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# HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.  
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A-8397-06

December 26, 1996

Mr. Jon Clark  
Municipality of Anchorage  
Department of Property and Facility Management  
3640 East Tudor Road  
Anchorage, Alaska 99519-6650

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Dept. of Environmental Conservation  
Underground Storage Tanks — FAP

Re: Remediation System Operation and Monitoring  
August 7 through November 20, 1996  
Anchorage Fire Department Station No. 4

Dear Mr. Clark:

This letter report presents the hydrocarbon recovery activities and results of groundwater sampling at the Municipality of Anchorage (MOA) Fire Department Station No. 4 (AFD-4) for the period of August 7 through November 20, 1996. AFD-4 is located at 4350 MacInnes Road in Anchorage, Alaska.

In January 1995, two recovery wells were installed at the site to collect floating hydrocarbons (Figure 1) using Petro-trap passive hydrocarbon pumps. Work was conducted in accordance with the Corrective Action Plan for this site dated October 19, 1994. This plan was approved by the Alaska Department of Environmental Conservation in a meeting with the MOA - Department of Property and Facility Management and Hart Crowser on January 13, 1995.

## WORK PERFORMED BY HART CROWSER

Product thickness measurements were taken in monitoring well MW-1, and groundwater elevation measurements were taken in monitoring wells MW-2 through MW-4, on November 20, 1996 (Appendix A - Field Methods). Monitoring wells MW-2, MW-3, and MW-4 were then purged and sampled. Samples were submitted to North Creek Analytical (NCA) laboratory for analyses of benzene, toluene, ethylbenzene, and xylenes (BTEX; EPA Method 8020) and diesel-range organics (DRO; EPA Method 8100M).

## WATER TABLE CONDITIONS

Groundwater elevations declined 0.04 feet in MW-1, 0.48 feet in MW-2, 0.05 feet in MW-3, and 0.26 feet in MW-4 over the monitoring period (Figure 2). The inferred groundwater contours for this site, for November 20, 1996, are presented on Figure 1. The groundwater flow direction is





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inferred to the northeast and the average hydraulic gradient was 0.04 feet/foot. This is generally the same as in August 1996.

The inferred flow direction is somewhat more easterly and the gradient slightly higher than in observations made previous to August 1996. This is due to a higher relative groundwater elevation measured at MW-3, which was also observed in August 1996. If the groundwater flow direction becomes more easterly, an additional monitoring point may be required between MW-2 and MW-4 so that observations can be made directly down-gradient from the hydrocarbon recovery area. However, at this time, the location of MW-2 appears to be sufficient.

### **HYDROCARBON THICKNESS AND RECOVERY**

The hydrocarbon thickness in MW-1 is presented in Table 1, and a comparison between hydrocarbon thickness and groundwater elevation is presented in Figure 3. Hydrocarbon thickness on November 20, 1996 was 0.32 feet.

Product recovery is summarized in Table 2. Over this period, 6.7 gallons of product were recovered, and a total of 26.7 gallons of fuel has been collected since the inception of hydrocarbon recovery.

### **PURGE WATER OBSERVATIONS**

No odor or sheen was observed in the purge water from MW-2, MW-3, or MW-4.

### **LABORATORY ANALYSES RESULTS**

The results of BTEX laboratory analyses are summarized in Table 3a. No BTEX was detected in any of the monitoring wells sampled. The DRO results (Table 3b) ranged from 0.12 mg/L in MW-2 (ND less than 0.10 in the field duplicate labeled MW-5) to ND in MW-3. All laboratory reports are presented in Appendix B along with a review of data quality.

#### ***Data Validation***

Laboratory Quality Control Data provided by NCA on groundwater samples collected at AFD-4 indicated that reported results met the data quality objectives outlined in the Hart Crowser Quality Assurance Program Plan; all data are accepted. Any deviations are discussed in Appendix B.





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## CONCLUSIONS

Hydrocarbon recovery should be continued through the winter because anticipated falling groundwater levels should increase the hydrocarbon thickness in the recovery wells until snowmelt occurs, generally in April. After that time, we recommend that a soil vapor extraction test be conducted to remove the residual hydrocarbons from the subsurface soils.

Since August 1994, data collected from MW-2, MW-3, and MW-4 shows that no dissolved BTEX constituents have reached the down-gradient edge of the site (MW-2) or impacted the area around the former UST excavation. In addition, the DRO concentrations detected in the monitoring wells are low, and no sheen or odor has been observed in the purge water. We recommend that a letter be presented to ADEC requesting that quarterly sampling be reduced to semi-annual events, to occur in January and July of each year, during the duration of this project.

## INFORMATION LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same and similar localities at the time the work was performed. It is intended for the exclusive use of MOA. This letter report is not meant to represent a legal opinion, and no other warranty, express or implied, is made.

We trust that this report meets your needs. Any questions regarding the field work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to Nino Muniz at (907) 276-7475.

Sincerely,

**HART CROWSER, INC.**

**Herminio R. Muniz**  
Sr. Project Hydrogeologist

HRM/mm

**Mark G. Madden, P.E.**  
Senior Associate





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Attachments: Table 1 Groundwater Elevations and Hydrocarbon Thickness in MW-1  
Table 2 Hydrocarbon Recovery Record for RW-1 and RW-2  
Table 3a Groundwater Laboratory Analyses Results - BTEX  
Table 3b Groundwater Laboratory Analyses Results - DRO  
Figure 1 Site Plan and Water Table Elevations on November 20, 1996  
Figure 2 Monitoring Well Hydrographs  
Figure 3 Hydrocarbon Thickness and Groundwater Elevation in MW-1  
Appendix A Field Explorations Methods and Analyses  
Appendix B Laboratory Reports



**Table 1: Groundwater Elevations and Hydrocarbon Thickness in MW-1  
AFD - 4  
Anchorage, Alaska**

Date	Depth to Hydrocarbon (Feet)	Depth to Groundwater (Feet)	Corrected Groundwater Elev. (Feet) {1} {2}	Hydrocarbon Thickness (Feet)
8/1/94	Not Observed	10.30	89.07	0.00
8/10/94	9.73	10.58	89.50	0.85
9/8/94	9.99	11.86	89.08	1.87
1/24/95	10.69	13.43	88.24	2.74
1/27/95	10.77	13.33	88.19	2.56
2/3/95	10.99	12.19	88.19	1.20
2/10/95	10.97	12.15	88.21	1.18
2/15/95	10.85	11.97	88.34	1.12
2/24/95	10.88	12.09	88.30	1.21
3/9/95	11.03	12.33	88.13	1.30
3/27/95	11.20	12.56	87.95	1.36
4/21/95	9.34	9.92	89.94	0.58
5/22/95	7.86	8.19	91.46	0.33
6/12/95	8.29	8.60	91.03	0.31
7/7/95	8.83	9.19	90.48	0.36
7/17/95	9.02	9.35	90.30	0.33
7/27/95	8.57	8.96	90.74	0.39
8/3/95	8.08	8.44	91.23	0.36
8/29/95	8.60	8.95	90.71	0.35
9/28/95	8.43	8.81	90.88	0.38
10/25/95	8.68	9.05	90.63	0.37
11/21/95	9.11	9.51	90.20	0.40
12/22/95	9.74	10.47	89.51	0.73
1/24/96	10.15	10.85	89.11	0.70
4/18/96	9.56	10.35	89.68	0.79
5/10/96	8.90	9.27	90.41	0.37
7/3/96	7.92	8.18	91.41	0.26
7/31/96	7.54	7.84	91.78	0.30
8/6/96	7.46	7.75	91.86	0.29
11/20/96	7.50	7.82	91.82	0.32

## Notes:

{1} Vertical Survey conducted on 7/2/94; elevation of 100.00 assumed at northeast corner of concrete flagpole footing.

MW-1 measuring point elevation =99.37

{2} Groundwater elevation corrected using measured hydrocarbon specific gravity of 0.84 as determined by laboratory.

**Table 2: Hydrocarbon Recovery Record for RW-1 and RW-2**  
**AFD- 4**  
**Anchorage, Alaska**

Dates	Recovery			Recovery		
	Well RW-1 (Ounces)	Cumulative (Ounces)	Cumulative (Gallons)	Well RW-2 (Ounces)	Cumulative (Ounces)	Cumulative (Gallons)
1/25/95 - 2/15/95	328	328	2.6	0	0	0
2/16/95 - 3/9/95	55	383	3.0	0	0	0
3/10/95 - 3/24/95	7	390	3.0	0	0	0
3/25/95 - 3/29/95	Frozen	390	3.0	0	0	0
3/30/95 - 4/21/95	0	390	3.0	0	0	0
9/22/95-9/28/95	23	413	3.2	436	436	3.4
9/29/95-10/25/95	4	417	3.3	216	652	5.1
10/25/95-11/21/95	18	435	3.4	388	1040	8.1
11/22/95-12/22/95	72	507	4.0	463	1503	11.7
12/23/95-1/24/96	32	539	4.2	108	1611	12.6
6/28/96-7/31/96	45	584	4.6	360	1971	15.4
8/1/96-11/20/96	151	735	5.7	713	2684	21.0

totrecv.xls

NOTE: Hydrocarbon recovery system was out of service from April 22 through September 15, 1995 due to high water levels.  
 System was down from February through May 1996 due to pumps being frozen into recovery wells.

**Table 3a: Groundwater Laboratory Analysis Results - BTEX**  
**AFD-4**  
**Anchorage, Alaska**

Monitoring Well	Benzene (mg/L) - EPA 5030/8020									
	8/1/94	1/25/95	4/21/95	7/27/95	10/26/95	1/24/96	5/10/96	8/6/96	11/20/96	
MW-1 Field Duplicate	2.3 2.2	N/S {2}	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
MW-2 Field Duplicate	ND(0.0005) {1}	N/S {3}	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)	ND(0.0005) ND(0.0005)
MW-3 Field Duplicate	ND(0.0005)	ND(0.0005) ND(0.0005)	N/S {4}	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
MW-4	0.0005	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Trip Blank	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
Total BTEX (mg/L) - EPA 5030/8020										
Monitoring Well	8/1/94	1/25/95	4/21/95	7/27/95	10/26/95	1/24/96	5/10/96	8/6/96	11/20/96	
MW-1 Field Duplicate	40 38	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
MW-2 Field Duplicate	0.003	N/S	ND ND	ND ND	ND ND	0.0006 ND	ND ND	ND ND	ND ND	ND ND
MW-3 Field Duplicate	0.006	ND ND	N/S	ND	ND	ND	ND	ND	ND	ND
MW-4	0.004	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES: {1} ND(0.0005) - Not Detected (Detection Limit)

{2} N/S - Not sampled due to floating hydrocarbons in well.

{3} N/S - Not sampled due to large snowpile over well.

{4} N/S - Not sampled due to ice blockage in well riser.

**Table 3b: Groundwater Laboratory Analysis Results - DRO**  
**AFD-4**  
**Anchorage, Alaska**

Monitoring Well	DRO (mg/L) - EPA 3510/8100M						
	4/21/95	7/27/95	10/26/95	1/24/96	5/10/96	8/6/96	11/20/96
MW-1	N/S {1}	N/S {1}	N/S {1}	N/S {1}	N/S {1}	N/S {1}	N/S {1}
MW-2	ND(0.25)	0.17	0.14	0.30	ND(0.25)	0.15	0.12
Field Duplicate	ND(0.25)	0.17	0.16	0.17	0.47	0.12	ND(0.10)
MW-3	N/S {2}	0.27	0.16	0.16	ND(0.25)	0.21	ND(0.10)
MW-4	ND(0.25)	0.16	0.13	0.14	ND(0.25)	0.11	0.11

**NOTES:**

ND(0.0005) - Not Detected (Detection Limit)

{1} N/S - Not sampled due to floating hydrocarbon in well.

{2} N/S - Not sampled due to ice blockage in well riser.

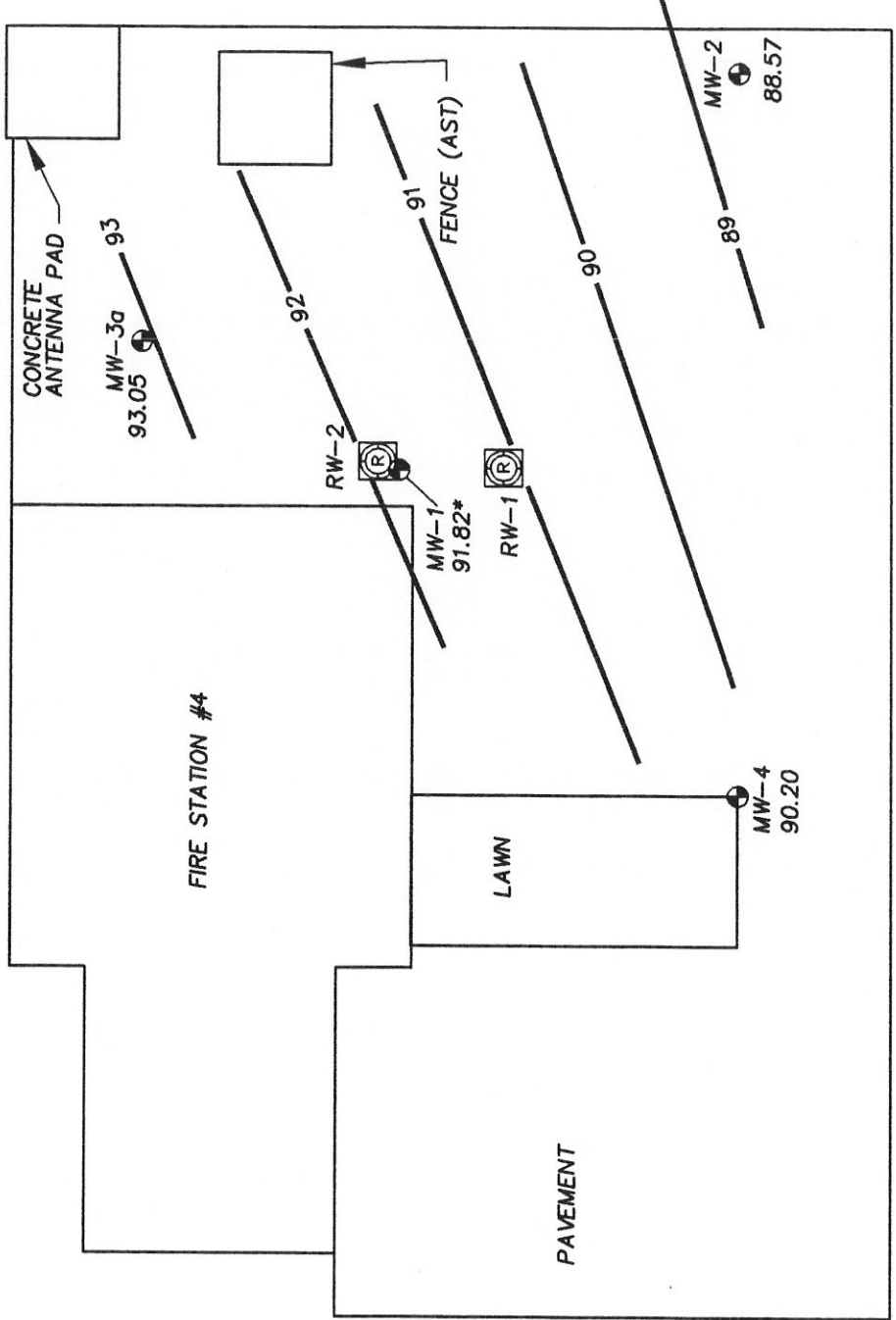
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# Site Plan and Water Table Elevations on November 20, 1996

## AFD-4

Anchorage, Alaska



TUDOR ROAD

MACINNES STREET

**LEGEND**

MW-1	Monitoring Well
91.82	Water Table Elevation
(R)	Recovery Well
89	Inferred Groundwater Contour
-o-	Chain Link Fence

**HARTCROWSER**  
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 Figure 1

\*Corrected for 0.32 feet of free-phase hydrocarbon.



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**APPENDIX A  
FIELD EXPLORATIONS METHODS AND ANALYSES**

## APPENDIX A FIELD EXPLORATIONS METHODS AND ANALYSES

This appendix documents the field methods used by Hart Crowser in determining the nature of the conditions underlying the project site addressed by this report. The discussion includes information on the following subjects:

- ▶ *Water/Floating Hydrocarbon Level Measurements*
- ▶ *Water Quality Sampling*
- ▶ *Petro-trap Operations*
- ▶ *Decontamination of Field Equipment*

### *Water/Floating Hydrocarbon Level Measurements*

The water level and floating hydrocarbon in each well was measured from a reference point or "measuring point" marked on the PVC casing. A Flexidip electronic oil/water interface well sounder was used to make the measurements, which were recorded to an accuracy of  $\pm 0.01$  feet.

### *Water Quality Sampling*

Monitoring wells were purged immediately prior to sampling until a minimum of three casing volumes of water were removed. All purge water was containerized. Purging and sampling was performed by lowering a factory decontaminated disposable bailer into the well with single-use polypropylene rope. Samples were collected in 40-ml clear-glass, VOA vials, fitted with TEFLON septa, and 1-Liter brown bottles (when appropriate) provided by the laboratory. A duplicate sample was collected for each well sampling event. Immediately after collection, the samples were labeled and placed in a cooler with "blue-ice" for shipment to NCA laboratory under chain-of-custody procedures.

### *Petro-trap Operations*

Petro-trap hydrocarbon collectors were placed in recovery wells with their screened sections within the floating hydrocarbon zone. Hydrocarbon collection was performed by slowly removing the Petro-trap from the recovery well, and emptying its contents into a graduated container. The Petro-trap was then slowly lowered back into position in the well.

The hydrocarbon quantity was read from the graduated container and recorded on a log sheet. Hydrocarbons were then placed in a 55-gallon drum.

### *Equipment Decontamination*

The Flexi-dip interface probe was cleaned prior to and between sampling attempts using an anionic detergent wash (Alconox) followed by two potable water rinses.

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**APPENDIX B  
LABORATORY REPORTS**

**APPENDIX B**  
**QUALITY CONTROL NARRATIVE**

All field and laboratory quality control criteria regarding the groundwater samples collected and analyzed for this project meet the quality control/quality assurance objectives as stated in Hart Crowser's Standard Quality Assurance Program Plan, dated September 7, 1994, except for the following:

- ▶ No relative percent difference could be calculated for DRO because the sample MW-2 had a concentration of 0.12 mg/L. The duplicate sample, labeled MW-5, did not have a detectable concentration at a detection limit of 0.10 mg/L. Because the MW-2 concentration was just above the detection limit, we accept the data.

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**NORTH  
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*Environmental Laboratory Services*

200311

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PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Hart Crowser, Inc. - Alaska 2550 Denali Street, Ste 705 Anchorage, AK 99503	Project: AFD#4 Project Number: A-8397-06 Project Manager: Nino Muniz	Sampled: 11/20/96 Received: 11/22/96 Reported: 12/5/96 15:08
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**ANALYTICAL REPORT FOR SAMPLES:**

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-2	B611410-01	Water	11/20/96
MW-3	B611410-02	Water	11/20/96
MW-4	B611410-03	Water	11/20/96
MW-5	B611410-04	Water	11/20/96
Trip Blank	B611410-05	Water	11/20/96


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North Creek Analytical, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document.  
This analytical report must be reproduced in its entirety.*

  
Matthew Essig, Project Manager

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# NORTH CREEK ANALYTICAL

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Hart Crowser, Inc. - Alaska 2550 Denali Street, Ste 705 Anchorage, AK 99503	Project: AFD#4 Project Number: A-8397-06 Project Manager: Nino Muniz	Sampled: 11/20/96 Received: 11/22/96 Reported: 12/5/96 15:08
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### Diesel Hydrocarbons (C10-C28) by EPA Method 8100 (modified) North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
<b>MW-2</b>				<b>B611410-01</b>			<b>Water</b>	
Diesel Range Hydrocarbons	1160684	11/22/96	11/25/96		0.10	<b>0.12</b>	mg/l	1
Surrogate: 2-FBP	"	"	"	50.0-150		72.5	%	
<b>MW-3</b>				<b>B611410-02</b>			<b>Water</b>	
Diesel Range Hydrocarbons	1160684	11/22/96	11/25/96		0.10	ND	mg/l	
Surrogate: 2-FBP	"	"	"	50.0-150		8.01	%	
<b>MW-4</b>				<b>B611410-03</b>			<b>Water</b>	
Diesel Range Hydrocarbons	1160684	11/22/96	11/25/96		0.10	<b>0.11</b>	mg/l	1
Surrogate: 2-FBP	"	"	"	50.0-150		66.8	%	
<b>MW-5</b>				<b>B611410-04</b>			<b>Water</b>	
Diesel Range Hydrocarbons	1160684	11/22/96	11/25/96		0.10	ND	mg/l	
Surrogate: 2-FBP	"	"	"	50.0-150		61.6	%	

North Creek Analytical, Inc.

\*Refer to end of report for text of notes and definitions.

  
Matthew Essig, Project Manager

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Hart Crowser, Inc. - Alaska 2550 Denali Street, Ste 705 Anchorage, AK 99503	Project: AFD#4 Project Number: A-8397-06 Project Manager: Nino Muniz	Sampled: 11/20/96 Received: 11/22/96 Reported: 12/5/96 15:08
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### BTEX by EPA Method 8020A North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
<b>MW-2</b>			<b>B611410-01</b>		<b>Water</b>			
Benzene	1160799	11/27/96	11/27/96		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	53.0-136		88.1	%	
<b>MW-3</b>			<b>B611410-02</b>		<b>Water</b>			
Benzene	1160799	11/27/96	11/27/96		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	53.0-136		90.0	%	
<b>MW-4</b>			<b>B611410-03</b>		<b>Water</b>			
Benzene	1160799	11/27/96	11/27/96		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	53.0-136		83.7	%	
<b>MW-5</b>			<b>B611410-04</b>		<b>Water</b>			
Benzene	1160799	11/27/96	11/27/96		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	53.0-136		85.0	%	
<b>Trip Blank</b>			<b>B611410-05</b>		<b>Water</b>			
Benzene	1160799	11/27/96	11/27/96		0.500	ND	ug/l	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (PID)	"	"	"	53.0-136		86.3	%	

North Creek Analytical, Inc.

\*Refer to end of report for text of notes and definitions.

  
Matthew Essig, Project Manager

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# NORTH CREEK ANALYTICAL

Environmental Laboratory Services

200314

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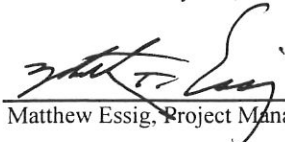
Hart Crowser, Inc. - Alaska 2550 Denali Street, Ste 705 Anchorage, AK 99503	Project: AFD#4 Project Number: A-8397-06 Project Manager: Nino Muniz	Sampled: 11/20/96 Received: 11/22/96 Reported: 12/5/96 15:08
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## Diesel Hydrocarbons (C10-C28) by EPA Method 8100 (modified)/Quality Control North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
<b>Batch: 1160684</b>			<b>Date Prepared: 11/22/96</b>			<b>Extraction Method: EPA 3520/600 Series</b>				
<b>Blank</b>			<b>1160684-BLK1</b>							
Diesel Range Hydrocarbons	11/25/96			ND	mg/l	0.10				
Surrogate: 2-FBP	"	0.344		0.271	"	50.0-150	78.8			
<b>LCS</b>			<b>1160684-BS1</b>							
Diesel Range Hydrocarbons	11/25/96	2.04		1.64	mg/l	54.0-121	80.4			
Surrogate: 2-FBP	"	0.344		0.236	"	50.0-150	68.6			
<b>LCS Dup</b>			<b>1160684-BSD1</b>							
Diesel Range Hydrocarbons	11/25/96	2.04		1.50	mg/l	54.0-121	73.5	20.0	8.97	
Surrogate: 2-FBP	"	0.344		0.212	"	50.0-150	61.6			

North Creek Analytical, Inc.

\*Refer to end of report for text of notes and definitions.

  
 Matthew Essig, Project Manager

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 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132



# NORTH CREEK ANALYTICAL

Environmental Laboratory Services

200315

BOTHELL ■ (206) 481-9200 ■ FAX 485-2992  
 SPOKANE ■ (509) 924-9200 ■ FAX 924-9290  
 PORTLAND ■ (503) 643-9200 ■ FAX 644-2202

Hart Crowser, Inc. - Alaska 2550 Denali Street, Ste 705 Anchorage, AK 99503	Project: AFD#4 Project Number: A-8397-06 Project Manager: Nino Muniz	Sampled: 11/20/96 Received: 11/22/96 Reported: 12/5/96 15:08
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### BTEX by EPA Method 8020A/Quality Control North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
<b>Batch: 1160799</b>			<b>Date Prepared: 11/27/96</b>			<b>Extraction Method: EPA 5030</b>				
<b>Blank</b>			<b>1160799-BLK1</b>							
Benzene	11/27/96			ND	ug/l	0.500				
Toluene	"			ND	"	0.500				
Ethylbenzene	"			ND	"	0.500				
Xylenes (total)	"			ND	"	1.00				
Surrogate: 4-BFB (PID)	"	16.0		13.6	"	53.0-136	85.0			
<b>Matrix Spike</b>			<b>1160799-MS1</b>		<b>B611410-01</b>					
Benzene	11/27/96	10.0	ND	8.91	ug/l	62.0-126	89.1			
Toluene	"	10.0	ND	8.74	"	72.0-120	87.4			
Ethylbenzene	"	10.0	ND	8.95	"	69.0-129	89.5			
Xylenes (total)	"	30.0	ND	26.8	"	73.0-126	89.3			
Surrogate: 4-BFB (PID)	"	16.0		15.2	"	53.0-136	95.0			
<b>Matrix Spike Dup</b>			<b>1160799-MSD1</b>		<b>B611410-01</b>					
Benzene	11/27/96	10.0	ND	8.91	ug/l	62.0-126	89.1	13.5	0	
Toluene	"	10.0	ND	8.74	"	72.0-120	87.4	8.70	0	
Ethylbenzene	"	10.0	ND	8.73	"	69.0-129	87.3	13.6	2.49	
Xylenes (total)	"	30.0	ND	26.2	"	73.0-126	87.3	16.3	2.27	
Surrogate: 4-BFB (PID)	"	16.0		14.2	"	53.0-136	88.7			

North Creek Analytical, Inc.

\*Refer to end of report for text of notes and definitions.

  
 Matthew Essig, Project Manager

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# NORTH CREEK ANALYTICAL

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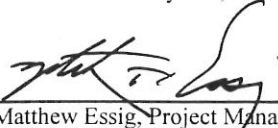
Hart Crowser, Inc. - Alaska 2550 Denali Street, Ste 705 Anchorage, AK 99503	Project: AFD#4 Project Number: A-8397-06 Project Manager: Nino Muniz	Sampled: 11/20/96 Received: 11/22/96 Reported: 12/5/96 15:08
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### Notes and Definitions

#	Note
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- 1 The sample chromatographic pattern does not resemble the fuel standard used for quantitation. A fuel fingerprint is advised.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- Recov. Recovery
- RPD Relative Percent Difference

North Creek Analytical, Inc.



Matthew Essig, Project Manager

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# Sample Custody Record

Samples Shipped to: N/A

B61410



Hart Crowser, Inc.  
2550 Denali Street, Suite 705  
Anchorage, AK 99503-2737  
Phone: 907-276-7475 FAX: 907-276-2104

JOB NUMBER <u>A 8377 06</u> LAB NUMBER _____		OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS						
PROJECT NAME <u>AFD #4</u>		NO. OF CONTAINERS						
HART CROWSER CONTACT <u>Nino Muniz</u>		REQUESTED ANALYSES						
SAMPLED BY: <u>Matt Flynn</u>		SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS: <u>Results to Nino Muniz</u>						
LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NO. OF CONTAINERS	TOTAL NUMBER OF CONTAINERS	SAMPLE RECEIPT INFORMATION
B61410-01	Mw-2		11/20/96	2:00p	W.A.V	3	14	SAMPLE RECEIPT INFORMATION CUSTODY SEALS: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A GOOD CONDITION <input type="checkbox"/> YES <input type="checkbox"/> NO TEMPERATURE: _____ SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> OVERNIGHT <input type="checkbox"/> COURIER
-02	Mw-3		↙	1:30p	↘	3		
-03	Mw-4		↘	1:00p		3		
-04	Mw-5		↘	2:30p		3		
-05	Trip Blank					2		
REINQUISHED BY: <u>Matt Flynn</u>						TURNAROUND TIME: <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK <input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD <input type="checkbox"/> 72 HOURS <input type="checkbox"/> OTHER _____		
SIGNATURE <u>Matt Flynn</u>		RECEIVED BY <u>Rb Kelley</u>		DATE <u>11/21/96</u>		COOLER NO.:		
PRINT NAME <u>Matt Flynn</u>		SIGNATURE <u>Rb Kelley</u>		TIME _____		STORAGE LOCATION:		
COMPANY <u>PCL - Ale</u>		PRINT NAME <u>Rb Kelley</u>		DATE <u>0900</u>		See Lab Work Order No. _____ for Other Contract Requirements		
SIGNATURE _____		RECEIVED BY _____		DATE _____		COOLING METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> OVERNIGHT		
PRINT NAME _____		SIGNATURE _____		TIME _____		SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> OVERNIGHT		
COMPANY _____		PRINT NAME _____		DATE _____		COURIER <input type="checkbox"/> OVERNIGHT <input type="checkbox"/>		