



Event ID
407 L 69.47

Anchorage

July 22, 2004

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Boston

DEPT. OF ENVIRONMENTAL CONSERVATION

Mr. Jon Clark
Municipality of Anchorage
Department of Maintenance and Operations
P.O. Box 196650
Anchorage, Alaska 99519-6650

Denver

Re: Groundwater Monitoring
Anchorage Fire Department Station No. 4
Anchorage, Alaska
ADEC Release No. 94-2-1-00-245-03
8397-09

Edmonds

Fairbanks

Dear Mr. Clark:

This letter report presents the observations and results of the May 25, 2004, groundwater monitoring event at the Municipality of Anchorage (MOA) Fire Department Station No. 4 (AFD-4). AFD-4 is located at 4350 MacInnes Street in Anchorage, Alaska. The work was conducted to update groundwater quality information at the site and to assess whether free-phase hydrocarbons are still present in the area of the former underground storage tank (UST) excavation at the site.

Jersey City

Juneau

In June 1994, one gasoline and one diesel UST were removed from the site. Petroleum-impacted soils were encountered; however excavation was limited by the proximity of the AFD-4 building. Subsequent site assessment which included installation of four monitoring wells, showed free-phase hydrocarbons to be present in the former excavation area. In January 1995, two product recovery wells were installed at the site to collect floating hydrocarbons (Figure 1) using Petrotrap® passive hydrocarbon pumps. These were operated through November 1996 and a total volume of 21 gallons of hydrocarbons was recovered.

Long Beach

Portland

Seattle



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WORK PERFORMED

On May 25, 2004, four monitoring wells were rehabilitated and resurveyed to provide accurate elevation measurements. Free-phase-hydrocarbons-thickness and groundwater-level measurements were then taken in MW-1, MW-2, MW-3a, and MW-4. Following groundwater and free-phase-hydrocarbon-level measurements, wells MW-2, MW-3a, and MW-4 were then purged and sampled. MW-1 was not sampled due to the presence of free-phase-hydrocarbons. Samples were submitted to North Creek Analytical, Inc. (NCA), in Anchorage, Alaska, for analyses of benzene, toluene, ethylbenzene, and xylenes (BTEX; using Environmental Protection Agency [EPA] Method 8021B), gasoline-range organics (GRO; using Alaska Method AK 101), and diesel-range organics (DRO; using Alaska Method AK 102). Field methods are discussed in Attachment 1.

After sampling, the Petrotrap® free-phase hydrocarbon recovery units were removed from the recovery wells. Upon examination, it was determined that the hydrocarbon recovery systems were no longer usable.

SITE OBSERVATIONS

Water Table Conditions

Groundwater levels at the site were measured at approximately 7 to 9 feet below ground surface (bgs). Figure 1 presents the inferred groundwater elevation contours for the site. Groundwater flow direction is inferred to be to the northeast with an average hydraulic gradient of 0.010.

Free-Phase-Hydrocarbon Thickness

The free-phase-hydrocarbon thickness measured in MW-1 is presented in Table 1. A thickness of 0.07 foot was recorded.

Purge Water Observations

Neither odor nor sheen were observed in the purge water from MW-2, MW-3a, or MW-4.



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LABORATORY ANALYTICAL RESULTS

Analytical results are summarized in Table 2 and laboratory reports are provided in Attachment 2. No analytes were detected in the samples.

Data Validation

Review of 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 18 AAC 75; all data are accepted. Minor deviations are reported in laboratory data report provided in Attachment 2.

CONCLUSIONS AND RECOMMENDATIONS

Free-phase hydrocarbons are still present in the immediate vicinity of the former UST excavation at the site. The contamination has not migrated to the property edge in the 10 years since the USTs were removed. Contaminated soil likely remains under the building.

Because it does not appear that contamination is migrating from the AFD-4 site, there does not appear to be an immediate risk to off-site water supply contamination. However, we recommend that the free-phase hydrocarbons remaining in the area of the former UST be removed to allow for natural attenuation of residual contaminants. The groundwater interface is relatively shallow (less than 10 feet bgs); therefore, as performed at the MOA-Department of Maintenance and Operations (DMO) Bering Street facility, we recommend that soil in the former UST area be excavated to several feet below the water table and the free-phase hydrocarbons/water pumped into a tanker truck to be taken to Alaska Pollution Control (APC) for disposal. We recommend Oxygen Release Compound® (ORC) powder be then placed into the excavation and the hole backfilled with clean imported fill material. The excavated soil should be taken to Alaska Soil Recycling (ASR) for thermal desorption. A monitoring well would need to be installed to replace MW-1. The site should then be monitored on an annual basis for the presence of free-phase hydrocarbons and BTEX, GRO and DRO. Based on monitoring results, the monitoring frequency could be reduced at a future date or ceased when dissolved-phase petroleum hydrocarbon levels in the MW-1 area decline to below ADEC Groundwater Cleanup Levels.



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INFORMATION LIMITATIONS

All ADEC Groundwater Cleanup Levels included in this report are based on our estimate of site characteristics using the ADEC *Oil and Other Hazardous Substances Pollution Control (18 AAC 75)*, dated August 8, 2003. These cleanup levels do not represent ADEC interpretations and are presented only for comparison with your analytical results. By using them, we are not implying that remedial actions at this site are required by the ADEC. Specific ADEC interpretations may involve consideration of other factors upon which a range of cleanup standards may be established.

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-DMO. This letter report is not meant to represent a legal opinion, and no other warranty, expressed or implied, is made.

We trust that this report meets your needs. Questions regarding the fieldwork, 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.

TREVOR C. WHITE, E.I.T.
Staff Environmental Engineer

HERMINIO R. MUNIZ, R.P.G.
Sr. Associate Hydrogeologist

Ref:\PROJECT\839709\AFD4-0504.DOC

Attachments:	Table 1	Groundwater Elevations - May 25, 2004
	Table 2	Groundwater Analytical Results - May 25, 2004
	Figure 1	Site Plan and Water Table Elevations on May 25, 2004
	Attachment 1	Field Methods
	Attachment 2	Laboratory Reports

Table 1 - Groundwater Elevations - May 25, 2004
Anchorage Fire Department Station No. 4
Anchorage, Alaska

Monitoring Well	Measuring Point Elevation in feet ¹	Depth to Water in feet	Depth to Product in feet	Product Thickness in feet	Groundwater Elevation in feet
MW-1 ²	99.72	8.09	8.02	0.07	91.64
MW-2	99.52	8.89	NA	NA	90.63
MW-3a	99.51	7.72	NA	NA	91.79
MW-4	98.32	7.14	NA	NA	91.18

Notes:

¹ Arbitrary benchmark of 100.00 feet established on north east edge of sidewalk in front of main (east) door.

² Groundwater elevation corrected for free-phase hydrocarbons using a hydrocarbon specific gravity of 0.8.
 N/A - Not applicable

Hart Crowser
 8397-09

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Table 2 - Groundwater Analytical Results - May 25, 2004
Anchorage Fire Department Station No. 4
Anchorage, Alaska

Monitoring Well	EPA Method 8021b				GRO Alaska Method AK 101 in mg/L	DRO Alaska Method AK 102 in mg/L
	Benzene in mg/L	Toluene in mg/L	Ethyl- benzene in mg/L	Total Xylenes in mg/L		
MW-2	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.500 U
Field Duplicate MW-100	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.397 U
MW-3	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.417 U
MW-4	0.0005 U	0.0005 U	0.0005 U	0.0015 U	0.05 U	0.420 U
ADEC Cleanup Level in mg/L ¹	0.005	1.0	0.7	10	1.3	1.5

Notes:

¹ Cleanup Level per 18 AAC 75.345, Table C.

ADEC - Alaska Department of Environmental Conservation.

EPA - U.S. Environmental Protection Agency.

mg/L - Milligrams per liter.

U - Below detection limit at concentration shown.

Hart Crowser

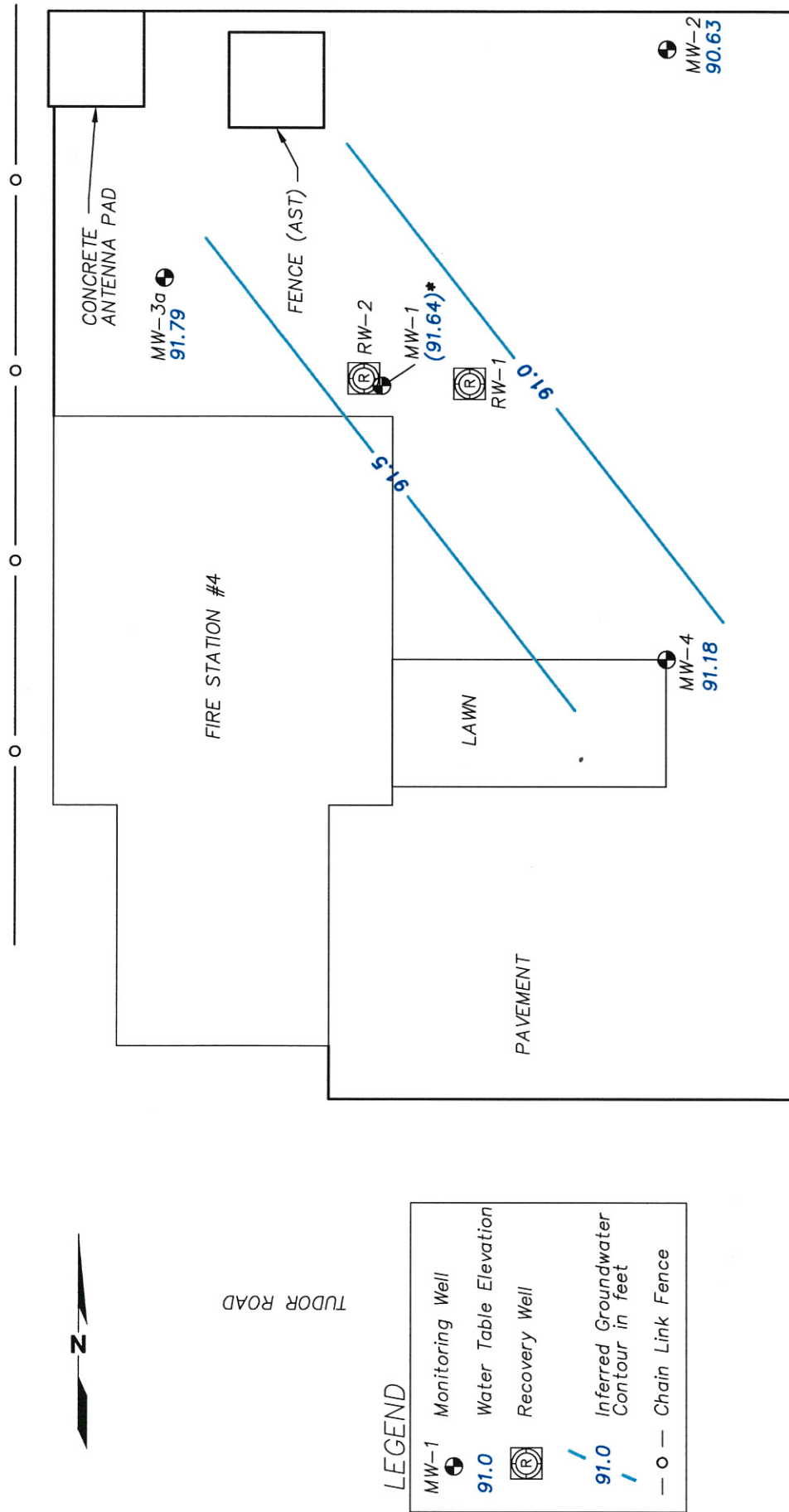
8397-09

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Site Plan and Water Table Elevations on May 25, 2004

AFD-4

Anchorage, Alaska



MACINNES STREET



HARTCROWSER
8397-09 7/04
Figure 1

*Corrected for 0.07 feet of free-phase hydrocarbon.
Not used in determination of contours.

ATTACHMENT 1
FIELD METHODS

ATTACHMENT 1 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:

- Monitoring well rehabilitation
- Monitoring well survey
- Water/Floating Hydrocarbon Level Measurements
- Water Quality Sampling
- Decontamination of Field Equipment

Monitoring Well Rehabilitation

Several of the monitoring wells, subject to heaving from ice or geologic processes, were pushing into the well casing cover. Some of the backfill material was removed prior to cutting the PVC casing to take the material to a level suitable for the new casing height. The PVC casings were then cut-down by approximately three inches in order to allow the well casing cover to be flush with the ground surface.

Monitoring Well Survey

The monitoring wells were resurveyed after well rehabilitation using a level-loop method to determine the new measuring point elevations to an accuracy of ± 0.01 feet in relation to an assumed benchmark elevation of 100.00 on the northeast corner of the concrete sidewalk in front of the main door of the building.

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 Flexi-dip 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 0.25-Liter brown bottles provided by the laboratory. A duplicate sample was also collected. Immediately after collection, the samples were labeled and placed in a cooler with "gel-ice" for shipment to the laboratory under chain-of-custody procedures.

Equipment Decontamination

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

ATTACHMENT 2
LABORATORY REPORTS



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
907.563.9200 fax 907.563.9210

09 June 2004

Nino Muniz
Hart Crowser, Inc.
2550 Denali Street, Suite 705
Anchorage, AK/USA 99503
RE: Fire Station #4

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JUN 10 2004

HART-CROWSER, INC.

Enclosed are the results of analyses for samples received by the laboratory on 05/25/04 15:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Mike Priebe
Technical Services Manager



Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
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907.563.9200 fax 907.563.9210

Hart Crowser, Inc.
2550 Denali Street, Suite 705
Anchorage, AK/USA 99503

Project: Fire Station #4
Project Number: 8397-05
Project Manager: Nino Muniz

Reported:
06/09/04 16:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-2	A4E0036-01	Water	05/25/04 13:45	05/25/04 15:15
MW-3	A4E0036-02	Water	05/25/04 13:15	05/25/04 15:15
MW-4	A4E0036-03	Water	05/25/04 12:35	05/25/04 15:15
MW-100	A4E0036-04	Water	05/25/04 13:45	05/25/04 15:15
H2O Trip Blanks	A4E0036-05	Water	05/25/04 13:45	05/25/04 15:15

North Creek Analytical - Alaska

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.

Mike Priebe, Technical Services Manager

North Creek Analytical, Inc.
Environmental Laboratory Network

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Hart Crowser, Inc.
2550 Denali Street, Suite 705
Anchorage, AK/USA 99503

Project: Fire Station #4
Project Number: 8397-05
Project Manager: Nino Muniz

Reported:
06/09/04 16:56

Gasoline Range Organics (C6-C10) and BTEX per AK101 - Quality Control
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4E31002: Prepared 05/31/04 Using EPA 5030										
Duplicate (4E31002-DUP1) Source: A4E0026-11										
Gasoline Range Organics	ND	50.0	ug/l		ND				50	
Surrogate: a,a,a-TFT (FID)	38.9		"	50.0		77.8	60-120			
Duplicate (4E31002-DUP2) Source: A4F0001-01										
Gasoline Range Organics	17600	1000	ug/l		18300			3.90	50	R-01
Surrogate: a,a,a-TFT (FID)	45.8		"	50.0		91.6	60-120			
Matrix Spike (4E31002-MS1) Source: A4E0036-04										
Benzene	19.6	0.500	ug/l	20.0	0.154	97.2	70-130			
Toluene	20.7	0.500	"	20.0	0.258	102	70-130			
Ethylbenzene	19.1	0.500	"	20.0	0.255	94.2	70-130			
Xylenes (total)	57.9	1.50	"	60.0	0.995	94.8	70-130			
Surrogate: a,a,a-TFT (PID)	47.7		"	50.0		95.4	70-130			
Matrix Spike Dup (4E31002-MSD1) Source: A4E0036-04										
Benzene	21.1	0.500	ug/l	20.0	0.154	105	70-130	7.37	20	
Toluene	20.9	0.500	"	20.0	0.258	103	70-130	0.962	20	
Ethylbenzene	21.1	0.500	"	20.0	0.255	104	70-130	9.95	20	
Xylenes (total)	63.3	1.50	"	60.0	0.995	104	70-130	8.91	20	
Surrogate: a,a,a-TFT (PID)	47.0		"	50.0		94.0	70-130			

North Creek Analytical - Alaska

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Mike Priebe, Technical Services Manager

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Environmental Laboratory Network

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Hart Crowser, Inc.
 2550 Denali Street, Suite 705
 Anchorage, AK/USA 99503

Project: Fire Station #4
 Project Number: 8397-05
 Project Manager: Nino Muniz

Reported:
 06/09/04 16:56

Diesel Range Organics (C10-C25) per AK102 - Quality Control
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4E27001: Prepared 05/27/04 Using EPA 3510										
Blank (4E27001-BLK1)										
Diesel Range Organics	ND	0.397	mg/l							
Surrogate: 1-Chlorooctadecane	1.02		"	1.16		87.9	50-150			
LCS (4E27001-BS1)										
Diesel Range Organics	8.03	0.394	mg/l	7.95		101	75-125			
Surrogate: 1-Chlorooctadecane	1.09		"	1.15		94.8	50-150			
LCS Dup (4E27001-BSD1)										
Diesel Range Organics	8.05	0.397	mg/l	8.02		100	75-125	0.249	20	
Surrogate: 1-Chlorooctadecane	1.11		"	1.16		95.7	50-150			
Duplicate (4E27001-DUP1) Source: A4E0036-01										
Diesel Range Organics	ND	0.410	mg/l		ND				50	Q-05
Surrogate: 1-Chlorooctadecane	1.05		"	1.20		87.5	50-150			
Batch 4E28001: Prepared 05/28/04 Using EPA 3510										
Blank (4E28001-BLK1)										
Diesel Range Organics	ND	0.420	mg/l							
Surrogate: 1-Chlorooctadecane	1.10		"	1.23		89.4	50-150			
LCS (4E28001-BS1)										
Diesel Range Organics	8.31	0.413	mg/l	8.35		99.5	75-125			
Surrogate: 1-Chlorooctadecane	1.16		"	1.21		95.9	50-150			
LCS Dup (4E28001-BSD1)										
Diesel Range Organics	9.59	0.439	mg/l	8.86		108	75-125	14.3	20	
Surrogate: 1-Chlorooctadecane	1.34		"	1.28		105	50-150			

North Creek Analytical - Alaska

Mike Priebe, Technical Services Manager

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Hart Crowser, Inc.
2550 Denali Street, Suite 705
Anchorage, AK/USA 99503

Project: Fire Station #4
Project Number: 8397-05
Project Manager: Nino Muniz

Reported:
06/09/04 16:56

Diesel Range Organics (C10-C25) per AK102 - Quality Control
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 4E28001: Prepared 05/28/04 Using EPA 3510										
Duplicate (4E28001-DUP1)					Source: A4E0029-01					
Diesel Range Organics	0.150	0.385	mg/l		ND				50	
Surrogate: 1-Chlorooctadecane	1.13		"	1.12		101	50-150			

North Creek Analytical - Alaska

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Reported:
06/09/04 16:56

Notes and Definitions

R-01 Reporting limit raised due to dilution necessary for analysis.
Q-05 Analyses are not controlled on RPD values from sample concentrations less than 10 times the reporting limit.
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
RPD Relative Percent Difference

North Creek Analytical - Alaska

Mike Priebe, Technical Services Manager

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