

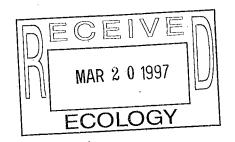
INDEPENDENT REMEDIAL ACTION REPORT

C JS 12216 U7474

For:

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION RIMROCK MAINTENANCE FACILITY

Prepared by WSDOT - Environmental Service Branch March 6, 1997



NAME:

WSDOT -Rimrock Maintenance Facility

LOCATION:

Junction of US Route 12 and State Route 410

OWNER:

Washington State Department of Transportation

(WSDOT)

SITE REMEDIATION PERFORMED BY:

Norm Payton & Thad Richardson

Washington State Department of Transportation

FOSSC - Environmental Service Branch

PO Box 47358

Olympia, WA 98504-7358

(360) 705-7848

BACKGROUND INFORMATION

The WSDOT - Rimrock Maintenance Facility is located at the Junction of US Route 12 and State Route 410 (see Appendix A). The facility was used as a highway maintenance equipment and material storage area. 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 its north end. Soil and 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.

Excavation revealed that, in general, native soil underlying the contaminated part of the subject property consists of poorly graded gravel-sand mixtures (GP). Groundwater within the excavation was encountered at levels between 4 and 5 feet below ground surface.

FIELD ACTIVITIES

On October 23, 1995, Norm Payton, with the WSDOT - Environmental Service Branch, arrived on site to characterize the UST excavation (1991) for possible remaining contamination. The maintenance building had been demolished. All that remained of the building was the concrete foundation. Excavation activities began in the area of the hot spot, adjacent to the northwest

corner of the building foundation. A photoionization detector (PID) and an oil sheen test was used to field screen suspected contaminated soil. Based on petroleum odors, PID readings and the heavy sheen evident in the sheen test, the hot spot was determined to be contaminated with petroleum. The contamination found was fairly extensive. It appears that petroleum floating on top of the groundwater had caused much greater horizontal contamination than was anticipated to be encountered. The groundwater fluctuation caused the soil between about 4 and 7.5 feet to become contaminated. The top 3' of soil was considered clean. This overburden was stockpiled separately from the contaminated material. The material used as back fill for the 1989 excavation (1" minus crushed rock) was field screened, and determined to be contaminated.

Discovery of contaminated soil prompted independent remedial action activities. These activities were performed under the direction of Norm Payton and Thad Richardson of the WSDOT - Environmental Service Branch. The excavation activities were performed in two stages. The first stage took place on October 23, 1995, through October 26, 1995. The second stage took place on April 9, 1996, and April 10, 1996. All of the excavation work was not completed during stage 1, because of concerns about weather and lack of a large excavator.

During Stage 1 of the cleanup, work was conducted using a backhoe. After it was determined that the volume of contaminated soil warranted a larger excavator, the objective changed from excavating contaminated soil to determining the extent of the contamination and removing the top 3' of clean overburden. The western limits of contamination were determined during this stage of the cleanup. Approximately, 80 cubic yards of contaminated soil was excavated during this stage. The contaminated material was stockpiled on the concrete slab that was the floor of the old maintenance building.

During Stage 2 of the cleanup, Norm Payton oversaw the excavation of approximately 1,100 cubic yards of additional material. Eight hundred cubic yards of this material was considered contaminated. The top 3' of the excavation was still considered clean. Contaminated soil was excavated until PID readings and a sheen test indicated that soils were clean. The depth of the excavation ranged from 7.5' to 10' below ground surface. Groundwater was located at 4 feet below ground surface. Therefore, most of the contaminated soil being excavated was underwater. This made contaminated soil removal difficult because the operator could not see if all of the material was being removed to a specific depth. Yet, the objective of the project was met in that the goal was to try to remove as much of the remaining source for continued groundwater degradation, the contaminated soil.

A creosoted wood pipe, thought to be an old storm drain line, was encountered on the west wall (in the vicinity of sample #R5WW.) This creosoted pipe running parallel with SR 410, caused sheen on the water in this area of excavation. At this point the north wall of the excavation was 22' feet south of SR 410. This line is believed to still route storm water from upgradient properties.

Field screening indicated that contaminated soil was present under the foundation of the old maintenance shop foundation (the south side wall of the excavation). The north side of the old shop foundation was demolished to excavate this contaminated soil.

SAMPLING

Thad Richardson performed all soil sampling activities on 10/26/95, while Norm Payton performed all other sampling activities. All samples were obtained by backhoe and hand tool. Due to the heavy oil film on the water, representative samples could not be obtained directly from the excavation. Samples obtained from the excavation itself would have to be lifted through an oil film. Therefore, once field screening showed a side wall to be clean, a hole would be dug directly adjacent to the excavation, leaving a soil dam between the excavation and the test pit. The soil dam would prevent contaminated water from contacting the soil to be sampled. A soil sample would be obtained from the side of the bucket nearest the excavation. The following are the numbers and locations of soil samples obtained on 10/24/95, 4/8/96, and 4/9/96 (See Figure 1):

10/24/96:

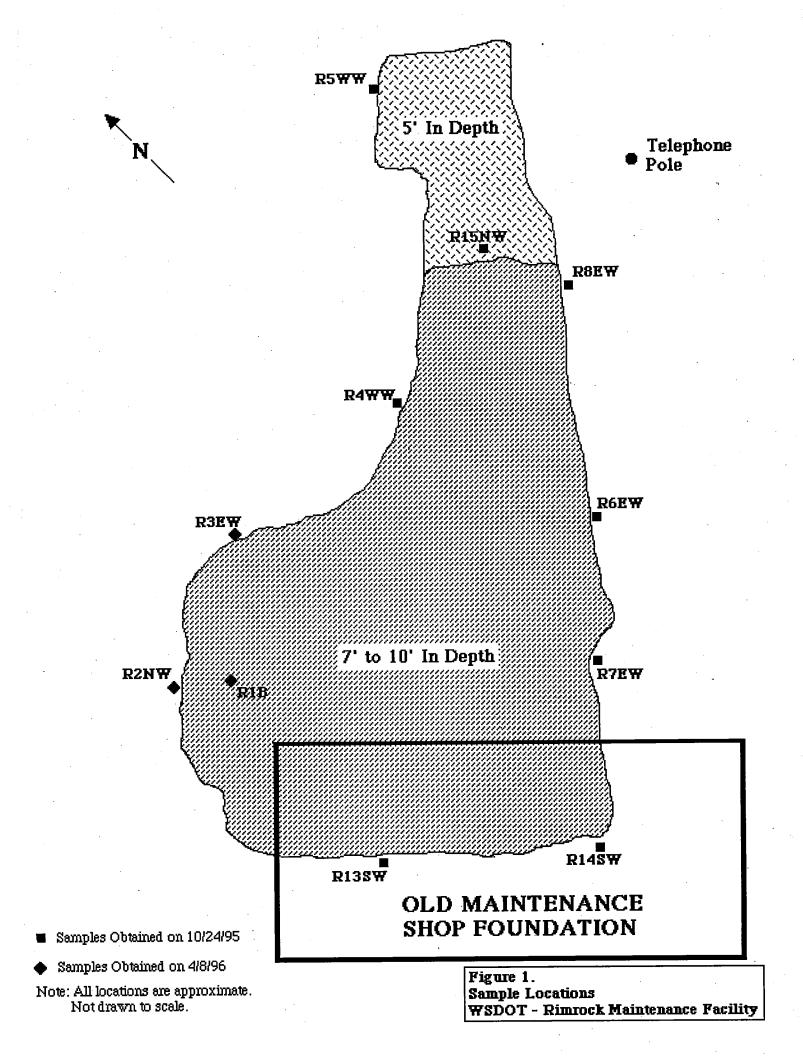
- Sample #R1B was obtained from the bottom of the excavation, 8' north and 7' west of the northwest corner of the building foundation. This sample was obtained at a depth of 7' below ground surface (BGS).
- Sample #R2NW was obtained from the west wall of the excavation, 9' north and 14' west of the northwest corner of the building foundation. This sample was obtained from a depth of 6' BGS.
- Sample #R3EW was obtained from the north wall of the excavation, 22' north and 2' west of the northwest corner of the building foundation. This sample was obtained from a depth of 6' BGS slow the water table.

10/26/96:

• Sample #1 - was a obtained from the 80 cubic yard contaminated pile that was stockpiled on the concrete slab of the old maintenance building. This random sample was obtained to provide a base line contamination level.

4/9/96:

- Sample #R4WW- was obtained from the west wall of the excavation, approximately 61' south of SR 410. This sample was obtained from a depth of 5.5' BGS.
- Sample #R5WW- was taken on the north end of the west wall, approximately 30 feet from SR 410. This sample was obtained from a depth of 6' BGS.
- Sample #R6EW- was obtained from the east wall of the excavation, approximately 93' south of SR 410. This sample was obtained from a depth of 6.5' BGS.
- Sample #R7EW- was obtained from the east wall of the excavation, approximately 12' north and 18' west of the northeast corner of the building foundation. This sample was obtained from a depth of 6.5' BGS.



• Sample #R8EW- was obtained from the east wall of the excavation, approximately 58' south of SR 410. This sample was obtained from a depth of 6.5' BGS

<u>4/10/96:</u>

- Sample #R9-OB was obtained from the south side, east end of the clean overburden pile.
- Sample #R10-OB was obtained from the south side, west ends of the clean overburden pile.
- Sample #R11-OB was obtained from the north side, east ends of the clean overburden pile.
- Sample #R12-OB was obtained from the north side, west end of the clean overburden pile.
- Sample #R13SW- was obtained from the south wall of the excavation, 10' east and 16' south of the northwest corner of the foundation. This sample was pulled from a depth of 7.5' BGS.
- Sample #R14SW- was obtained from the south wall of the excavation, 18' west, and 16' south of the north east corner of the foundation. This sample was obtained from a depth of 7' BGS.
- Sample #R15NW- was obtained from the north end of the excavation, approximately 52' south of SR 410. This sample was obtained from a depth of 7.5' BGS. This sample was obtained to verify that the north wall of the excavation was clean. The area to the north of this sample was only excavated to a depth of 3' to remove clean overburden. Soils below 3' in the area north of sample #R15NW appeared clean based on PID readings and oil sheen tests

All samples were placed in iced coolers and delivered under chain-of-custody to Sound Analytical Inc., Fife, Washington for analysis.

ANALYTICAL RESULTS

With the exception of Sample #1, all of the samples were analyzed for WTPH-D, and WTPH-G with BTEX. Sample #1 was only analyzed for WTPH-D and WTPH-G. Samples R9-OB and R10-OB, along with samples R11-OB and R12-OB were combined into composite samples at the laboratory. All the sample results as reported by Sound Analytical Inc. were below MTCA method A cleanup levels, except for sample #1. Sample #1 was obtained from the contaminated soil pile to obtain a base line. A summary of the results is shown in Table 1. Complete analytical data as reported by Sound Analytical Inc. can be found in Appendix C.

WSDOT- RIMROCK MAINTENANCE FACILITY REMEDIAL ACTION SOIL SAMPLE RESULTS

Sample	Date	Depth	WTPH-G	WTPH-D	В	T	E	Χ
ID	(mo/day/yr)	(ft)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
R1B	10/24/95	7	13	28	. ND	ND_	ND	0.12
R2NW	10/24/95	6	ND	ND	ND	ND	ND_	ND
R3EW	10/24/95	6	1.1	ND	ND	ND	ND	ND
1	10/26/95	PCS Pile	960	31	·			
E4WW	4/8/96	5.5	ND	ND _	ND	ND	ND	ND
R5WW	4/8/96	7.5	ND	ND	ND	ND	ND	ND
R6EW	4/8/96	8.5	ND	ND	ND	ND	ND _	ND
R7EW	4/8/96	8.5	9.5	28	ND	ND	ND_	ND
R8EW	4/8/96	8	ND	ND	ND	ND	ND	ND_
R9-OB & R10-OB	4/9/96	Clean Pile	5.4	_~ 46	ND	ND	ND	ND _
R11-0B & R12-0B	4/9/96	Clean Pile	ND	ND	ND	ND	ND	ND
R13SW	4/9/96	7	1.2	ND	ND	ND	ND	ND
R14SW	4/9/96	. 7	1	ND _	ND.	ND	ND_	ND
R15NW	4/9/96	7.5	2.4	ND	ND	ND	ND	ND
MTCA Method A So			100	200	0.5	40	20	20

B, Benzene; T, Toluene; E, Ethyl Benzene; X, Xylene

ND = Not Detected

_ = Not Analyzed

CONTAMINATED SOIL TREATMENT

The estimated 880 cubic yards of petroleum contaminated soil was screened on site to separate the clean rock from the contaminated soil, and thus reduce the amount of material needing treatment. The contaminated soil was passed through a vibrating screen (Read Screen-All) which separated the rock larger than one inch and also aerated the soil. Screening the rock from the contaminated soil reduced the volume of material requiring treatment to 378 cubic yards.

On May 10, 1996, Thad Richardson and Manuel Flores of the WSDOT - Environmental Service Branch returned to the site to obtain soil samples of the screened soil. These samples were to be used as a base line for future treatment of the pile. Random test holes were dug into the contaminated soil pile. PID readings obtained from these holes were at non detectable levels. No petroleum odors were evident while these holes were dug. Based on the field screening results the soils appeared uniform in contamination, with no apparent hot spots. Five (5) grab soil samples (according to Ecology "Guidance for Remediation of Petroleum Contaminated Soils") were obtained from the 378 cubic yard pile. The samples were obtained from a minimum of 6 inches below the surface of the pile. Samples were immediately placed in a cooler with ice. Samples were then transported under chain of custody to Sound Analytical Services, Inc., Fife, Washington.

These samples were analyzed for WTPH-D, and WTPH-G with BTEX. The sample results as reported by Sound Analytical Inc. showed that the diesel, gasoline and BTEX results were below MTCA method A cleanup levels. Yet, the diesel analysis determined that heavy oil was present in three of the five samples analyzed. Sound Analytical was able to provide WSDOT with results for the heavy oil range using the data already available. Two of these samples had heavy oil above MTCA method A cleanup level at 230 ppm and 300 ppm. A summary of the results is shown in Table 2. Complete analytical data as reported by Sound Analytical Inc. can be found in Appendix C. The source of this heavy oil contamination is unknown. It may have been caused by leaking equipment used by the contractor during the screening process, or historical contamination that was encountered underground.

On May 31, 1996, and June 3, 1996, the 378 cubic yards of heavy oil contaminated soil was transported to the WSDOT - Union Gap Maintenance Facility, located at 2809 Rudkin Rd., Union Gap, Washington. This material was placed on an asphalt pad with other contaminated soils generated from a remediation project at Union Gap. These two projects were kept separate. At this same time, nitrogen and phosphorus were added to the contaminated soil. These nutrients, in a commercially available inorganic fertilizer were mixed into the soil with a front end loader. This mixing also improved soil aeration and evenly distributed soil moisture. In late July 1996, the soil was mixed again. During the July mixing process, the contractor inadvertently combined the Rimrock soil with the 1,280 cubic yards of contaminated soil generated from Union Gap. Both piles had heavy oil contamination at levels below 400 ppm.

On August 12, 1996, Manuel Flores, of the WSDOT-Environmental Service Branch went to the Union Gap facility to obtain soil samples of the Rimrock/Union Gap contaminated pile. Prior testing had shown that both piles were uniform in contamination. Ten (10) grab soil samples

WSDOT - RIMROCK MAINTENANCE FACILITY SCREENED PETROLEUM CONTAMINATED SOIL SOIL SAMPLE RESULTS

Sample	Date I	Depth	WTPH-G	WTPH-D	WTPH-D EXTENDED		T	E	Х
ID.				DIESEL	HEAVY OIL				
	(mo/day/yr)	(ft)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg
1	5/13/96	0.5	3.6	160	ND	ND	ND	ND	ND
2	5/13/96	0.5	1.5	120	300	ND	ND	ND	ND
3	5/13/96	0.5	1.7	55	ND	ND	ND	ND	ND_
4	5/13/96	0.5	1.8	100	150	ND	ND	ND_	ND
5	5/13/96	0.5	5	130	230	ND	ND	ND	ND
MTCA ME	THOD A CLEAN	JP LEVEL	100	200	200	0.5	40	2.0	20

B, Benzene; T, Toluene; E, Ethyl Benzene; X, Xylene

ND = Not Detected

(according to Ecology "Guidance for Remediation of Petroleum Contaminated Soils") were obtained from the 1650 cubic yard pile. The samples were obtained from a minimum of 2 feet below the surface of the pile. Samples were immediately placed in a cooler with ice. Samples were then transported under chain of custody to Sound Analytical Services, Inc., Fife, Washington.

These ten samples were analyzed for WTPH-D extended with silica gel cleanup. The sample results as reported by Sound Analytical Inc. showed that seven of the ten samples collected contained heavy oil above MTCA method A cleanup levels. A summary of the results is shown in Table 2. Complete analytical data as reported by Sound Analytical Inc. can be found in Appendix C.

In a September 26, 1996, letter to the Yakima Health District, WSDOT requested approval of a proposal to use the 1650 cubic yards of material for WSDOT roadside maintenance projects (See Appendix D). In a letter dated October 1, 1996, the Yakima Health District approved these Class 3 soils for reuse in roadside maintenance projects. (See Appendix E).

CONCLUSION

Based on the lab results received from Sound Analytical Incorporated, the excavated area is now below MTCA method A cleanup levels. The excavation has been back filled with the screened rock and clean material brought in from off site. WSDOT is building a new interchange for SR 410 and US 12.

The estimated 378 cubic yards of petroleum contaminated soil that remained after screening meets Class 3 criteria, and has been approved for use on roadside maintenance projects by the Yakima Health District.

Groundwater monitoring wells will be installed at this site during the spring/summer of 1997 to evaluate potential impacts to site groundwater. Information obtained from these wells will be provided to Ecology in subsequent reports.

Prepared by

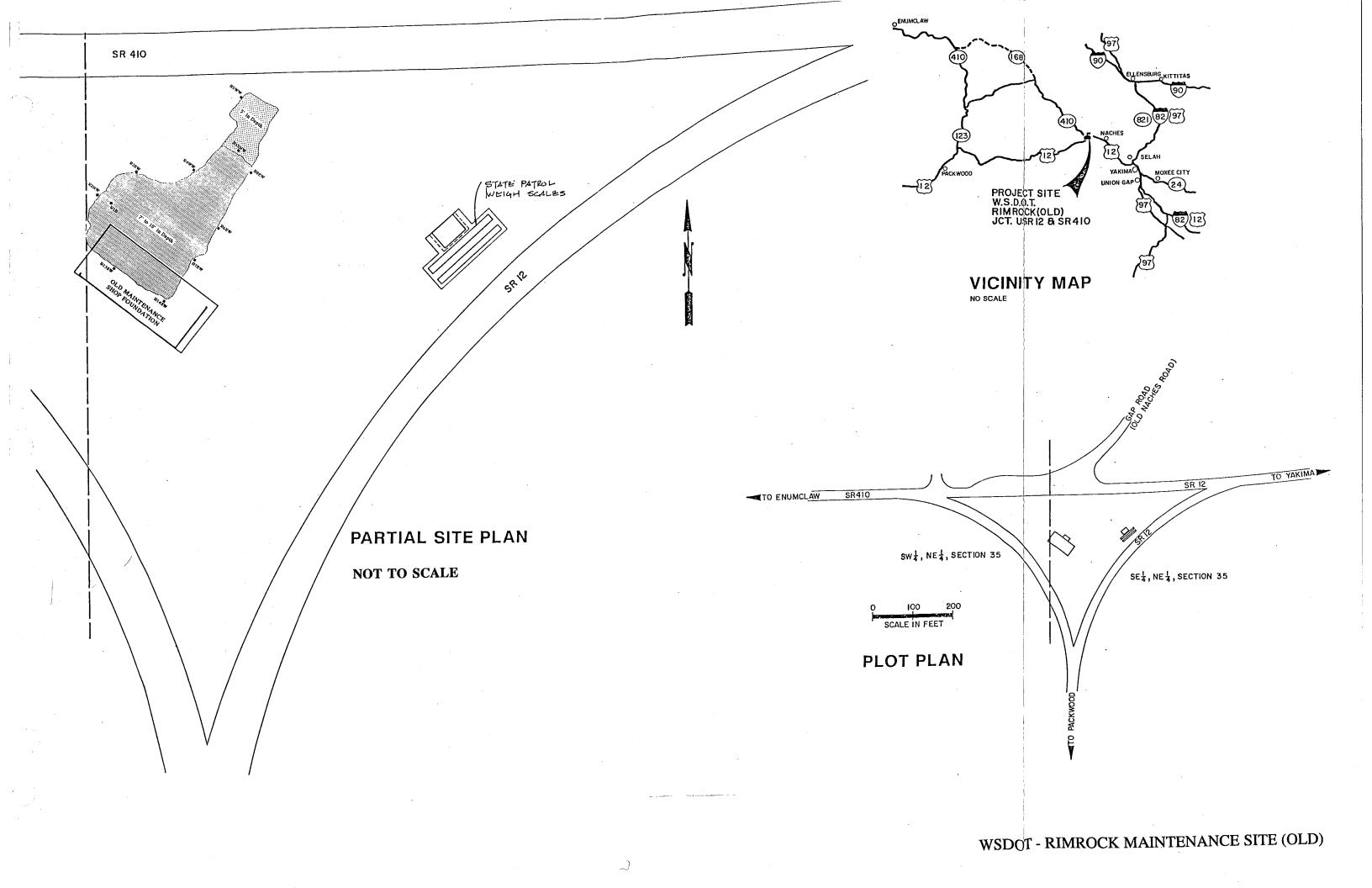
Reviewed by

Norm Payton Hazardous Material Specialist Environmental Service Branch Thad Richardson
Environmental Compliance Specialist
Environmental Service Branch

WSDOT - RIMROCK MAINTENANCE FACILITY TREATED PETROLEUM CONTAMINATED SOIL FROM RIMROCK UNION GAP SOIL SAMPLE RESULTS

Sample	Date	Depth	WTPH-D B	XTENDED
ID	manufacture of the second of t		DIESEL	HEAVY OIL (mg/kg)
	(mo/day/yr)	(ft)	(mg/kg)	
UG1	8/12/96	PCS PILE	34	270
UG2	8/12/96	PCS PILE	41	350
UG3	8/12/96	PCS PILE	58	390
UG4	8/12/96	PCS PILE	41	320
UG5	8/12/96	PCS PILE	37	290
UG6	8/12/96	PCS PILE	29	240
UG7	8/12/96	PCS PILE	21	96
UG8	8/12/96	PCS PILE	29	140
UG9	8/12/96	PCS PILE	51	340
UG10	8/12/96	PCS PILE	29	250
MTCA METH	HOD A CLEANU	PLEVELS	200	200

APPENDIX A VICINITY MAP & SITE PLAN



APPENDIX B RIMROCK CLEANUP ACTION REPORT

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	(040)
<u> </u>	
SHOP	
BUILDING	
	SAMPLES TAKEN
	WERE S'=DEEP

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REMOVED: -		
1-500 gal	Unleoded	
1-1500 ga	I diesel	

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 Toluene Ethyl Benzene Xylenes BTEX by EPA SW-846 Method 8020	5.5 130 32 340	< 0.05 < 0.05 < 0.05 < 0.05	< 0.05 0.20 < 0.05 0.62	0.41 2.7 0.73 6.9
Total Petroleum Fuel Hydrocarbons by EPA SW-846 Modified Method 8015	1,500	< 10.0	94	270
IPH as	Aged Gas	· ·	Diesel	Diesel

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

WA State Dept. of Transportation Project: Rim Rock Page 2 of 2 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 Toluene Ethyl Benzene Xylenes BTEX by EPA SW-846 Method 8020	0.44 5.3 1.3 15.	0.51 14 3.1 62	9.0 190 62 420	< 0.001 < 0.001 < 0.001 < 0.001
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. PARRY ZERAN

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS 4813 FACTIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 • TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: WA State Dept. of

Date: June 18, 1991

Transportation

Report On: Analysis of Soil

Lab No.:

IDENTIFICATION:

Samples Received on 06-14-91

Project: Rim Rock

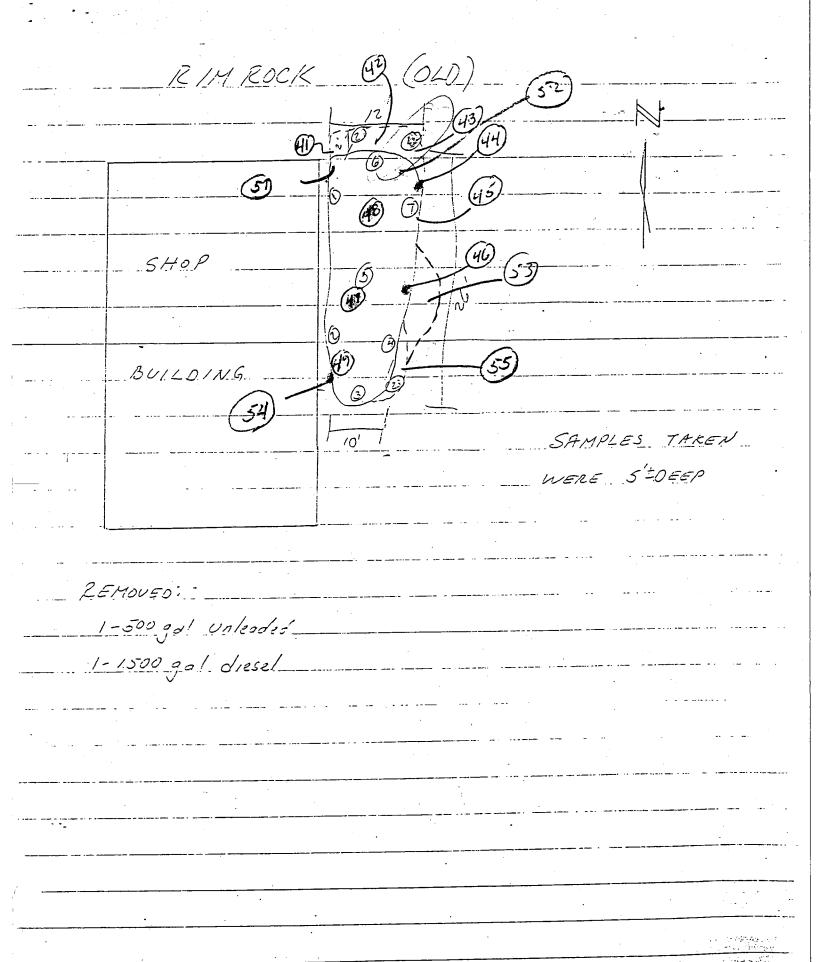
ANALYSIS:

Lab Sample No.	Client ID	*Total Petroleum Fuel Hydrocarbons, mg/kg
1	社 21	< 10
2	#2 22	8,400 as Aged Gas/Diesel
. 3	# 13	< 10

*TPH by EPA SW-846 Modified Method 8015 Note - Results reported on an as received basis.

SURR	OGATE RECO	VERY, %	· · · · · · · · · · · · · · · · · · ·
Lab Sample No.	1	2	3
TPH by Mod 8015 1-Chlorooctane Perylene	89 72	249* 76	93 75

*Surrogate recovery invalid due to matrix interference.



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 4210	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.

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 \star NEXT TO BLUE, Note - Results reported on an as received basis.

	SURR	OGATE REC	OVERY, %	· · · · · · · · · · · · · · · · · · ·	
Lab Sample No.	1	2	. 3	4	5
TPH by Mod 8015 1-Chlorocctane Perylene	106 84	86 72	101 65	104 73	84 75

SOUND ANALYTICAL SERVICES

LARRY ZURAW



UNDERGROUND STORAGE TANK Site Check/Site Assessment Checklist

0 12216 JS

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 informati	on about completing this form, please contact the Department of Ecology UST Program.
The completed check	ist should be mailed to the following address:
	Underground Storage Tank Section Department of Ecology Mail Stop PV-11 Olympia, WA 98504-8711
Wereverty OW	
1. UST SYSTEM OW	NEH AND ECCATION OF THE PROPERTY OF THE PROPER
UST Owner/Operator:	W.S.D.O.T.
Owners Address:	Transportation Bldg KF-01 Olympia Wa 98504
	Olympia Wa 98504
Telephone:	(206) 753-7062 State
Site ID Number (on invo	ce or available from Ecology if tank is registered):
Site/Business Name:	WSDOT- OLD RIMITOCK Maintenance Site
Site Address:	WSDO7- OLU KIMPOCK FRANKE SIFE Jet SR 12 & SR 410 Yakima County Naches City State ZIP-Code
· ·	Naches Wa
	City State ZIP-Code
2. SITE CHECK/SIT	ASSESSMENT CONDUCTED BY:
Registered Person:	Harry Horn
Address:	4200 Main ST. 1.709 Street
	Vancouver Wa 98668
Telephone:	Vancouver Wa = 98668 (206) 696-6518
1	

3, T	ANK INFORMATION	PERS.	
	Fank ID Number (as registered with Ecology):		
		· •	
	rank capacity in ganons.		
A P	REASON FOR CONDUCTING SITE CHECK/SITE ASSESSMENT		aspy east Marketin
<u>-1485</u>			
Che	ack 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):		
_		ENGLISHED	htts://250
Administration of the second	CHECKLIST.		
	Each item of the following checklist shall be initialed by the person registered with the Department of Ecol	ogy who	se
	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?	141	
		140,	
2.	Has a release from the UST system been confirmed?	114	
	NOTE: Owners/operators must report all confirmed releases to the Department of Ecology or delegated agency within 24	HU	
<u> </u>	hours.	1 1 1	٠.
	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	14K	
	reporting requirements specified in the UST site check/site assessment guidance.	1	
···	I hereby certify that I have been in responsible charge of performing the site check/site assessment described about	ove.	:
	I hereby certify that I have been in responsible charge of performing the site checkstie tissessment described as Persons submitting false information are subject to penalties under Chapter 173.360 WAC.	•	
	a crosso and a cross-control of the cross-control o	ngened on greekering 178 Marin 1884 (1886)	
			ji Hariyan
	Wales Harris	in Min	<u> </u>
-	Oate Signature of Person Registered with Ecology		
0.5	OWNER'S SIGNATURE		Min
0:	J. / J. /		
_	11-6-91 Signature of Tank Owner or Authorized Representative		
	Date Signature of Talix Child St.		

APPENDIX C

ANALYTICAL RESULTS FROM SOUND ANALYTICAL, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

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

TRANSMITTAL MEMORANDUM

DATE: October 31, 1995

TO: Norm Payton

WSDOT - Operations Olympia

PROJECT: Old Rimrock UST

LABORATORY NUMBER: 52345

Enclosed are the test results for three samples received at Sound Analytical Services on October 26, 1995.

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

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,

Andrew J. Riddell Project Manager

AJR:tm

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed:

% Solids

R₁B

52345-01

10/25/95

10/25/95

10/25/95

81.62

BTEX by USEPA Method 8020

Recovery Limits High Low Surrogate % Recovery **Flags** 150 50 64 Trifluorotoluene

Sample results are on a dry weight basis.

	Result		·
Analyte	(mg/kg)	PQL	Flags
Benzene	ND	0.053	
Toluene	ND	0.053	
Ethylbenzene	ND .	0.053	
Total Xylenes	0.12	0.053	

Client Name

WSDOT - Operations Olympia

Client ID:

R1B

Lab ID:

52345-01

Date Received:

10/25/95

Date Prepared:

10/25/95

Date Analyzed:

10/25/95

% Solids

81.62

Gasoline by WTPH-G

Surrogate
Trifluorotoluene

% Recovery 64

Flags

Recovery Limits Low High

50

150

Sample results are on a dry weight basis.

Analyte
Gasoline (Toluene-nC12)

Result (mg/kg) 13

PQL 1.2

Flags X2

Client Name

WSDOT - Operations Olympia R2NW

Client ID:

·

Lab ID:

52345-02

Date Received:

10/25/95

Date Prepared:

10/25/95

Date Analyzed:

10/25/95

% Solids

91.22

BTEX by USEPA Method 8020

		Recove		
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	84		50	150

Sample results are on a dry weight basis.

Analyte	Result (mg/kg)	PQL	Flags
Benzene	ND	0.045	
Toluene	ND	0.045	
Ethylbenzene	ND	0.045	
Total Xylenes	ND	0.045	•

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received:

Date Prepared:

Date Analyzed:

% Solids

R2NW

52345-02

10/25/95

10/25/95

10/25/95

91.22

Gasoline by WTPH-G

Surrogate

Trifluorotoluene

% Recovery

84

Flags

Recovery Limits

Low High 50

150

Sample results are on a dry weight basis.

Analyte

Gasoline (Toluene-nC12)

Result

(mg/kg)

ND

PQL

Flags

Client Name

WSDOT - Operations Olympia

Client ID:

R3EW

Lab ID:

52345-03

Date Received:

10/25/95

Date Prepared:

10/25/95

Date Analyzed:

10/25/95

% Solids

83.15

BTEX by USEPA Method 8020

	•		Recovery Limits	
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	75		50	150

Sample results are on a dry weight basis.

	Result		
Analyte	(mg/kg)	PQL	Flags
Benzene	ND	0.049	·
Toluene	ND	0.049	
Ethylbenzene	ND	0.049	
Total Xylenes	ND	0.049	

Client Name

WSDOT - Operations Olympia R3EW

Client ID:

Lab ID:

Date Received:

52345-03

10/25/95

Date Prepared:

10/25/95

Date Analyzed:

10/25/95

% Solids

83.15

Gasoline by WTPH-G

Surrogate Trifluorotoluene . % Recovery 75

Flags

Recovery Limits

Low

50

High 150

Sample results are on a dry weight basis.

Analyte Gasoline (Toluene-nC12)

Result (mg/kg) 1.1

PQL 1.1 **Flags** J

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID: Date Received:

Date Prepared:

Date Analyzed: % Solids

R1B 52345-01

10/25/95

10/25/95

10/26/95

81.62

Diesel by WTPH-D

Surrogate o-Terphenyi % Recovery 100

Flags

Recovery Limits Low

High 150 50

Sample results are on a dry weight basis.

Analyte Diesel (>nC12-nC24)

Result (mg/kg)

28

PQL 30 Flags

Client Name

WSDOT - Operations Olympia

Client ID:

R2NW

Lab ID:

52345-02

Date Received:

10/25/95

Date Prepared:

10/25/95

Date Analyzed:

10/27/95

% Solids

91.22

Diesel by WTPH-D

Surrogate o-Terphenyl

% Recovery

Flags

Recovery Limits High

Low

116

150 50

Sample results are on a dry weight basis.

Analyte

Result (mg/kg)

PQL

Flags

Diesel (>nC12-nC24)

ND

27

9

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID: Date Received:

Date Prepared:

Date Analyzed: % Solids

R3EW 52345-03

10/25/95

10/25/95

10/27/95

83.15

Diesel by WTPH-D

Surrogate

% Recovery

Flags

Recovery Limits

High Low 150 50

o-Terphenyl

113

Sample results are on a dry weight basis.

Analyte

Diesel (>nC12-nC24)

Result

(mg/kg)

PQL

29

Flags

Lab ID:

Method Blank - GB574

Date Received: Date Prepared:

10/25/95 10/25/95

Date Analyzed: % Solids

BTEX by USEPA Method 8020

•			Recove	ery Limits
Surrogate Trifluorotoluene	% Recovery 52	Flags	Low 50	High 150

Sample results are on an as received basis.

Analyte	Result (mg/kg)	PQL	Flags
Benzene	ND	0.044	
Toluene	ND	0.044	
Ethylbenzene	ND	0.044	
Total Xylenes	ND	0.044	

Lab ID:

Method Blank - GB574

Date Received:

Date Prepared:

Date Analyzed:

% Solids

10/25/95

10/25/95

Gasoline by WTPH-G

Surrogate
Trifluorotoluene

% Recovery 52

Flags

Recovery Limits

Low High 50 150

Sample results are on an as received basis.

Analyte

Gasoline (Toluene-nC12)

Result (mg/kg)

ND

PQL

Flags

Blank Spike Report

 Lab ID:
 GB574

 Date Prepared:
 10/25/95

 Date Analyzed:
 10/25/95

 QC Batch ID:
 GB574

BTEX by USEPA Method 8020

Parameter Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	Flag
Benzene	0	1	0.91	91	
Toluene	0	1	0.96	96	
Ethylbenzene	Ö	1	0.96	96	
Total Xylenes	0	3	3.1	105	

Blank Spike Report

Lab ID:

Date Prepared:

Date Analyzed: QC Batch ID: GB574

10/25/95

10/25/95 **GB574**

Gasoline by WTPH-G

Blank Result

Spike **Amount**

BS Result

BS % Rec.

Parameter Name Gasoline (Toluene-nC12) (mg/kg) (mg/kg) 0

14

(mg/kg) 15

103

Flag

Duplicate Report

Client Sample ID:

TD9510-16-15

Lab ID:

52302-01

Date Prepared:

10/25/95

Date Analyzed:

10/25/95

QC Batch ID:

GB574

BTEX by USEPA Method 8020

Parameter Name Benzene	Sample Result (mg/kg) 0	Duplicate Result (mg/kg) 0	RPD % 0.0	Flag
Toluene	0	0	0.0	
Ethylbenzene	0	0	0.0	
Total Xylenes	0	0	0.0	

Duplicate Report

Client Sample ID:

TD9510-16-15

Lab ID:

52302-01

Date Prepared:

10/25/95

Date Analyzed:

10/25/95

QC Batch ID:

GB574

Gasoline by WTPH-G

	Sample Result	Duplicate Result	RPD	
Parameter Name Gasoline (Toluene-nC12)	(mg/kg) 0	(mg/kg) 0	% 0.0	Flag

Lab ID:

Method Blank - DI554

Date Received:

Date Prepared:

Date Analyzed:

10/25/95 10/26/95

% Solids

Diesel by WTPH-D

Surrogate

% Recovery

Flags

Recovery Limits Low

High

o-Terphenyl

103

50 150

Sample results are on an as received basis.

Analyte

Diesel (>nC12-nC24)

Result

(mg/kg)

ND

PQL

25

Flags

Blank Spike Report

Lab ID:
Date Prepared:
Date Analyzed:
QC Batch ID:

DI554 10/25/95 10/26/95 DI554

Diesel by WTPH-D

BS Blank Spike Result BS Result Amount (mg/kg) (mg/kg) % Rec. Flag (mg/kg) **Parameter Name** 94 250 230 0 Diesel (>nC12-nC24)

Duplicate Report

Client Sample ID:

R₁B

Lab ID:

52345-01

Date Prepared:

10/25/95

Date Analyzed:

10/27/95

QC Batch ID:

DI554

Diesel by WTPH-D

Sample Duplicate

Result

Result

RPD

Parameter Name Diesel (>nC12-nC24)

(mg/kg) 28

(mg/kg) 13

% 73.0 Flag X4a

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

R1B

52345-01

10/25/95

10/27/95

DI554

Diesel by WTPH-D

	Sample Result	Spike Amount	MS Result	MS	MSD Result	MSD		51
Compound Name Diesel (>nC12-nC24)	(mg/kg) 28	(mg/kg) 300	(mg/kg) 330	% Rec. 101	(mg/kg) 290	% Rec. 86	RPD 16.0	Flag

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

DATA QUALIFIERS AND ABBREVIATIONS

The analyte was analyzed for and positively identified, but the associated numerical value is an estimated quantity. J: This analyte was also detected in the associated method blank. The reported sample results have been adjusted for B1: moisture, final exract volume, and/or dilutions performed during extract preparation. The analyte concentration was evaluated prior to sample preparation adjustments, and was determined not to be significantly higher than the associated method blank (less than ten times the concentration reported in the blank). This analyte was also detected in the associated method blank. However, the analyte concentration in the sample B2: was determined to be significantly higher than the method blank (greater than ten times the concentration reported in the blank). The concentration of this analyte exceeded the instrument calibration range. E: The reported result for this analyte is calculated based on a secondary dilution factor. D: Contaminant does not appear to be "typical" product. Elution pattern suggests it may be ___ X1: Contaminant does not appear to be "typical" product. Further testing is suggested for identification. X2: Identification and quantification of peaks was complicated by matrix interference; GC/MS confirmation is **√**3: recommended. RPD for duplicates outside advisory QC limits. Sample was re-analyzed with similar results. X4: RPD for duplicates outside advisory QC limits due to analyte concentration near the method practical quantitation X4a: limit/detection limit. Matrix spike was diluted out during analysis. X5: Recovery of matrix spike outside advisory QC limits. Sample was re-analyzed with similar results. X6: Recovery of matrix spike outside advisory QC limits. Matrix interference is indicated by blank spike recovery data. X7: Recovery and/or RPD values for MS/MSD outside advisory QC limits due to high contaminant levels. X7a: Surrogate was diluted out during analysis. X8: Surrogate recovery outside advisory QC limits due to matrix composition. X9: See analytical narrative. N:

Practical Quantitation Limit MCL: Maximum Contaminant Level

Not Detected

ND:

PQL:

ANALYTICAL & ENVIRONMENTAL CHEMISTS

UST PARAMETERS

(206) 922-2310 • FAX (206) 922-5047

Tacoma, Washington 98424 4013 Pacine Hwy. East

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS Specify State WH

DEFÜNEBYBLES CLOSURE Total Halogens Metals SPECIAL INSTRUCTIONS/COMMENTS: EPA 625/8270 GC/MS Semi-volatiles Volatile Organics
Apple 624/6240 GC/MS Aromatic Volatiles EPA 602/8020 Halogenated Volatiles PPA 601/8010 Phenols e'HA9 ьсв,г Time / Date TCLP Lead Total Lead 8:45PM Maros H9T TPH-G / BTEX **STEX** WSD07 ANALYSIS REQUESTED: Firm 1.814 H9T **G-H9T** D-H9T Printed Name HCID # of Containers DATE TIME MATRIX 25.7 . 3 PROJECT NAME: O/V Rimack UST 124/55 10:27 2:32 10:6 3:01 PHONE NO: 360 -705 - 7848 Signature CONTACT: Norm Paylon SAMPLE I.D. CLIENT: USDOT RIMBB RZNW SEW Relinquished By Relinquished By Relinquished By Received By Received By Received By LAB#

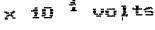
Sample: 52345-1 Acquired: 25-007-95 16:51 Oilution: 1 : 44.000

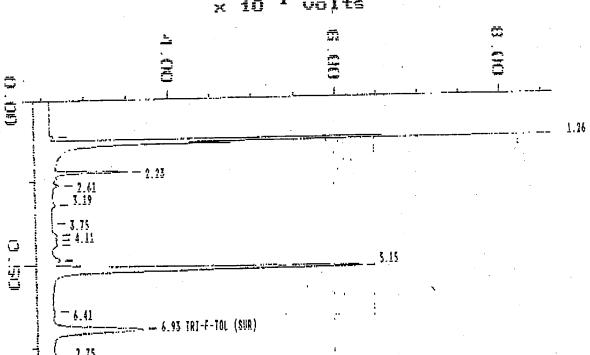
Comments: VARIAN 3400-1

Channel: FID Method: C:\DATA1\250\YPH1025& Amount: 10.162

Filename: 95102512 Operator: JMC

FAX NO. 12069225047





7.75 — 8.00 — 8.43 — 8.74 — 9.08 — 9.60 — 9.88 — 10.40 — 10.78

. 단 단

- 11.55 - 11.76 - 12.18 - 12.78 - 13.17 - 13.36

- 13.76 -- 14.17

15.61 15.61 15.78 15.90 16.64 16.71 17.19 17.19 18.16 19.16

į 19.77

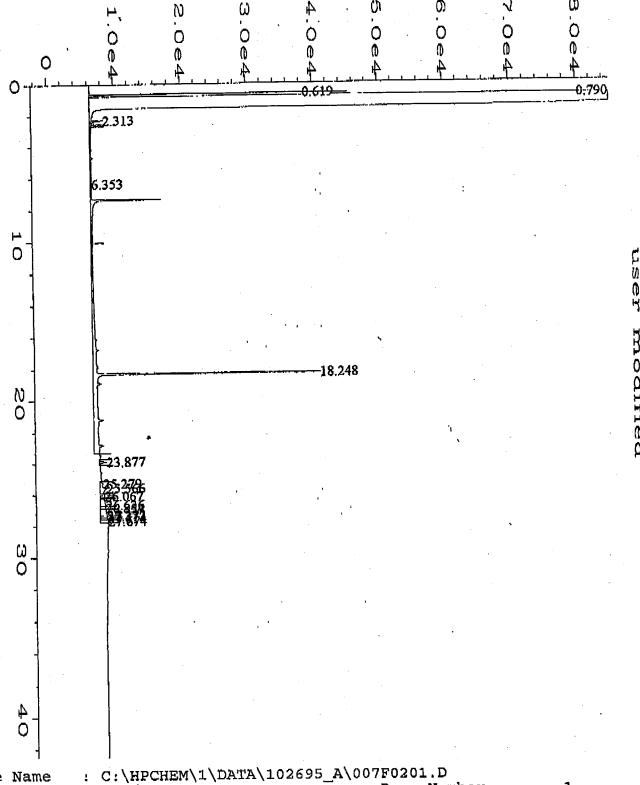
P. 06 FAX NO. 12069225047 SOUND ANALYTICAL AUG-21-96 WED 9:53 Filename: 95102513 Operator: JMC Channel: PID
Nethod: C:\DaYA1\250\TP41025A
Amount: 10.757 Sample: \$2345-2 Acquired: 25-001-95 17:21 Dilution: 1 : 44.000 Comments: YARIAK 3400-1 volts \times 10 []. []. 5.15 F-8EHZENE (18) 6.95 TRI-F-TOL (SUR) Siebellbeit bit gall. Bi ÷ ∵:: ∵:: 19 26

21.99

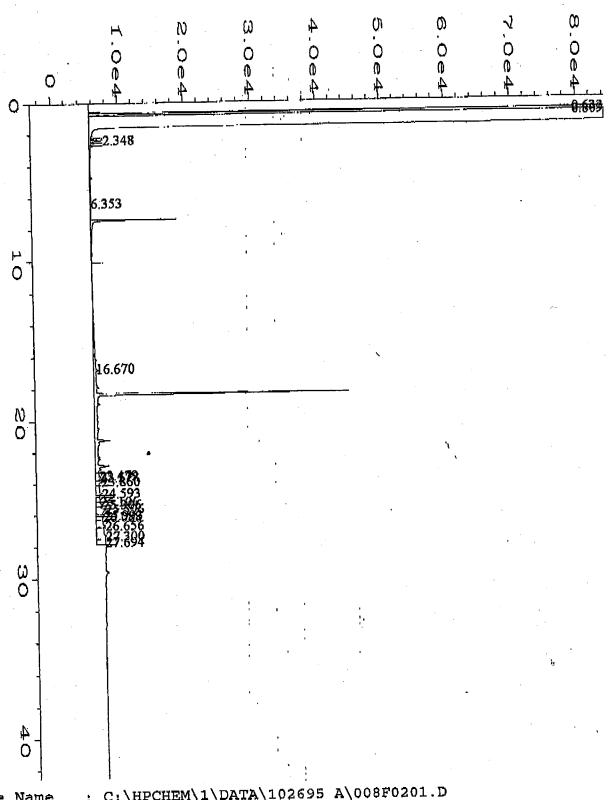
P. 07

P. 09

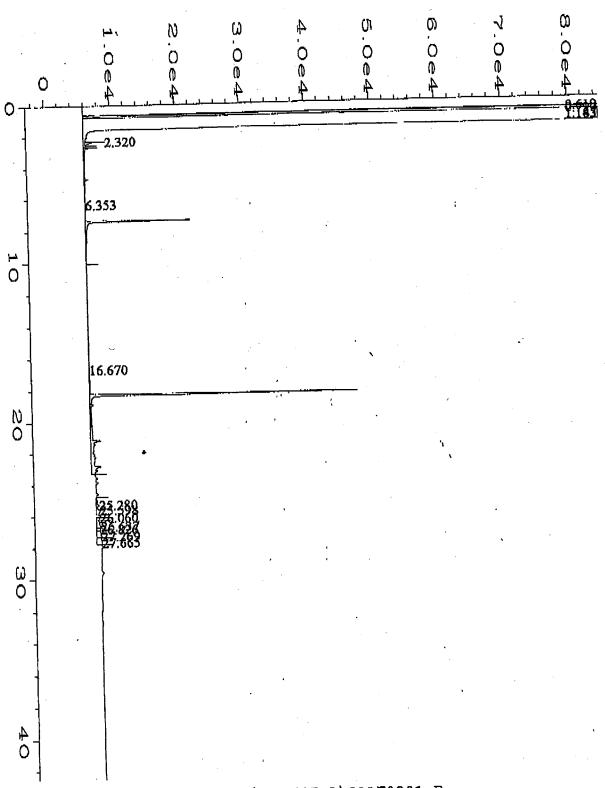




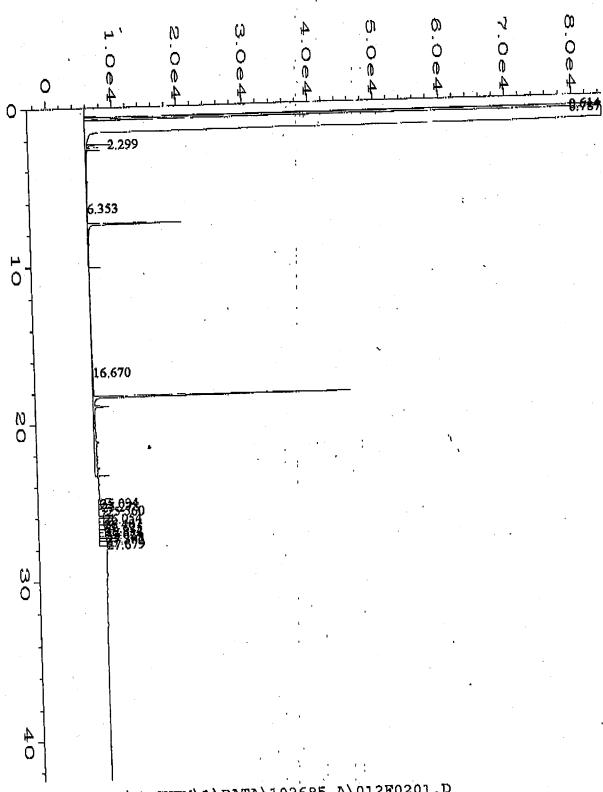
Data File Name Page Number DAS/ELG Operator Vial Number Instrument : HP 5890 Injection Number 1 : 52345-1 ample Name : 2 Sequence Line in Time Bar Code: Instrument Method: SU1019-1.MTH Analysis Method: 1019-1D.MTH Acquired on : 26 Oct 95 05;11 PM Report Created on: 29 Oct 95 10:54 AM Sample Amount ISTD Amount : 0 Last Recalib on : 20 OCT 95 10:31 AM Multiplier



: C:\HPCHEM\1\DATA\102695_A\008F0201.D Data File Name Page Number : DAS/ELG Operator Vial Number : HP 5890 Instrument Injection Number: 1 : 52345-1d ample Name Sequence Line Run Time Bar Code: Instrument Method: SU1019-1.MTH Analysis Method : 1019-1D.MTH : 27 Oct 95 Acquired on Report Created on: 29 Oct 95 10:54 AM Sample Amount : 0 Last Recalib on : 20 OCT 95 10:31 AM ISTD Amount Multiplier 1



: C:\HPCHEM\1\DATA\102695_A\011F0201.D Data File Name Page Number : DAS/ELG Operator : 11 Vial Number Instrument ; HP 5890 Injection Number: 1 : 52345-2 Bample Name : 2 Sequence Line Run Time Bar Code: Instrument Method: SU1019-1.MTH : 27 Oct 95 05:44 PM Acquired on Analysis Method : 1019-1D.MTH Report Created on: 29 Oct 95 10:56 AM Sample Amount ISTD Amount : 0 Last Recalib on : 20 OCT 95 10:31 AM Multiplier



: C:\HPCHEM\1\DATA\102695_A\012F0201.D Data File Name l Page Number : DAS/ELG Operator Vial Number : 12 HP 5890 Instrument Injection Number: 1 : 52345-3 Jample Name Sequence Line : 2 Instrument Method: SU1019-1.MTH Run Time Bar Code: 06:36 PM : 27 Oct 95 Acquired on : 1019-1D.MTH Analysis Method Report Created on: 29 Oct 95 10:56 AM Sample Amount : 0 Last Recalib on : 20 OCT 95 10:31 AM ISTD Amount : 1 Multiplier

ANALYTICAL & ENVIRONMENTAL CHEMISTS

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

TRANSMITTAL MEMORANDUM

DATE: November 1, 1995

TO: Thad Richardson

WSDOT - Operations Olympia

PROJECT: Rimrock 10/26

LABORATORY NUMBER: 52512

Enclosed are the test results for one sample received at Sound Analytical Services on October 30, 1995.

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

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,

Andrew J. Middell Project Manager

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed:

% Solids

52512-01

10/30/95

10/31/95

10/31/95

78.97

Diesel by WTPH-D

Surrogate o-Terphenyl

% Recovery 94

Flags

Recovery Limits

High Low 150 50

Sample results are on a dry weight basis.

Analyte Diesel (>nC12-nC24)

Result (mg/kg) 31

PQL 31 Flags J X2

Client Name

WSDOT - Operations Olympia

Client ID:

1

Lab ID:

52512-01

Date Received:

10/30/95

Date Prepared: Date Analyzed: 10/31/95 11/1/95

% Solids

78.97

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 84

Flags

Recovery Limits High

Low 150 50

Sample results are on a dry weight basis.

Analyte Gasoline (Toluene-nC12)

Result (mg/kg) 960

PQL 24 **Flags** X2

Lab ID:

Method Blank - DI570

Date Received:

Date Prepared:

Date Analyzed:

10/31/95 10/31/95

% Solids

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 109

Flags

Recovery Limits

High Low 50 . 150

Sample results are on an as received basis.

Analyte Diesel (>nC12-nC24)

Result (mg/kg)

PQL 25 **Flags**

Duplicate Report

Client Sample ID: KT SWB
Lab ID: 52444-11
Date Prepared: 10/31/95
Date Analyzed: 11/1/95
QC Batch ID: DI570

Diesel by WTPH-D

	Sample Result	Duplicate Result	RPD	
Parameter Name Diesel (>nC12-nC24)	(mg/kg) 0	(mg/kg) 0	·% 0.0	Flag

Blank Spike Report

Lab ID:
Date Prepared:
Date Analyzed:
QC Batch ID:

DI570 10/31/95 10/31/95 DI570

Diesel by WTPH-D

BS Blank Spike Result BS Result **Amount** Flag % Rec. (mg/kg) (mg/kg) (mg/kg) **Parameter Name** 107 0 250 270 Diesel (>nC12-nC24)

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed: QC Batch ID:

KT SWB

52444-11

10/31/95

11/1/95

DI570

Diesel by WTPH-D

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg) 310	MS Result (mg/kg) 260	MS % Rec. 86	MSD Result (mg/kg) 320	MSD % Rec. 104	RPD 19.0	Flag
Diesel (>nC12-nC24)	Ü	310	260	00	320	104	15.0	

Lab ID:

Method Blank - GB583

Date Received:

10/31/95

Date Prepared: Date Analyzed:

% Solids

11/1/95

Gasoline by WTPH-G

Surrogate

% Recovery

Flags

Recovery Limits High Low

Trifluorotoluene

93

150 50

Sample results are on an as received basis.

Analyte

Result (mg/kg)

PQL

Flags

Gasoline (Toluene-nC12)

ND

Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared: Date Analyzed: QC Batch ID: 11D-37-NPD

52462-01

10/31/95 11/1/95

GB583

Gasoline by WTPH-G

Sample Duplicate
Result Result RPD

(mg/kg) (mg/kg) % Flag

Gasoline (Toluene-nC12) 1.6 1.7 6.1

Blank Spike Report

Lab ID: Date Prepared: Date Analyzed: QC Batch ID: GB583 10/31/95 11/1/95 GB583

Gasoline by WTPH-G

BS Spike Blank BS Result **Amount** Result Flag % Rec. (mg/kg) (mg/kg) (mg/kg) **Parameter Name** 100 14 Gasoline (Toluene-nC12) 14 0

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DATA QUALIFIERS AND ABBREVIATIONS

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

 B1: This analyte was also detected in the associated method blank. The reported sample results have been adjusted for
- This analyte was also detected in the associated method blank. The reported sample results have been adjusted for moisture, final exract volume, and/or dilutions performed during extract preparation. The analyte concentration was evaluated prior to sample preparation adjustments, and 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 also detected in the associated method blank. However, 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).
- E: The concentration of this analyte exceeded the instrument calibration range.
- D: The reported result for this analyte is calculated based on a secondary dilution factor.
- 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 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.
- N: See analytical narrative.
- ND: Not Detected
- PQL: Practical Quantitation Limit
- MCL: Maximum Contaminant Level

ANALYTICAL & ENVIRONMENTAL CHEMISTS

4813 Pacific Hwy. East Tacoma, Washington 98424 (206) 922-2310 • FAX (206) 922-5047

UST PARAMETERS

****			* -			- *****									-				٠				
Received By	Relinquished By	Received By	Relinquished By	Received By	Relinquished By																PROJECT NAME: CONTACT: HAB PHONE NO: (36)	CHENT: /	
			6.00	Dw /how	ALMANN.	∫ Signature ∕															DIMPOCK DO TOS- DO DATE	VI Coron	CH/
			Control of the contro	med my	med market	Printed Name											· · · · · · · · · · · · · · · · · · ·			2 2	# of Containers		CHAIN OF CUSTODY / REQUEST
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			-	10/25/95	10/30 14:10,	Time / Date		47													TPH-G / BTEX TPH 8015M Total Lead	Specify State	FOR L
				4.10.	Den 100		 - -														PCB's	4	ABORATORY ANALYSIS
						SPECIAL INSTRUCTIONS/COMMENTS:						_									Phenols Halogenated Volatiles EPA 601/8010 Aromatic Volatiles EPA 602/8020 Volatile Occasion		RY ANALY
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								\vdash	_		\vdash	-	-	_			_	<u> </u>	\vdash		CLOSURE DELIVERABLES		

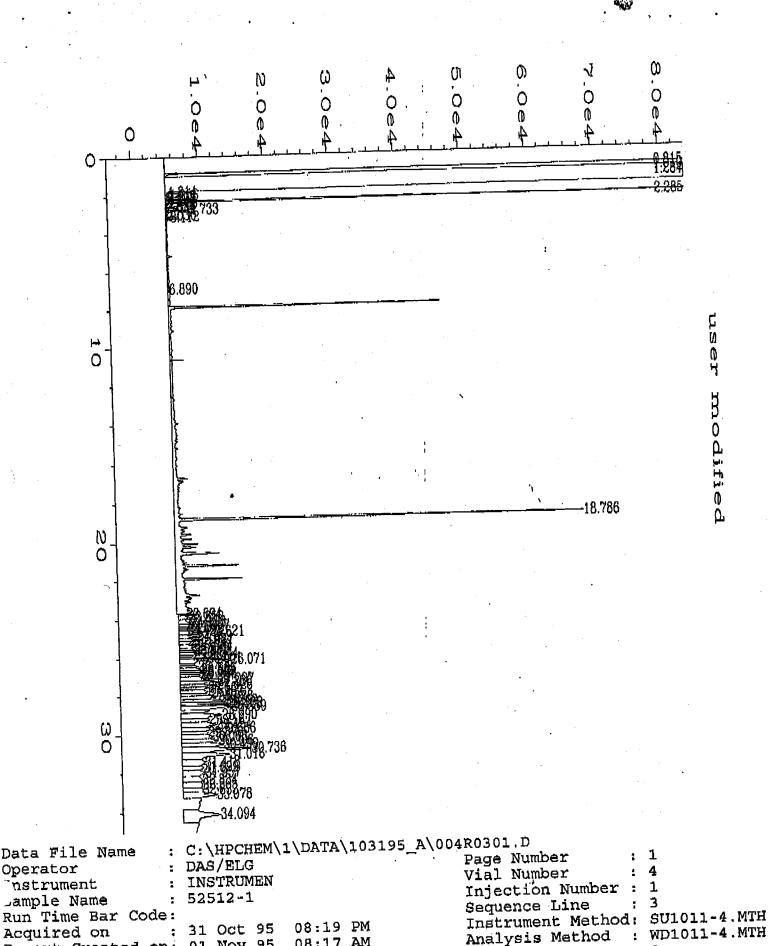
Report Created on: 01 Nov 95

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Last Recalib on

Multiplier



08:17 AM

12 OCT 95 03:26 PM

Sample Amount

ISTD Amount

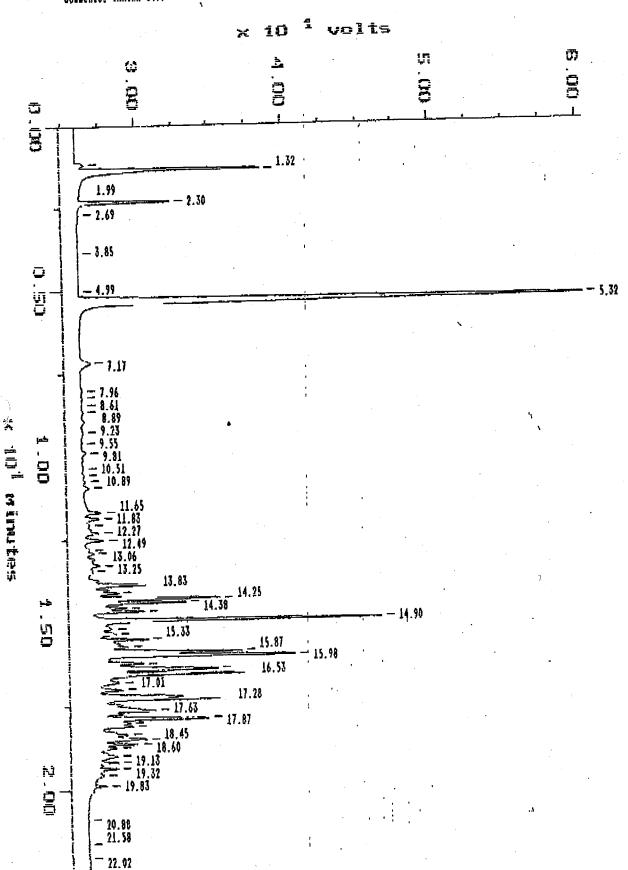
: 0

Sample: 52512-1 1:880 Acquired: 01-NOY-95 12:31 Dilution: 1 : 880.000

Connents: VARIAN 3400-1

Channel: FID Method: C:\DATA1\250\AKG1931A Amount: 10.344

Filemame: 95103138 Operator: JKC



ANALYTICAL & ENVIRONMENTAL CHEMISTS

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

TRANSMITTAL MEMORANDUM

DATE: April 16, 1996

TO:

Norm Payton

WSDOT - Operations Olympia

PROJECT: Old Rimrock

REPORT NUMBER: 55852

Enclosed are the test results for eight samples received at Sound Analytical Services on April 10, 1996.

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

ANALYTICAL NARRATIVE: X1 flagged gasoline results for samples 55852-4, 55852-6, 55852-7, and 55852-8 indicate that the product is similar to diesel or kerosene.

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,

Andrew J. Riddell Project Manager

Client Name

WSDOT - Operations Olympia

Client ID:

R4WW

Lab ID:

55852-01

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

81.75

BTEX by USEPA Method 8020

	•		Recove	ry Limits
Surrogate Trifluorotoluene	% Recovery 62	Flags	Low 50	High 150

Result (mg/kg) ND ND ND	PQL 0.051 0.051 0.051	Flags
ND	0.051	,
	(mg/kg) ND ND ND	(mg/kg) PQL ND 0.051 ND 0.051 ND 0.051

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed: % Solids

WSDOT - Operations Olympia

R4WW

55852-01

4/10/96

4/10/96

4/10/96

81.75

Gasoline by WTPH-G

Surrogate
Trifluorotoluene

% Recovery 62

Flags

Recovery Limits
Low High

50 150

Sample results are on a dry weight basis.

Analyte
Gasoline (Toluene-nC12)

Result (mg/kg) ND

PQL 1.2

Client Name

WSDOT - Operations Olympia

Client ID:

R5WW

Lab ID:

55852-02

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

85.84

BTEX by USEPA Method 8020

	•		Recove	ery Limits	
Surrogate Trifluorotoluene	% Recovery 65	Flags	Low 50	High 150	
Illinolotolació		•			

Analyte Benzene Toluene Ethylbenzene Total Xylenes	Result (mg/kg) ND ND ND ND	PQL 0.049 0.049 0.049 0.049	Flags
--	---	---	-------

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed: % Solids WSDOT - Operations Olympia

R5WW

55852-02

4/10/96

4/10/96

4/10/96

85.84

Gasoline by WTPH-G

Surrogate

Trifluorotoluene

% Recovery

65

Flags

Recovery Limits

Low High

50 150

Sample results are on a dry weight basis.

Analyte

Gasoline (Toluene-nC12)

Result

(mg/kg)

ND

PQL

1.1

Client Name

WSDOT - Operations Olympia

Client ID:

R6EW

Lab ID:

55852-03

Date Received:

4/10/96

Date Prepared: Date Analyzed: 4/10/96

4/10/96

% Solids

85.8

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	72		50	150

ND ND ND	PQL 0.048 0.048 0.048 0.048	Flags
ND.	0.5.10	
	(mg/kg) ND ND	(mg/kg) PQL ND 0.048 ND 0.048 ND 0.048

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed:

% Solids

WSDOT - Operations Olympia

R6EW

55852-03

4/10/96

4/10/96

4/10/96

85.8

Gasoline by WTPH-G

Surrogate

Trifluorotoluene

% Recovery

72

Flags

Recovery Limits

High Low

150 50

Sample results are on a dry weight basis.

Analyte

Gasoline (Toluene-nC12)

Result

(mg/kg)

ND

PQL

1.1

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed: % Solids

WSDOT - Operations Olympia

R7EW

55852-04

4/10/96

4/10/96

4/10/96

82.53

BTEX by USEPA Method 8020

,			Recove	ry Limits
Surrogate Trifluorotoluene	% Recovery 63	Flags	Low 50	High 150

Analyte Benzene Toluene Ethylbenzene Total Xvienes	(mg/kg) ND ND ND ND	PQL 0.049 0.049 0.049 0.049	·
Ethylbenzene Total Xylenes			

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared: Date Analyzed:

% Solids

WSDOT - Operations Olympia

R7EW

55852-04

4/10/96

4/10/96

4/10/96

82.53

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 63

Flags

Recovery Limits

High Low

50 150

Sample results are on a dry weight basis.

Analyte Gasoline (Toluene-nC12)

Result (mg/kg)

9.5

PQL 1.1

Client Name

WSDOT - Operations Olympia

Client ID:

R8EW

Lab ID:

55852-05

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

84.73

BTEX by USEPA Method 8020

		Recove	ery Limits
Recovery 66	Flags	Low 50	High 150
	Recovery 66		Recovery Flags Low

Analyte Benzene	Result (mg/kg) ND	PQL 0.05	Flags
Toluene	ND	0.05	
Ethylbenzene	ND	0.05	
Total Xylenes	ND	0.05	

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared:

Date Analyzed: % Solids

WSDOT - Operations Olympia

R8EW

55852-05

4/10/96

4/10/96

4/10/96

84.73

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 66

Flags

Recovery Limits

High

Low 150 50

Sample results are on a dry weight basis.

Analyte

Gasoline (Toluene-nC12)

Result

(mg/kg)

ND

PQL

1.1

Client Name

WSDOT - Operations Olympia

Client ID:

R13SW

Lab ID:

55852-06

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

84.55

BTEX by USEPA Method 8020

				Recove	ery Limits
Surrogate Trifluorotoluene	<i>2</i>	% Recovery 69	Flags	Low 50	High 150

Analyte Benzene Toluene Ethylbenzene	Result (mg/kg) ND ND ND ND	PQL 0.052 0.052 0.052 0.052	Flag
Benzene Toluene	ND ND	0.052 0.052 0.052	

Client Name

WSDOT - Operations Olympia

Client ID:

R13SW

Lab ID:

55852-06

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

84.55

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 69

Flags

Recovery Limits Hìgh Low

50

150

Sample results are on a dry weight basis.

Analyte Gasoline (Toluene-nC12)

Result (mg/kg)

PQL

Flags

1.2

1.2

X1

Client Name

WSDOT - Operations Olympia

Client ID:

R14SW

Lab ID:

55852-07

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

% Solids

4/10/96 87.07

BTEX by USEPA Method 8020

	•		Recove	ry Limits
Surrogate Trifluorotoluene	% Recovery 65	Flags	Low 50	High 150

Result (mg/kg) ND ND ND ND	PQL 0.048 0.048 0.048 0.048	Flags
	(mg/kg) ND ND ND	(mg/kg) PQL ND 0.048 ND 0.048 ND 0.048

Client Name

WSDOT - Operations Olympia

Client ID:

R14SW

Lab ID:

55852-07

Date Received:

4/10/96

Date Prepared: Date Analyzed: 4/10/96

4/10/96

% Solids

87.07

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 65

Flags

Recovery Limits High Low 50 150

Sample results are on a dry weight basis.

Analyte Gasoline (Toluene-nC12)

Result (mg/kg)

PQL 1.1 **Flags** JX1

· Client Name

WSDOT - Operations Olympia

Client ID:

R15NW

Lab ID:

55852-08

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

85.4

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate Trifluorotoluene	% Recovery 52	Flags	Low 50	High 150

Analyte	Result (mg/kg)	PQL	Flags
Benzene	ND	0.051	
Toluene	ND	0.051	
Ethylbenzene	ND	0.051	
Total Xylenes	ND	0.051	

Client Name

WSDOT - Operations Olympia

Client ID:

R15NW.

Lab ID:

55852-08

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

85.4

Gasoline by WTPH-G

Surrogate

% Recovery

Flags

Recovery Limits

Trifluorotoluene

Low High 50 150

52

Sample results are on a dry weight basis.

Result

(mg/kg)

PQL

Flags

Analyte Gasoline (Toluene-nC12)

2.4

1.2

X1

Client Name

WSDOT - Operations Olympia

Client ID:

R4WW

Lab ID:

55852-01

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

% Solids

81.75

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 75 Flags

Recovery Limits Low High

50

High 150

Sample results are on a dry weight basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 30

Client Name

WSDOT - Operations Olympia

Client ID:

R5WW

Lab ID:

55852-02

Date Received: Date Prepared:

4/10/96

Date Analyzed:

4/10/96 4/10/96

% Solids

85.84

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 77

Flags

Recovery Limits Low High

50

150

Sample results are on a dry weight basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 29

Client Name

WSDOT - Operations Olympia

Client ID:

R6EW

Lab ID:

55852-03

Date Received:

4/10/96

Date Prepared:

Date Analyzed:

4/10/96 4/11/96

% Solids

85.8

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery

Flags

Recovery Limits

71

High Low 150

50

Sample results are on a dry weight basis.

Analyte

Result (mg/kg)

PQL

Flags

Diesel (>nC12-nC24)

ND

28

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed:

% Solids

WSDOT - Operations Olympia

R6EW - dup

55852R03

4/10/96

4/10/96

4/11/96

85.8

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 74

Flags

Recovery Limits High Low

50

150

Sample results are on a dry weight basis.

Analyte

Result (mg/kg)

PQL

Flags

Diesel (>nC12-nC24)

ND

29

Client Name

WSDOT - Operations Olympia

Client ID:

R7EW

Lab ID:

55852-04

Date Received:

4/10/96

Date Prepared:

4/10/96

Date Analyzed:

4/11/96

% Solids

82.53

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 69

Flags

Recovery Limits High Low

50

150

Sample results are on a dry weight basis.

Analyte Diesel (>nC12-nC24)

Result (mg/kg) 28

PQL 29

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received:

Date Prepared:

Date Analyzed:

% Solids

R8EW

55852-05

4/10/96

4/10/96

4/11/96

84.73

Diesel by WTPH-D

Surrogate

o-Terphenyl

% Recovery

83

Flags

Recovery Limits High

Low

150 50

Sample results are on a dry weight basis.

Analyte

Diesel (>nC12-nC24)

Result

(mg/kg)

PQL

Flags

ND

28

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared: Date Analyzed:

% Solids

WSDOT - Operations Olympia

R13SW

55852-06

4/10/96

4/10/96

4/11/96

84.55

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 60

Flags

Recovery Limits

Low High 50 150

Sample results are on a dry weight basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 29

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

Date Analyzed:

% Solids

WSDOT - Operations Olympia

R14SW

55852-07

4/10/96

4/10/96

4/11/96 87.07

Diesel by WTPH-D

% Recovery

.78

Flags

Recovery Limits

Low High 50

150

Sample results are on a dry weight basis.

Analyte

Surrogate

o-Terphenyl

Diesel (>nC12-nC24)

Result

(mg/kg)

ND

PQL

28

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared:

Date Analyzed:

% Solids

WSDOT - Operations Olympia

R15NW

55852-08

4/10/96

4/10/96

4/12/96

85.4

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 71

Flags

Recovery Limits High

Low 50

150

Sample results are on a dry weight basis.

Analyte Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 29 Flags -

Lab ID:

Method Blank - GB737

Date Received:

4/10/96

Date Prepared: Date Analyzed:

4/10/96

% Solids

BTEX by USEPA Method 8020

	•		Recove	ery Limits
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	76		50	150

Sample results are on an as received basis.

Analyte Benzene Toluene Ethylbenzene Total Xylenes	Result (mg/kg) ND ND ND ND	PQL 0.044 0.044 0.044 0.044	Flags
Total Xylenes	ND	0.044	

Lab ID:

Method Blank - GB737

Date Received:

4/10/96

Date Prepared: Date Analyzed:

4/10/96

% Solids

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 76

Flags

Recovery Limits Low High 150 50

Sample results are on an as received basis.

Analyte

Result (mg/kg)

PQL

Flags

Gasoline (Toluene-nC12)

ND

Blank Spike Report

Lab ID:	GB737
Date Prepared:	4/10/96
Date Analyzed:	4/10/96
QC Batch ID:	GB737

BTEX by USEPA Method 8020

Parameter Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg)	BS % Rec.	Flag
Benzene	0	1	0.94	94	
Toluene	0	1	0.96	96	
Ethylbenzene	0	· 1	0.99	99	
Total Xylenes	0	3	3.1	103	

Blank Spike Report

Lab ID: Date Prepared: Date Analyzed:

GB737 4/10/96 4/10/96 **GB737**

QC Batch ID:

Gasoline by WTPH-G

0

Parameter Name Gasoline (Toluene-nC12)

Blank **Spike** BS **Amount** Result BS Result % Rec. (mg/kg) (mg/kg) (mg/kg) 96 12 11

Flag

Duplicate Report

Client Sample ID:	R4WW
Lab ID:	55852-01
Date Prepared:	4/10/96
Date Analyzed:	4/10/96
QC Batch ID:	GB737

BTEX by USEPA Method 8020

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Benzene	0	0	0.0	
Toluene	0	0	0.0	
Ethylbenzene	0	0	0.0	
Total Xylenes	. 0	0	0.0	

Duplicate Report

Client Sample ID:

R4WW

Lab ID:

55852-01

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

QC Batch ID:

GB737

Gasoline by WTPH-G

	Sample Result	Duplicate Result	RPD	
Parameter Name	(mg/kg)	(mg/kg)	%	Flag
Gasoline (Toluene-nC12)	0	0	0.0	

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

R4WW

Lab ID:

55852-01

Date Prepared:

4/10/96

Date Analyzed:

4/10/96

QC Batch ID:

GB737

Gasoline by WTPH-G

	Sample Result	Spike Amount	MS Result	MS	MSD Result	MSD		
Compound Name Gasoline (Toluene-nC12)	(mg/kg) 0	(mg/kg) 14	(mg/kg) 12	% Rec. 80	(mg/kg) 11	% Rec. 83	RPD 2.9	Flag

Lab ID:

Method Blank - DI724

Date Received:

4/10/96

Date Prepared: Date Analyzed:

4/10/96

% Solids

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 88 Flags

Recovery Limits Low High 50 150

Sample results are on an as received basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 25

Blank Spike Report

Lab ID: Date Prepared:

Date Analyzed:

D1724

4/10/96 4/10/96

D1724

QC Batch ID:

Diesel by WTPH-D

Blank

Spike -Amount

BS Result

BS % Rec.

Flag

Parameter Name Diesel (>nC12-nC24)

Result (mg/kg) 0

(mg/kg) 250

(mg/kg) 240

96

Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared: Date Analyzed:

QC Batch ID:

R6EW

55852-03

4/10/96

4/11/96

DI724

Diesel by WTPH-D

Sample Result

le Duplicate It Result g) (mg/kg)

RPD %

Flag

Parameter Name Diesel (>nC12-nC24) (mg/kg) 0

0

0.0

Fla

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

R6EW

55852-03

4/10/96

4/11/96

DI724

Diesel by WTPH-D

	Sample	Spike	MS		MSD			
	Result	Amount	Result	MS	Result	MSD	DDD	Flag
Compound Name	(mg/kg)	(mg/kg)	(mg/kg)	% Rec.	(mg/kg)	% Rec.	RPD	riay
Diesel (>nC12-nC24)	0	290	230	80	230	80	0.1	

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

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.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

THE PARTY OF THE P 4813 Pacific Hwy. East Tacoma, Washington 98424 (206) 922-2310 • FAX (206) 922-5047

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS **UST PARAMETERS**

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Henetken pl		Relinquished By	Received By	Relinquished By	Received By	Relinquished By				×	4	6	1	i many many	/		8	14	S	2		LAB#	PHON	CONTACT:	PROJE	CLIENT:	
		shed By	By	hed By		_				KIN NW	MC-NIX	R13.5W	80-518	R11-0B	80-01×	R9.08	A8EN	MILA	R6EW	RSWW	RHWW	SAMPLE I.D	PHONE NO: 360 -	ACT: Norm	PROJECT NAME: OI &	T. WSpor-	
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					30/5	<u>0805</u>	Tim	H	+	\dagger	+	1		}								TF	PH 801	5M]	Specify State
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			Kirob say	305	48 hr TAT Rost C	Check this box to have samples returned	SPECIAL INSTRUCTIONS/COMMENTS: These samples will be disposed of after				\dashv	\dagger	\dagger	\dagger	\dagger	\dagger	\dagger	\dagger	\dagger	1	\dagger	1 _s	emi-vo	latiles	GC/MS	\neg	
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			•	_																	\perp		DELIVE	JRE ERABL	ES		<u></u>

Sample: 55852-1 Acquired: 10-APR-96 11:45 Channel: PID Operator: JMC Method: C:\DATA1\250\TPH0410 Amount: 10.464 Dilution: 1: 44.000 Comments: VARIAN 3400-I volts 10 12 . 130 3.68 5.15 F-BENZENE (IS) 6.95 TRI-F-TOL (SUR) , I sterd that i m i till. <u>.</u> -19.3821.97

Filename: 96041006

Filename: 96041006 Sample: 55852-1 Channel: FID Operator: JMC Method: C:\DATA1\250\TPH0410 Amount: 10.464 Acquired: 10-APR-96 11:45 Dilution: 1 : 44.000 Comments: VARIAN 3400-I volts 10 - 1.95 -2.24- 2.61 3.41 - 3.70 4.13 5.17 6.97 TRI-F-TOL (SUR) stern muliply in the state - 9.20 - 9.68 10.78 $= \frac{12.00}{12.18} \\
= \frac{12.78}{12.78}$ $= \frac{14.30}{14.47} \\ -14.83$ Ů ∏ <u>_ 16.22</u> $\frac{-16.72}{-17.11}$ - 17.97 - 18.18 = 18.88 - 19.18 - 19.37 - 19.71 - 20.37 - 20.81 21.98

Sample: 55852-2 Operator: JMC Method: C:\DATA1\250\TPH0410 Amount: 10.433 Acquired: 10-APR-96 12:14 Dilution: 1 : 44.000 Comments: VARIAN 3400-I volts 10 3 . OG . . 3.68 5.13 F-BENZENE (IS) 6.93 TRI-F-TOL (SUR) statical of the state of the st <u>.</u> _ 18.53

Channel: PID

Filename: 96041007

Filename: 96041007 Sample: 55852-2 Channel: FID Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 12:14 Dilution: 1 : 44.000 Amount: 10.433 Comments: VARIAN 3400-I 를 x 10 volts. **\$**.00 6.00 .4 . (DC) 1.28 -1.95- 2.23 -2.613<u>.</u>40 3.69 5.15 6.94 TRI-F-TOL (SUR) esselli la manima de la sessione -9.21: : : - 9.81 11.73 12.19 12.74 $= \frac{14.29}{14.48} \\ = \frac{14.29}{14.81}$ 변 : : : : : 16.21 - 16.73 - 17.13 - 17.53 - 17.98 - 18.18 - 18.54 - 19.19 - 19.38 - 19.72 20.82 21.99

Filename: 96041008 Sample: 55852-3 Channel: PID Method: C:\DATA1\250\TPH0410 Amount: 10.692 Operator: JMC Acquired: 10-APR-96 12:43 Dilution: 1 : 44.000 Comments: VARIAN 3400-I 10 volts 3.00 10. SET ħ. . E 3.68 5.15 F-BENZENE (IS) 6.93 TRI-F-TOL (SUR) _ 8.20 esemperation in the second . U

Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 12:43 Amount: 10.692 Dilution: 1 : 44.000 Comments: VARIAN 3400-I x 10 volts 1.28 _ 1.94 -2.232.60 5.16 6.96 TRI-F-TOL (SUR) seed their by the -9.19-10.66- 12.18 - 12.78 - 13.75= 14.33= 14.46- 14.83<u>≐</u> _ 16.21 $\frac{-16.72}{-17.14}$ $\begin{array}{r}
= 17.98 \\
18.18 \\
= 18.64 \\
- 19.18 \\
- 19.38 \\
- 19.74
\end{array}$ 20.83 21.98

Channel: FID

Sample: 55852-3

Filename: 96041008

Filename: 96041009 Sample: 55852-4 Acquired: 10-APR-96 13:12 Dilution: 1 : 44.000 Channel: PID Operator: JMC Method: C:\DATA1\250\TPH0410 Amount: 10.842 Comments: VARIAN 3400-I volts 10 12.SC-10. 5 -1.093.67] . !!! 5.13 F-BENZENE (IS) .93 TRI-F-TOL (SUR) sendinini ni Ithi 😥 * . DD 발 _ 16.20 - 17.18

Filename: 96041009 Channel: FID Sample: 55852-4 Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 13:12 Dilution: 1 : 44.000 Amount: 10.842 Comments: VARIAN 3400-I = 10 volts T; 4.00 - 1.94 2.23 2.60 3.41 3.68 5.15 6.94 TRI-F-TOL (SUR) <u>— 8.39</u> seed room of LCD. = 9.38 = 9.69 -10.7811.55 -11.73 -12.41 -12.79 -13.17 -13.35 -13.78 -14.29 -14.47 -14.89 -15.49 -15.61 - 17.98 18.18 18.63 19.18 19.58 19.78 N. CO 20.84 21.98

Filename: 96041018 Sample: 55852-5 Acquired: 10-APR-96 18:21 Channel: PID Operator: JMC Method: C:\DATA1\250\TPH0410 Amount: 10.373 Dilution: 1: 44.000 Comments: VARIAN 3400-I 표 volts 10 ħĴ. . 636.3 3.65 5.10 F-BENZENE (IS) 6.88 TRI-F-TOL (SUR) See a rown and a College

Filename: 96041018 Channel: FID Method: C:\DATA1\250\TPH0410 Sample: 55852-5 Operator: JMC Acquired: 10-APR-96 18:21 Amount: 10.373 Dilution: 1: 44.000 Comments: VARIAN 3400-I <u>=</u> x 10 volts 8 . OC 6.00 4.00 _ _ 1.93 2.22 2.59 3.38 3.66 6.89 - 9.16 _ 11.23 12:17 12:78 - 13.70 - 14.28 - 14.83 - 15.18 - 15.87 - 16.18 7,17.11 = 17.95 = 18.87 = 19.15 = 19.3520.81 -22.55

Filename: 96041019 Sample: 55852-6 Channel: PID Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 18:50 Amount: 10.071 Dilution: 1: 44.000 Comments: VARIAN 3400-I 1 volts x 10 12. SE : Ð, 3.71 5.16 F-BENZENE (IS) 6.93 TRI-F-TOL (SUR) eseral corrigions of the $=\frac{19.22}{19.33}$

Filename: 96041019 Sample: 55852-6 Channel: FID Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 18:50 Amount: 10.071 Dilution: 1: 44.000 Comments: VARIAN 3400-I Ξ volts 10 . 00 6.00 - 1.93 - 2.24 2.63 3.45 - 3.73 5.18 6.95 TRI-F-TOL (SUR) -9.17eteration in the state - 10.21 10.78 - 12.15 - 12.67 - 13.14 - 13.34 - 13.375 - 14.11 - 14.34 - 14.93 - 15.17 - 16.18 16.49 - 17.48 - 17.95 - 18.49 - 19.16 - 19.45 - 19.71 UI □ 20.79

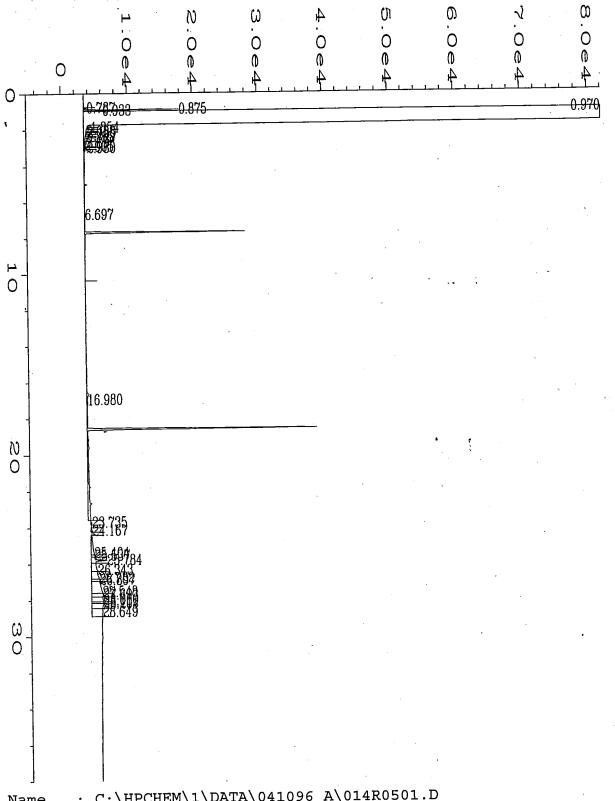
_ 21.95

Filename: 96041020 Sample: 55852-7 Channel: PID Operator: JMC Method: C:\DATA1\250\TPH0410 Amount: 10.601 Acquired: 10-APR-96 19:19 Dilution: 1 : 44:000 Comments: VARIAN 3400-I volts 10 2.50. ħJ. 2.21 3.64 5.09 F-BENZENE (IS) 6.87 TRI-F-TOL (SUR) Special months for a Chill. <u>.</u> ∴ ⁻ 19.36 21.94

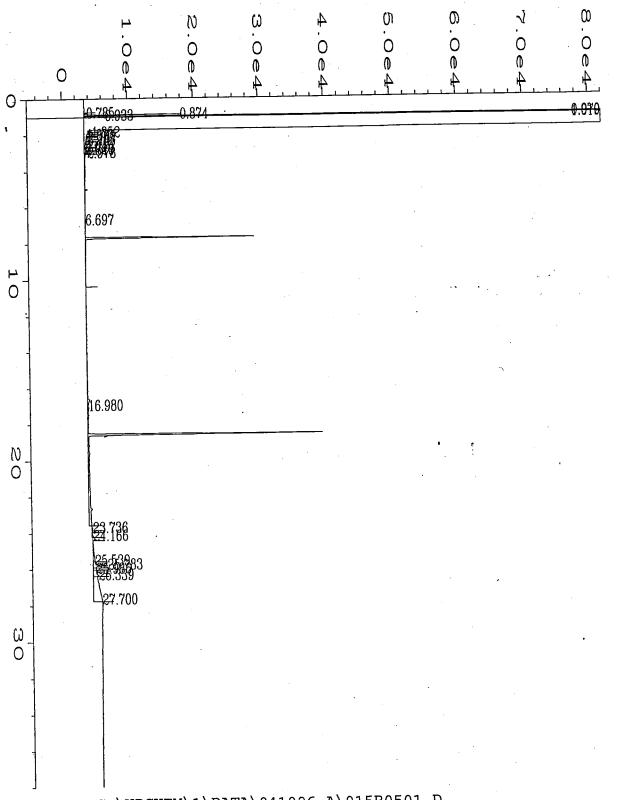
Filename: 96041020 Operator: JMC Channel: FID
Method: C:\DATA1\250\TPH0410
Amount: 10.601 Sample: 55852-7 Acquired: 10-APR-96 19:19 Dilution: 1 : 44.000 Comments: VARIAN 3400-I 10 volts 1.28 2.58 3.38 3.66 5.11 sergirurija vi ji (1913. - 6 13.15 = 13.33 = 13.75 = 14.08 = 14.43 = 14.85 = 15.15 = 15.69 = 16.18 1 1 1 = 17.95 = 18.49 = 18.88 (- 19.17 - 19.36

Filename: 96041021 Channel: PID Sample: 55852-8 Operator: JMC Acquired: 10-APR-96 19:48 Dilution: 1 : 44.000 Method: C:\DATA1\250\TPH0410 Amount: 10.030 Comments: VARIAN 3400-I volts 3 .CC 13 3.64 _ 5.10 F-BENZENE (IS) 6.88 TRI-F-TOL (SUR) aseog, rockij sel _{ji} CPP. ¥ : : : : $=\frac{19.12}{19.33}$

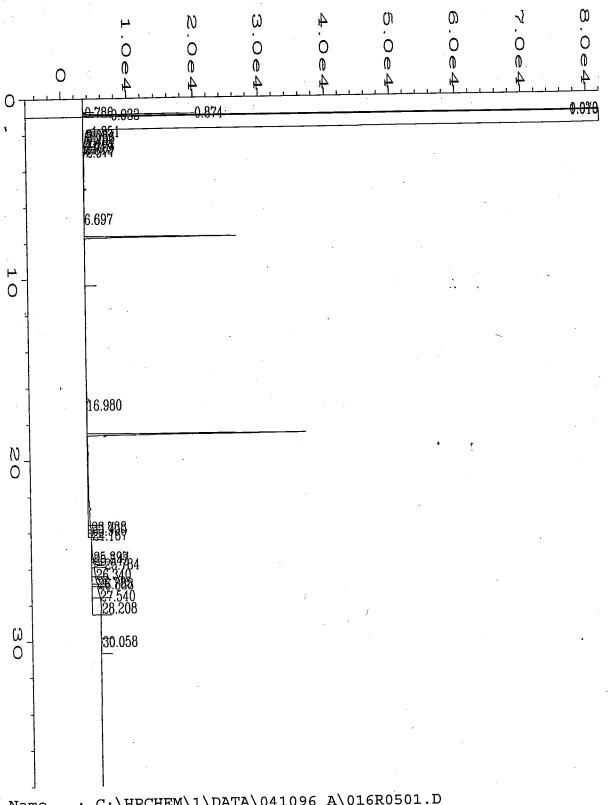
Filename: 96041021 Channel: FID Method: C:\DATA1\250\TPH0410 Sample: 55852-8 Acquired: 10-APR-96 19:48 Operator: JMC Amount: 10.030 Dilution: 1 : 44.000 Comments: VARIAN 3400-I volts × 10 5.00-- 1.93 2.22 2.59 3<u>.</u>38 3.66 **–** 6.89 7.71 7.93 - 8.41 - 8.71 - 9.07 9.64 stationii su I.CHI. = 10.36 = 10.74 = 11.51 = 11.70 = 12.37 = 13.13 = 13.31 = 13.73 = 14.14 = 14.43 = 14.43 = 15.17 = 15.76 = 16.68 = 17.15 = 16.68 = 17.15 = 17.77 = 18.87 = 19.15 = 19.33 년 : (J) _ 20.79 _ 21.95



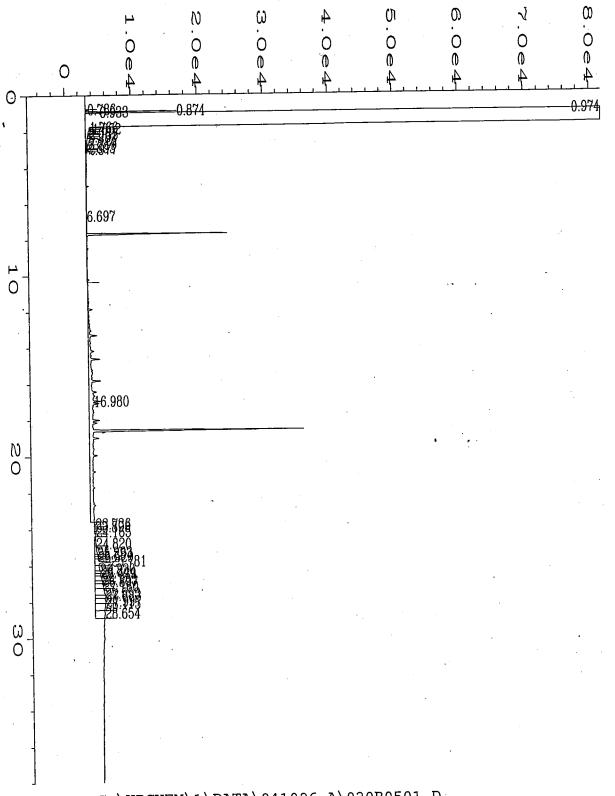
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: C:\HPCHEM\1\DATA\041096_A\014R0501.D
Data File Name
                                                 Page Number
                  : DAS/ELG
Operator
                                                                     14
                                                 Vial Number
                   INSTRUMEN
Instrument
                                                                  : 1
                                                 Injection Number
                  : 55852-1 rush
Sample Name
                                                                   : 5
                                                 Sequence Line
 'n Time Bar Code:
                                                 Instrument Method: SU0404-4.MTH
                  : 10 Apr 96
                               11:01 PM
_quired on
                                                                   : WD0402-4.MTH
                                                 Analysis Method
Report Created on: 11 Apr 96
                               12:37 PM
                                                 Sample Amount
                 : 03 APR 96 02:04 PM
Last Recalib on
                                                 ISTD Amount
Multiplier
                  : 1
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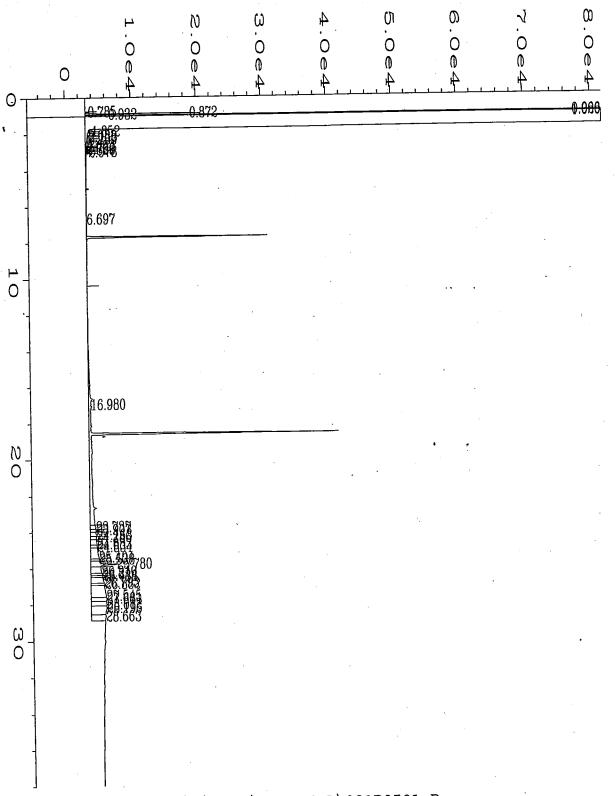
Operator : Instrument : Sample Name : in Time Bar Code: cquired on : Report Created on: Last Recalib on :	10 Apr 96 11:46 PM 11 Apr 96 12:37 PM 03 APR 96 02:04 PM	Page Number Vial Number: Injection Number: Sequence Line: Instrument Method: Analysis Method: Sample Amount:	15 1 5 SU0404-4.MTH
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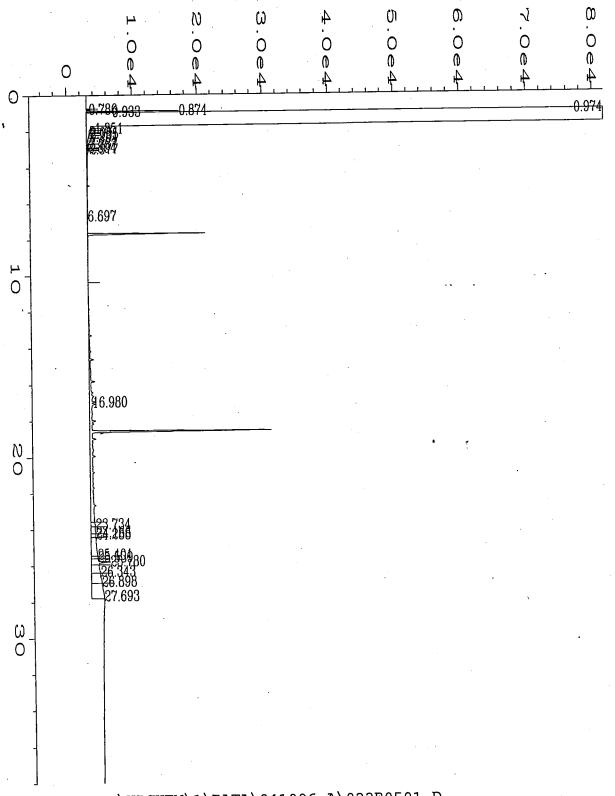
Operator : Instrument : Sample Name : in Time Bar Code:cquired on : Report Created on:	11 Apr 96 00:31 AM 11 Apr 96 12:37 PM	Page Number : 1 Vial Number : 16 Injection Number : 1 Sequence Line : 5 Instrument Method: SU0404-4.MTH Analysis Method : WD0402-4.MTH
Report Created on:	11 Apr 96 12:37 PM 03 APR 96 02:04 PM	Sample Amount : 0
	1	ISTD Amount :



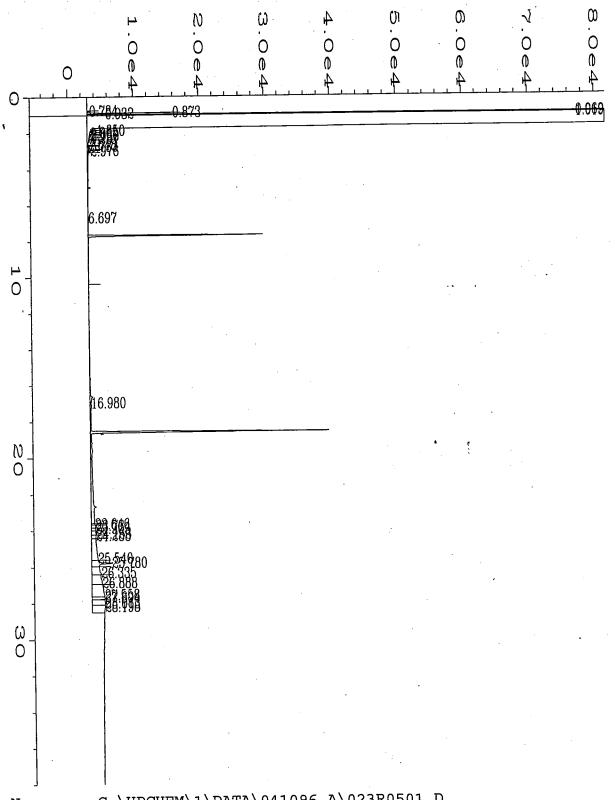
Data File Name :	C:\HPCHEM\1\DATA\041096_A\02	OR0501.D
	DAS/ELG	Page Number : 1
openio-	INSTRUMEN	Vial Number : 20
		Injection Number: 1
	55852-4 rush	Sequence Line : 5
in Time Bar Code:		Sequence Line . J
courred on :	11 Apr 96 03:30 AM	Instrument Method: SU0404-4.MTH
Report Created on:	11 Apr 96 12:38 PM	Analysis Method : WD0402-4.MTH
Tagt Pogalib on :	03 APR 96 02:04 PM	Sample Amount : 0
		ISTD Amount :
Multiplier :	1	IDID IMOUIS



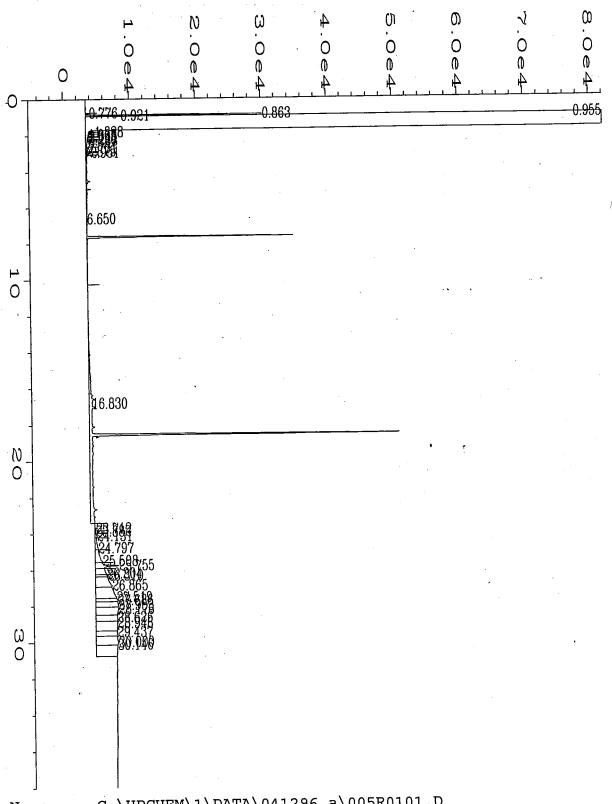
Operator : Instrument :	C:\HPCHEM\1\DATA\041096_A\02 DAS/ELG INSTRUMEN	1R0501.D Page Number : 1 Vial Number : 21 Injection Number : 1
~ ·····	55852-5 rush	Sequence Line : 5
ın Time Bar Code:	· · · · · · · · · · · · · · · · · · ·	Instrument Method: SU0404-4.MTH
cquired on :	11 Apr 96 04:15 AM	Analysis Method: WD0402-4.MTH
Report Created on:	11 Apr 96 12:38 PM	
Last Recalib on :	03 APR 96 02:04 PM	Sample Amount : 0
	1	ISTD Amount :



Data File Name :	C:\HPCHEM\1\DATA\041096_A\02	2R0501.D	
	DAS/ELG	Page Number :	
	INSTRUMEN	Vial Number :	
	55852-6 rush	Injection Number:	1
`un Time Bar Code:		Sequence Line :	5
gauired on :	11 Apr 96 05:00 AM	Instrument Method:	SU0404-4.MTH
Poport Created on:	11 Apr 96 12:38 PM	Analysis Method :	WD0402-4.MTH
Tagt Pegalib on :	03 APR 96 02:04 PM	Sample Amount :	
	1	ISTD Amount :	
Multiplier :	上		•



Operator : Instrument : Sample Name : In Time Bar Code: Acquired on :	11 Apr 96 05:45 AM	Page Number : 1 Vial Number : 23 Injection Number : 1 Sequence Line : 5 Instrument Method: SU0404-4.MT	CH
in Time Bar Code:	11 Apr 96 05.45 AM	Sequence Line : 5 Instrument Method: SU0404-4.MT	Ή
Report Created on:	11 Apr 96 05:45 AM 11 Apr 96 12:38 PM	Analysis Method : WD0402-4.MT	Ή
Last Recalib on :	03 APR 96 02:04 PM	Sample Amount : 0	
Multiplier :	1	ISTD Amount :	



Data File Name :	C:\HPCHEM\1\DATA\041296_a\00	SKUTUT.D
	ELG/JV/DAS	Page Number : 1
- 1	INSTRUMEN	Vial Number : 5
		Injection Number: 1
Sample Name :	55852-8 rush	
<pre>lun Time Bar Code:</pre>		Sequence Line : 1
Acquired on :	12 Apr 96 06:58 PM	Instrument Method: SU0411-4.MTH
Poport Crosted On:	14 Apr 96 01:13 PM	Analysis Method : WD0411-4.MTH
Report Created on.	14 11p1 00 02 120 DM	Sample Amount : 0
Last Recalib on :	12 APR 96 03:48 PM	
Multiplier :	1	ISTD Amount :
		_

ANALYTICAL & ENVIRONMENTAL CHEMISTS

7813 PACIFIC HIGHWAY EAST, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

TRANSMITTAL MEMORANDUM

DATE: April 16, 1996

TO: No:

Norm Payton

WSDOT - Operations Olympia

PROJECT: Old Rimrock

REPORT NUMBER: 55853

Enclosed are the test results for two samples received at Sound Analytical Services on April 10, 1996.

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

Analytical Narrative: X1 flag = product is similar to diesel or kerosene.

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,

Andrew J. Riddell Project Manager

Andrew & Gillies

his report is issued solely for the use of the person or company to whom it is addressed. This laboratory accepts responsibility only for the due performance of analysis in accordance with idustry acceptable practice. In no event shall Sound Analytical Services, Inc. or its employees be responsible for consequential or special damages in any kind or in any amount.

Client Name

Client ID:

Lab ID: Date Received:

Date Prepared:
Date Analyzed:

% Solids

WSDOT - Operations Olympia

COMPOSITE R9-0B & R10-0B

55853-01

4/10/96

4/10/96

4/10/96

90.03

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	73		50	150

Sample results are on a dry weight basis.

Analyte Benzene Toluene Ethylbenzene Total Yvlenes	Result (mg/kg) ND ND ND ND ND	PQL 0.046 0.046 0.046 0.046	Flags
Total Xylenes	ND	0.040	

Client Name

Client ID:

Lab ID:

Date Received: Date Prepared:

% Solids

Date Analyzed:

WSDOT - Operations Olympia

COMPOSITE R9-0B & R10-0B 55853-01

4/10/96

4/10/96

4/10/96

90.03

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery

Flags

Recovery Limits

High Low 150 50

73

Sample results are on a dry weight basis.

Analyte Gasoline (Toluene-nC12)

Result (mg/kg)

PQL

Flags X1

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared: Date Analyzed:

% Solids

WSDOT - Operations Olympia COMPOSITE R11-0B & R12-0B

55853-02

4/10/96

4/10/96

4/10/96

90.13

BTEX by USEPA Method 8020

			Recove	ry Limits
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	71		50	150

Sample results are on a dry weight basis.

	Result		
Analyte	(mg/kg)	PQL	Flags
Benzene	ND	0.049	
	ND	0.049	
Toluene	ND	0.049	
Ethylbenzene Total Xylenes	ND	0.049	

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared: Date Analyzed:

% Solids

WSDOT - Operations Olympia

COMPOSITE R11-0B & R12-0B

55853-02

4/10/96

4/10/96

4/10/96

90.13

Gasoline by WTPH-G

Surrogate
Trifluorotoluene

% Recovery 71

Flags

Recovery Limits

Low 50 High 150

Sample results are on a dry weight basis.

Analyte
Gasoline (Toluene-nC12)

Resuit (mg/kg) ND

PQL 1.1

Flags

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared:

Date Analyzed:

% Solids

WSDOT - Operations Olympia

COMPOSITE R9-0B & R10-0B

55853-01

4/10/96

4/10/96

4/12/96

90.03

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 104 **Flags**

Recovery Limits Low High

50

) 150

Sample results are on a dry weight basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) 46

PQL 27 Flags X2

Client Name

Client ID:

Lab ID:

Date Received:

Date Prepared: Date Analyzed:

% Solids

WSDOT - Operations Olympia

COMPOSITE R11-0B & R12-0B

55853-02

4/10/96

4/10/96

4/12/96

90.13

Diesel by WTPH-D

Surrogate

o-Terphenyl

% Recovery 82

Recovery Limits Low **Flags**

High 150 50

Sample results are on a dry weight basis.

Analyte

Diesel (>nC12-nC24)

Result (mg/kg)

ND

PQL

28

Flags

Lab ID:

Method Blank - GB737

Date Received:

Date Prepared:

Date Analyzed: % Solids 4/10/96 4/10/96

1, , 0, 0

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate Trifluorotoluene	% Recovery 76	Flags	Low 50	High 150

Sample results are on an as received basis.

Analyte Benzene	Result (mg/kg) ND	PQL 0.044	Flags
Toluene	ND	0.044	
Ethylbenzene	ND	0.044	
Total Xylenes	ND	0.044	

Lab ID:

Method Blank - GB737

Date Received:

Date Prepared:

Date Analyzed: % Solids

4/10/96 4/10/96

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 76

Flags

Recovery Limits Low High 50 150

Sample results are on an as received basis.

Analyte
Gasoline (Toluene-nC12)

Result (mg/kg) ND

PQL

Flags

Blank Spike Report

Lab ID:	GB737
Date Prepared:	4/10/96
Date Analyzed:	4/10/96
QC Batch ID:	GB737

BTEX by USEPA Method 8020

Parameter Name	Blank Result (mg/kg)	Spike Amount (mg/kg)	BS Result (mg/kg) 0.94	BS % Re c. 94	Flag
Benzene Toluene Ethylbenzene	0	. 1 1	0.96 0.99	96 99	
Total Xylenes	0	3	3.1	103	

Blank Spike Report

Lab ID: Date Prepared:

Date Analyzed: QC Batch ID:

GB737

4/10/96

4/10/96

GB737

Gasoline by WTPH-G

Blank

Result

(mg/kg)

0

Parameter Name Gasoline (Toluene-nC12)

Spike Amount (mg/kg) 12

BS Result (mg/kg)

11

BS % Rec. 96

Flag

Duplicate Report

Client Sample ID:	R4WW
Lab ID:	55852-01
Date Prepared:	4/10/96
Date Analyzed:	4/10/96
QC Batch ID:	GB737

BTEX by USEPA Method 8020

Parameter Name	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Benzene	0	0	0.0	
Toluene	0	0	0.0	
Ethylbenzene	0	0	0.0	
Total Xylenes	0	0	0.0	

Duplicate Report

Client Sample ID: R4WW
Lab ID: 55852-01
Date Prepared: 4/10/96
Date Analyzed: 4/10/96

Date Analyzed: 4/10/96
QC Batch ID: GB737

Gasoline by WTPH-G

Sample Duplicate
Result RPD

Parameter Name (mg/kg) (mg/kg) % Flag

Gasoline (Toluene-nC12) 0 0 0.0

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

R4WW

55852-01

4/10/96

4/10/96

GB737

Gasoline by WTPH-G

	Sample Result	Spike Amount	MS Result	MS	MSD Result	MSD		
Compound Name	(mg/kg)	(mg/kg)	(mg/kg)	% Rec.	(mg/kg)	% Rec.	RPD 2.9	Flag
Gasoline (Toluene-nC12)	. 0	. 14	12.00	80	11.00	83	2.5	

Lab ID:

Method Blank - DI724

Date Received: Date Prepared:

Date Prepared: Date Analyzed: % Solids 4/10/96 4/10/96

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 88 Flags

Recovery Limits Low High

.6w High 50 150

Sample results are on an as received basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 25 **Flags**

Blank Spike Report

Lab ID: Date Prepared: Date Analyzed: QC Batch ID: DI724 4/10/96 4/10/96 DI724

Diesel by WTPH-D

Parameter Name Diesel (>nC12-nC24)

BS Blank Spike Amount Result BS Result (mg/kg) (mg/kg) % Rec. Flag (mg/kg) 96 0 250 240

Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed: QC Batch ID:

R6EW

55852-03

4/10/96

4/11/96

D1724

Diesel by WTPH-D

Sample

Duplicate Result

RPD

0

0

% 0.0

Parameter Name Diesel (>nC12-nC24)

Result (mg/kg)

(mg/kg)

Flag

Sound Analytical Services, INC. 55853

ANALYTICAL & ENVIRONMENTAL CHEMISTS

CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS **UST PARAMETERS**

(206) 922-2310 • FAX (206) 922-5047 Tacoma, Washington 98424 4813 Pacific Hwy. East

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CONTACT	CONTACT: Nom	Payton			stani						p	pe			led Vol 0108)rganica 18240 G tiiles 18270 G	n 0/28	suəbol				JABLES JE
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Filename: 96041004 Channel: PÍD Sample: 55853-1 Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 10:47 Dilution: 1 : 44.000 Amount: 10.627 Comments: VARIAN 3400-I uolts iO ij 3.66 5.12 F-BENZENE (IS) 6.90 TRI-F-TOL (SUR) State Truckly by N.C. 1. - 17.48 - 17.96 - 18.17 - 18.79 - 19.24 - 19.57 - 19.78 21.39 21.95

Channel: FID Sample: 55853-1 Operator: JMC Method: C:\DATA1\250\TPH0410 Acquired: 10-APR-96 10:47 Amount: 10.627 Dilution: 1 : 44.000 Comments: VARIAN 3400-I volts 10 5.00 -1.932.23 2.60 3.38 3.68 4.34 4.57 5.13 6.92 TRI-F-TOL (SUR) 3.72 9.19 9.68 10.09 10.50 10.78 securonia de 1. Coll. - 11.54 - 11.96 - 12.16 - 12.78 - 13.17 - 13.33 - 14.28 - 14.45 - 14.88 - 15.18 - 15.73 - 16.06 - 16.53 - 16.72 - 17.07 - 17.07 - 18.18 - 19.18 - 19.58 - 19.77 20.80 21.41 21.97

Filename: 96041004

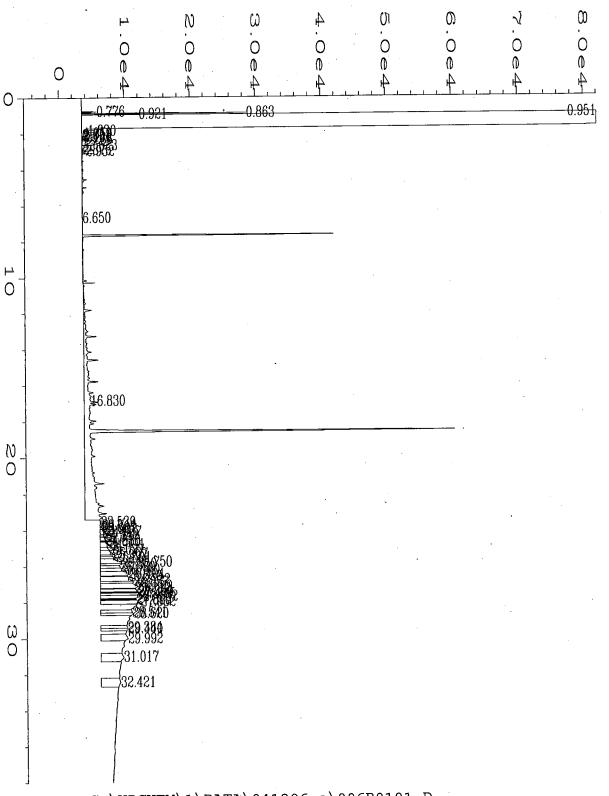
Filename: 96041005 Channel: PID Sample: 55853-2 Acquired: 10-APR-96 11:15 Method: C:\DATA1\250\TPH0410 Amount: 10.005 Operator: JMC Dilution: 1 : 44.000 Comments: VARIAN 3400-I volts 10 <u>; -</u> 3.68 5.14 F-BENZENE (IS) 6.93 TRI-F-TOL (SUR) Seas Truck Park Line ₩ $-\frac{19.26}{19.58}$ N O

Operator: JMC Acquired: 10-APR-96 11:15 Method: C:\DATA1\250\TPH0410 Dilution: 1 : 44.000 Amount: 10.005 Comments: VARIAN 3400-I volts 10 **9.00** _ _ 1.95 2.23 2.62 $=\frac{3.41}{5.70}$ 6.95 TRI-F-TOL (SUR) _ 8.56 -9.21. □ □ $= \frac{12.18}{12.78}$ - 13.75 - 14.32 - 14.47 - 14.88 - 15.21 - 15.73 - 16.22 - 16.54 - 16.73 - 17.09 - 17.53 - 17.98 - 18.18 - 19.38 - 19.38 - 19.78 __ 20.82 _ 21.98

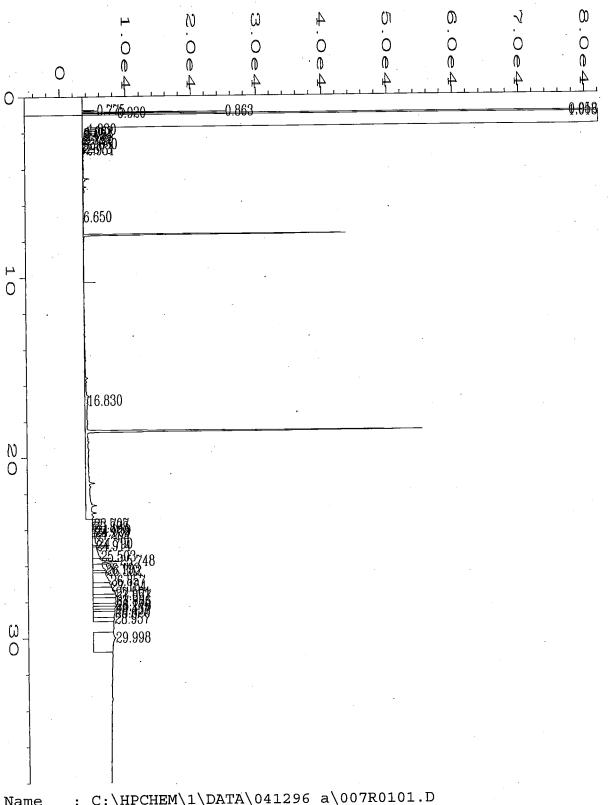
Channel: FID

Sample: 55853-2

Filename: 96041005



```
: C:\HPCHEM\1\DATA\041296_a\006R0101.D
Data File Name
                                                 Page Number
                  : ELG/JV/DAS
Operator
                                                 Vial Number
                  : INSTRUMEN
Instrument
                                                 Injection Number: 1
                 : 55853-1
Sample Name
                                                                   : 1
                                                 Sequence Line
  n Time Bar Code:
                                                 Instrument Method: SU0411-4.MTH
                 : 12 Apr 96
                               07:43 PM
acquired on
                                                 Analysis Method
                                                                  : WD0411-4.MTH
Report Created on: 14 Apr 96
                               01:13 PM
                                                 Sample Amount
                                                                   : 0
Last Recalib on
                : 12 APR 96 03:48 PM
                                                 ISTD Amount
Multiplier
```



	C:\HPCHEM\1\DATA\041296_a\007	7R0101.D
Operator :	ELG/JV/DAS	Page Number : 1
Instrument :		Vial Number : 7
Sample Name :	55853-2	Injection Number: 1
n Time Bar Code:	• ,	Sequence Line : 1
acquired on :	12 Apr 96 08:28 PM	Instrument Method: SU0411-4.MTH
Report Created on:	14 Apr 96 01:13 PM	Analysis Method : WD0411-4.MTH
Last Recalib on :	12 APR 96 03:48 PM	Sample Amount : 0
	1 ·	ISTD Amount :
•		

ANALYTICAL & ENVIRONMENTAL CHEMISTS

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

TRANSMITTAL MEMORANDUM

DATE: May 14, 1996

TO: Norm Payton

WSDOT - Operations Olympia

PROJECT: Rayrock Ale

REPORT NUMBER: 56568

Enclosed are the test results for five samples received at Sound Analytical Services on May 13, 1996.

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

Analytical Narrative: X1 flag (gasoline) = Contaminant appears to be kerosene, jet fuel, or similar product. X1 flag (diesel) = Contaminant appears to be aged or degraded diesel with heavy oil present.

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,

Andrew J. Riddell Project Manager

dudiew) Likel

AJR:tm

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

56568-01

Date Received:

5/13/96

Date Prepared: Date Analyzed: 5/13/96 5/14/96

% Solids

81.44

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate	% Recovery	Flags	Low	High
Trifluorotoluene	67		50	150

Analyte Benzene Toluene Ethylbenzene Total Xylenes	Result (mg/kg) ND ND ND ND ND	PQL 0.053 0.053 0.053 0.053	Flags
Total Xylenes	ND	0.055	

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

56568-01

Date Received:

5/13/96

Date Prepared: Date Analyzed:

5/13/96 5/13/96

% Solids

81.44

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery 67 Flags

Recovery Limits Low High

50 150

Sample results are on a dry weight basis.

Analyte
Gasoline (Toluene-nC12)

Result (mg/kg) 3.6

PQL 1.2

Flags X2

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received:

Date Prepared: Date Analyzed:

% Solids

56568-02

5/13/96

5/13/96

5/14/96

96.82

BTEX by USEPA Method 8020

•		•	Recove	ery Limits
Surrogate Trifluorotoluene	% Recovery 90	Flags	Low 50	High 150

	Result		
Analyte	(mg/kg)	PQL	Flags
Benzene	ND	0.044	
Toluene	ND ·	0.044	
Ethylbenzene	ND	0.044	
Total Xylenes	ND	0.044	

Client Name

WSDOT - Operations Olympia 2

Client ID:

Lab ID: Date Received: 56568-02 5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/13/96

% Solids

96.82

Gasoline by WTPH-G

Surrogate
Trifluorotoluene

% Recovery 89 Flags

Recovery Limits Low High

50

150

Sample results are on a dry weight basis.

Analyte
Gasoline (Toluene-nC12)

Result (mg/kg) 1.5

PQL 0.99

Flags X2

Client Name

WSDOT - Operations Olympia

Client ID:

. 3

Lab ID:

56568-03

Date Received:

5/13/96

Date Prepared: Date Analyzed: 5/13/96 5/14/96

% Solids

87.8

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate Trifluorotoluene	% Recovery 79	Flags	Low 50	High 150
I IIII III OLOI II CITO				

Analyte Benzene	Result (mg/kg) ND	PQL 0.047 0.047	Flags
Toluene Ethylbenzene	ND ND	0.047	
Total Xvienes	ND	0.047	

Client Name

WSDOT - Operations Olympia

Client ID:

3

Lab ID:

56568-03

Date Received:

5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/14/96

% Solids

87.8

Gasoline by WTPH-G

Surrogate Trifluorotoluene % Recovery

Flags

Recovery Limits

75

Low 50

High 150

Sample results are on a dry weight basis.

Analyte

Result (mg/kg)

PQL

Flags X2

Gasoline (Toluene-nC12)

1.7

1.1

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received: Date Prepared: Date Analyzed:

% Solids

56568-04

5/13/96

5/13/96

5/14/96

92.06

BTEX by USEPA Method 8020

Recovery Limits High Low **Flags** % Recovery Surrogate 150 50 82 Trifluorotoluene

Analyte	Result (mg/kg)	PQL	Flags
Benzene	· ND	0.045	
Toluene	ND	0.045	
Ethylbenzene	ND	0.045	
Total Xylenes	ND	0.045	

Client Name

WSDOT - Operations Olympia

Client ID:

4

Lab ID:

56568-04

Date Received:

5/13/96

Date Prepared: Date Analyzed:

5/13/96 5/14/96

% Solids

92.06

Gasoline by WTPH-G

Surrogate
Trifluorotoluene

% Recovery 81 Flags

Recovery Limits
Low High

Low 50

150

Sample results are on a dry weight basis.

Analyte
Gasoline (Toluene-nC12)

Result (mg/kg) 1.8

PQL

Flags X2

Client Name

WSDOT - Operations Olympia

Client ID:

· 5

Lab ID:

56568-05

Date Received:

5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/14/96

% Solids

82.45

BTEX by USEPA Method 8020

			Recove	ery Limits
Surrogate Trifluorotoluene	% Recovery 68	Flags	Low 50	High 150

Analyte	Result (mg/kg)	PQL	Flags
Benzene	ND	0.05	
Toluene	ND	0.05	
Ethylbenzene	ND	0.05	
Total Xylenes	ND	0.05	

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

56568-05

Date Received:

5/13/96

Date Prepared: Date Analyzed: 5/13/96

5/14/96

% Solids

82.45

Gasoline by WTPH-G

Surrogate **Trifluorotoluene** % Recovery 71

Flags

Recovery Limits Low High

150

50

Sample results are on a dry weight basis.

Analyte

Result (mg/kg)

PQL

Flags **X1**

Gasoline (Toluene-nC12)

1.1

Client Name

WSDOT - Operations Olympia

Client ID:

1

Lab ID:

56568-01

Date Received:

5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/13/96

% Solids

81.44

Extended Diesel Range by WTPH-D Modified

•		Recove	ery Limits
% Recovery 78	Flags	Low 50	High 150
	% Recovery 78	% Recovery Flags 78	% Recovery Flags Low

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	160	31	. X1
Heavy Oil (>nC24-nC32)	ND	150	
Ext. Diesel (>nC12-nC32)	300	150	

Client Name

WSDOT - Operations Olympia

Client ID:

2

Lab ID:

56568-02

Date Received:

5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/13/96

% Solids

96.82

Extended Diesel Range by WTPH-D Modified

			Recove	ery Limits
Surrogate o-Terphenyl	% Recovery 85	Flags	Low 50	High 150

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	120	26	X1
Heavy Oil (>nC24-nC32)	300	130	
Ext. Diesel (>nC12-nC32)	420	130	

Client Name

WSDOT - Operations Olympia

Client ID:

3

Lab ID:

56568-03

Date Received:

Date Prepared:

5/13/96

Date Analyzed:

5/13/96

5/14/96

% Solids

87.8

Extended Diesel Range by WTPH-D Modified

			Recove	ry Limits
Surrogate o-Terphenyl	% Recovery 79	Flags	Low 50	High 150

Analyte	Result (mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	55	28	, X1
Heavy Oil (>nC24-nC32)	ND	140	
Ext. Diesel (>nC12-nC32)	180	140	

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

56568-04

Date Received:

5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/14/96

% Solids

92.06

Extended Diesel Range by WTPH-D Modified

Surrogate o-Terphenyl

% Recovery 82

Flags

Recovery Limits High Low

50 150

	Result		
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	100	27	X1
Heavy Oil (>nC24-nC32)	150	130	
Ext. Diesel (>nC12-nC32)	250	130	

Client Name

WSDOT - Operations Olympia

Client ID:

5

Lab ID:

56568-05

Date Received:

5/13/96

Date Prepared:

5/13/96

Date Analyzed:

5/14/96

% Solids

82.45

Extended Diesel Range by WTPH-D Modified

				Recovery Limits	
Surrogate o-Terphenyl	% Recovery 77	Flags	Low 50	High 150	
•				-	

	Result		
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	130	30	X1
Heavy Oil (>nC24-nC32)	230	150	
Ext. Diesel (>nC12-nC32)	340 .	150	

Lab ID:

Method Blank - GB782

Date Received:

Date Prepared: Date Analyzed: 5/13/96 5/14/96

% Solids

BTEX by USEPA Method 8020

Surrogate % Recovery Flags Low High
Trifluorotoluene 92 50 150

Sample results are on an as received basis.

Analyte Benzene	Result (mg/kg) ND	PQL 0.044	Flags
Toluene	ND	0.044 0.044	
Ethylbenzene Total Xylenes	ND ND	0.044	

Lab ID:

Method Blank - GB782

Date Received:

Date Prepared:

Date Analyzed: % Solids

5/13/96

5/13/96

Gasoline by WTPH-G

Surrogate

Trifluorotoluene

% Recovery 90 Flags

Recovery Limits Low High

ow High 50 150

Sample results are on an as received basis.

Analyte

Gasoline (Toluene-nC12)

Result

(mg/kg)

ND

PQL

Flags

Blank Spike Report

Lab ID:	GB782
Date Prepared:	5/13/96
Date Analyzed:	5/14/96
QC Batch ID:	.GB782

BTEX by USEPA Method 8020

Parameter Name	Blank Result (mg/kg)	Spike Amount (mg/kg) 1	BS Result (mg/kg) 0.95	BS % Rec. 95	Flag
Benzene Toluene	0	1	1	102	
Ethylbenzene Total Xylenes	0 0	1 3	1 3.1	101 102	

Blank Spike Report

Lab ID:
Date Prepared:
Date Analyzed:
QC Batch ID:

GB782 5/13/96 5/13/96 GB782

Gasoline by WTPH-G

Spike BS Blank BS Result **Amount** Result % Rec. Flag (mg/kg) (mg/kg) (mg/kg) **Parameter Name** 12 99 12 Gasoline (Toluene-nC12)

Duplicate Report

Client Sample ID:	2
Lab ID:	56568-02
Date Prepared:	5/13/96
Date Analyzed:	5/14/96
QC Batch ID:	GB782

BTEX by USEPA Method 8020

Parameter Name	J	Sample Result (mg/kg)	Duplicate Result (mg/kg)	RPD %	Flag
Benzene		0	0	0.0	
Toluene		0	0	0.0	
Ethylbenzene		0	0	0.0	
Total Xylenes		0	0.	0.0	

Duplicate Report

Client Sample ID:

- 2

Lab ID:

56568-02

Date Prepared:

5/13/96

Date Analyzed:

5/13/96

QC Batch ID:

GB782

Gasoline by WTPH-G

	Sample Result	Duplicate Result	RPD	
Parameter Name	(mg/kg)	(mg/kg)	%	Flag
Gasoline (Toluene-nC12)	1.5	0.91	49.0	X4a

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

2

56568-02

5/13/96

5/14/96

GB782

Gasoline by WTPH-G

Compound Name Gasoline (Toluene-nC12)	Sample Result (mg/kg) 1.5	Spike Amount (mg/kg) 11.3	MS Result (mg/kg) 12.1	MS % Rec. 94.2	MSD Result (mg/kg) 12.2	MSD % Rec. 90.6	RPD 3.9	Flag
---------------------------------------	------------------------------------	------------------------------------	---------------------------------	----------------------	----------------------------------	-----------------------	-------------------	------

Lab ID:

Method Blank - DI762

Date Received:

5/13/96

Date Prepared: Date Analyzed:

5/13/96

% Solids

5/13/90

Diesel by WTPH-D

Surrogate o-Terphenyl % Recovery 91 Flags

Recovery Limits Low High 50 150

Sample results are on an as received basis.

Analyte
Diesel (>nC12-nC24)

Result (mg/kg) ND

PQL 25

Flags

Blank Spike Report

Lab ID: Date Prepared: Date Analyzed: QC Batch ID: DI762 5/13/96 5/13/96 DI762

Diesel by WTPH-D

Spike BS Blank BS Result **Amount** Result % Rec. Flag (mg/kg) (mg/kg) (mg/kg) **Parameter Name** 86 250 210 0 Diesel (>nC12-nC24)

Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

2

56568-02

5/13/96

5/13/96

D1762

Diesel by WTPH-D

	Sample Result	Duplicate Result	RPD	
Parameter Name	(mg/kg)	(mg/kg)	%	Flag
Diesel (>nC12-nC24)	120	95	23.0	X4a

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

. 2

56568-02

5/13/96

5/14/96

DI762

Diesel by WTPH-D

Compound Name	Sample Result (mg/kg)	Spike Amount (mg/kg) 256	MS Result (mg/kg) 301	MS % Rec. 70.8	MSD Result (mg/kg) 290	MSD % Rec. 67	RPD 5.5	Flag
Diesel (>nC12-nC24)	120	256	301	70.0	290	07	3.5	

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

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
- POL: 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 98424 (206) 922-2310 • FAX (206) 922-5047

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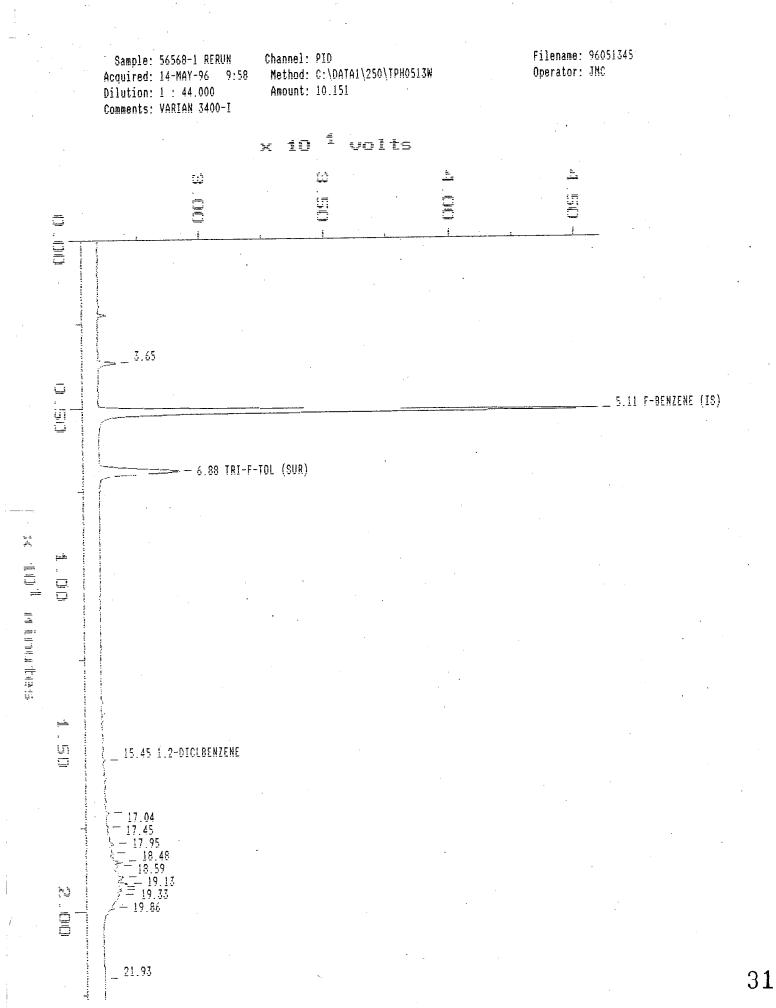
Acquired: 13-MAY-96 21:38 Dilution: 1 : 44.000 Amount: 10.151 Comments: VARIAN 3400-I 10 volts Į, 4.00. 1.30 2.26 2.63 3.48 - 3.73 5.21 .03 TRI-F-TOL (SUR) 9.23 9.73 11.58 11.78 11.78 12.22 12.44 12.82 13.20 14.18 14.37 15.22 15.51 16.08 16.27 17.13 18.53 18.67 19.18 19.38 19.38 : : : 20.85 22.01

Channel: FID

Method: C:\DATA1\250\TPH0513W

Sample: 56568-1

Filename: 96051320 Operator: JMC



Filename: 96051321 Operator: JMC Channel: FID Sample: 56568-2 Method: C:\DATA1\250\TPH0513W Acquired: 13-MAY-96 22:07 Dilution: 1 : 44.000 Amount: 10.402 Comments: VARIAN 3400-I 10 volts <u>-</u>-2.26 2.64 5.23 7.04 TRI-F-TOL (SUR) sequencia e 1.00 % 9.27 9.76 . □ _ 10.88 11.60
11.78
12.23
12.45
12.45
13.21
13.80
14.22
14.35
14.86
15.59
16.28
16.78
16.78
17.16
18.22
18.56
19.20
19.33 N. O 20.84 22.02

Filename: 96051346 Operator: JMC Method: C:\DATA1\250\TPH0513W Acquired: 14-MAY-96 10:27 Amount: 10.402 Dilution: 1: 44.000 Comments: VARIAN 3400-I 10 volts 3.72 5.18 F-BENZENE (IS) 6.94 TRI-F-TOL (SUR) stephinning of the st _ 18.50 = 19.15 = 19.35 - 19.88 21.97

Channel: PID

Sample: 56568-2 RERUN

Filename: 96051327 Sample: 56568-3 Channel: FID Operator: JMC Method: C:\DATA1\250\TPH0513W Acquired: 14-MAY-96 1:00 Dilution: 1 : 44.000 Amount: 10.556 Comments: VARIAN 3400-I 10 volts Ħ 2.26 2.63 3.48 - 3.73 5.22 7.03 TRI-F-TOL (SUR) 7.82 = 8.06 8.52 - 8.82 - 9.15 - 9.73 = 9.96 = 10.46 10.83 seam. mulium nicht vo 11.59 11.79 12.22 12.43 13.21 13.21 14.06 14.90 15.58 15.58 16.25 17.13 18.22 19.38 19.38 20.84

22.02

Operator: JMC Acquired: 14-MAY-96 11:26 Method: C:\DATA1\250\TPH0513W Amount: 10.556 Dilution: 1 : 44.000 Comments: VARIAN 3400-I 10 volts 3.50 3.00 31.65 5.11 F-BENZENE (IS) 6.88 TRI-F-TOL (SUR) See H. T. B. B. C. S. . U1 ____ 17.05 $\begin{array}{r}
= 17.95 \\
18.17 \\
= 18.61 \\
= 19.13 \\
= 19.33 \\
= 19.86
\end{array}$ = 21.97

Sample: 56568-3 RERUN

1 - 22.49

Channel: PID

Filename: 96051348

Filename: 96051328 Sample: 56568-4 Acquired: 14-MAY-96 1:30 Channel: FID Operator: JMC Method: C:\DATA1\250\TPH0513W Amount: 10.632 Dilution: 1 : 44.000 Comments: VARIAN 3400-I 10 volts 4.00 2.26 2.63 — 3.46 >> = 3.73 5.21 02 TRI-F-TOL (SUR) as all the first of the said $= \frac{9.31}{9.73}$ 1. 00 -10.8111.59 11.76 12.22 12.45 12.83 13.20 14.33 14.57 15.58 15.59 16.77 17.68 18.02 18.22 18.22 18.39 19.39 19.39 19.39 . 되 므 20.84 22.00

Filename: 96051349 Sample: 56568-4 RERUN Channel: PID Operator: JMC Method: C:\DATA1\250\TPH0513W Acquired: 14-MAY-96 11:55 Dilution: 1 : 44.000 Comments: VARIAN 3400-I Amount: 10.632 volts 10 3.65 5.10 F-BENZENE (IS) 6.87 TRI-F-TOL (SUR) . Un **=** 17.05 - 17.95 - 18.48 - 18.61 \$= 19.13 - 19.86 N . OO

_ 21.95

Sample: 56568-5 RERUN

Channel: FID

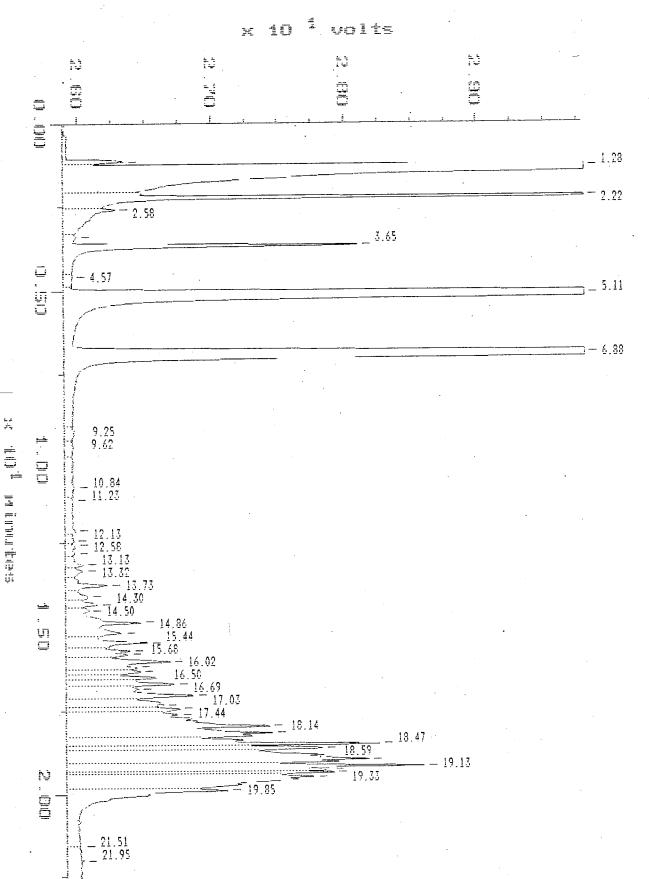
Filename: 96051350 Operator: JMC

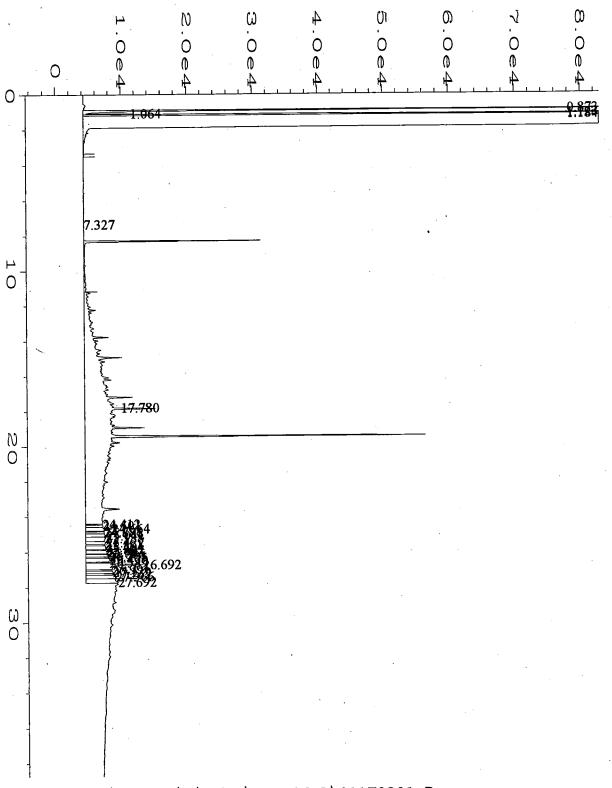
Acquired: 14-MAY-96 12:24

Method: C:\DATA1\250\TPH0513W

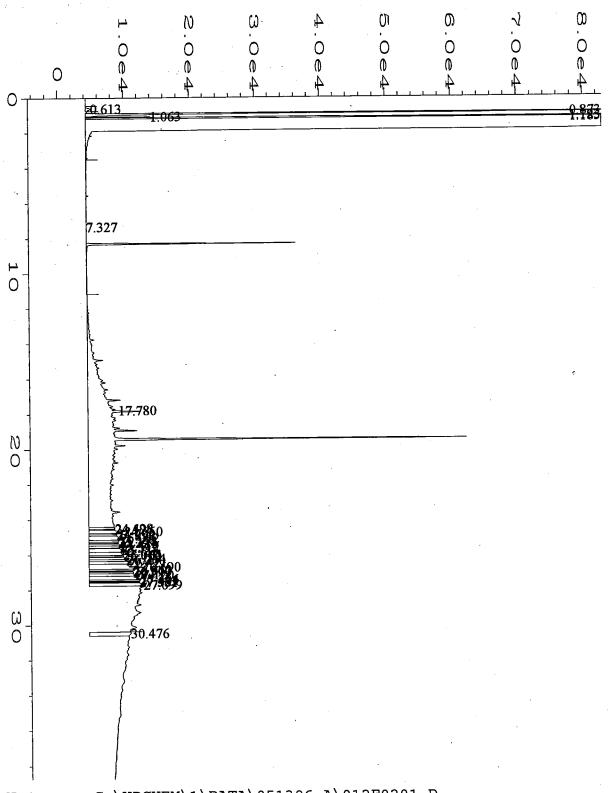
Dilution: 1 : 44.000 Amount: 10.597

Comments: VARIAN 3400-I

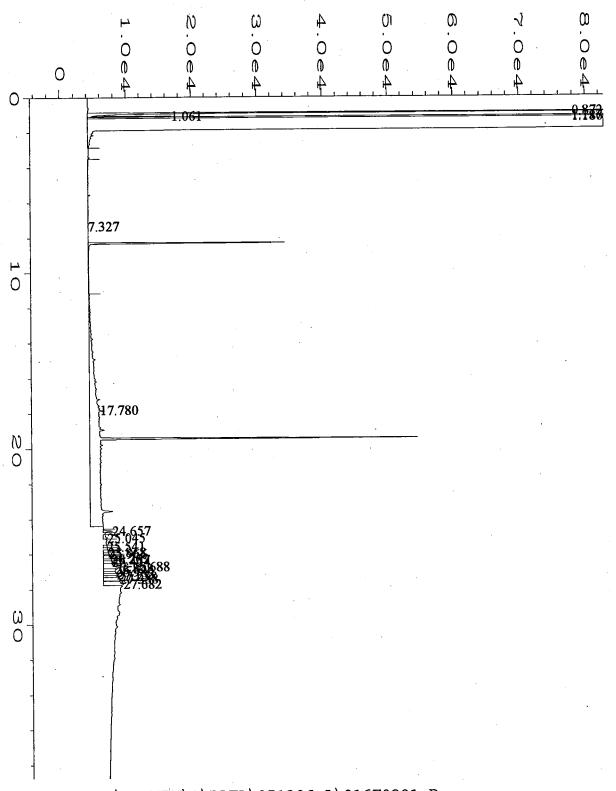




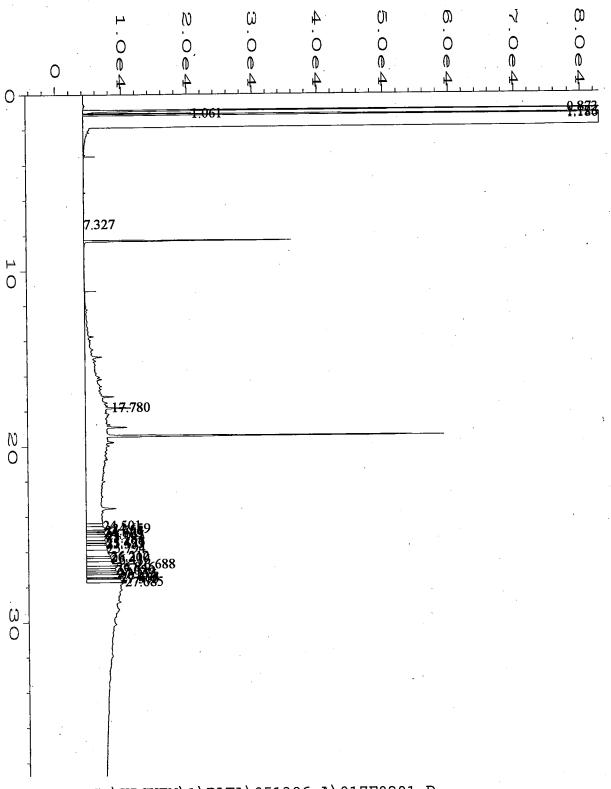
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: C:\HPCHEM\1\DATA\051396_A\011F0201.D
Data File Name
                                                      Page Number
                   : ELG/JV/DAS
Operator
                                                                          : 11
                                                      Vial Number
                   : HP 5890
Instrument
                                                      Injection Number: 1
Sample Name
                   : 56568-1
                                                      Sequence Line
n Time Bar Code:
                                                      Instrument Method: SU0510-1.MTH
                   : 13 May 96
                                  11:03 PM
 quired on
Report Created on: 14 May 96 07:31 AM Last Recalib on : 13 MAY 96 08:08 AM
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                                                                         : 0510-1D.MTH
                                  07:31 AM
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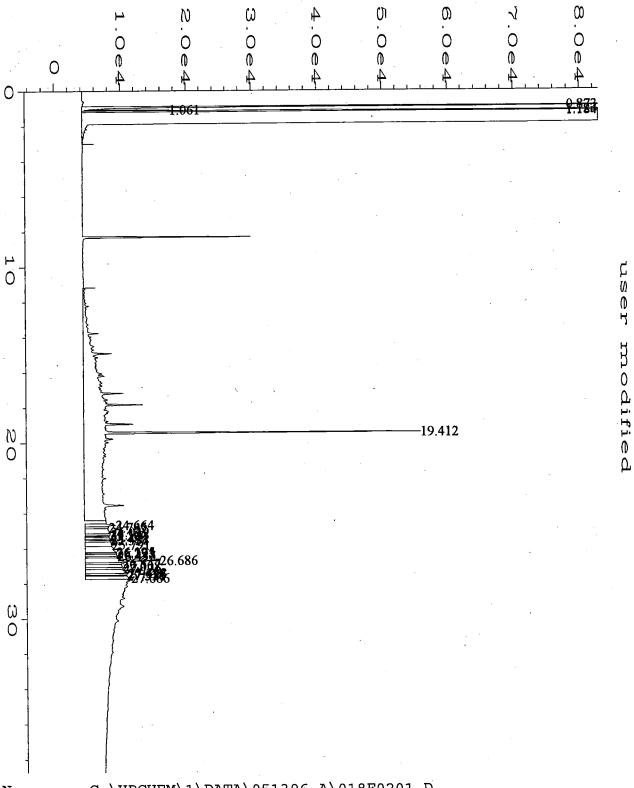
Data File Name :	C:\HPCHEM\1\DATA\051396_A\013	2F0201.D
Operator :	ELG/JV/DAS	Page Number : 1
↔	HP 5890	Vial Number : 12
Jample Name:		Injection Number : 1
'n Time Bar Code:		Sequence Line : 2
	13 May 96 11:51 PM	Instrument Method: SU0510-1.MTH
	14 May 96 07:31 AM	Analysis Method : 0510-1D.MTH
	13 MAY 96 08:08 AM	Sample Amount : 0
	1	ISTD Amount :
, larorprise	·	11



ˈData File Name :	C:\HPCHEM\1\DATA\051396_A\016		
Operator :	ELG/JV/DAS	Page Number :	1
instrument :		Vial Number :	16
Sample Name :		Injection Number:	1
r 'n Time Bar Code:	,	Sequence Line :	
	14 May 96 02:58 AM	Instrument Method:	
	14 May 96 07:32 AM	Analysis Method:	0510-1D.MTH
	13 MAY 96 08:08 AM	Sample Amount :	0
	1	ISTD Amount :	42
		•	. 4~



Data File Name : (C:\HPCHEM\1\DATA\051396_A\017	F0201.D	
	ELG/JV/DAS	Page Number :	1 .
	HP 5890	Vial Number :	17
	56568-4	Injection Number :	1.
· ±		Sequence Line :	
n Time Bar Code:		Instrument Method:	
quired on :	,	Analysis Method :	0510 1D MTH
Report Created on: 1	— <u>-</u>		
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Multiplier : 3		ISTD Amount	4.0
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                 : ELG/JV/DAS
Operator
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                                                                   : 18
                  : HP 5890
instrument
                                                 Injection Number: 1
Jample Name
                   56568-5
                                                                   : 2
                                                 Sequence Line
r n Time Bar Code:
                                                 Instrument Method: SU0510-1.MTH
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                                                 Analysis Method
                                                                  : 0510-1D.MTH
leport Created on: 14 May 96 07:47 AM
Last Recalib on : 13 MAY 96 08:08 AM
                                                 Sample Amount
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Multiplier
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ANALYTICAL & ENVIRONMENTAL CHEMISTS

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

TRANSMITTAL MEMORANDUM

DATE: August 20, 1996

TO: Doug Pierce

WSDOT - Operations Olympia

M. Wesner

PROJECT: Union Gap

REPORT NUMBER: 58733

Enclosed are the test results for ten samples received at Sound Analytical Services on August 14, 1996.

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

Analytical Narrative: The relative percent difference (RPD) between the sample and duplicate was outside the advisory Q.C. limits. The RPD between the matrix spike and matrix spike duplicate was with in the advisory limits and no action was taken.

Should there be any questions regarding this report, please contact me at (206) 922-2310.

Sincerely,

Dawn M. Werner

Project Manager

DMW:tm

Client Name

WSDOT - Operations Olympia

Client ID:

UG1

Lab ID:

58733-01

Date Received:

8/14/96

Date Prepared:

8/19/96

Date Analyzed:

8/19/96

% Solids

86

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

			Recovery Limits			
Surrogate o-Terphenyl	% Recovery 92	Flags	Low 50	High 150		

Analyte Diesel (>nC12-nC24)	Result (mg/kg) 34	PQL 14	Flags X2
Heavy Oil (>nC24-nC32)	270	70	
Ext. Diesel (>nC12-nC32)	310	70	

Client Name

SOUND ANALYTICAL SERVICES, INC. WSDOT - Operations Olympia

Client ID:

UG2

Lab ID:

58733-02

Date Received:

8/14/96

Date Prepared: Date Analyzed: 8/19/96 8/19/96

% Solids

90.24

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

			Recove	ery Limits
Surrogate	% Recovery	Flags	Low	High
o-Terphenyl	91		50	150

	Result		
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	41	14	X2
Heavy Oil (>nC24-nC32)	350	68	
Ext. Diesel (>nC12-nC32)	390	68 .	

Client Name

WSDOT - Operations Olympia

Client ID:

UG3

Lab ID:

58733-03

Date Received:

8/14/96

Date Prepared:

8/19/96

Date Analyzed:

8/19/96

% Solids

88.19

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

			Recove	ery Limits
Surrogate o-Terphenyl	% Recovery 90	Flags	Low 50	High 150

Analyte	Result (mg/kg) 58	PQL 14		Flags X2
Diesel (>nC12-nC24) Heavy Oil (>nC24-nC32) Ext. Diesel (>nC12-nC32)	390 450	70 70	•	

Client Name

WSDOT - Operations Olympia

Client ID:

וופות: Lab ID:

Date Received:

Date Prepared:

Date Analyzed:

% Solids

UG4

58733-04

8/14/96

8/19/96

8/19/96

87.1

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

	•		Recovery Limit	
Surrogate o-Terphenyl	% Recovery 85	Flags	Low 50	High 150

	Result		
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	. 41	14	X2
Heavy Oil (>nC24-nC32)	320	70	
Ext. Diesel (>nC12-nC32)	370	70	

Client Name

SOUND ANALYTICAL SERVICES, INC. WSDOT - Operations Olympia

Client ID:

UG5

Lab ID:

58733-05

Date Received:

8/14/96

Date Prepared:

8/19/96

Date Analyzed:

8/20/96

% Solids

88.31

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

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

Result			
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	37	. 14	X2
Heavy Oil (>nC24-nC32)	290	69	
Ext. Diesel (>nC12-nC32)	320	69	•

Client Name

WSDOT - Operations Olympia

Client ID:

Lab ID:

Date Received:

Date Prepared:

Date Analyzed:

% Solids

UG6

58733-06

8/14/96

8/19/96

8/20/96

87.75

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

	•		Recove	ery Limits
Surrogate o-Terphenyl	% Recovery 90	Flags	Low 50	High 150

Result			
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	29	. 14	X2
Heavy Oil (>nC24-nC32)	240	70	
Ext. Diesel (>nC12-nC32)	270	70	

Client Name

WSDOT - Operations Olympia

Client ID:

UG7

Lab ID:

58733-07

Date Received:

8/14/96

Date Prepared:

8/19/96

Date Analyzed:

8/20/96

% Solids

89.34

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

		•	Recove	ry Limits
Surrogate	% Recovery	Flags	Low	High
o-Terphenyl	73		50	150

Result				
(mg/kg)	PQL	Flags		
21	14	X2		
96	68			
120	68			
	(mg/kg) 21 96	(mg/kg) PQL 21 14 96 68		

Client Name

WSDOT - Operations Olympia

Client ID:

UG8

Lab ID:

58733-08

Date Received:

8/14/96

Date Prepared:

8/19/96

Date Analyzed:

8/20/96

% Solids

87.9

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

			Recovery Limits	
Surrogate o-Terphenyl	% Recovery 79	Flags	Low 50	High 150

	Result	PO!	Elago
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	29	14	, X2
Heavy Oil (>nC24-nC32)	140	69	
Ext. Diesel (>nC12-nC32)	170	. 69	

Client Name

WSDOT - Operations Olympia

Client ID: Lab ID: UG9

Lab ID:

58733-09

Date Received:

8/14/96

Date Prepared:

8/19/96

Date Analyzed:

8/20/96

% Solids

88.93

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

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

	Result	•	
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	51	14	X2
Heavy Oil (>nC24-nC32)	340	69	
Ext. Diesel (>nC12-nC32)	390	69	

Client Name

WSDOT - Operations Olympia

Client ID:

UG10

Lab ID:

58733-10

Date Received:

8/14/96

Date Prepared:

0/14/30

Date Analyzed:

8/19/96 8/20/96

% Solids

88.17

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

			Recove		
Surrogate o-Terphenyl	% Recovery 76	Flags	Low 50	High 150	
0- respirency					

Result			
Analyte	(mg/kg)	PQL	Flags
Diesel (>nC12-nC24)	29	14	X2
Heavy Oil (>nC24-nC32)	250 ·	70	
Ext. Diesel (>nC12-nC32)	280	70	•

Lab ID:

Method Blank - DI911

Date Received:

Date Prepared:

Date Analyzed:

% Solids

8/19/96

8/19/96

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

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

Sample results are on an as received basis.

•	Result		
Analyte	(mg/kg)	PQL	Flag
Diesel (>nC12-nC24)	ND	13	
Heavy Oil (>nC24-nC32)	ND	63	•
Ext. Diesel (>nC12-nC32)	ND	63	

Blank Spike Report

Lab ID:

DI911

Date Prepared:

8/19/96

Date Analyzed:

8/19/96

QC Batch ID:

DI911

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

	Blank Result	Spike Amount	BS Result	BS	
Parameter Name	(mg/kg)	(mg/kg)	(mg/kg)	% Rec.	Flag
Diesel (>nC12-nC24)	0	130	130	101	
Heavy Oil (>nC24-nC32)	. 0	250	260	104	i i

Duplicate Report

Client Sample ID:

UG10

Lab ID:

58733-10

Date Prepared:

8/19/96

Date Analyzed:

8/20/96

QC Batch ID:

DI911

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

	Sample Result	Duplicate Result	RPD	
Parameter Name	(mg/kg)	(mg/kg)	%	Flag
Diesel (>nC12-nC24)	29	37	24.0	N
Heavy Oil (>nC24-nC32)	250	360	36.0	N
Ext. Diesel (>nC12-nC32)	280	400	35.0	Ν

Matrix Spike/Matrix Spike Duplicate Report

Client Sample ID:

Lab ID:

Date Prepared:

Date Analyzed:

QC Batch ID:

UG10

58733-10

8/19/96

8/20/96

DI911

Extended Diesel Range by WTPH-D Modified with Silica Gel Cleanup

MSD MS Sample Spike. MSD Result MS **Amount** Result Result **RPD** Flag (mg/kg) % Rec. (mg/kg) (mg/kg) % Rec. **Compound Name** (mg/kg) 20 190 114 159 93.5 141 29 Diesel (>nC12-nC24)

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

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.

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SOUND ANALYTICAL SERVICES, INC.

ANALYTICAL & ENVIRONMENTAL CHEMISTS

PROJECT NAME: ()ातका (दर्व)

CLIENT: (N) > (X) T

CONTACT: 17(1)(1)(1)

UST PARAMETERS

(206) 922-2310 • FAX (206) 922-5047

Tacoma, Washington 98424 4813 Pacific Hwy. East

DEFINEBABLES CLOSURE Total Halogens Metals Semi-volatiles BPA 625/8270 GC/MS CHAIN OF CUSTODY / REQUEST FOR LABORATORY ANALYSIS Volatile Organica Aromatic Volatiles EPA 602/8020 Halogenated Volatiles EPA 601/8010 Phenols s'HA9 bcg,2 TCLP Lead Total Lead Specify State M2108 H9T X3T8 \ D-H9T X3T8 ANALYSIS REQUESTED: 1,814 H9T = Q-H9T D-H9T HCID # of Containers DATE TIME MATRIX JUD (B. 1001) PHONE NO: 300 705 7512

4/12

SAMPLE I.D.

LAB#

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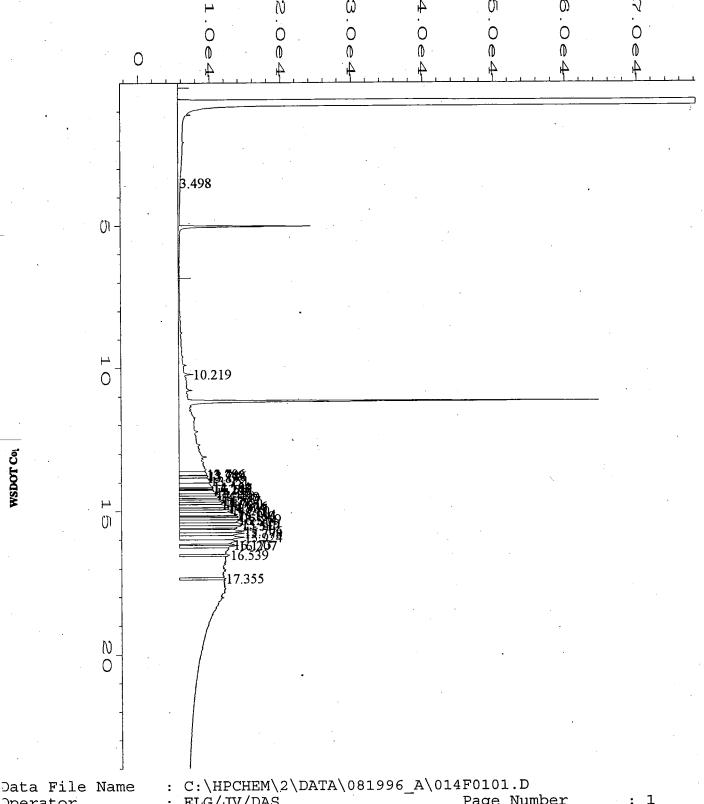
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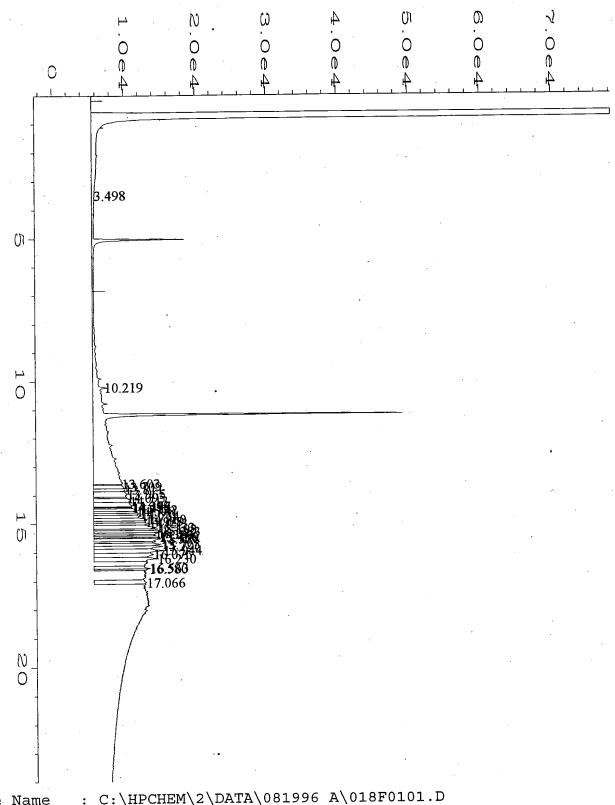
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Page Number
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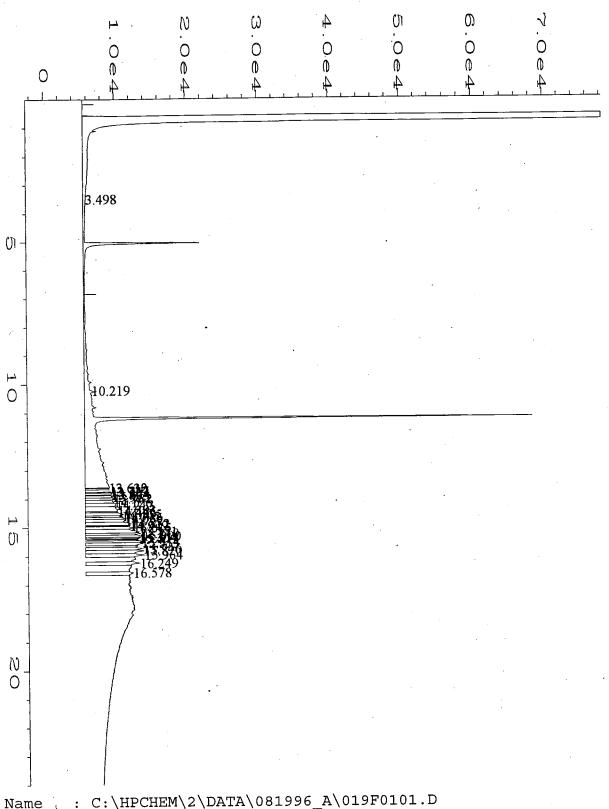
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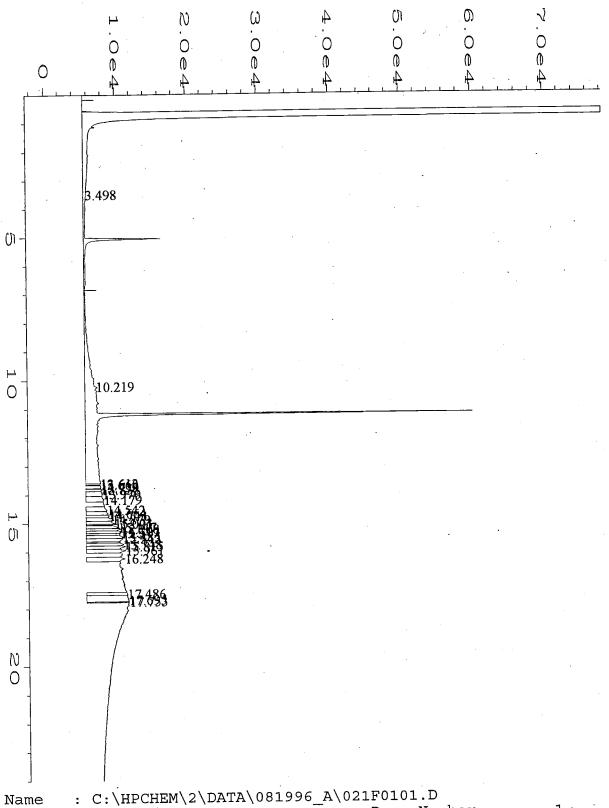
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Data File Name
                                                 Page Number
                 : ELG/JV/DAS
Operator
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                 : VARIAN 34
Instrument
                                                 Injection Number: 1
                   58733-5 SiO2
Sample Name
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 n Time Bar Code:
                                                 Instrument Method: SR0815-V.MTH
                 : 20 Aug 96
                               00:02 AM
acquired on
                                                 Analysis Method
                                                                   : 0815-WD.MTH
                               07:25 AM
Report Created on: 20 Aug 96
                                                 Sample Amount
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Last Recalib on
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Multiplier
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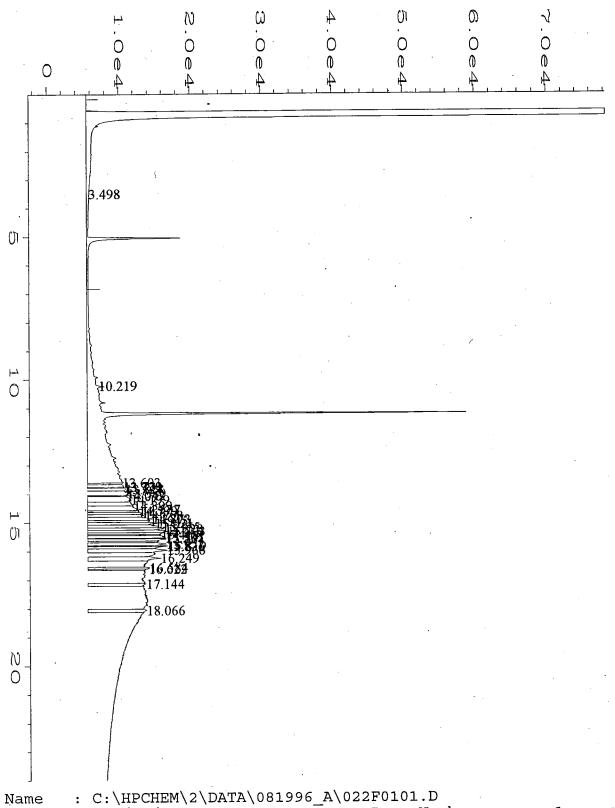
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Data File Name : C:\HPCHEM\2\DATA\081996_A\019F0101.D
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                                                 Page Number
Operator
                                                 Vial Number
                                                                   : 19
                 : VARIAN 34
Instrument
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cample Name
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                                                 Instrument Method: SR0815-V.MTH
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Report Created on: 20 Aug 96
                                                 Analysis Method
                              07:25 AM
Last Recalib on : 16 AUG 96 10:08 AM
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                                                 ISTD Amount
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: C:\HPCHEM\2\DATA\081996_A\020F0101.D
Data File Name
                                                 Page Number
                 : ELG/JV/DAS
Operator
                                                 Vial Number
                 : VARIAN 34
Instrument
                                                 Injection Number: 1
                 : 58733-7 SiO2
cample Name
                                                 Sequence Line
 n Time Bar Code:
                                                 Instrument Method: SR0815-V.MTH
Acquired on
                 : 20 Aug 96
                              01:05 AM
                                                                  : 0815-WD.MTH
                                                 Analysis Method
Report Created on: 20 Aug 96
                              07:26 AM
                                                 Sample Amount
Last Recalib on : 16 AUG 96 10:08 AM
                                                 ISTD Amount
Multiplier
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Data File Name
                                                 Page Number
                                                                   : 1
                 : ELG/JV/DAS
Operator
                                                                   : 21
                                                 Vial Number
                 : VARIAN 34
Instrument
                                                 Injection Number: 1
                 : 58733-8 SiO2
Sample Name
                                                 Sequence Line
                                                                   : 1
  n Time Bar Code:
                                                 Instrument Method: SR0815-V.MTH
                 : 20 Aug 96
                               01:36 AM
acquired on
                                                                  : 0815-WD.MTH
                                                 Analysis Method
Report Created on: 20 Aug 96
                               07:26 AM
                                                 Sample Amount
                 : 16 AUG 96 10:08 AM
Last Recalib on
                                                 ISTD Amount
                  : 1
Multiplier
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Data File Name
                                                  Page Number
                  : ELG/JV/DAS
Operator
                                                  Vial Number
                                                                      22
Instrument
                  : VARIAN 34
                                                  Injection Number :
                   58733-9 SiO2
Sample Name
                                                  Sequence Line
                                                                    : 1
 in Time Bar Code:
                                                  Instrument Method: SR0815-V.MTH
                               02:07 AM
                  : 20 Aug 96
Acquired on
                                                  Analysis Method
                                                                   : 0815-WD.MTH
Report Created on: 20 Aug 96
                               07:26 AM
                                                  Sample Amount
                  : 16 AUG 96 10:08 AM
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Data File Name
                                                Page Number
                 : ELG/JV/DAS
Operator
                                                                 : 26
                                                Vial Number
                 : VARIAN 34
Instrument
                                                Injection Number: 1
                 : 58733-10 SiO2
Sample Name
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                                                Sequence Line
 un Time Bar Code:
                                                Instrument Method: SR0815-V.MTH
Acquired on
                 : 20 Aug 96
                              04:11 AM
                                                                : 0815-WD.MTH
                                                Analysis Method
Report Created on: 20 Aug 96
                              07:27 AM
                                                Sample Amount
Last Recalib on : 16 AUG 96 10:08 AM
                                                ISTD Amount
Multiplier
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APPENDIX D

WSDOT LETTER TO YAKIMA HEALTH DISTRICT

Mr. Art McQuen Yakima County Health Department 105 North First Street Yakima, Washington 98901

Dear Mr McQuen

This is to request the Yakima County Health Department's approval of the Washington Department of Transportation's (WSDOT) proposal to ulilize treated petroleum contaminated soil for roadside maintenance. The approximate 2000 cubic yards of dirt was excavated from WSDOT's Union Gap maintenance facility the Summer of 1994. You will recall that this material was generated during the remediation of a dry well at the facility.

WSDOT has treated the material twice with hydrogen peroxide and three times utilizing bioremediation. After each treatment the petroleum levels declined but we are unable to acheive further petroleum degredation through bioremediation. The level of TPH has decreased to a range of 250ppm-350ppm; (analytical results attached).

Our proposal is to utilize this material, over time, for roadside maintenance, including shoulder rebuilding, median crossover construction and slope reduction in medians. None of the reuse areas would be into or ajacent to watercourses.

We believe long chain hydrocarbon (heavy oil) does not present a risk to the environment or the public. All uses would nevertheless be in low public contact areas. Further treatment of this material is not practical nor economical.

Please advise of your position on this matter and feel free to contact me at 360-705-7812 in additional information is needed.

Sincerely,

DOUG PIERCE

Environmental Manager for Operations

APPENDIX E

YAKIMA HEALTH DISTRICT APPROVAL LETTER

CENTRAL OFFICE — 575-4040 — 104 North First Street — Yakima, Wash. 98901 SUNNYSIDE OFFICE — 837-3411 — 1319 Saul Road — P.O. Box 821 — Sunnyside, Wash. 98944



October 01, 1996

Doug Pierce
Washington State Department of Transportation
Transportation Building
P.O. Box 47300
Olympia, Wa. 98504-7300

Ref. Union Gap Maintenance Facility: Petroleum Contaminated Soil

Mr. Pierce,

This office has reviewed the post treatment test data on the above mentioned project or projects. Based on the data submitted it has been determined that the soil meets the criteria for Class 3 soil. The soil may be removed from the site and used as indicated in your request for removal.

If you have any questions regarding this letter please contact me.

Sincerely,

Art McEwen

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SUPPORTING GOVERNMENTAL UNITS