

## Product Baildown Tests and Groundwater Sampling Near Yukon River at FAA Tanana Site, Alaska

**Contract No. DTFA04-96-D-10002**

**Task Order No. DTFA04-00-F-C0075**

TO: Jim Swalling/FAA  
Lillian Demoski/FAA

COPIES: Charlie Wilson

FROM: Win Westervelt

DATE: April 11, 2002

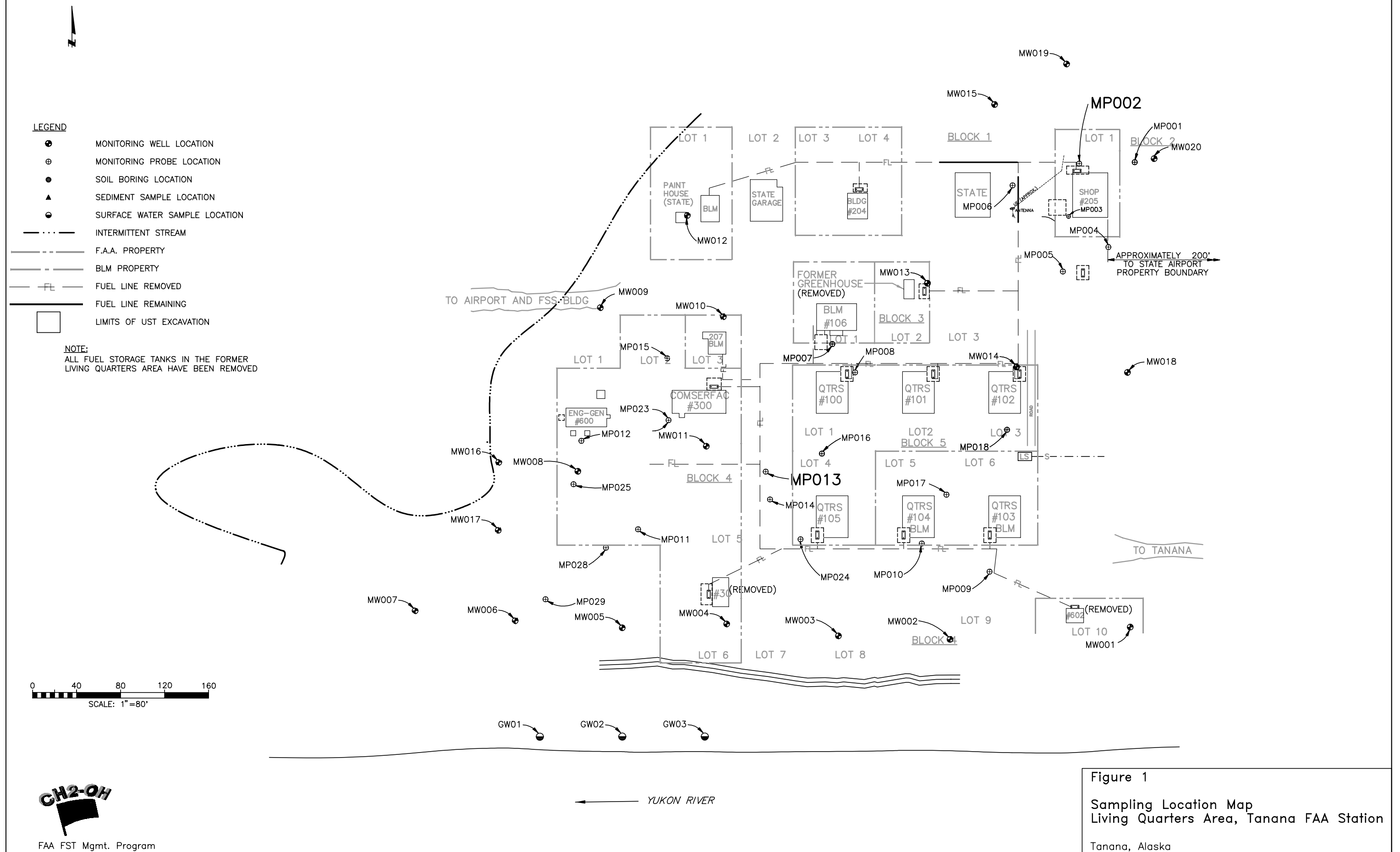
### Introduction

On October 2 and 3, 2001, Win Westervelt/CH2M HILL, Scott Thorsell/CH2M HILL, and Dale Fogel/FAA traveled to the FAA Tanana Site to perform the following tasks:

- Perform a product baildown test on two monitoring probes (MP-002 and MP-013) that have historically had floating product.
- Collect groundwater samples from three shallow pits dug adjacent to the Yukon River.
- Measure groundwater levels in monitoring wells at the FAA and Public Health Service sites.
- Download data from continuous water level monitoring (CWLM) probes installed in five FAA monitoring wells.

This memorandum summarizes the findings from the product baildown and groundwater sampling tasks.

The purpose of the product baildown tests was to provide an estimate of the recharge rate of product into the probes. This information may be useful in evaluating the feasibility of a product recovery system. The purpose of the groundwater sampling was to determine if groundwater entering the Yukon River contained petroleum hydrocarbons at concentrations that exceed Alaska Department of Environmental Conservation (ADEC) cleanup goals. The sampling sites were downgradient from the FAA former Living Quarters Area where groundwater contamination has been documented. Sampling locations are shown in Figure 1.



## Background

Soil and groundwater contamination was observed at the former Living Quarters Area when the FAA decommissioned the fuel storage tanks and pipelines in August 1997. The tanks were used to store heating oil, gasoline, and diesel fuel. A release investigation (RI) was performed in October 1998, and 21 monitoring probes were installed (CH2-OH, 1999). The RI determined that at several locations within the former Living Quarters Area, diesel-range organic (DRO) compounds and benzene, toluene, ethylbenzene, and xylene (BTEX) were present in soil and groundwater samples above the ADEC cleanup goals. Additional RI activities were performed in the fall of 1999, including the installation of 20 monitoring wells, surface water sampling, and sediment sampling (CH2-OH, 2000a). During 2000, the FAA performed quarterly groundwater sampling (CH2-OH, 2000b, 2000c, 2000d, 2001), aquifer drawdown and slug tests, and a bioventing test (CH2-OH, 2000e). Continuous water level monitoring was also performed in five monitoring wells from August 2000 to October 2001.

Two monitoring probes (MP-002 and MP-013) were observed to have a significant thickness of floating product during several of the groundwater monitoring events. Probe MP-002 is located near the northwest corner of the FAA Shop Building No. 205, where a 500-gallon heating oil tank (former underground storage tank [UST] No. 15-B-2) was decommissioned on August 15, 1997. Probe MP-013 is located near a former fuel pipeline valve box and T-intersection west of the former Living Quarters Area buildings and was decommissioned between August 14 and 16, 1997. The monitoring probes are constructed of 1-1/4-inch-diameter black iron pipe and have 10 feet of slotted screen. The product thickness observed during groundwater monitoring events is summarized in Table 1.

TABLE 1  
Product Thickness Observed in Monitoring Probes MP-002 and MP-013

Probe	October 1998	October 1999	August 2000	October 2000	October 2001
MP-002	ND	0.05	0.66	1.17	1.63
MP-013	0.04	0.7	1.02	0.86	0.23

Note: Units are feet.

## Product Baildown Tests

Prior to bailing product out of the probes, the groundwater and product layer depths and total depths of the probes were measured with an oil/water interface probe. The measured product thickness in MP-002 was 1.63 feet and in MP-013 was 0.23 feet. The groundwater elevation at the time of the test was at about the middle of the 10-foot-long screen section of each of the probes. The product was then removed using a bailer until the product thickness appeared to stabilize at a minimal level. The product and water depths were then measured several times over the next 24 hours to see if the product thickness rebounded.

While taking the water and product depth measurements, it became apparent that the oil/water interface probe would displace the product and cause a depression in the groundwater elevation in the well. This caused the product-groundwater interface to drop

between 0.02 and 0.14 feet during the measurements. After observation of this occurrence, the initial and final water depths were recorded for each measurement. The two readings resulted in a minimum and maximum product thickness estimate for each measurement. The baildown test measurements are summarized in Table 2, and in Figures 2 and 3.

TABLE 2  
Monitoring Probe Baildown Test Measurements

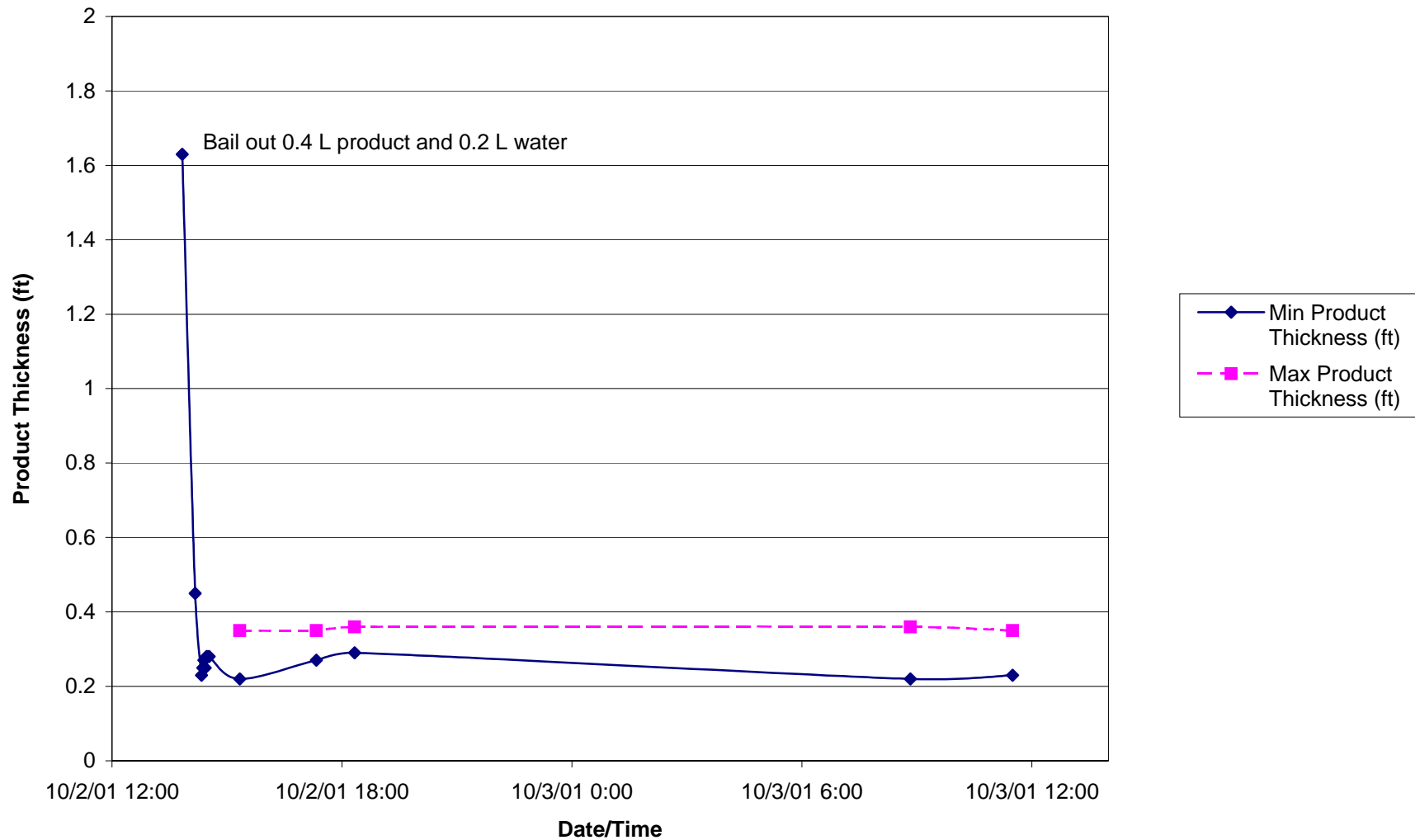
Date Time	Depth to Product (ft)	Initial Depth to Water (ft)	Final Depth to Water <sup>a</sup> (ft)	Minimum Product Thickness (ft)	Maximum Product Thickness <sup>a</sup> (ft)
<b>Monitoring Probe MP-002</b>					
10/2/01 13:50	23.59	25.22		1.63	
10/2/01 14:10	23.78	24.23		0.45	
10/2/01 14:20	23.80	24.03		0.23	
10/2/01 14:22	23.80	24.05		0.25	
10/2/01 14:24	23.81	24.08		0.27	
10/2/01 14:26	23.80	24.05		0.25	
10/2/01 14:28	23.80	24.08		0.28	
10/2/01 14:30	23.80	24.08		0.28	
10/2/01 14:32	23.80	24.08		0.28	
10/2/01 15:20	23.80	24.02	24.15	0.22	0.35
10/2/01 17:20	23.81	24.08	24.16	0.27	0.35
10/2/01 18:20	23.81	24.10	24.17	0.29	0.36
10/3/01 8:50	23.85	24.07	24.21	0.22	0.36
10/3/01 11:30	23.85	24.08	24.20	0.23	0.35
<b>Monitoring Probe MP-013</b>					
10/2/01 14:45	24.87	25.1		0.23	
10/2/01 15:10	24.9	24.95		0.05	
10/2/01 15:13	24.9	24.95		0.05	
10/2/01 15:16	24.9	24.95		0.05	
10/3/01 9:00	24.95	25.02	25.04	0.07	0.09
10/3/01 11:34	24.97	25.02	25.05	0.05	0.08

<sup>a</sup>Stabilized water depth and product thickness after the oil/water interface probe had displaced the product layer in the well.

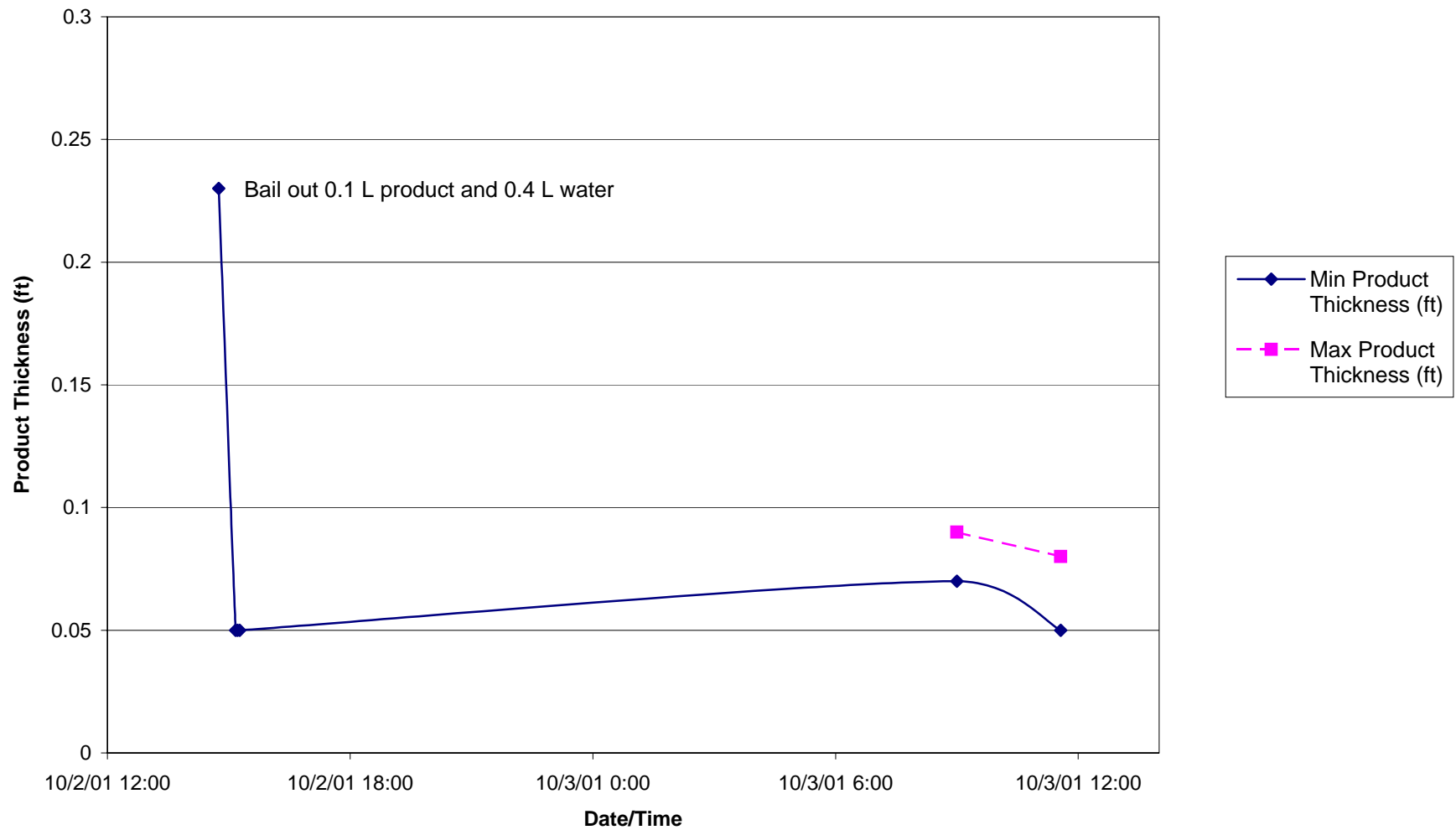
Note: Depths are relative to the top of the probe casing.

Figures 2 and 3 show that the product thickness was not observed to rebound significantly during the tests. This is interpreted to mean that the thickness of the product layer in the aquifer (outside of the well) is closer to the minimum product thickness observed in the

**Figure 2**  
**Product Baildown Test at MP-002**  
**Former Living Quarters Area, FAA Tanana Site**



**Figure 3**  
**Product Baildown Test at MP-013**  
**Former Living Quarters Area, FAA Tanana Site**



baildown tests, as opposed to the initial thickness recorded at the beginning of the test. It appears from the historical data summary in Table 1 that the product thickness in the monitoring probes fluctuated greatly over time. This may be due to the fluctuating groundwater levels at the site, which would cause a monitoring well to act as a sump for product when the water levels are falling.

In addition, it has been documented that the relationship between the observed thickness of product in a monitoring well and the thickness of product present in an aquifer formation is very sensitive to soil texture (API, 1999). For example, Figure 4 shows this relationship for four different soil types. For smaller grain size soil, the figure shows that a relatively large product thickness is observed in the monitoring well for a small thickness in the aquifer. The relationship is approximately linear except for small product thickness values, which are affected by the entry pressure head of product flowing into the aquifer formation. Since water is the wetting fluid, a positive product head must be established before it can displace water from the soil pore space and enter the formation. This is represented by the curved dashed lines in Figure 4 for smaller product thickness values. For the sand and gravel soils at the FAA Tanana site, an observed product thickness of 0.2 feet in MP-002 corresponds to an aquifer product thickness of less than 0.03 feet.

Based on the information obtained from the product baildown tests, there does not appear to be a sufficient product thickness at monitoring probes MP-002 and MP-013 to successfully perform active product recovery. Passive product skimming methods are available; however, this would require installing larger diameter (minimum 2-inch) monitoring wells at the monitoring probe locations to accommodate the diameter of the skimmer equipment, and frequent adjustments would be required to maintain the skimmer inlet at the oil/water interface due to the large groundwater table fluctuations. The expense of installing new wells and the operation and maintenance costs of the product recovery may make the remediation not practicable or cost-effective.

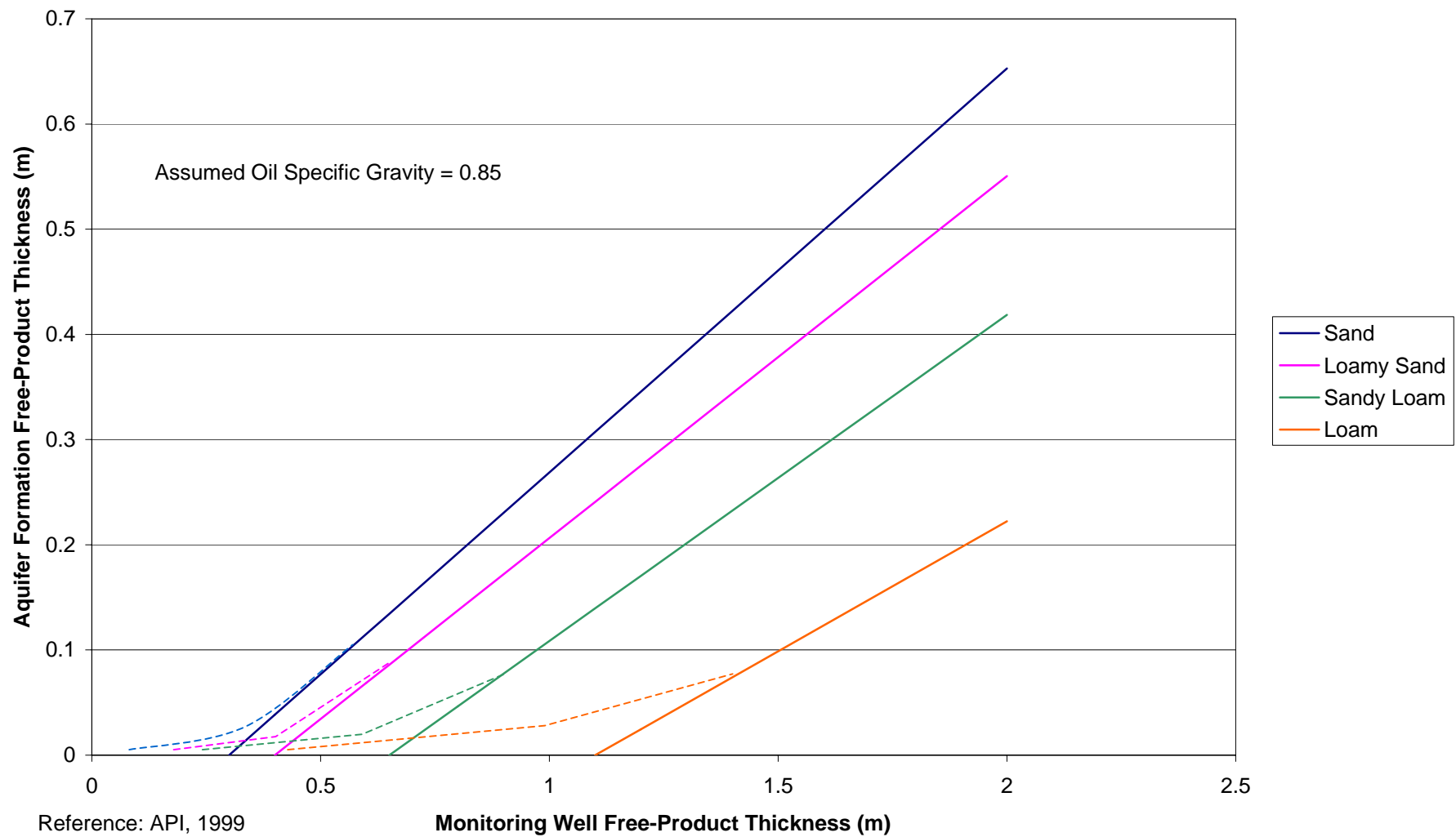
## Groundwater Sampling Adjacent to Yukon River

Groundwater samples were collected from three pits dug in the bank of the Yukon River. The pits were spaced approximately 75 feet apart and approximately 7 feet from the edge of the river. The nearest monitoring wells were MW-004, MW-005 and MW-006, which are located about 100 feet north of the pit sampling locations. The historical groundwater quality in these monitoring wells is summarized in Table 3.

The historical monitoring well results indicate that the water quality at MW-006 exceeded the ADEC groundwater cleanup level of 1,500 µg/L for DRO on several occasions. Lower levels of DRO were observed in wells MW-004 and MW-005. BTEX and GRO compounds were observed in MW-006 at concentrations below the ADEC groundwater cleanup levels.

The results for the three pits sampled on October 2, 2001, are summarized in Table 4. DRO was detected in all three pit water samples at concentrations ranging between 140 and 300 µg/L, which are below the ADEC groundwater cleanup level of 1,500 µg/L. BTEX and GRO compounds were not detected in any of the samples. These results suggest that the groundwater at these sampling locations does not exceed ADEC water quality criteria at the point where it enters the Yukon River.

**Figure 4**  
**Free-Product Thickness for Different Soil Textures**





**TABLE 3**  
Historical Groundwater Quality at Monitoring Wells MW-005, MW-005 and MW-006

Date	Benzene	Toluene	Ethyl-benzene	Xylenes	GRO	DRO
<b>Monitoring Well MW-004</b>						
Oct 20, 1999	ND	ND	ND	ND	ND	390
Feb 2, 2000	ND	ND	ND	ND	ND	140
Apr 25, 2000	ND	ND	ND	ND	ND	130
Aug 23, 2000	ND	ND	ND	ND	ND	ND
Nov 2, 2000	ND	ND	ND	ND	ND	ND
<b>Monitoring Well MW-005</b>						
Oct 18, 1999	ND	ND	ND	ND	ND	530
Feb 2, 2000	0.03 ft floating product present; well not sampled					
Apr 25, 2000	ND	ND	ND	ND	ND	340
Aug 23, 2000	ND	ND	ND	ND	ND	150
Nov 2, 2000	ND	ND	ND	ND	ND	210
<b>Monitoring Well MW-006</b>						
Oct 18, 1999	ND	ND	5.7	11	380	4700
Feb 2, 2000	0.02 ft floating product present; well not sampled					
Apr 25, 2000	ND	ND	1.5	4	290	3700
Aug 23, 2000	ND	1.7	1.4	5.3	180	450
Nov 2, 2000	ND	ND	2.4	5.5	160	2500

Note: Units are micrograms per liter

**TABLE 4**  
Groundwater Sampling Results for Pits Adjacent to the Yukon River

Sample ID	Benzene	Toluene	Ethyl-benzene	Xylenes	GRO	DRO
TAL01GW01	ND	ND	ND	ND	ND	300
TAL01GW02	ND	ND	ND	ND	ND	180
TAL01GW03	ND	ND	ND	ND	ND	140

Note: Units are micrograms per liter

## References

American Petroleum Institute. "Free-Product Recovery of Petroleum Hydrocarbon Liquids." Publication Number 4682. 1999.

CH2-OH. *Release Investigation Report*. 1999.

CH2-OH. *Additional Release Investigation Report*. 2000a.

CH2-OH. *Tanana FAA Facility Groundwater Monitoring, February 2000*. 2000b.

CH2-OH. *Tanana FAA Facility Groundwater Monitoring, April 2000*. 2000c.

CH2-OH. *Tanana FAA Facility Groundwater Monitoring, August 2000*. 2000d.

CH2-OH. *Aquifer and Biovent Testing at the FAA Tanana Site*. Memorandum. 2000e.

CH2-OH. *Tanana FAA Facility Groundwater Monitoring, October-November 2000*. 2001.



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CH2M Hill of Alaska  
301 W. Northern Lights Blvd.  
Suite 601  
Anchorage, AK 99503  
Attn: Win Westervelt

Work Order #: A0110029  
Date: 10/23/01  
Work ID: FAA Tanana  
Date Received: 10/4/01

#### Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
A0110029-01	TAL01GW01	A0110029-02	TAL01GW02
A0110029-03	TAL01GW03		

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Jason Gray  
Project Manager



## Case Narrative

Work Order: A0110029

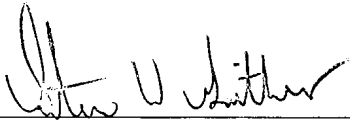
ADEC Laboratory Approval Number: UST-014

The samples were received properly packed in one cooler +.7°C and were refrigerated upon receipt.

### QUALITY CONTROL

All applicable ADEC methodology requirements were followed and all quality control objectives were met for this project.

Analyst



Date

10/24/01

Analyst



Date

10/24/01

Summary Tabular Analytical Report

Analytica Alaska Inc.  
Work Order: A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

Analytical Method: DRO by AK102  
Sample Prep Method: 3510C

UNITS:   mg/L		
ID	Client Sample Name	Diesel Range Organics
01B	TAL01GW01	0.30(0.13)
02B	TAL01GW02	0.18(0.14)
03B	TAL01GW03	0.14(0.14)

Summary Tabular Analytical Report

Analytica Alaska Inc.  
Work Order: J10110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

Analytical Method: BTX/GAS Water (8021)  
Sample Prep Method: 5030B

UNITS:		ug/L					
ID	Client Sample Name	Benzene	Toluene	Ethyl Benzene	Xylenes	Gasoline Range	
01A	TAL01GW01	ND(1.0)	ND(1.0)	ND(1.0)	ND(3.2)	ND(67)	
02A	TAL01GW02	ND(1.0)	ND(1.0)	ND(1.0)	ND(3.2)	ND(67)	
03A	TAL01GW03	ND(1.0)	ND(1.0)	ND(1.0)	ND(3.2)	ND(67)	

## Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

### Report Section: Client Sample Report

Client Sample Name:	TAL01GW01	Collection Date:	10/2/01
Lab Sample Number:	A0110029-01B	Prep Date:	10/9/01
Matrix:	Aqueous	Analysis Date:	10/18/01 1:14:00AM
Analytical Method ID:	DRO by AK102	Instrument:	woof
Prep Method ID:	3510	File Name:	W1101733.D
Prep Batch Number:	A011010004	Dilution Factor:	1
RR #:	1		
Initial prep wt/vol:	1,010 ml	Prep Extract Volume:	1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL
<u>Analyte Results:</u>										
Diesel Range Organics	n/a	0.30		mg/L	0.13	0.027				
<u>Surrogate Results:</u>										
o-Terphenyl	84-15-1	0.038		mg/L	0.020	0.0020	0.050	76.6	50	150

Client Sample Name:	TAL01GW02	Collection Date:	10/2/01
Lab Sample Number:	A0110029-02B	Prep Date:	10/9/01
Matrix:	Aqueous	Analysis Date:	10/18/01 1:41:00AM
Analytical Method ID:	DRO by AK102	Instrument:	woof
Prep Method ID:	3510	File Name:	W1101734.D
Prep Batch Number:	A011010004	Dilution Factor:	1
RR #:	1		
Initial prep wt/vol:	980 ml	Prep Extract Volume:	1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL
<u>Analyte Results:</u>										
Diesel Range Organics	n/a	0.18		mg/L	0.14	0.028				
<u>Surrogate Results:</u>										
o-Terphenyl	84-15-1	0.041		mg/L	0.020	0.0020	0.051	80.9	50	150

# Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

## Report Section: Client Sample Report

Client Sample Name:	TAL01GW03	Collection Date:	10/2/01
Lab Sample Number:	A0110029-03B	Prep Date:	10/9/01
Matrix:	Aqueous	Analysis Date:	10/18/01 2:07:00AM
Analytical Method ID:	DRO by AK102	Instrument:	woof
Prep Method ID:	3510	File Name:	W1101735.D
Prep Batch Number:	A011010004	Dilution Factor:	1
RR #:	1		
Initial prep wt/vol:	980 ml	Prep Extract Volume:	1.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL
Analyte Results:										
Diesel Range Organics	n/a	0.14		mg/L	0.14	0.028				
Surrogate Results:										
o-Terphenyl	84-15-1	0.044		mg/L	0.020	0.0020	0.051	86.0	50	150



# Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

## Report Section: Client Sample Report

Client Sample Name: **TAL01GW01**  
Lab Sample Number: A0110029-01A  
Matrix: Aqueous  
Analytical Method ID: GRO/BTEX by AK101/SW-8021B  
Prep Method ID: 5030  
Prep Batch Number: A011015003  
RR #: 1  
Initial prep wt/vol: 5.00 ml  
Collection Date: 10/2/01  
Prep Date: 10/15/01  
Analysis Date: 10/16/01 2:26:00AM  
Instrument: Natasha  
File Name: N1015038.D  
Dilution Factor: 1  
Prep Extract Volume: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL
Analyte Results:										
Benzene	71-43-2	ND		ug/L	1.0	0.25				
Gasoline Range Organics	n/a	ND		ug/L	67	6.7				
Toluene	108-88-3	ND		ug/L	1.0	0.26				
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.27				
Xylenes, Total	1330-20-7	ND		ug/L	3.2	1.1				
Surrogate Results:										
Bromofluorobenzene(PID)	1072-85-1	85		ug/L	1.0	0.10	100	85.5	50	150
Bromofluorobenzene	1072-85-1	88		ug/L	1.0	0.10	100	87.7	50	150
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.0	50	150
Difluorobenzene	540-36-3	47		ug/L	1.0	0.10	50	94.8	50	150

Client Sample Name: **TAL01GW02**  
Lab Sample Number: A0110029-02A  
Matrix: Aqueous  
Analytical Method ID: GRO/BTEX by AK101/SW-8021B  
Prep Method ID: 5030  
Prep Batch Number: A011015003  
RR #: 1  
Initial prep wt/vol: 5.00 ml  
Collection Date: 10/2/01  
Prep Date: 10/15/01  
Analysis Date: 10/16/01 2:55:00AM  
Instrument: Natasha  
File Name: N1015039.D  
Dilution Factor: 1  
Prep Extract Volume: 5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL
Analyte Results:										
Benzene	71-43-2	ND		ug/L	1.0	0.25				
Gasoline Range Organics	n/a	ND		ug/L	67	6.7				
Toluene	108-88-3	ND		ug/L	1.0	0.26				
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.27				
Xylenes, Total	1330-20-7	ND		ug/L	3.2	1.1				
Surrogate Results:										
Bromofluorobenzene(PID)	1072-85-1	87		ug/L	1.0	0.10	100	87.3	50	150
Bromofluorobenzene	1072-85-1	90		ug/L	1.0	0.10	100	89.6	50	150
Difluorobenzene(PID)	540-36-3	50		ug/L	1.0	0.10	50	99.2	50	150
Difluorobenzene	540-36-3	48		ug/L	1.0	0.10	50	95.9	50	150

# Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

## Report Section: Client Sample Report

Client Sample Name:	TAL01GW03	Collection Date:	10/2/01
Lab Sample Number:	A0110029-03A	Prep Date:	10/15/01
Matrix:	Aqueous	Analysis Date:	10/16/01 3:24:00AM
Analytical Method ID:	GRO/BTEX by AK101/SW-8021B	Instrument:	Natasha
Prep Method ID:	5030	File Name:	N1015040.D
Prep Batch Number:	A011015003	Dilution Factor:	1
RR #:	1		
Initial prep wt/vol:	5.00 ml	Prep Extract Volume:	5.00 ml

Analyte	CASNo	Result	Flags	Units	PQL	MDL	Spike	% Recov	LCL	UCL
Analyte Results:										
Benzene	71-43-2	ND		ug/L	1.0	0.25				
Gasoline Range Organics	n/a	ND		ug/L	67	6.7				
Toluene	108-88-3	ND		ug/L	1.0	0.26				
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.27				
Xylenes, Total	1330-20-7	ND		ug/L	3.2	1.1				
Surrogate Results:										
Bromofluorobenzene(PID)	1072-85-1	87		ug/L	1.0	0.10	100	86.5	50	150
Bromofluorobenzene	1072-85-1	87		ug/L	1.0	0.10	100	87.4	50	150
Difluorobenzene(PID)	540-36-3	49		ug/L	1.0	0.10	50	98.6	50	150
Difluorobenzene	540-36-3	47		ug/L	1.0	0.10	50	94.3	50	150

## Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: **FAA Tanana**  
Client: **CH2M Hill of Alaska**  
Client Project Number: **CH2M Hill**

### Report Section: Method Blank Report

Client Sample Name:	<b>MB</b>	Collection Date:	10/9/01
Lab Sample Number:	A011010004-MB	Prep Date:	10/9/01
Matrix:	Aqueous	Analysis Date:	10/17/01 8:19:00PM
Analytical Method ID:	DRO by AK102	Instrument:	woof
Prep Method ID:	3510	File Name:	W1101722.D
Prep Batch Number:	A011010004	Dilution Factor:	1
RR #:	1		
Initial prep wt/vol:	1,000 ml	Prep Extract Volume:	1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>
<u>Analyte Results:</u>										
Diesel Range Organics	n/a	ND		mg/L	0.14	0.027				
<u>Surrogate Results:</u>										
o-Terphenyl	84-15-1	0.035		mg/L	0.020	0.0020	0.050	69.5	60	120

# Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: **FAA Tanana**  
Client: **CH2M Hill of Alaska**  
Client Project Number: **CH2M Hill**

## Report Section: Method Blank Report

Client Sample Name:	<b>MB</b>	Collection Date:	10/15/01
Lab Sample Number:	A011015003-MB	Prep Date:	10/15/01
Matrix:	Aqueous	Analysis Date:	10/15/01 5:16:00PM
Analytical Method ID:	GRO/BTEX by AK101/SW-8021B	Instrument:	Natasha
Prep Method ID:	5030	File Name:	N1015019.D
Prep Batch Number:	A011015003	Dilution Factor:	1
RR #:	1		
Initial prep wt/vol:	5.00 ml	Prep Extract Volume:	5.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>
<u>Analyte Results:</u>										
Benzene	71-43-2	ND		ug/L	1.0	0.25				
Gasoline Range Organics	n/a	ND		ug/L	67	6.7				
Toluene	108-88-3	ND		ug/L	1.0	0.26				
Ethylbenzene	100-41-4	ND		ug/L	1.0	0.27				
Xylenes, Total	1330-20-7	ND		ug/L	3.2	1.1				
<u>Surrogate Results:</u>										
Bromofluorobenzene(PID)	1072-85-1	90		ug/L	1.0	0.10	100	90.2	60	120
Bromofluorobenzene	1072-85-1	89		ug/L	1.0	0.10	100	88.5	60	120
Difluorobenzene(PID)	540-36-3	50		ug/L	1.0	0.10	50	100.5	60	120
Difluorobenzene	540-36-3	46		ug/L	1.0	0.10	50	92.5	60	120

## Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: **FAA Tanana**  
Client: **CH2M Hill of Alaska**  
Client Project Number: **CH2M Hill**

### QC Recovery Report

Work Order: A0110029

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**Prep Batch Number: A011010004**

Base Sample	<b>A011010004-MB</b>	Anal. Method:	DRO by AK102
Spike Sample	<b>A011010004-LCS</b>	Sample Prep Date:	10/9/01 12:00:00AM
Spike Duplicate:	<b>A011010004-LCSD</b>	Analysis Units:	mg/L
<i>LCS/LCSD Report</i>		Matrix:	Aqueous

Analyte	Samp. Result	Spike Result	Sp. Dup Result	Spike Conc	Spike Recov	Spike Dup Conc	SpikeD Recov	RPD	LCL	UCL	RPD Lim.	Recov. Flag	RPD Flag
<u>Analytes</u>													
Diesel Range Organics	ND	2.08	1.99	2.00	104	2.00	100	4.5	60	120	20		
<u>Surrogates:</u>													
o-Terphenyl	0.0348	0.0488	0.0435	0.0500	98	0.0500	87	11.4	60	120	20		

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Please note: Results are shown here with three significant figures, to avoid rounding errors in the calculation.

# Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

## QC Recovery Report

Work Order: A0110029

Prep Batch Number: A011015003

Base Sample: A011015003-MB      Anal. Method: GRO/BTEX by AK101/SW-8021B  
Spike Sample: A011015003-LCS      Sample Prep Date: 10/15/01 12:00:00AM  
Spike Duplicate: A011015003-LCSD      Analysis Units: ug/L  
Matrix: Aqueous

### LCS/LCSD Report

Analyte	Samp. Result	Spike Result	Sp. Dup Result	Spike Conc	Spike Recov	Spike Dup Conc	SpikeD Recov	RPD	LCL	UCL	RPD Lim.	Recov. Flag	RPD Flag
<b>Analytes</b>													
Benzene	ND	15	15	14	107	14	107	0.4	60	120	20		
Toluene	ND	86	83	85	101	85	98	2.6	60	120	20		
Ethylbenzene	ND	23	22	20	115	20	110	2.2	60	120	20		
Xylenes, Total	ND	105	103	99	106	99	104	2.6	60	120	20		
Gasoline Range Organics	ND	980	1,040	1,100	89	1,100	95	6.1	60	120	20		
<b>Surrogates:</b>													
Difluorobenzene(PID)	50	53	53	50	106	50	106	0.1	60	120	20		
Bromofluorobenzene(PID)	90	100	95	100	100	100	95	5.5	60	120	20		
Bromofluorobenzene	89	95	98	100	95	100	98	2.3	60	120	20		
Difluorobenzene	46	44	48	50	88	50	96	7.5	60	120	20		

Please note: Results are shown here with three significant figures, to avoid rounding errors in the calculation.

# Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: FAA Tanana  
Client: CH2M Hill of Alaska  
Client Project Number: CH2M Hill

## QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 6,037 Lab Project Number: A0110029

Test: DRO by AK102 Prep Date: 10/9/01

Lab Method Blank Id: A011010004-MB

Prep Batch ID: A011010004

Method: DRO by AK102

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A011010004-LCS	LCS	W1101723.D	10/17/01 8:46:00PM
A011010004-LCSD	LCSD	W1101724.D	10/17/01 9:12:00PM
A0110029-01B	TAL01GW01	W1101733.D	10/18/01 1:14:00AM
A0110029-02B	TAL01GW02	W1101734.D	10/18/01 1:41:00AM
A0110029-03B	TAL01GW03	W1101735.D	10/18/01 2:07:00AM

Test: GRO/BTEX by AK101/SW-8021B Prep Date: 10/15/01

Lab Method Blank Id: A011015003-MB

Prep Batch ID: A011015003

Method: GRO/BTEX by AK101/SW-8021B

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A011015003-LCS	LCS	N1015020.D	10/15/01 5:45:00PM
A011015003-LCSD	LCSD	N1015021.D	10/15/01 6:14:00PM
A0110029-01A	TAL01GW01	N1015038.D	10/16/01 2:26:00AM
A0110029-02A	TAL01GW02	N1015039.D	10/16/01 2:55:00AM
A0110029-03A	TAL01GW03	N1015040.D	10/16/01 3:24:00AM

## Detailed Analytical Report

Analytica Alaska Inc.  
Workorder (SDG): A0110029

Project: **FAA Tanana**  
Client: **CH2M Hill of Alaska**  
Client Project Number: **CH2M Hill**

### DATA FLAGS AND DEFINITIONS

#### Result Field:

ND = Not Detected at or above the Reporting Limit Shown  
NA = Analyte not applicable (see Case Narrative for discussion)

#### Qualifier Fields:

LOW = Recovery is below Low Control Limit  
HIGH = Recovery, RPD, or other parameter is above Upper Control Limit  
E = Reported concentration is above the instrument calibration upper range  
DIL = Sample required dilution to bring analytes within calibration range of the instrument.  
At the dilution level required, the surrogate could not be quantified due to the resulting low surrogate concentration and/or coelution interference from the sample.

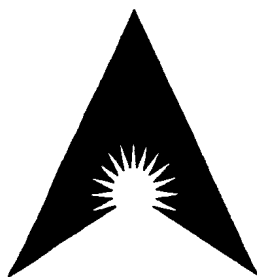
#### Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank.

#### Please Note:

For the purposes of this report the Reporting limit is set at the PQL, or quantitation limit. Below this level, results are reported as ND, or "not detected". The mdl (method detection limit) is shown on the report as support for the PQL choice.





**Analytica  
Alaska, Inc.**

# **Support Documentation**



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LGN: 0110029  
Quote: A01050012

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## Chain of Custody Record / Analysis Request

Company Name: <b>CH2M HILL</b>		Project Name: <b>FPA Tanana</b>		
Company Address: <b>301 W. Northern Lights Blvd Anchorage, AK 99503</b>		Report To: <b>Win Westervelt</b>		
Telephone: <b>907-218-2551</b>		Invoice To: <b>LI</b>		
Fax: <b>907-257-2000</b>		P.O. Number: <b>N/A</b>		
Email: <b>western@ch2m.com</b>				
Sample ID	Date Collected	Time Collected	Matrix	# Containers
TALPH1GWPH1	10/2/01	16:40	W	2 1
TALPH1GWPH2	10/2/01	16:45	W	2 1
TALPH1GWPH3	10/2/01	16:50	W	2 1
VOA by EPA 602				
PAH by EPA 610				
TA <sub>OH</sub> by EPA 610/602				
BTEX by EPA 5030/8021B				
GRO by AK101				
DRO by AK102				
RRO by AK103				
BTEX / GRO				
PH <sub>2</sub>				
Hold for Further Analysis				
LAB ID				
COMMENTS				
RELINQUISHED BY SAMPLER:				
Signature:		Signature:		Signature:
Printed Name:		Printed Name:		Printed Name:
Firm:		Firm:		Firm:
Date/Time:		Date/Time:		Date/Time:
RELINQUISHED BY:				
Signature:		Signature:		Signature:
Printed Name:		Printed Name:		Printed Name:
Firm:		Firm:		Firm:
Date/Time:		Date/Time:		Date/Time:
DELIVERABLES				
EDD				
TURNAROUND				
Cooler Receipt Information				
Temp Received: <b>47</b> °C				
Temp Received: _____ °C				
Coolers: <b>1</b>				
Seals: <b>yes</b>				
Courier Fee: \$ <b>None</b>				
Airbill # <b>None</b>				
PAGE _____ OF _____				



# Cooler Receipt Form

Client: CH2M Hill of Alaska  
Project: FAA Tanana

Client Code: 002148

Order #: A0110029

Cooler ID: 1

**A. Preliminary Examination Phase:**

Date cooler opened: 10/4/01  
Cooler opened by: DP

Signature: 

1. Was airbill Attached? N/A

Airbill #:

Carrier Name: Client

2. Custody Seals? Yes

How many? 1

Location: cooler lid

Seal Name: WW

3. Seals intact? Yes

4. Screened for radiation? No

5. COC Attached? Yes

Properly Completed? Yes

Signed by AEL employee? Yes

6. Project Identification from custody paper: FAA Tanana

7. Preservative: BlueGel

Temperature: 4.7

Designated person initial here to acknowledge receipt:

 Date: 10-5-01

Comments:

**B. Log-In Phase:**

Samples Log-in Date: 10/5/01

Log-in By: DP

Signature: 

1. Packing Type: Bubblewrap

2. Were samples in separate bags? Yes

3. Were containers intact? Yes

Labels agree with COC? Yes

4. Number of bottles received: 9

Number of samples received: 3

5. Correct containers used? Yes

Correct preservatives added? Yes

6. Sufficient sample volume? Yes

7. Bubbles in VOA samples? No

8. Was Project manager called and status discussed? No

9. Was anyone called? No Who was called? \_\_\_\_\_ By whom? \_\_\_\_\_ Date: \_\_\_\_\_

Comments:

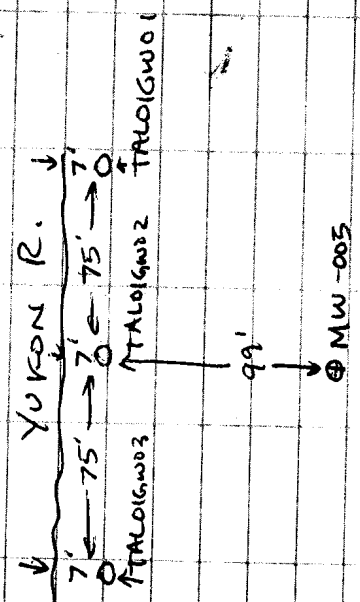
(52)

10/20/01

FAA-TALC

1700 Replaced batteries in XD at MW15. Start new test run. MW15 100201

Collect groundwater samples at the edge of the Yukon River



1640 Collect 2 vials and 1 liter for Geo/biochemical DRO. Sample ID TAL01GW01

1645 Collect TAL01GW02

1650 Collect TAL01GW03

Shirley Barker

(53)

10/2/01

FAA Tanager

FAA Site GW Level Measurements

Time Wed DTW (ft bar)

1737 MW-19 24.12

1750 MW-14 24.58

1755 MW-13 18.22

1800 MW-01 19.99

1805 MW-03 24.31

1810 MW-02 24.45

1845 Lock up equipment at shop bldg and leave site for day.

Shirley Barker 10/2/01