	0.00069	0.001	J
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW1
Lab ID:	74874-01
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Bromofluorobenzene	107		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW2
Lab ID:	74874-02
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Bromofluorobenzene	106		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW3
Lab ID:	74874-03
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
Bromofluorobenzene	104		50	150

Analyte	Result (mg/L)	PQL	Flags
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW4
Lab ID:	74874-04
Date Received:	8/12/98
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Bromofluorobenzene	103		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW1
Lab ID:	74874-01
Date Received:	8/12/98
Date Prepared:	8/14/98
Date Analyzed:	8/18/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-terphenyl	100		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.23	
Motor Oil (>nC24-nC32)	ND	0.47	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW2
Lab ID:	74874-02
Date Received:	8/12/98
Date Prepared:	8/14/98
Date Analyzed:	8/18/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	Recovery Limits High
o-terphenyl	90		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.25	
Motor Oil (>nC24-nC32)	ND	0.5	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW3
Lab ID:	74874-03
Date Received:	8/12/98
Date Prepared:	8/14/98
Date Analyzed:	8/18/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-terphenyl	78		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.25	
Motor Oil (>nC24-nC32)	ND	0.5	

SOUND ANALYTICAL SERVICES, INC.

Client Name	WSDOT - Operations, Olympia
Client ID:	RMW4
Lab ID:	74874-04
Date Received:	8/12/98
Date Prepared:	8/14/98
Date Analyzed:	8/18/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
o-terphenyl	68		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Diesel (>nC12-nC24)	ND	0.25	
Motor Oil (>nC24-nC32)	ND	0.5	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1506
Date Received:	-
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Bromofluorobenzene	63		63	141

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Benzene	ND	0.001	
Toluene	ND	0.001	
Ethylbenzene	ND	0.001	
m,p-Xylenes	ND	0.002	
o-Xylene	ND	0.001	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1506
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
QC Batch ID:	GB1506

Volatile Aromatic Hydrocarbons by USEPA Method 8021 Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Benzene	0	0.025	0.0267	107	0.0267	107	0	
Toluene	0	0.025	0.0235	94	0.0235	94	0	
Ethylbenzene	0	0.025	0.0221	88.4	0.0229	91.6	3.6	
m,p-Xylenes	0	0.05	0.0427	85.4	0.0452	90.4	5.7	
o-Xylene	0	0.025	0.0201	80.4	0.0213	85.2	5.8	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - GB1506
Date Received:	-
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
% Solids	-

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

			Recovery Limits	
Surrogate	**% Recovery**	**Flags**	**Low**	**High**
Bromofluorobenzene	62		50	150

Analyte	**Result (mg/L)**	**PQL**	**Flags**
Gasoline Range Organics	ND	0.05	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	GB1506
Date Prepared:	8/18/98
Date Analyzed:	8/19/98
QC Batch ID:	GB1506

Total Petroleum Hydrocarbons as Gasoline by WSDOE Method WTPH-G Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Gasoline Range Organics	0	1	0.811	81.1	0.787	78.7	-3	

SOUND ANALYTICAL SERVICES, INC.

Lab ID:	Method Blank - DI1661
Date Received:	-
Date Prepared:	8/14/98
Date Analyzed:	8/18/98
% Solids	-

Extended Diesel Range by WTPH-D Modified

Surrogate	% Recovery	Flags	Recovery Limits Low	High
o-terphenyl	97		50	150

Analyte	Result (mg/L)	PQL	Flags
Diesel (>nC12-nC24)	ND	0.25	
Motor Oil (>nC24-nC32)	ND	0.5	

SOUND ANALYTICAL SERVICES, INC.

Blank Spike/Blank Spike Duplicate Report

Lab ID:	DI1661
Date Prepared:	8/14/98
Date Analyzed:	8/18/98
QC Batch ID:	DI1661

Extended Diesel Range by WTPH-D Modified

Compound Name	Blank Result (mg/L)	Spike Amount (mg/L)	BS Result (mg/L)	BS % Rec.	BSD Result (mg/L)	BSD % Rec.	RPD	Flag
Diesel (>nC12-nC24)	0	5.01	5.23	104	5.29	106	1.9	
Motor Oil (>nC24-nC32)	0	5.01	5.04	101	5.18	104	2.9	

SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE: (253) 922-2310 - FAX: (253) 922-5047

DATA QUALIFIERS AND ABBREVIATIONS

B1: This analyte was detected in the associated method blank. The analyte concentration was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank).

B2: This analyte was detected in the associated method blank. The analyte concentration in the sample was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank).

C1: Second column confirmation was performed. The relative percent difference value (RPD) between the results on the two columns was evaluated and determined to be $\leq 40\%$.

C2: Second column confirmation was performed. The RPD between the results on the two columns was evaluated and determined to be $> 40\%$. The higher result was reported unless anomalies were noted.

M: GC/MS confirmation was performed. The result derived from the original analysis was reported.

D: The reported result for this analyte was calculated based on a secondary dilution factor.

E: The concentration of this analyte exceeded the instrument calibration range and should be considered an estimated quantity.

J: The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity.

MCL: Maximum Contaminant Level

MDL: Method Detection Limit

N: See analytical narrative.

ND: Not Detected

PQL: Practical Quantitation Limit

X1: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be _____ .

X2: Contaminant does not appear to be "typical" product.

X3: Identification and quantitation of the analyte or surrogate was complicated by matrix interference.

X4: RPD for duplicates was outside advisory QC limits. The sample was re-analyzed with similar results. The sample matrix may be nonhomogeneous.

X4a: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation limit/detection limit.

X5: Matrix spike recovery was not determined due to the required dilution.

X6: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Sample was re-analyzed with similar results.

X7: Recovery and/or RPD values for matrix spike(/matrix spike duplicate) outside advisory QC limits. Matrix interference may be indicated based on acceptable blank spike recovery and/or RPD.

X7a: Recovery and/or RPD values for this spiked analyte outside advisory QC limits due to high concentration of the analyte in the original sample.

X8: Surrogate recovery was not determined due to the required dilution.

X9: Surrogate recovery outside advisory QC limits due to matrix interference.

SOUND ANALYTICAL SERVICES, INC.
ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 Pacific Hwy. East
Tacoma, Washington 98[illegible]
(253) 922-2310 • FAX (253) 922-5047

74874 4/3/01

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS

CLIENT: WSDOT - Operations
PROJECT NAME: Rimrock Groundwater Monitoring Wells
CONTACT: Norm Payton
PHONE NO: 360-705-7848

LAB #	SAMPLE I.D.	DATE	TIME	MATRIX	# of Containers
	RMW1	8-10-98	1:39	H_2O	3
	RMW2	8-10-98	3:46	H_2O	3
	RMW3	8-10-98	2:55	H_2O	3
	RMW4	8-10-98	2:25	H_2O	3

ANALYSIS REQUESTED:

Halogenated Volatiles EPA 601/8010	Aromatic Volatiles EPA 602/8020	Chlorinated Pest., PCB's EPA 608/8080	PAH's	Volatile Organics EPA 624/8240 (GC/MS)	Semi-volatiles EPA625/8270 (GC/MS)	TPH 418.1	Oil & Grease	Total Metals (Specify below)	TCLP Extraction: 8 Metals	TCLP Extraction: Volatiles	TCLP Extraction: Semi-volatiles	TCLP Extraction: Pesticides & Herbicides	WTPH-G/BTEX	WTPH-D Ext.
													✓	✓

A/B/C

	Signature	Printed Name	Firm	Time / Date
Relinquished By	Norman E. Payton	Norman E. Payton	WSDOT	0840 / 8-12-98
Received By	Sgraig	Graig	SAS	0840 8-12-98
Relinquished By				
Received By				
Relinquished By				
Received By				

SPECIAL INSTRUCTIONS/COMMENTS:

These samples will be disposed of 45 days after receipt.
Check this box to have samples returned ☐.

Normal TAT.
Electronic Deliverables

SOUND ANALYTICAL SERVICES, INC.

4813 Pacific Highway East • Tacoma, Washington 98424 • (253) 922-2310

INVOICE #: 748740

WA DOT Operations Dept-Olympia
P.O. Box 47358
Olympia, WA 98504-7358

REFERENCE:
Contract 94-2 Rimrock Ground
Water Wells (Norm Payton)

PURCHASE ORDER:

ACCT #:	TERMS:	DATE	PAGE:
0052	Net 30	08/24/98	1

QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
4	BTEX/TPHG	75.00	$300.00
4	TPH-D	65.00	$260.00

SUBTOTAL:	$560.00
SALES TAX:	$.00
TOTAL DUE:	$560.00

White - Original, Canary - Remittance, Pink - File, Goldenrod - Accounting