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HARTCROWSER

Earth and Environmental Technologies

RECEIVED
OCT 20 1998
Dept. of Environmental Conservation
Underground Storage Tanks — FAP

Hart Crowser, Inc.
2550 Denali Street, Suite 705
Anchorage, Alaska 99503-2737
Fax 907.276.2104
Tel 907.276.7475

A-8397-08

July 17, 1998

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

Re: Groundwater Monitoring
Anchorage Fire Department Station No. 4
ADEC Release No. 94-2-1-00-245-03

Dear Mr. Clark:

This letter report presents a summary of the May 28, 1998 groundwater sampling at the Municipality of Anchorage (MOA) Fire Department Station No. 4 (AFD-4). AFD-4 is located at 4350 MacInnes Street 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 January 13, 1995 meeting with the MOA - Department of Property and Facility Management and Hart Crowser.

WORK PERFORMED BY HART CROWSER

On May 28, 1998, a product thickness measurement was taken in MW-1, and groundwater elevation measurements were taken in monitoring wells MW-2 through MW-4 (Appendix A - Field Methods). Monitoring wells MW-2, MW-3, and MW-4 were then purged and sampled. Samples were submitted to MultiChem Analytical Services (MAS) for analyses of benzene, toluene, ethylbenzene, and xylenes (BTEX; EPA Method 8021) and diesel range organics (DRO; EPA Method 8100M).

FS#4 94 21 00 245 03

4350 MacInnes Street

Free product still present in MW 1

Require remedial action
- SVE acceptable
- fp removal is 1st step

WATER TABLE CONDITIONS

Over the monitoring period, the groundwater elevation in MW-3 and MW-4 declined by approximately 0.9 feet and 0.2 feet, respectively (Figure 2). In MW-2, the groundwater elevation rose by less than 0.1 feet. The inferred groundwater contours for this site, for May 28, 1998 are presented on Figure 1. The groundwater flow direction is inferred to the northeast with an average hydraulic gradient of 0.008 feet/foot. The groundwater flow direction was consistent with previously observed conditions. The gradient was somewhat lower than previously observed.

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 on Figure 3. On May 28, hydrocarbon thickness was 1.12 feet. This is the greatest thickness observed since March 1995, but it is more likely associated with a 2 foot drop in groundwater elevation in the area of the well rather than an increase in product thickness within the formation. No product was recovered over this period.

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 benzene and total BTEX laboratory analyses are summarized in Tables 2a and 2b. No BTEX analytes or DRO concentrations were detected in the sampled monitoring wells. All laboratory reports are presented in Appendix B along with a review of data quality.

Data Validation

Review of Laboratory Quality Control Data provided by MAS 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.

CONCLUSIONS

The hydrocarbon thickness in MW-1 increased from the last several observations; however, this is most likely associated with a fall in the groundwater elevation at the site. As no USTs are present in the area, there is no source for additional product. As stated in our last report, based on the equilibrium conditions observed during 1996 and 1997, we estimate that less than an inch of product remains within the formation. We continue to recommend that a soil vapor extraction (SVE) test be conducted during this summer to allow for design of a soil remediation system. If the pilot test shows that the site is suitable for SVE, the system will be designed to operated first as a SVE system (negative pressure) to remove the residual volatile hydrocarbons from the soils. After the residual volatile fraction of the hydrocarbons has been removed, the system air flow would then be reversed to allow for bioventing of any remaining diesel-range fuel components from the subsurface.

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 the MOA-DPFM. 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
Associate Hydrogeologist

HRM/mm

Ref:J:\PROJECT\839708\AFD4-698.DOC

Attachments:

	Table 1	Groundwater Elevations and Hydrocarbon Thickness in MW-1
	Table 2a	Groundwater Laboratory Analyses Results - Benzene
	Table 2b	Groundwater Laboratory Analyses Results - Total BTEX
	Table 2c	Groundwater Laboratory Analyses Results - DRO
	Figure 1	Site Plan and Water Table Elevations on May 28, 1998
	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
2/19/97	7.65	7.91	91.68	0.26
4/10/97	7.00	7.23	92.33	0.23
7/11/97	7.50	7.75	91.83	0.25
5/28/98	8.64	9.76	90.55	1.12

Notes: levels.xls-prodlvl

{1} Vertical Survey conducted on 7/2/94; elevation of 100.00 feet assumed at northeast corner of concrete flagpole footin MW-1 measuring point elevation = 99.37 feet.

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

Table 2a: Groundwater Laboratory Analysis Results - Benzene
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	**2.3**	N/S {2}	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Field Duplicate	**2.2**								
MW-2	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)
Field Duplicate			ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)	ND(0.0005)
MW-3	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)
Field Duplicate		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)
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)

Monitoring Well	2/19/97	7/11/97	5/28/98
MW-1	N/S	N/S	N/S
Field Duplicate			
MW-2	ND(0.0005)	ND(0.0005)	ND(0.0005)
Field Duplicate	ND(0.0005)	ND(0.0005)	ND(0.0005)
MW-3	ND(0.0005)	ND(0.0005)	ND(0.0005)
Field Duplicate			
MW-4	ND(0.0005)	ND(0.0005)	ND(0.0005)
Trip Blank	ND(0.0005)	ND(0.0005)	ND(0.0005)

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.

h2ochem.xls-benzene

Table 2b: Groundwater Laboratory Analysis Results - Total BTEX
AFD-4
Anchorage, Alaska

Monitoring Well	Total BTEX (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	**40**	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
ield Duplicate	**38**								
MW-2	**0.003**	N/S	ND	ND	ND	**0.0006**	ND	ND	ND
ield Duplicate			ND	ND	ND	ND	ND	ND	ND
MW-3	**0.006**	ND	N/S	ND	ND	ND	ND	ND	ND
ield Duplicate		ND							
MW-4	**0.004**	ND	ND	ND	ND	ND	ND	ND	ND
Trip Blank	ND	ND	ND	ND	ND	ND	ND	ND	ND

Monitoring Well	2/19/97	7/11/97	5/28/98
MW-1	N/S	N/S	N/S
ield Duplicate			
MW-2	ND	ND	ND
ield Duplicate	ND	ND	ND
MW-3	ND	**0.001**	ND
ield Duplicate			
MW-4	ND	ND	ND
Trip Blank	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.

h2ochem.xls-btex

Table 2c: 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**

Monitoring Well	2/19/97	7/11/97	5/28/98
MW-1	N/S {1}	N/S {1}	N/S {1}
MW-2	**0.14**	ND(0.25)	ND(0.25)
Field Duplicate	**0.14**	ND(0.25)	ND(0.25)
MW-3	**0.15**	ND(0.25)	ND(0.26)
MW-4	**0.20**	ND(0.25)	ND(0.26)

NOTES:

h2ochem.xls-dro

ND(0.0005) - Not Detected (Detection Limit)

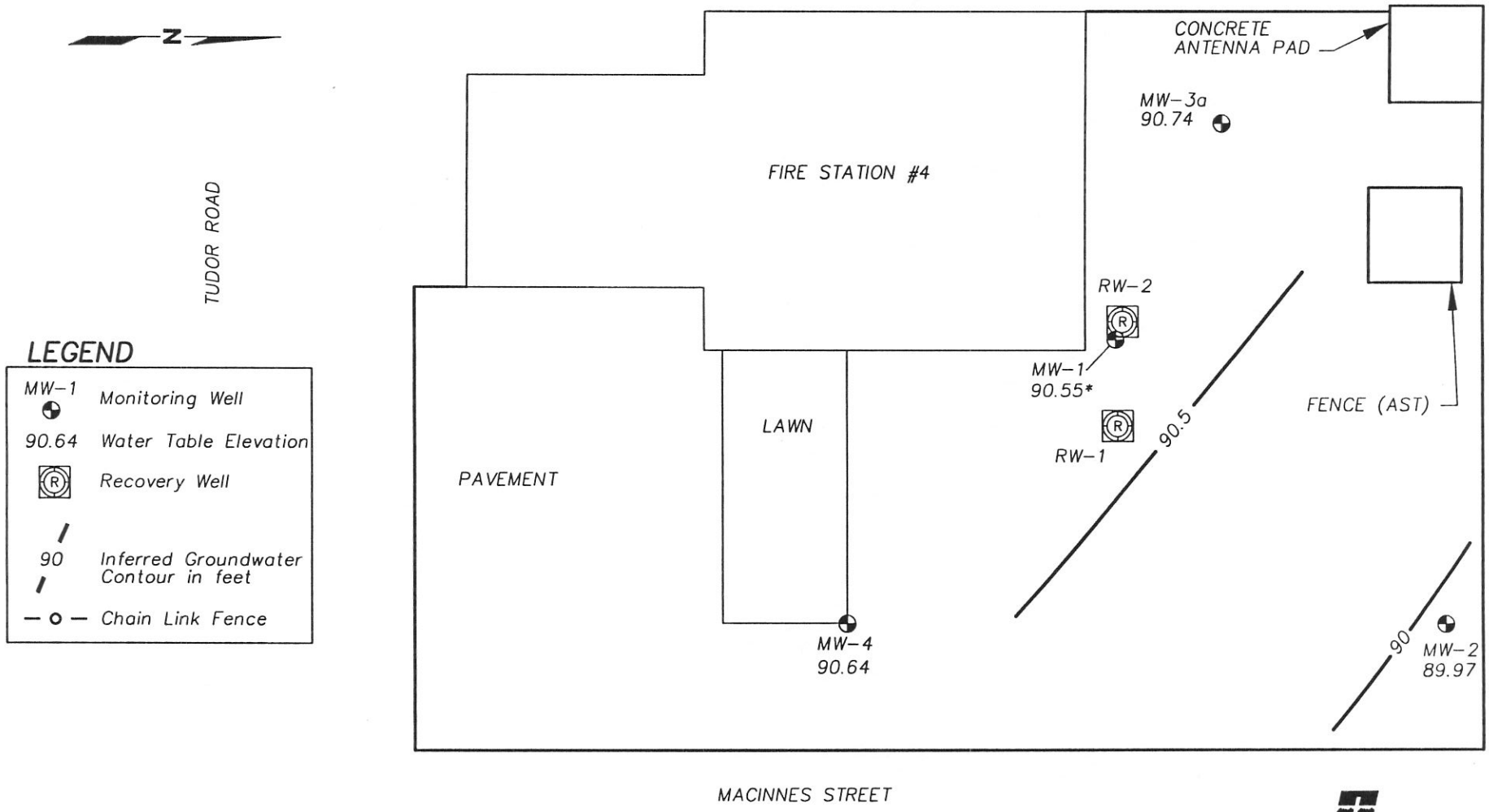
{1} N/S - Not sampled due to floating hydrocarbon in well.

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

Site Plan and Water Table Elevations on May 28, 1998

AFD-4

Anchorage, Alaska



*Corrected for 1.12 feet of free-phase hydrocarbon.

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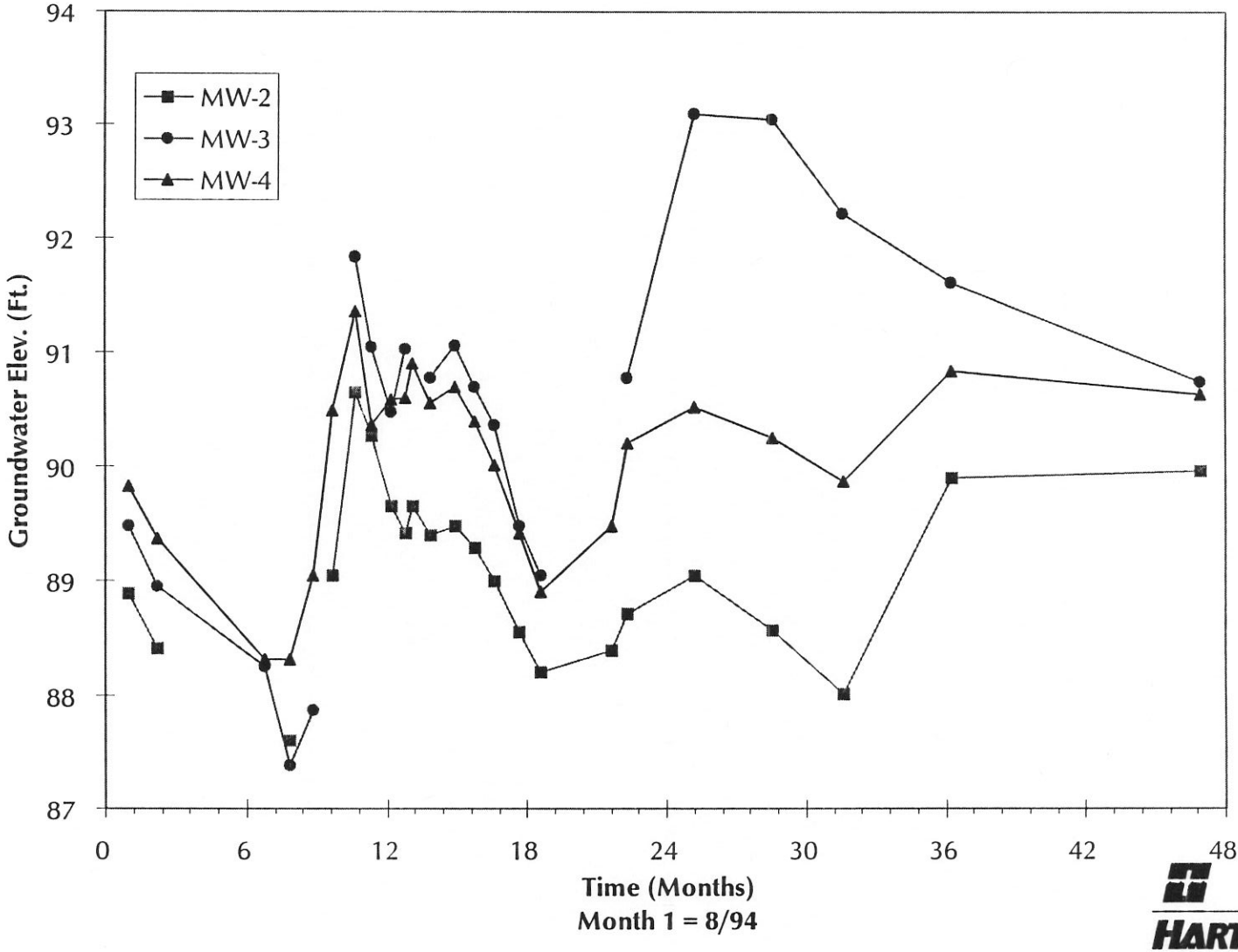
Figure 1

BHJ 7/98 1=30 STD.PCP 4898

Monitoring Well Hydrographs
AFD-4
Anchorage, Alaska



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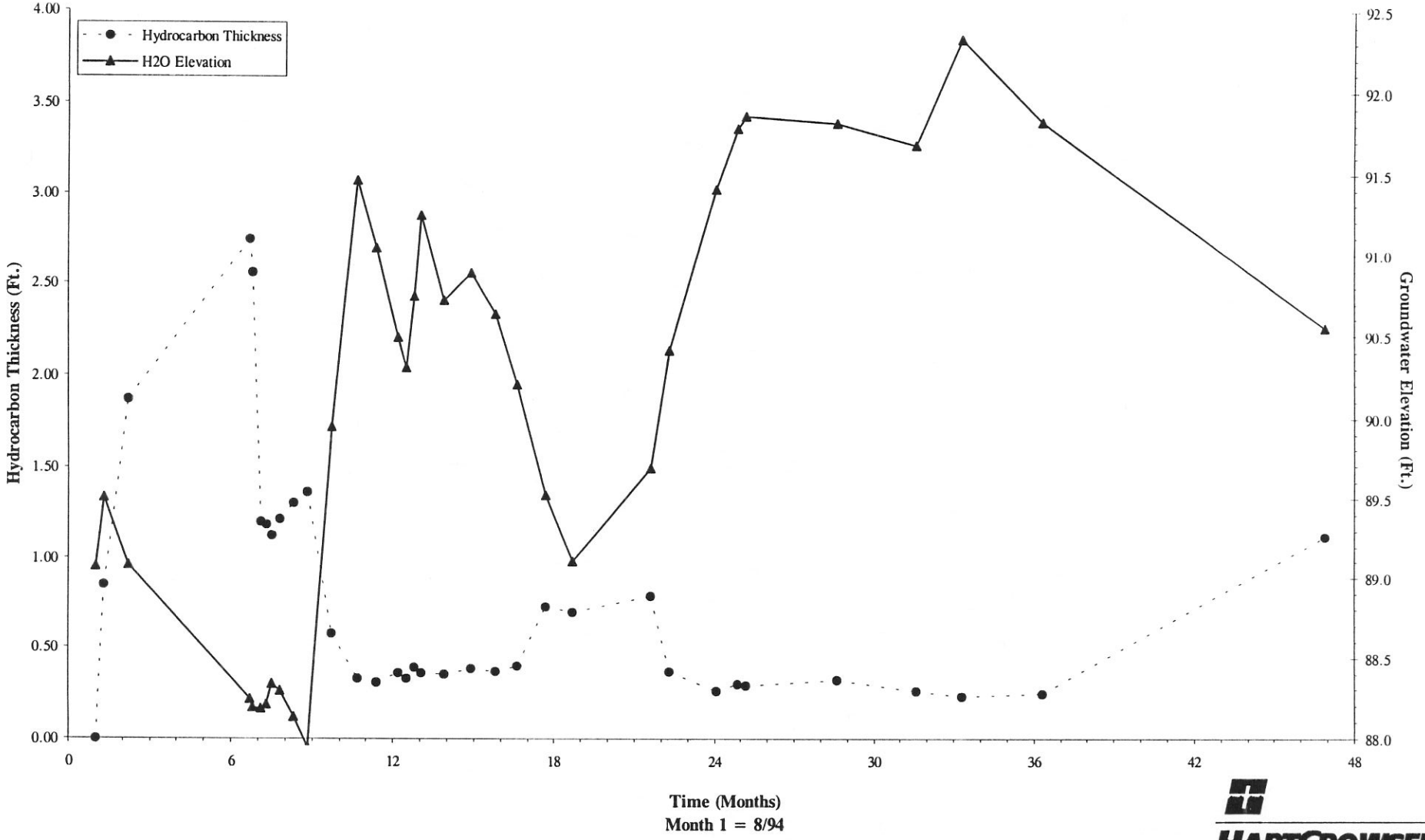
A-8397-08 7/98

Figure 2

Hydrocarbon Thickness and Groundwater Elevation in MW-1
AFD-4
Anchorage, Alaska



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A-8397-08 7/98

Figure 3

BHJ 7/98 1=1
4978

APPENDIX A
FIELD METHODS

APPENDIX A
FIELD METHODS

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***
- ***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 ± 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 were 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 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 the laboratory under chain-of-custody procedures.

Decontamination Field Equipment

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

Ref:J:\PROJECT\839708\AFD4-APA.DOC

APPENDIX B
LABORATORY DATA

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. All data is accepted for the purposes of this report.

Ref:J:\PROJECT\839708\AFD4APB.DOC

MultiChem
ANALYTICAL SERVICES

June 8, 1998

MAS I.D. #805033
UST 010

Hart Crowser, Inc.
Attn. Mr. Steve Gruhn
2550 Denali Street, Suite 705
Anchorage, AK 99503

Project Name: AFD #4

Project Number: A-8397-08

Dear Mr. Gruhn:

On May 28, 1998, MultiChem Analytical Services, LLC of Alaska received five samples for analysis in conjunction with the above listed project. The requested analyses were performed using EPA or equivalent methods. The reports of analyses are enclosed. Below is an outline of the laboratories that participated in this project.

MAS-AK Analysis Performed: BETX (8021m), DRO (8100m)

Please do not hesitate to contact us at (907) 248-8273, if you have any questions or comments.

Sincerely,
MultiChem Analytical Services

Susan Snyder
Laboratory Manager

2000 West International Airport Road, Suite C7, Anchorage, Alaska 99502-1116 • 907-248-8273 • FAX 907-248-8274

MultiChem
ANALYTICAL SERVICES

Sample ID. Cross Reference Sheet

Client: Hart Crowser, Inc.
Project #: A-8397-08
Project Name: AFD#4

MAS I.D.: 805033

MAS ID #	Client Description
805033 1	MW-2
805033 2	MW-3
805033 3	MW-4
805033 4	Field Dup
805033 5	Trip Blank

MAS STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Sample Custody Record

Samples Shipped to: _____

805033

HARTCROWSER

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

JOB NUMBER 8397-03 LAB NUMBER MAS

PROJECT NAME AFD-4

HART CROWSER CONTACT S. Crowell

SAMPLED BY: Peter Montesano

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	BTEX (8021)	DRO (Sperm)	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
1	MW-1		[redacted]			[redacted]	[redacted]	No Samples Taken	
2	MW-2		5/28/98	1227	AQ	X	X	4	mostly clear, some cloudiness
3	MW-3		5/28/98	1338	AQ	X	X	4	Some cloudiness
4	MW-4		5/28/98	1413	AQ	X	X	4	some cloudiness
5	Field Dup		5/28/98		AQ	X	X	4	some cloudiness
6	Trip Blank		↓ BS/27/98		AQ	X		1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	5/28/98	SIGNATURE	5/28/98
PRINT NAME Peter Montesano	TIME	PRINT NAME Gary Fisher	TIME
COMPANY HC	1443	COMPANY MAS-AK	1443
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
PRINT NAME	TIME	PRINT NAME	TIME
COMPANY		COMPANY	

SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS:

17 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐ YES ☑ NO ☐ N/A
GOOD CONDITION ☑ YES ☐ NO
TEMPERATURE: 6.0°C
SHIPMENT METHOD: ☒ HAND ☐ COURIER ☐ OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☐ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser

corel\forms\custody

MultiChem Analytical Services, LLC **Anchorage, AK**

SAMPLE LOG-IN CHECKLIST

ACCESSION #: 805033 SUBCONTRACT WORK? YES / (NO)

CLIENT NAME: Hart Crowser TO LAB (circle): MAS-R / OTHER:

LOGGED-IN BY (print): Gary Fisher (sign):

Date received: 5/28/98 Client's Cooler # (if any):

Is the project for: ACOE? YES / (NO) NAVY? YES / (NO)

Did cooler arrive with shipping document? (Hand delivery) (N/A)		YES	NO
Are Custody seals present on cooler? YES / (NO) How many? Where?			
Seal date: Seal name: Intact? (N/A)		YES	NO
Are Custody seals present on sample containers?		YES	(NO)
If "YES", intact? (N/A)		YES	NO
Is the Chain of Custody (C-O-C) sealed in plastic bag? (YES) / NO Taped to cooler lid?		YES	(NO)
Is the C-O-C complete? * Relinquished by client: (YES) / NO Analyses marked off:		(YES)	NO
* C-O-C or other representative documents, letters, and/or shipping memos. Signed/received by lab:		(YES)	NO
Is the C-O-C in agreement with samples received?			
Sample ID's: (YES) / NO Matrix:		(YES)	NO
Date sampled: (YES) / NO # Containers:		(YES)	NO
Has the main logbook been filled out properly?		(YES)	NO
If samples are RUSH has notice been given? (N/A)		YES	NO
Is proper preservation indicated on label(s)? N/A		(YES)	NO
Did pH check verify preservative indicated? (Volatiles) N/A		YES	NO
Is there sufficient sample volume for analyses?		(YES)	NO
Are samples in proper containers? (see reference chart)		(YES)	NO
Are all samples within holding times for requested analysis?		(YES)	NO
Are all sample containers intact? (i.e. not broken, leaking...)		(YES)	NO
Are samples individually bagged ?		(YES)	NO
Are all volatile samples headspace-free (< pea-size for waters)? N/A		(YES)	NO
Shipping container (circle one): Cooler / Box / Other:			
Type of packing material used (circle one): Bubble Wrap / Styrofoam Peanuts / Vermiculite / None			
Refrigerant (circle one): Gel Ice / Loose Ice / Other: / None			
Was refrigerant frozen upon receipt?		(YES)	NO
Cooler temperature(s): #1: 6.0 °C #2: °C			
Sample tagging check for QC:			
Sample ID's issued in order of appearance on C-O-C:		(YES)	NO
Labels placed in appropriate areas of sample containers:		(YES)	NO

Initials of reviewer: DC

Describe any "NO" items from checklist above:

Was client contacted: YES / NO / N/A Date: Name of person contacted:

Describe client instructions or actions taken:

MultiChem Analytical Services, Alaska.

GC-Fuels QC Evaluation Summary

Date:06/08/98

Client:	HartCrowser	Dates Extracted:	
Method:	EPA 8021		
Criteria:	SW-846		
MAS-Alaska #:	805033	Dates Analyzed:	06/04/98
Client Project #:	A-8397-08		
Matrix:	Water		
Number of Samples:	5		

QC Parameter	Method Criteria Acceptance	Comments/Actions
Holding Times	☒Pass ☐Fail	
Extraction Dates	☒Pass ☐Fail	
Analysis Dates	☒Pass ☐Fail	
Continuing Calibration	☒Pass ☐Fail	
Method Blanks	☒Pass ☐Fail	
QC Spike Samples	☒Pass ☐Fail	
MS/MSD	☒Pass ☐Fail	
Calculations	☒Pass ☐Fail	
Surrogate Recoveries	☒Pass ☐Fail	
Retention Times	☒Pass ☐Fail	

Hydrocarbon Match: Samples were below the method reporting limit.

Laboratory QA:

Data meets guidelines established within the SOP for the MAS-Alaska Data Reporting Level **3,** and State of Alaska Standard Quality Assurance Program Plan, 18AAC78 Underground Storage Tanks, as amended through Nov. 3, 1995.

Data Reviewed by: Christina Hartsock Approved by: Jessa Snyder

MultiChem Analytical Services, Alaska.

GC-Fuels QC Evaluation Summary

Date:06/08/98

Client:	Hart Crowser, Inc.	Dates Extracted:	05/29/98
Method:	8100M		
Criteria:	ADEC		
MAS-Alaska #:	805033	Dates Analyzed:	06/01/98
Client Project #:	A-8397-08		
Matrix:	Water		
Number of Samples:	4		

QC Parameter	Method Criteria Acceptance	Comments/Actions
Holding Times	☒Pass ☐Fail	
Extraction Dates	☒Pass ☐Fail	
Analysis Dates	☒Pass ☐Fail	
Continuing Calibration	☒Pass ☐Fail	
Method Blanks	☒Pass ☐Fail	
QC Spike Samples	☒Pass ☐Fail	
MS/MSD	☒Pass ☐Fail	
Calculations	☒Pass ☐Fail	
Surrogate Recoveries	☒Pass ☐Fail	
Retention Times	☒Pass ☐Fail	

Hydrocarbon Match: Samples were below the method reporting limit.

Laboratory QA:

Data meets guidelines established within the SOP for the MAS-Alaska Data Reporting Level **3,** and State of Alaska Standard Quality Assurance Program Plan, 18AAC78 Underground Storage Tanks, as amended through Nov. 3, 1995.

Data Reviewed by: _____ Approved by: _____

MultiChem
ANALYTICAL SERVICES

SUMMARY REPORT of ANALYSIS

Client: **Hart Crowser, Inc.**

Lab Accession: **805033**
Date Received: 5/28/98
Matrix: Water
BETX Units: ug/L
DRO Units: mg/L

Project Name: AFD#4
Project Number: A-8397-08
Project Manager: Steve Gruhn

Reviewed By:

Client Sample	Lab Accession #	Date Collected	% Moisture	Conc. Benzene	Conc. Toluene	Conc. Ethyl-Benzene	Conc. Total Xylene	Conc. GRO as Gasoline	Conc DRO as Diesel	Conc RRO as 30w Oil
MW-2	805033 -1	5/28/98	0	<1.0	<1.0	<1.0	<1.0		<0.26	
MW-3	805033 -2	5/28/98	0	<1.0	<1.0	<1.0	<1.0		<0.26	
MW-4	805033 -3	5/28/98	0	<1.0	<1.0	<1.0	<1.0		<0.26	
Field Dup	805033 -4	5/28/98	0	<1.0	<1.0	<1.0	<1.0		<0.25	
Trip Blank	805033 -5	5/28/98	0	<1.0	<1.0	<1.0	<1.0			

Methods:

B.T.E.X. = 8021M
DRO = 8100M

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: N/A
PROJECT #	: A-8397-08	DATE RECEIVED	: N/A
PROJECT NAME	: AFD#4	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<1.0
ETHYLBENZENE	<1.0
TOLUENE	<1.0
TOTAL XYLENES	<1.0

SURROGATE PERCENT RECOVERY		LIMITS
A,A,A-TRIFLUOROTOLUENE	99	82 - 121
BROMOFLUOROBENZENE	93	89 - 124
1-CHLOROOCTANE	75	60 - 120

Analyst CH Date 6-5-98
Reviewer SK Date 6-5-98

Sample File : 98D03025.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-2	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<1.0
ETHYLBENZENE	<1.0
TOLUENE	<1.0
TOTAL XYLENES	<1.0

SURROGATE PERCENT RECOVERY		LIMITS
A,A,A-TRIFLUOROTOLUENE	98	82 - 121
BROMOFLUOROBENZENE	93	89 - 124
1-CHLOROOCTANE	72	60 - 120

Analyst CM Date 6-5-98
Reviewer [illegible] Date 6-5-98

Sample File : 98D03043.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-3	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<1.0
ETHYLBENZENE	<1.0
TOLUENE	<1.0
TOTAL XYLENES	<1.0

SURROGATE PERCENT RECOVERY		LIMITS
A,A,A-TRIFLUOROTOLUENE	95	82 - 121
BROMOFLUOROBENZENE	96	89 - 124
1-CHLOROOCTANE	89	60 - 120

Analyst CM Date 6-5-98
Reviewer SS Date 6-5-98

Sample File : 98D03044.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-4	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<1.0
ETHYLBENZENE	<1.0
TOLUENE	<1.0
TOTAL XYLENES	<1.0

SURROGATE PERCENT RECOVERY		LIMITS
A,A,A-TRIFLUOROTOLUENE	96	82 - 121
BROMOFLUOROBENZENE	97	89 - 124
1-CHLOROOCTANE	72	60 - 120

Analyst CH Date 6-5-98
Reviewer SH Date 6-5-98

Sample File : 98D03045.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: N/A
CLIENT I.D.	: FIELD DUP	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<1.0
ETHYLBENZENE	<1.0
TOLUENE	<1.0
TOTAL XYLENES	<1.0

SURROGATE PERCENT RECOVERY		LIMITS
A,A,A-TRIFLUOROTOLUENE	97	82 - 121
BROMOFLUOROBENZENE	96	89 - 124
1-CHLOROOCTANE	89	60 - 120

Analyst CLC Date 6-5-98
Reviewer SS Date 6-5-98

Sample File : 98D03046.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-5

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<1.0
ETHYLBENZENE	<1.0
TOLUENE	<1.0
TOTAL XYLENES	<1.0

SURROGATE PERCENT RECOVERY		LIMITS
A,A,A-TRIFLUOROTOLUENE	100	82 - 121
BROMOFLUOROBENZENE	94	89 - 124
1-CHLOROOCTANE	85	60 - 120

Analyst CM Date 6-5-98
Reviewer SH Date 6-5-98

Sample File : 98D03047.D

MultiChem
ANALYTICAL SERVICES

IAS I.D. # 805033

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : HART CROWSER, INC.
PROJECT # : A-8397-08
PROJECT NAME : AFD#4
SAMPLE MATRIX : WATER
EPA METHOD : 8021 (BETX)

SAMPLE I.D. # : BLANK
DATE EXTRACTED : N/A
DATE ANALYZED : 06/04/98
UNITS : ug/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<1.00	26.1	26.9	103	25.7	98	5
ETHYLBENZENE	<1.00	35.6	40.1	113	38.1	107	5
TOLUENE	<1.00	160	156	98	151	94	3
TOTAL XYLENES	<1.00	187	195	104	185	99	5

CONTROL LIMITS	% REC.	RPD
BENZENE	87 - 124	20
ETHYLBENZENE	85 - 115	20
TOLUENE	81 - 115	20
TOTAL XYLENES	86 - 118	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
A,A,A-TRIFLUOROTOLUENE	116	112	82 - 121
BROMOFLUOROBENZENE	96	93	89 - 124
1-CHLOROOCTANE	92	86	60 - 120

Analyst CU Date 6-5-98
Reviewer SS Date 6-5-98

Sample File : 98D03025
MS File : 98D03026
MSD File : 98D03027

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: HART CROWSER, INC.	SAMPLE I.D. #	: 806002-2
PROJECT #	: A-8397-08	DATE EXTRACTED	: N/A
PROJECT NAME	: AFD#4	DATE ANALYZED	: 06/04/98
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8021 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<1.00	26.1	24.1	92	24.4	93	1
ETHYLBENZENE	<1.00	35.6	37.7	106	37.1	104	2
TOLUENE	<1.00	160	146	91	148	93	1
TOTAL XYLENES	<1.00	187	183	98	176	94	4

CONTROL LIMITS	% REC.	RPD
BENZENE	78 - 133	20
ETHYLBENZENE	80 - 113	20
TOLUENE	80 - 112	20
TOTAL XYLENES	68 - 119	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
A,A,A-TRIFLUOROTOLUENE	112	110	82 - 121
BROMOFLUOROBENZENE	96	96	89 - 124
1-CHLOROOCTANE	92	104	60 - 120

Analyst CLL Date 6 5 98
Reviewer SS Date 6-5-98

Sample File : 98D03040
MS File : 98D03041
MSD File : 98D03042

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033

DIESEL RANGE ORGANICS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: N/A
PROJECT #	: A-8397-08	DATE RECEIVED	: N/A
PROJECT NAME	: AFD#4	DATE EXTRACTED	: 05/29/98
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 06/01/98
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: EPA 8100 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<0.25
HYDROCARBON RANGE	C10 - C28
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY		LIMITS
O-TERPHENYL	82	56-124

Analyst VBM Date 6/6/98
Reviewer [illegible] Date 6/6/98

Sample File : 98A01434.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-1

DIESEL RANGE ORGANICS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: 05/29/98
CLIENT I.D.	: MW-2	DATE ANALYZED	: 06/01/98
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: EPA 8100 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<0.26
HYDROCARBON RANGE	C10 - C28
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY		LIMITS
O-TERPHENYL	90	56-124

Analyst [signature] Date 6/6/98
Reviewer [signature] Date 6/6/98

Sample File : 98A01437.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-2

DIESEL RANGE ORGANICS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: 05/29/98
CLIENT I.D.	: MW-3	DATE ANALYZED	: 06/01/98
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: EPA 8100 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<0.26
HYDROCARBON RANGE	C10 - C28
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY		LIMITS
O-TERPHENYL	91	56-124

Analyst JKM Date 6/6/98
Reviewer SMJ Date 6/6/98

Sample File : 98A01438.D

MultiChem
ANALYTICAL SERVICES

IAS I.D. # 805033-3

DIESEL RANGE ORGANICS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: 05/29/98
CLIENT I.D.	: MW-4	DATE ANALYZED	: 06/01/98
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: EPA 8100 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<0.26
HYDROCARBON RANGE	C10 - C28
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY		LIMITS
O-TERPHENYL	92	56-124

Analyst JKM Date 6/6/98
Reviewer SS Date 6/6/98

Sample File : 98A01439.D

MultiChem
ANALYTICAL SERVICES

MAS I.D. # 805033-4

DIESEL RANGE ORGANICS
DATA SUMMARY

CLIENT	: HART CROWSER, INC.	DATE SAMPLED	: 05/28/98
PROJECT #	: A-8397-08	DATE RECEIVED	: 05/28/98
PROJECT NAME	: AFD#4	DATE EXTRACTED	: 05/29/98
CLIENT I.D.	: FIELD DUP	DATE ANALYZED	: 06/01/98
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: EPA 8100 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<0.25
HYDROCARBON RANGE	C10 - C28
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY		LIMITS
O-TERPHENYL	85	56-124

Analyst JRM Date 6/6/98
Reviewer SMS Date 6/6/98

Sample File : 98A01440.D

MAS I.D. # 805033

MultiChem
ANALYTICAL SERVICES

DIESEL RANGE ORGANICS
QUALITY CONTROL DATA

CLIENT	: HART CROWSER, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: A-8397-08	DATE EXTRACTED	: 05/29/98
PROJECT NAME	: AFD#4	DATE ANALYZED	: 06/01/98
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: EPA 8100 (MODIFIED)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<0.250	2.50	1.76	70	2.05	82	15

CONTROL LIMITS	% REC.	RPD
DIESEL	52 - 109	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
O-TERPHENYL	89	96	56 - 124

Analyst JAM Date 6/18/98
Reviewer SS Date 6/18/98

Sample File : 98A01434
MS File : 98A01435
MSD File : 98A01436

MAS I.D. # 805033

MultiChem
ANALYTICAL SERVICES

DIESEL RANGE ORGANICS
QUALITY CONTROL DATA

CLIENT : HART CROWSER, INC.
PROJECT # : A-8397-08
PROJECT NAME : AFD#4
SAMPLE MATRIX : WATER
METHOD : EPA 8100 (MODIFIED)

SAMPLE I.D. # : 805033-4
DATE EXTRACTED : 05/29/98
DATE ANALYZED : 06/01/98
UNITS : mg/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<0.250	4.98	4.27	85	4.23	85	1
CONTROL LIMITS				% REC.			RPD
DIESEL				58 - 98			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		92		88		56 - 124	

Analyst JMM Date 6/8/98
Reviewer SS Date 6/8/98

Sample File : 98A01440
MS File : 98A01441
MSD File : 98A01442