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Chevron Environmental Management Company

2008 Groundwater Monitoring Report and Geochemical Parameter Monitoring Results

Former Chevron Facility #301726
ADEC File #100.38.066
Lot 5A, Block 10, West Ramp
Fairbanks International Airport
Fairbanks, Alaska

December 12, 2008

ARCADIS

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2008 Groundwater Monitoring Report and Geochemical Parameter Monitoring Results

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Prepared for:
Chevron Environmental Management Company

Our Ref.:
B0046269

Date:
December 12, 2008

ARCADIS

1. Introduction

On behalf of Chevron Environmental Management Company (Chevron), ARCADIS U.S., Inc. (ARCADIS) has prepared this 2008 groundwater monitoring report and natural attenuation feasibility study for former Chevron facility 301726 located at Lot 5A, Block 10, West Ramp at the Fairbanks International Airport (the site). The site location is shown on **Figure 1**.

This report summarizes groundwater monitoring activities conducted at the site during September 2008. Monitoring activities were conducted pursuant to communications between ARCADIS and the Alaska Department of Environmental Conservation (ADEC). Monitoring activities were conducted under the direction of a "qualified person" [18 AAC 75. 990 (100), and 18 AAC 78.995 (118)]. The last sampling event at this site was conducted in September 2005.

2. Site Description and Background

The site is approximately one acre and located on the southwestern portion of the Fairbanks International Airport (FIA), west of Airport Industrial Road. The site was originally designated as Block 10, Lots 5A and 5B, however, the lots were subsequently combined, and are now referred to as Block 10, Lot 5A.

The site is currently vacant with no features remaining associated with the previous land uses. An abandoned six-inch diameter fuel pipeline crosses through the southeast portion of the site, adjacent to Airport Industrial Road. The former Texaco Bulk Terminal occupied the southeastern portion of the site facing Airport Industrial Road; this portion of the site is now covered with dirt and gravel and is used for truck staging and as an access road for a business located adjacent to the northeast portion of the site. The northwestern portion of the site is primarily unimproved land that is covered with mature vegetation. The Chena River is located approximately 700 feet west of the site.

Land use in the site vicinity is mixed industrial and unimproved (vegetation). The nearest residential properties are located approximately 600 feet west of the site. Domestic production wells have been reported at the residential properties. Airplane hangars, tarmacs, and other facilities associated with airport land uses are across Airport Industrial Road from the referenced site are commercial businesses.

The former Texaco bulk fuel terminal began operation at the site in July 1969 and was closed in September 1989. There were three 25,000-gallon aboveground storage tanks (ASTs) and a warehouse. The three ASTs and structures were relocated to another facility in 1989 by MAPCO Alaska Petroleum, Inc. and the parcel has since remained vacant.

Seven documented petroleum releases of aviation fuel and diesel fuel occurred at the site during operation. Petroleum hydrocarbons have been detected and observed during routine utility maintenance operations and site investigations since 1992 and in groundwater samples since 2004.

The site geology consists of fill materials and unconsolidated alluvium deposited by the Chena and Tanana Rivers. Based on observations made during well installation approximately 200 feet northeast of the site, it is overlain by gravel fill material to depths of up to 5 feet below ground surface (bgs) and underlain by silty sand that becomes coarser with depth and grades into a gravelly sand (SAIC, 2005). Groundwater is approximately seven feet bgs.

3. Groundwater Monitoring Methods

3.1 Groundwater Gauging Methods

Groundwater elevations were measured in wells MW-1 through MW-6 on September 11, 2008. Groundwater elevations were measured using an oil/water interface probe. Immediately after opening each well for monitoring, the well casing organic vapor concentration was measured using a photoionization detector (PID).

Non-disposable groundwater monitoring equipment was decontaminated prior to and after each use with an Alconox® solution and rinsed in potable water.

3.2 Groundwater Sampling Methods

Groundwater samples were collected using dedicated, disposable Teflon® tubing with an In-Situ® 9500 meter and peristaltic pump. Geochemical parameters measured include dissolved oxygen (DO), oxidation-reduction potential (ORP), conductivity, pH, and temperature. Groundwater was purged until the geochemical parameters stabilized to within approximately ten percent of their value.

The groundwater samples were labeled and stored in a cooler packed with ice and submitted to TestAmerica of Bothell, Washington for the following chemical analyses:

- Gasoline range organics (GRO) by method AK101
- Diesel range organics (DRO) by method AK102
- Residual range organics (RRO) by method AK103
- Benzene, toluene, ethylbenzene, total xylenes (BTEX) by EPA method 8021
- Total alkalinity by EPA method 310.1
- Sulfate by EPA method 300.0
- Nitrate as nitrogen by EPA method 300.0 and Hach colorimetric field kit
- Ferrous Iron by Hach colorimetric field kit
- Methane by method RSK 175

4. Groundwater Monitoring Results

4.1 Groundwater Elevation and Flow Direction

Depths-to-groundwater measured in wells MW-1 through MW-6 were consistent with historical measurements and ranged from 8.52 feet bgs in well MW-2 to 8.96 feet bgs in well MW-3. Groundwater elevations ranged from 418.16 feet above mean sea level (feet amsl) in well MW-6 to 418.21 feet amsl in wells MW-1 and MW-2. The inferred flow direction to the south-southwest; however, is not consistent with historical observations. Historical inferred groundwater directions were to the east and southeast. The apparent difference is likely due to natural groundwater fluctuations. Groundwater elevations are summarized in **Table 1**. Groundwater elevations and inferred flow direction are shown on **Figure 2**.

4.2 Groundwater Analytical Results

While constituent-of-concern (COC) concentrations have generally increased since the last monitoring event in September 2005, groundwater samples collected during the reporting period contained concentrations within the historical ranges for each well. Samples collected from wells MW-1 contained GRO, DRO, and benzene concentrations and samples collected from MW-3 contained DRO concentrations exceeding their respective ADEC groundwater cleanup levels. RRO, toluene, ethylbenzene, and total xylenes were not detected above their respective ADEC cleanup levels. Samples collected from wells MW-2, MW-4, and MW-6 did not contain COC concentrations exceeding their respective minimum reporting limits (MRLs). Groundwater analytical results are summarized in **Table 1**.

5. Geochemical Parameter Monitoring Results

Due to the relatively low concentrations of petroleum-related hydrocarbons currently detected in groundwater samples collected from monitoring wells at the site and relatively small area of the site, natural attenuation may be a viable remedial solution. To determine the potential for natural attenuation at the site, wells MW-1 through MW-6 were monitored for geochemical parameters to characterize the potential biodegradation of petroleum-related hydrocarbons. Geochemical parameter monitoring was conducted in conjunction with groundwater monitoring activities on September 11, 2008 and was the first geochemical parameter monitoring event conducted at the site.

Groundwater elevation measurements at the site indicate little variation in groundwater elevations across the site. This may indicate little hydrologic influence on the hydrocarbon plume on-site. Due to the low frequency of sampling since monitoring began in 2005, it is difficult to assess the long term COC concentration trends in wells on-site. However, COC concentrations appear to be decreasing since monitoring began in August 2004. This may indicate the plume is stable or shrinking.

DO and ORP measurements can also be indicative of a stable or shrinking plume. DO concentrations in wells MW-1 and MW-3 (inside the plume) range from 0.02 milligrams per liter (mg/L) to 0.16 mg/L, respectively while concentrations in wells MW-2, MW-4, MW-5 and MW-6 (outside the plume) ranged from 1.17 mg/L (MW-5) to 6.43 mg/L (MW-2). ORP measurements were consistent with DO measurements, as the DO measurements approached zero mg/L, the ORP measurements became more negative. DO and ORP measurements are summarized in **Table 2**.

The difference in DO and ORP measurements between the wells inside and outside of the plume indicates an induced anaerobic (reductive) environment within the COC plume while the area outside the boundary of the plume outside of the plume remains aerobic. Generally, ORP measurements less than zero millivolts (mV) and DO measurements less than 1.0 mg/L are indicative of anaerobic conditions. Temperature measurements ranged from 1.39 degrees Celsius (ºC) (MW-5) to 5.33 ºC (MW-6) and pH measurements ranged from 4.29 (MW-3) to 4.62 (MW-4). Temperature measurements are below the range generally associated with conditions consistent with natural attenuation. However, numerous published results suggest natural attenuation of petroleum hydrocarbons at low temperatures does occur (Filler, 2008). DO, ORP, temperature and pH results are summarized in **Table 2**.

Methane and ferrous iron results are also indicative of an anaerobic environment in and around wells MW-1 and MW-3. The methane concentration detected in well MW-1 (0.638 mg/L) is indicative of methanogenic conditions. It also corresponds to the highest total COC concentration. Methane was also detected in wells MW-3, MW-4 and MW-6 and in the case of MW-4 and MW-6 may be the result of past natural attenuation. In addition, ferrous iron was only detected in wells MW-1 and MW-3 at concentrations of 7.4 mg/L and 5.5 mg/L, respectively. Methane concentrations above 0.5 mg/L and ferrous iron concentrations elevated above background concentrations are generally consistent with anaerobic natural attenuation of petroleum hydrocarbons.

Total alkalinity was measured in all of the samples collected during the monitoring event. Total alkalinity concentrations in MW-1 and MW-3 were 627 mg/L as calcium carbonate (mg/L as $CaCO_3$) and 543 mg/L as $CaCO_3$, respectively. Concentrations in the remaining wells ranged from 347 mg/L as $CaCO_3$ in well MW-4 to 390 mg/L as $CaCO_3$ in wells MW-5 and MW-6. The total alkalinity concentrations elevated above background concentrations in wells MW-1 and MW-3 may be the result of past anaerobic natural attenuation.

Sulfate concentrations in wells MW-2 through MW-6 ranged from 12.5 mg/L in the duplicate sample from MW-2 to 31.8 mg/L in well MW-5 while the sulfate concentration in MW-1 was 1.56 mg/L. This may indicate sulfate reduction in well MW-1. Nitrate concentrations were not consistent with COC concentrations. The highest concentrations were detected in MW-5 and MW-6 while the nitrate was not detected in wells MW-1, MW-2 and MW-4. Nitrate field measurements ranged from non-detectable to 6.0 mg/L (MW-6). Nitrate concentrations are not conclusively indicative of nitrate reduction or anaerobic degradation.

Due to the limited extent of the monitoring well network, it is difficult to assess groundwater flow and its potential contribution to natural attenuation. Boring logs from site assessment activities classify the dominant soil type in the saturated zone as sand which generally has a high hydraulic conductivity.

The spatial variability of geochemical parameter concentrations is consistent with the inferred plume location. The distribution of electron acceptors (DO, nitrate, sulfate) and reduced electron acceptors (ferrous iron, methane) with respect to DRO and total BTEX concentrations indicates increased microbial activity within the plume. The data indicate that groundwater conditions are reducing in the impacted area (based on DO/ORP, decreased nitrate and sulfate, increased ferrous iron and methane) and aerobic downgradient and cross-gradient of the plume.

6. Laboratory Data Quality Assurance Summary

As required by ADEC (Technical Memorandum 06-002, dated August 20, 2008), ARCADIS completed a laboratory data review checklist for the TestAmerica report from the 2008 groundwater monitoring events. The laboratory report and the data checklist are included as **Appendix B**. A supplemental data package from Lancaster is included along with the electronic data deliverable (EDD) on the enclosed CD. The following quality assurance (QA) summary describes six parameters, related to the quality and usability of the data presented in this report.

1. Precision - Based on the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) relative percent differences, the data meet precision objectives.

2. Accuracy - The data generally meet accuracy objectives as indicated by the laboratory quality control samples, which were within method/laboratory limits.

   Report #BRI0213 – For sample MW-1 DRO analysis, the surrogate recovery was outside the acceptance limits due to sample matrix effects.

3. Representativeness - The data appear to be representative of site conditions and are generally consistent with expected groundwater concentrations.

4. Comparability - Comparability is not applicable to these laboratory results.

5. Completeness - The results appear to be valid and usable, and thus, the laboratory results have 100% completeness.

6. Sensitivity - The sensitivity of the analyses was adequate for the samples as the laboratory reporting limits were less than the applicable GCLs.

7. Conclusion

Groundwater elevations ranged from 418.16 ft-amsl to 418.21 ft-amsl and the inferred flow direction at the site is south to southwest. Wells MW-1 and MW-3 contained COC concentrations exceeding their respective ADEC groundwater cleanup levels while wells MW-2, MW-4 and MW-6 did not contain detectable COC concentrations.

Groundwater monitoring results from September 11, 2008 indicate spatial variability of geochemical parameter concentrations consistent with the estimated petroleum hydrocarbon plume distribution. Based on geochemical parameter sampling, anaerobic natural attenuation of the petroleum-hydrocarbon related impact may be occurring at the site. DO, ORP, total alkalinity, sulfate, ferrous iron and methane concentrations are also consistent with trends and observations associated with anaerobic natural attenuation while conditions outside of the COC plume indicate that the general subsurface conditions are aerobic.

The available geochemical data indicate that groundwater conditions in the vicinity of the source area may be nitrate and sulfate depleted. The groundwater gradient at the site is very flat, which may limit the rate at which electron acceptors are supplied. In addition, groundwater pH at the site is approximately 4.5, which is low enough to be potentially inhibitory to overall microbial activity. Continued monitoring of geochemical parameters is recommended to corroborate the trends observed in September 2008.

8. Recommendations

Additional COC and geochemical parameter sampling at the site is necessary to characterize seasonal and long-term concentration trends at the site. Enhanced natural attenuation may provide a remedial solution with a shorter time horizon than monitored natural attenuation.

9. References

Filler, D.M., I. Snape, and D.L. Barnes, editors. 2008. *Bioremediation of Petroleum Hydrocarbons in Cold Regions*. Cambridge University Press, Cambridge, Great Britain.

SAIC, 2008. *Site Assessment Report – Former Texaco Bulk Terminal No. 301726*. November 22, 2004. Science Applications International Corporation.

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Tables

TABLE 1
Groundwater Elevations and Analytical Results
Former Chevron Facility #301726
Lot 5A, Block 10, West Ramp
Fairbanks International Airport
Fairbanks, Alaska

Monitoring Well ID	Date Sampled	TOC (ft-amsl)	DTW (ft)	GWE (ft-amsl)	DRO[1] (µg/L)	RRO[2] (µg/L)	GRO[3] (µg/L)	BTEX[4]			
								Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
ADEC GCLs[5] (µg/L)					*1,500*	*1,100*	*2,200*	*5.0*	*1,000*	*700*	*10,000*
MW-1	08/19/04	426.84	6.37	420.47	33,400	<480	27,200	1,770	3,790	261	3,750
	03/30/05		10.09	416.75	436	<388	9,000	729	343	186	936
	09/19/05		8.12	418.72	8,660	<397	<2,500	153	150	<25	116
	09/11/08		**8.63**	**418.21**	**12,000**	**<708**	**6,680**	**357**	**413**	**124**	**815**
MW-2	08/19/04	426.73	6.29	420.44	-- [6]	-- [6]	<50	<0.2	<0.5	<0.5	<1.0
	03/30/05		9.98	416.75	4,040	427	<50	<0.5	<0.5	<0.5	<1.5
	09/19/05		8.02	418.71	<417	<417	<50	<0.5	<0.5	<0.5	<1.5
	09/11/08		**8.52**	**418.21**	**<94.3**	**<708**	**<50.0**	**<0.200**	**<0.500**	**<0.500**	**<1.0**
	9/11/08 [D]		**--**	**--**	**<95.2**	**<714**	**<50.0**	**<0.200**	**<0.500**	**<0.500**	**<1.0**
MW-3	08/19/04	427.16	6.73	420.43	1,190	<480	89.4	0.774	<0.5	5.83	3.18
	03/30/05		10.42	416.74	<391	<391	181	0.979	<0.5	24.1	6.94
	09/19/05		8.47	418.69	6,730	2,120	<50	0.556	<0.5	1.73	<1.5
	09/11/08		**8.96**	**418.20**	**12,000**	**<708**	**60.3**	**0.448**	**<0.500**	**0.653**	**1.96**
MW-4	08/19/04	427.02	6.59	420.43	<400	<480	<50	0.3	<0.5	<0.5	<1.0
	03/30/05		10.29	416.73	<385	<385	<50	<0.5	<0.5	<0.5	<1.5
	09/19/05		8.34	418.68	1,310	815	<50	<0.5	<0.5	<0.5	<1.5
	09/11/08		**8.83**	**418.19**	**<94.3**	**<708**	**<50.0**	**<0.200**	**<0.500**	**<0.500**	**<1.0**
MW-5	08/19/04	426.89	6.44	420.45	<400	<480	<50	<0.2	<0.5	<0.5	<1.0
	03/30/05		10.16	416.73	3,310	435	<50	<0.5	<0.5	<0.5	<1.5
	09/19/05		8.19	418.70	<431	782	<50	<0.5	<0.5	<0.5	<1.5
	09/11/08		**8.70**	**418.19**	**150**	**<708**	**<50.0**	**<0.200**	**<0.500**	**<0.500**	**<1.0**
MW-6	08/19/04	426.82	6.36	420.46	<400	<480	<50	0.351	<0.5	<0.5	<1.0
	03/30/05		10.08	416.74	<388	<388	<50	<0.5	<0.5	<0.5	<1.5
	09/19/05		8.12	418.70	<403	<403	<50	<0.5	<0.5	<0.5	<1.5
	09/11/08		**8.66**	**418.16**	**<100**	**<750**	**<50.0**	**<0.200**	**<0.500**	**<0.500**	**<1.0**

Notes:
[1]: Diesel range organics (DRO) was analyzed by AK Method 102.
[2]: Residual range organics (RRO) was analyzed by AK Method 103.
[3]: Gasoline range organics (GRO) was analyzed by AK Method 101.
[4]: Benzene, toluene, ethylbenzene, and total xylenes (BTEX) were analyzed by EPA Method 8021B.
[5]: ADEC Groundwater Cleanup Levels (GCLs) per 18 AAC 75.345, Table C, Register 188, January 2009.
[6]: MW-2 was not analyzed for DRO or RRO because there was insufficient sample volume due to breakage during shipping.

ft = feet
ft-amsl = feet-above mean sea level
µg/L = micrograms per liter
"--" = Indicates analyte was not sampled or analyzed for or parameter was not measured.
Highlighted cell indicates concentration exceeds groundwater cleanup level
"<" = Indicates analyte not detected greater than laboratory reporting limit indicated.
[D] = Indicates sample is a duplicate
Data associated with current monitoring event in **bold**.

TABLE 2
Geochemical Parameter Monitoring Results
Former Chevron Facility #301726
Lot 5A, Block 10, West Ramp
Fairbanks International Airport
Fairbanks, Alaska

Monitoring Well ID	Date Sampled	Temperature (ºC)[1]	pH[1]	DO (mg/L)[1]	ORP (mV)[1]	Total Alkalinity (mg/L as CaCO3)[2]	Sulfate (mg/L)[3]	Nitrate (mg/L)[3]	Methane (mg/L)[4]	Ferrous Iron (mg/L)[5]	Nitrate by Field Measurement (mg/L)[5]
MW-1	9/11/2008	4.22	4.34	0.02	-114.32	627	1.56	<0.200	0.638	7.4	6.0
MW-2	9/11/2008	4.63	4.41	6.43	145.16	376	12.6	<0.200	<0.0012	0.0	5.0
	9/11/2008[D]	--	--	--	--	375	12.5	<0.200	<0.0012	--	--
MW-3	9/11/2008	4.51	4.29	0.16	-8.10	543	28.1	0.210	0.0405	5.5	0.0
MW-4	9/11/2008	4.67	4.62	4.59	109.82	347	18.2	<0.200	0.0566	0.0	1.0
MW-5	9/11/2008	1.39	4.49	4.27	119.75	390	31.8	2.30	<0.0012	0.0	0.0
MW-6	9/11/2008	5.33	4.45	1.17	93.34	390	19.6	0.680	0.0336	0.0	3.0

[1]: Temperature, pH, DO and ORP measured using an In-Situ® 9500 and flow through cell.
[2]: Total Alkalinity analyzed using EPA method 310.1
[3]: Sulfate and nitrate analyzed by EPA method 300.0.
[4]: Methane analyzed using method RSK 175.
[5]: Ferrous iron and nitrate field measurement analyzed using a Hach field kit.

ºC = Degrees Celsius
DO = Dissolved oxygen
mg/L = milligrams per liter
ORP = Oxidation-reduction potential
mV = millivolts
$CaCO_3$ = Calcium carbonate
"<" = Indicates analyte not detected greater than laboratory reporting limit indicated.
EPA = Environemental Protection Agency
[D] = Indicates sample is a duplicate

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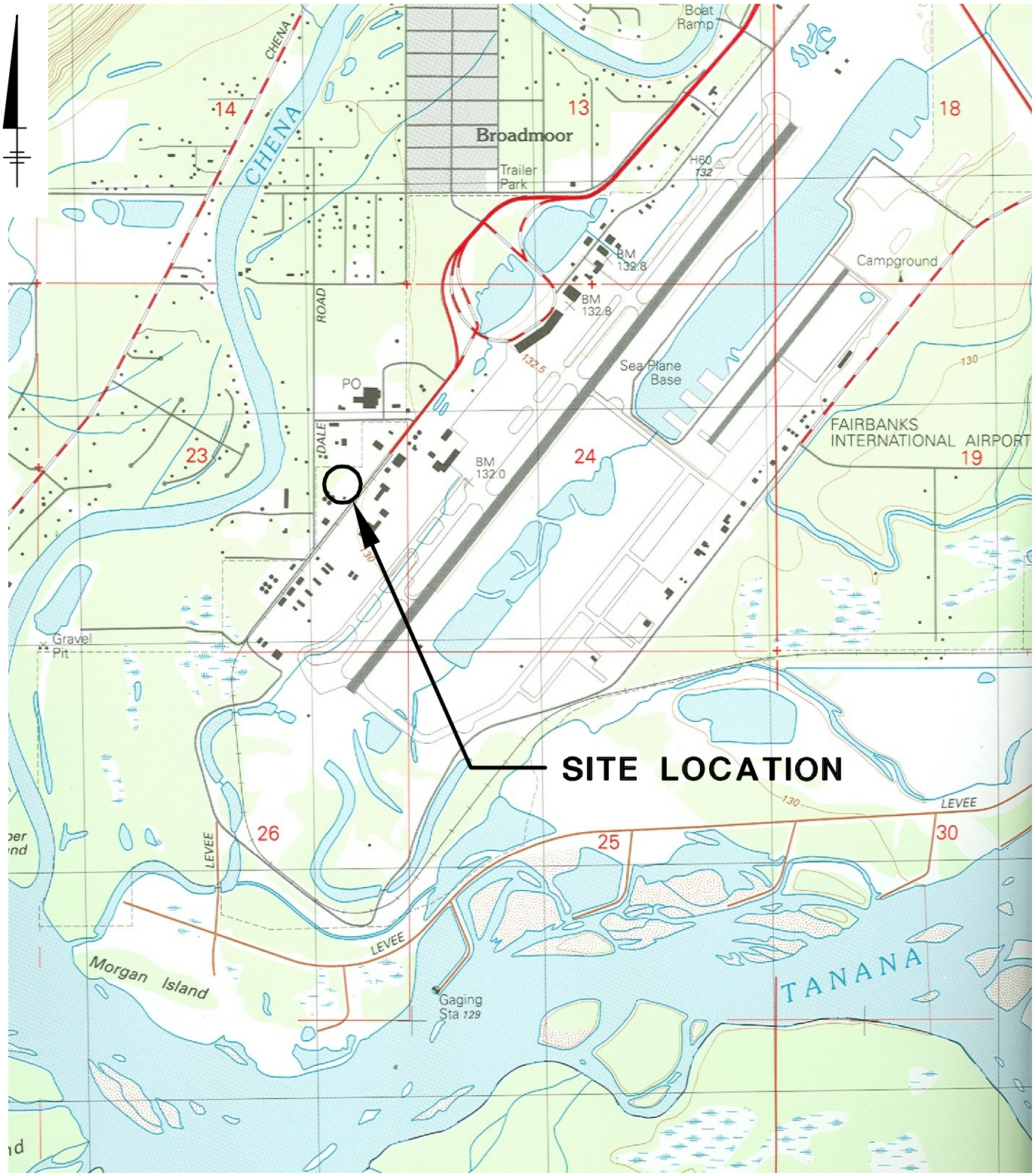
Figures



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: FAIRBANKS (D-2) SW, AK., 1992, FAIRBANKS NORTH STAR BOROUGH, SECTION: 24, TOWNSHIP: 1S, RANGE: 2W

0 2000' 4000'

APPROXIMATE GRAPHIC SCALE

CHEVRON FACILITY NO. 301726
FAIRBANKS INT. AIRPORT, FAIRBANKS, ALASKA
2008 GROUNDWATER MONITORING REPORT

SITE LOCATION MAP

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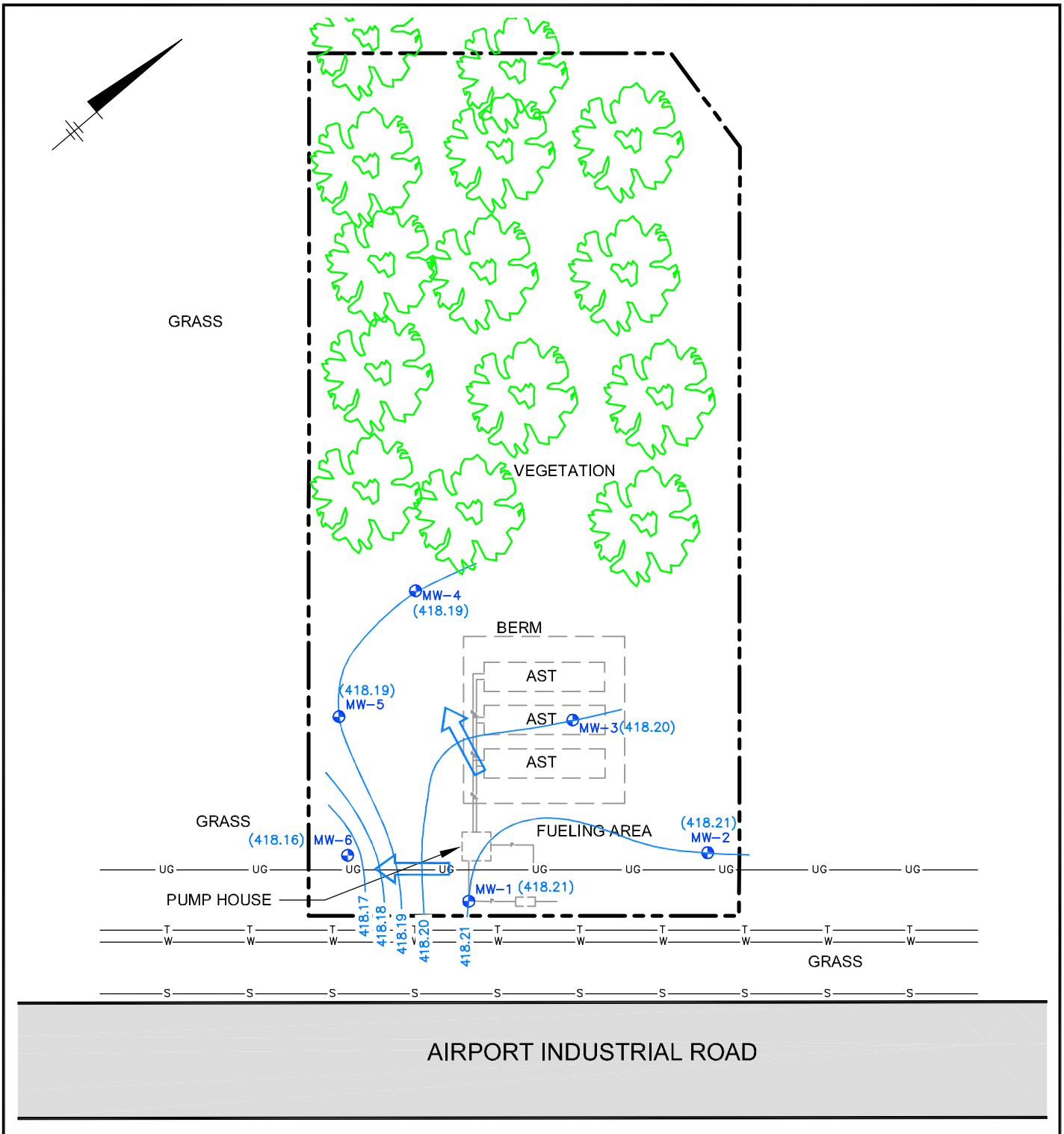
FIGURE 1



LEGEND

- MONITORING WELL
- BOUNDARY LINE
- 418.20 WATER-TABLE ELEVATION CONTOUR DASHED WHERE INFERRED CONTOUR INTERVAL = 0.01 FEET
- (418.19) WATER-TABLE ELEVATION (FEET)
- APPARENT DIRECTION OF GROUNDWATER FLOW

SOURCE: Base map digitized from "SAIC", Date 10/19/05, Scale 1"=30'

CHEVRON FACILITY NO. 301726
FAIRBANKS INT. AIRPORT, FAIRBANKS, ALASKA
2008 GROUNDWATER MONITORING REPORT

GROUNDWATER ELEVATION AND FLOW DIRECTION

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FIGURE
2

MW-6	
DATE	9/11/2008
DRO	<100
GRO	<50
B	<0.200
T	<0.500
E	<0.500
X	<1.00

MW-5	
DATE	9/11/2008
DRO	150
GRO	<50
B	<0.200
T	<0.500
E	<0.500
X	<1.00

MW-4	
DATE	9/11/2008
DRO	<94.3
GRO	<50
B	<0.200
T	<0.500
E	<0.500
X	<1.00

MW-1	
DATE	9/11/2008
DRO	**12,000**
GRO	**6,680**
B	**357**
T	413
E	124
X	815

MW-3	
DATE	9/11/2008
DRO	**12,000**
GRO	60.3
B	0.448
T	<0.500
E	0.653
X	1.96

MW-2	
DATE	9/11/2008
DRO	<94.3/<95.2
GRO	<50.0/<50.0
B	<0.200/<0.200
T	<0.500/<0.500
E	<0.500/<0.500
X	<1.00/<1.00

VEGETATION

MW-4

BERM

AST

AST

AST

MW-5

MW-3

GRASS

MW-6

FUELING AREA

MW-2

UG

PUMP HOUSE

MW-1

T

W

GRASS

S

AIRPORT INDUSTRIAL ROAD

RAILROAD

LEGEND

MONITORING WELL

BOUNDARY LINE

SAMPLE LOCATION		
DATE	SAMPLE DATE	ADEC LEVEL
DRO	DIESEL RANGE ORGANICS	1,500
GRO	GASOLINE RANGE ORGANICS	2,200
B	BENZENE	5.0
T	TOLUENE	1,000
E	ETHYLBENZENE	700
X	TOTAL XYLENES	10,000

RESULTS REPORTED IN MICROGRAMS PER LITER (µg/L)

BOLD INDICATES CONCENTRATION EXCEEDS RESPECTIVE GROUNDWATER CLEANUP LEVEL

ADEC = ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SOURCE: Base map digitized from "SAIC", Date 10/19/05, Scale 1"=30'

0 50' 100'

GRAPHIC SCALE

CHEVRON FACILITY NO. 301726
FAIRBANKS INT. AIRPORT, FAIRBANKS, ALASKA
2008 GROUNDWATER MONITORING REPORT

GROUNDWATER ANALYTICAL RESULTS

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FIGURE
3

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Appendix A

Field Sheets

ARCADIS Groundwater Sampling Form

Project No. _____ Well ID MW-1 Date 9/11/08

Project Name/Location FIA Texaco 301726 / Fairbanks, AK Weather Partly Cloudy

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2" Well Material ✓ PVC ___ SS

Static Water Level (ft-btoc) 8.63 Total Depth (ft-btoc) 13.99 Water Column/ Gallons in Well 5.36 / 0.87

TOC Elevation _____ Pump Intake (ft-btoc) _____ Purge Method: Peristaltic Centrifugal ___ Submersible ___ Other ___ Sample Method Peristaltic

Pump On/Off _____ Volumes Purged _____

Sample Time: Label 1540 Start _____ End _____ Replicate/ Code No. _____ Sampled by MLS

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
		In-Situ										
		Ferrous Iron: 7.4 mg/L										
Field kit		Nitrate: 6.0 mg/L										

Constituents Sampled	Container	Number	Preservative
BETX & GRO	VOA	3	HCl
DRO & RRO	Amber	2	HCl
Total Alkalinity	1L Poly	1	—
Sulfate			
Nitrate as Nitrogen			
Methane	VOA	3	HCl

Well Casing Volumes

Gallons/Foot: 1" = 0.04; 1.25" = 0.06; 1.5" = 0.09; 2" = 0.16; 2.5" = 0.26; 3" = 0.37; 3.5" = 0.50; 4" = 0.65; 6" = 1.47

Well Information

Well Location: Edge of gravel

Condition of Well: Good

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well: 3910

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Troll 9000 Low-Flow System
09/11/08 ISI Low-Flow Log

Project Information:

Operator Name	Mike Strickler
Company Name	ARCADIS
Project Name	FIA Texaco
Site Name	301726

Pump Information:

Pump Model/Type	Geopump 2
Tubing Type	FEP lined poly
Tubing Diameter	0.43 [cm]
Tubing Length	40 [m]
Pump placement from TOC	0 [m]

Well Information:

Well Id	MW-1
Well diameter	2 [cm]
Well total depth	13.99 [m]
Depth to top of screen	0 [m]
Screen length	0 [cm]
Depth to Water	8.63 [m]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	1131.88 [mL]
Calculated Sample Rate	272 [sec]
Sample rate	272 [sec]
Stabilized drawdown	0 [cm]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.03 +/-10 %	+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-10
Last 5 Readings	15:13:50	4.45	4.30	0.07	10.45	0.26	-109.65
	15:18:32	4.36	4.31	0.07	9.64	0.09	-111.19
	15:23:14	4.24	4.33	0.07	7.66	0.06	-112.65
	15:27:56	4.21	4.34	0.07	7.09	0.04	-113.82
	15:32:38	4.22	4.34	0.07	7.59	0.02	-114.32
Variance in last 3 readings	15:23:14	-0.13	0.01	0.00	-1.98	-0.04	-1.46
	15:27:56	-0.03	0.01	0.00	-0.58	-0.02	-1.17
	15:32:38	0.01	0.01	0.00	0.50	-0.01	-0.50

Notes: 1540 sample time

ARCADIS Groundwater Sampling Form

Page 1 of 1

Project No. _____ Well ID MW-2 Date 9/11/08

Project Name/Location FIA Texaco 301726/Fairbanks, AK Weather Partly Sunny

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2" Well Material ✓ PVC ___ SS

Static Water Level (ft-btoc) 8.52 Total Depth (ft-btoc) 13.29 Water Column/ Gallons in Well 4.77 / 0.78

TOC Elevation _____ Pump Intake (ft-btoc) _____ Purge Method: Peristaltic Centrifugal ___ Submersible ___ Other ___ Sample Method Peristaltic

Pump On/Off _____ Volumes Purged _____

Sample Time: Label 1325 Start _____ End _____ Replicate/ Code No. DUP-1 Sampled by MLS

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
		In-Situ										
Field Kit		Ferrous Iron: 0.0 mg/L (no color)										
		Nitrate: 5.0 mg/L										
		^DUP-1 collected from this well										

Constituents Sampled	Container	Number	Preservative
BETX & GRO	VOA	3	HCl
DRO & RRO	Amber	2	HCl
Total Alkalinity	1L Poly	1	None
Sulfate			
Nitrate as Nitrogen			
Methane	VOA	3	HCl

Well Casing Volumes

Gallons/Foot: 1" = 0.04; 1.25" = 0.06; 1.5" = 0.09; 2" = 0.16; 2.5" = 0.26; 3" = 0.37; 3.5" = 0.50; 4" = 0.65; 6" = 1.47

Well Information

Well Location: Edge of Fence Well Locked at Arrival: (Yes) / No

Condition of Well: Good Well Locked at Departure: (Yes) / No

Well Completion: (Flush Mount) / Stick Up Key Number To Well: 3910

GW Samp Form 9/3/2008

ARCADIS

Troll 9000 Low-Flow System
09/11/08 ISI Low-Flow Log

Project Information:

Operator Name	Mike Strickler
Company Name	ARCADIS
Project Name	FIA Texaco
Site Name	301726

Pump Information:

Pump Model/Type	Geopump 2
Tubing Type	FEP lined poly
Tubing Diameter	0.43 [cm]
Tubing Length	40 [m]
Pump placement from TOC	0 [m]

Well Information:

Well Id	MW-2
Well diameter	2 [cm]
Well total depth	13.29 [m]
Depth to top of screen	0 [m]
Screen length	0 [cm]
Depth to Water	8.52 [m]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	1131.88 [mL]
Calculated Sample Rate	272 [sec]
Sample rate	272 [sec]
Stabilized drawdown	0 [cm]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.03 +/-10 %	+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-10
Last 5 Readings	13:00:40	5.63	4.38	0.05	17.46	7.86	136.34
	13:05:22	5.13	4.39	0.05	5.83	7.09	139.15
	13:10:04	4.67	4.39	0.04	4.21	6.72	141.57
	13:14:46	4.64	4.40	0.04	3.11	6.50	143.48
	13:19:28	4.63	4.41	0.04	2.58	6.43	145.16
Variance in last 3 readings	13:10:04	-0.46	0.00	0.00	-1.62	-0.37	2.42
	13:14:46	-0.03	0.01	0.00	-1.11	-0.22	1.90
	13:19:28	-0.01	0.00	0.00	-0.53	-0.07	1.69

Notes: 1325 sample time

ARCADIS Groundwater Sampling Form

Page 1 of 1

Project No. _____ Well ID MW-3 Date 9/11/08

Project Name/Location FIA Texaco 301726 / Fairbanks, AK Weather Cloudy

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2" Well Material ✓ PVC ___ SS

Static Water Level (ft-btoc) 8.96 Total Depth (ft-btoc) 14.07 Water Column/ Gallons in Well 5.11 / 0.83

TOC Elevation _____ Pump Intake (ft-btoc) _____ Purge Method: Peristaltic Centrifugal ___ Submersible ___ Other ___ Sample Method Peristaltic

Pump On/Off _____ Volumes Purged _____

Sample Time: Label 1220 Start _____ End _____ Replicate/ Code No. _____ Sampled by MLS

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
			In-Situ									
			Ferrous Iron: 5.5 mg/L									
Field Kit												
			Nitrate: 0.0 mg/L (NO COLOR CHANGE)									

Constituents Sampled	Container	Number	Preservative
BETX & GRO	VOA	3	HCl
DRO & RRO	Amber	2	HCl
Total Alkalinity	1L Poly	1	Unpre.
Sulfate			
Nitrate as Nitrogen			
Methane	VOA	3	HCl

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Well Information

Well Location: Gravel Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 3910

ARCADIS

Troll 9000 Low-Flow System
09/11/08 ISI Low-Flow Log

Project Information:

Operator Name	Mike Strickler
Company Name	ARCADIS
Project Name	FIA Texaco
Site Name	301726

Pump Information:

Pump Model/Type	Geopump 2
Tubing Type	FEP lined poly
Tubing Diameter	0.43 [cm]
Tubing Length	40 [m]
Pump placement from TOC	0 [m]

Well Information:

Well Id	MW-3
Well diameter	2 [cm]
Well total depth	14.07 [m]
Depth to top of screen	0 [m]
Screen length	0 [cm]
Depth to Water	8.96 [m]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	1136.75 [mL]
Calculated Sample Rate	273 [sec]
Sample rate	273 [sec]
Stabilized drawdown	0 [cm]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.03 +/-10 %	+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-10
Last 5 Readings	11:55:04	5.13	4.27	0.06	5.58	0.69	8.63
	11:59:50	4.65	4.27	0.06	9.03	0.37	0.82
	12:04:33	4.79	4.28	0.06	30.57	0.23	-5.03
	12:09:16	4.64	4.28	0.06	50.75	0.17	-7.25
	12:13:59	4.51	4.29	0.06	174.04	0.16	-8.10
Variance in last 3 readings	12:04:33	0.14	0.00	0.00	21.54	-0.14	-5.85
	12:09:16	-0.14	0.00	0.00	20.17	-0.05	-2.22
	12:13:59	-0.14	0.01	0.00	123.29	-0.01	-0.85

Notes: 1220 sample time

ARCADIS Groundwater Sampling Form

Project No. _____ Well ID MW-4 Date 9/11/08

Project Name/Location FIA Texaco 301726 / Fairbanks, AK Weather Cloudy

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2" Well Material ✓ PVC ___ SS

Static Water Level (ft-btoc) 8.83 Total Depth (ft-btoc) 14.16 Water Column/ Gallons in Well 5.33 / 0.87

TOC Elevation _____ Pump Intake (ft-btoc) _____ Purge Method: Peristaltic Centrifugal Submersible Other _____ Sample Method Peristaltic

Pump On/Off _____ Volumes Purged _____

Sample Time: Label 1755 Start _____ End _____ Replicate/ Code No. _____ Sampled by MLS

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
		In-Situ										
Field kit		Ferrous Iron: 0.0 Mg/L										
		Nitrate: 1.0 Mg/L										

Constituents Sampled	Container	Number	Preservative
BETX + GRO	VOA	3	HCl
DRO + RRO	Amber	2	HCl
Total Alkalinity	Poly (1L)	1	—
Sulfate			
Nitrate as Nitrogen			
Methane	VOA	3	HCl

Well Casing Volumes

Gallons/Foot: 1" = 0.04; 1.25" = 0.06; 1.5" = 0.09; 2" = 0.16; 2.5" = 0.26; 3" = 0.37; 3.5" = 0.50; 4" = 0.65; 6" = 1.47

Well Information

Well Location: Edge of Woods Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: 3910

ARCADIS

Troll 9000 Low-Flow System
09/11/08 ISI Low-Flow Log

Project Information:

Operator Name	Mike Strickler
Company Name	ARCADIS
Project Name	FIA Texaco
Site Name	301726

Pump Information:

Pump Model/Type	Geopump 2
Tubing Type	FEP lined poly
Tubing Diameter	0.43 [cm]
Tubing Length	40 [m]
Pump placement from TOC	0 [m]

Well Information:

Well Id	MW-4
Well diameter	2 [cm]
Well total depth	14.16 [m]
Depth to top of screen	0 [m]
Screen length	0 [cm]
Depth to Water	8.83 [m]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	1131.88 [mL]
Calculated Sample Rate	272 [sec]
Sample rate	272 [sec]
Stabilized drawdown	0 [cm]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.03 +/-10 %	+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-10
Last 5 Readings	17:27:39	4.10	4.65	0.04	43.46	12.87	116.14
	17:32:20	4.64	4.62	0.04	8.71	8.51	116.18
	17:37:02	4.65	4.63	0.04	2.91	6.46	112.25
	17:41:44	4.62	4.63	0.04	2.51	5.22	110.03
	17:46:26	4.67	4.62	0.04	2.16	4.59	109.82
Variance in last 3 readings	17:37:02	0.01	0.01	0.00	-5.81	-2.05	-3.93
	17:41:44	-0.04	0.00	0.00	-0.39	-1.23	-2.22
	17:46:26	0.06	0.00	0.00	-0.36	-0.63	-0.21

Notes: 1755 sample time

ARCADIS Groundwater Sampling Form

Page 1 of 1

Project No. _____ Well ID MW-5 Date 9/11/08

Project Name/Location FIA Texaco 301726 / Fairbanks, AK Weather Cloudy

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2" Well Material ✓ PVC ___ SS

Static Water Level (ft-btoc) 8.70 Total Depth (ft-btoc) 14.20 Water Column/ Gallons in Well 5.5 / 0.90

TOC Elevation _____ Pump Intake (ft-btoc) _____ Purge Method: Peristaltic Centrifugal Submersible Other Sample Method Peristaltic

Pump On/Off _____ Volumes Purged _____

Sample Time: Label 1715 Start _____ End _____ Replicate/ Code No. _____ Sampled by MLS

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
		In-Situ										
		Ferrous Iron:				Ø.Ø		mg/L				
Field Kit		Nitrate:				mg/L						

Constituents Sampled	Container	Number	Preservative
BETX & GRO	VOA	3	HCl
DRO & RRO	Amber	2	HCl
Total Alkalinity	1L Poly	1	—
Sulfate			
Nitrate as Nitrogen			
Methane	VOA	3	HCl

Well Casing Volumes

Gallons/Foot: 1" = 0.04; 1.25" = 0.06; 1.5" = 0.09; 2" = 0.16; 2.5" = 0.26; 3" = 0.37; 3.5" = 0.50; 4" = 0.65; 6" = 1.47

Well Information

Well Location: Gravel

Condition of Well: Good - Buried

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well: 3910

GW Samp Form 9/3/2008

ARCADIS

Troll 9000 Low-Flow System
09/11/08 ISI Low-Flow Log

Project Information:

Operator Name	Mike Strickler
Company Name	ARCADIS
Project Name	FIA Texaco
Site Name	301726

Pump Information:

Pump Model/Type	Geopump 2
Tubing Type	FEP lined poly
Tubing Diameter	0.43 [cm]
Tubing Length	40 [m]
Pump placement from TOC	0 [m]

Well Information:

Well Id	MW-5
Well diameter	2 [cm]
Well total depth	14.2 [m]
Depth to top of screen	0 [m]
Screen length	0 [cm]
Depth to Water	8.7 [m]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	1131.88 [mL]
Calculated Sample Rate	272 [sec]
Sample rate	272 [sec]
Stabilized drawdown	0 [cm]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.03 +/-10 %	+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-10
Last 5 Readings	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00
	16:52:27	2.46	4.52	0.04	66.61	10.08	104.16
	16:57:08	1.59	4.49	0.04	40.33	6.08	113.18
	17:01:50	1.44	4.49	0.04	14.97	4.86	117.09
	17:06:32	1.39	4.49	0.04	10.17	4.27	119.75
Variance in last 3 readings	16:57:08	-0.88	-0.03	0.00	-26.27	-4.01	9.03
	17:01:50	-0.15	-0.01	0.00	-25.36	-1.22	3.90
	17:06:32	-0.05	0.00	0.00	-4.80	-0.59	2.66

Notes: 1715 sample time

ARCADIS Groundwater Sampling Form

Project No. _____ Well ID MW-6 Date 9/11/08

Project Name/Location FIA Texaco 301726 / Fairbanks, AK Weather Partly Sunny

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2" Well Material ✓ PVC ___ SS

Static Water Level (ft-btoc) 8.66 Total Depth (ft-btoc) 13.95 Water Column/ Gallons in Well 5.29 / 0.86

TOC Elevation _____ Pump Intake (ft-btoc) _____ Purge Method: Peristaltic Sample Method Peristaltic

Pump On/Off _____ Volumes Purged _____ Centrifugal _____ Submersible _____ Other _____

Sample Time: Label 1625 Start _____ End _____ Replicate/ Code No. _____ Sampled by MLS

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C) (°F)	Redox (mV)	Appearance Color	Appearance Odor
		In-Situ										
		Ferrous Iron: 0.0 mg/L (no color)										
Field kit		Nitrate: 3.0						mg/L				

Constituents Sampled	Container	Number	Preservative
BETX & GRO	VOA	3	HCl
DRO & RRO	Amber	2	HCl
Total Alkalinity	1L Poly	1	—
Sulfate			
Nitrate as Nitrogen			
Methane	VOA	3	HCl

Well Casing Volumes

Gallons/Foot: 1" = 0.04; 1.25" = 0.06; 1.5" = 0.09; 2" = 0.16; 2.5" = 0.26; 3" = 0.37; 3.5" = 0.50; 4" = 0.65; 6" = 1.47

Well Information

Well Location: Grassy Area Well Locked at Arrival: (Yes) / No

Condition of Well: Good Well Locked at Departure: (Yes) / No

Well Completion: (Flush Mount) / Stick Up Key Number To Well: 3910

GW Samp Form 9/3/2008

ARCADIS

Troll 9000 Low-Flow System
09/11/08 ISI Low-Flow Log

Project Information:

Operator Name	Mike Strickler
Company Name	ARCADIS
Project Name	FIA Texaco
Site Name	301726

Pump Information:

Pump Model/Type	Geopump 2
Tubing Type	FEP lined poly
Tubing Diameter	0.43 [cm]
Tubing Length	40 [m]
Pump placement from TOC	0 [m]

Well Information:

Well Id	MW-6
Well diameter	2 [cm]
Well total depth	13.95 [m]
Depth to top of screen	0 [m]
Screen length	0 [cm]
Depth to Water	8.66 [m]

Pumping information:

Final pumping rate	250 [mL/min]
Flowcell volume	1131.88 [mL]
Calculated Sample Rate	272 [sec]
Sample rate	272 [sec]
Stabilized drawdown	0 [cm]

Low-Flow Sampling Stabilization Summary

	Time	Temp [C]	pH [pH]	Cond [mS/cm]	Turb [NTU]	RDO [mg/L]	ORP [mV]
Stabilization Settings			+/-0.1	+/-0.03 +/-10 %	+/-0.1 +/-10 %	+/-0.1 +/-10 %	+/-10
Last 5 Readings	16:10:41	5.37	4.44	0.05	448.95	3.35	76.45
	16:15:24	5.58	4.44	0.05	303.62	1.98	82.02
	16:20:06	5.41	4.44	0.05	93.84	1.64	86.52
	16:24:47	5.37	4.45	0.05	16.31	1.35	90.68
	16:29:29	5.33	4.45	0.05	3.07	1.17	93.34
Variance in last 3 readings	16:20:06	-0.17	0.00	0.00	-209.78	-0.33	4.50
	16:24:47	-0.04	0.00	0.00	-77.53	-0.29	4.16
	16:29:29	-0.04	0.00	0.00	-13.23	-0.18	2.66

Notes: 1625 sample time

ARCADIS

Appendix B

Laboratory Analytical Reports and
Chain-of-Custody Documentation

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

September 29, 2008

Mike Strickler
Arcadis, Geraghty, & Miller - Seattle
2300 Eastlake Avenue East, Suite 100
Seattle, WA/USA 98102

RE: 301726

Enclosed are the results of analyses for samples received by the laboratory on 09/13/08 12:01. The following list is a summary of the Work Orders contained in this report, generated on 09/29/08 11:41.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
BRI0213	301726	[none]

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	BRI0213-01	Water	09/11/08 15:40	09/13/08 12:01
MW-2	BRI0213-02	Water	09/11/08 13:25	09/13/08 12:01
MW-3	BRI0213-03	Water	09/11/08 12:20	09/13/08 12:01
MW-4	BRI0213-04	Water	09/11/08 17:55	09/13/08 12:01
MW-5	BRI0213-05	Water	09/11/08 17:15	09/13/08 12:01
MW-6	BRI0213-06	Water	09/11/08 16:25	09/13/08 12:01
DUP-1	BRI0213-07	Water	09/11/08 17:00	09/13/08 12:01
Trip Blank	BRI0213-08	Water	09/11/08 17:00	09/13/08 12:01

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name: **301726**	
2300 Eastlake Avenue East, Suite 100	Project Number: [none]	Report Created:
Seattle, WA/USA 98102	Project Manager: Mike Strickler	09/29/08 11:41

Gasoline Hydrocarbons (n-Hexane to <n-Decane) and BTEX by AK101/EPA 8021B

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-01 (MW-1)		**Water**				**Sampled: 09/11/08 15:40**					
Gasoline Range Hydrocarbons	AK 101	**6680**	-----	500	ug/l	10x	8I16027	09/16/08 11:21	09/17/08 03:11	kmt	
Benzene	"	**357**	-----	2.00	"	"	"	"	"	kmt	
Toluene	"	**413**	-----	5.00	"	"	"	"	"	kmt	
Ethylbenzene	"	**124**	-----	5.00	"	"	"	"	"	kmt	
Xylenes (total)	"	**815**	-----	10.0	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*91.1%*		*60 - 120 %*	*1x*			*"*		
4-BFB (PID)			*99.1%*		*68 - 140 %*	*"*			*"*		
BRI0213-02 (MW-2)		**Water**				**Sampled: 09/11/08 13:25**					
Gasoline Range Hydrocarbons	AK 101	ND	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/17/08 00:29	kmt	
Benzene	"	ND	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*86.5%*		*60 - 120 %*	*"*			*"*		
4-BFB (PID)			*101%*		*68 - 140 %*	*"*			*"*		
BRI0213-03 (MW-3)		**Water**				**Sampled: 09/11/08 12:20**					
Gasoline Range Hydrocarbons	AK 101	**60.3**	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/16/08 20:41	kmt	**Q8**
Benzene	"	**0.448**	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	**0.653**	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	**1.96**	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*99.5%*		*60 - 120 %*	*"*			*"*		
4-BFB (PID)			*106%*		*68 - 140 %*	*"*			*"*		
BRI0213-04 (MW-4)		**Water**				**Sampled: 09/11/08 17:55**					
Gasoline Range Hydrocarbons	AK 101	ND	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/17/08 01:01	kmt	
Benzene	"	ND	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*86.4%*		*60 - 120 %*	*"*			*"*		
4-BFB (PID)			*100%*		*68 - 140 %*	*"*			*"*		

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

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CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name: **301726**	
2300 Eastlake Avenue East, Suite 100	Project Number: [none]	Report Created:
Seattle, WA/USA 98102	Project Manager: Mike Strickler	09/29/08 11:41

Gasoline Hydrocarbons (n-Hexane to <n-Decane) and BTEX by AK101/EPA 8021B

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-05 (MW-5)		**Water**					**Sampled: 09/11/08 17:15**				
Gasoline Range Hydrocarbons	AK 101	ND	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/17/08 01:34	kmt	
Benzene	"	ND	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*84.8%*		*60 - 120 %*	"				"	
4-BFB (PID)			*100%*		*68 - 140 %*	"				"	
BRI0213-06 (MW-6)		**Water**					**Sampled: 09/11/08 16:25**				
Gasoline Range Hydrocarbons	AK 101	ND	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/17/08 02:06	kmt	
Benzene	"	ND	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*85.2%*		*60 - 120 %*	"				"	
4-BFB (PID)			*100%*		*68 - 140 %*	"				"	
BRI0213-07 (DUP-1)		**Water**					**Sampled: 09/11/08 17:00**				
Gasoline Range Hydrocarbons	AK 101	ND	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/17/08 02:39	kmt	
Benzene	"	ND	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*86.8%*		*60 - 120 %*	"				"	
4-BFB (PID)			*100%*		*68 - 140 %*	"				"	
BRI0213-08 (Trip Blank)		**Water**					**Sampled: 09/11/08 17:00**				
Gasoline Range Hydrocarbons	AK 101	ND	-----	50.0	ug/l	1x	8I16027	09/16/08 11:21	09/16/08 23:56	kmt	
Benzene	"	ND	-----	0.200	"	"	"	"	"	kmt	
Toluene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Ethylbenzene	"	ND	-----	0.500	"	"	"	"	"	kmt	
Xylenes (total)	"	ND	-----	1.00	"	"	"	"	"	kmt	
Surrogate(s): 4-BFB (FID)			*86.5%*		*60 - 120 %*	"				"	
4-BFB (PID)			*100%*		*68 - 140 %*	"				"	

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CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Diesel Hydrocarbons (C10-C25) and Heavy Oil (C25-C36) by AK102 and AK103

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-01 (MW-1)			**Water**				**Sampled: 09/11/08 15:40**				
Residual Range Organics	AK102_103	ND	-----	0.708	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 11:55	WAS	
Surrogate(s): 2-FBP			*154%*		*50 - 150 %*	"			"		***ZX***
Octacosane			*106%*		*50 - 150 %*	"			"		
BRI0213-01RE1 (MW-1)			**Water**				**Sampled: 09/11/08 15:40**				
Diesel Range Hydrocarbons	AK102_103	**12.0**	-----	0.472	mg/l	5x	8I15017	09/15/08 09:20	09/17/08 19:18	WAS	**Q11**
Surrogate(s): 2-FBP			*198%*		*50 - 150 %*	"			"		***ZX***
Octacosane			*92.2%*		*50 - 150 %*	"			"		
BRI0213-02 (MW-2)			**Water**				**Sampled: 09/11/08 13:25**				
Diesel Range Hydrocarbons	AK102_103	ND	-----	0.0943	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 12:25	WAS	
Residual Range Organics	"	ND	-----	0.708	"	"	"	"	"	WAS	
Surrogate(s): 2-FBP			*77.4%*		*50 - 150 %*	"			"		
Octacosane			*105%*		*50 - 150 %*	"			"		
BRI0213-03 (MW-3)			**Water**				**Sampled: 09/11/08 12:20**				
Diesel Range Hydrocarbons	AK102_103	**12.0**	-----	0.0943	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 12:39	WAS	**Q11**
Residual Range Organics	"	ND	-----	0.708	"	"	"	"	"	WAS	
Surrogate(s): 2-FBP			*119%*		*50 - 150 %*	"			"		
Octacosane			*104%*		*50 - 150 %*	"			"		
BRI0213-04 (MW-4)			**Water**				**Sampled: 09/11/08 17:55**				
Diesel Range Hydrocarbons	AK102_103	ND	-----	0.0943	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 13:09	WAS	
Residual Range Organics	"	ND	-----	0.708	"	"	"	"	"	WAS	
Surrogate(s): 2-FBP			*75.7%*		*50 - 150 %*	"			"		
Octacosane			*102%*		*50 - 150 %*	"			"		
BRI0213-05 (MW-5)			**Water**				**Sampled: 09/11/08 17:15**				
Diesel Range Hydrocarbons	AK102_103	**0.150**	-----	0.0943	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 13:39	WAS	**Q3**
Residual Range Organics	"	ND	-----	0.708	"	"	"	"	"	WAS	
Surrogate(s): 2-FBP			*77.2%*		*50 - 150 %*	"			"		
Octacosane			*97.6%*		*50 - 150 %*	"			"		

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Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Diesel Hydrocarbons (C10-C25) and Heavy Oil (C25-C36) by AK102 and AK103

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-06 (MW-6)		**Water**					**Sampled: 09/11/08 16:25**				
Diesel Range Hydrocarbons	AK102_103	ND	-----	0.100	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 13:54	WAS	
Residual Range Organics	"	ND	-----	0.750	"	"	"	"	"	WAS	
Surrogate(s): 2-FBP			*79.4%*		*50 - 150 %*	"			"		
Octacosane			*104%*		*50 - 150 %*	"			"		
BRI0213-07 (DUP-1)		**Water**					**Sampled: 09/11/08 17:00**				
Diesel Range Hydrocarbons	AK102_103	ND	-----	0.0952	mg/l	1x	8I15017	09/15/08 09:20	09/17/08 14:24	WAS	
Residual Range Organics	"	ND	-----	0.714	"	"	"	"	"	WAS	
Surrogate(s): 2-FBP			*84.9%*		*50 - 150 %*	"			"		
Octacosane			*108%*		*50 - 150 %*	"			"		

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Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Conventional Chemistry Parameters by APHA/EPA Methods

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-01 (MW-1)			**Water**			**Sampled: 09/11/08 15:40**					
Total Alkalinity	EPA 310.1	**627**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	
BRI0213-02 (MW-2)			**Water**			**Sampled: 09/11/08 13:25**					
Total Alkalinity	EPA 310.1	**376**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	
BRI0213-03 (MW-3)			**Water**			**Sampled: 09/11/08 12:20**					
Total Alkalinity	EPA 310.1	**543**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	
BRI0213-04 (MW-4)			**Water**			**Sampled: 09/11/08 17:55**					
Total Alkalinity	EPA 310.1	**347**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	
BRI0213-05 (MW-5)			**Water**			**Sampled: 09/11/08 17:15**					
Total Alkalinity	EPA 310.1	**390**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	
BRI0213-06 (MW-6)			**Water**			**Sampled: 09/11/08 16:25**					
Total Alkalinity	EPA 310.1	**390**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	
BRI0213-07 (DUP-1)			**Water**			**Sampled: 09/11/08 17:00**					
Total Alkalinity	EPA 310.1	**375**	-----	5.00	mg/L as CaCO3	1x	8I17056	09/17/08 17:29	09/17/08 19:30	PT	

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CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name: **301726**	
2300 Eastlake Avenue East, Suite 100	Project Number: [none]	Report Created:
Seattle, WA/USA 98102	Project Manager: Mike Strickler	09/29/08 11:41

Anions by EPA Method 300.0

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-01 (MW-1)			**Water**			**Sampled: 09/11/08 15:40**					
Nitrate-Nitrogen	EPA 300.0	ND	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 13:04	LSB	
Sulfate	"	**1.56**	-----	0.400	mg/l	"	"	"	"	LSB	
BRI0213-02 (MW-2)			**Water**			**Sampled: 09/11/08 13:25**					
Nitrate-Nitrogen	EPA 300.0	ND	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 12:48	LSB	
Sulfate	"	**12.6**	-----	0.400	mg/l	"	"	"	"	LSB	
BRI0213-03 (MW-3)			**Water**			**Sampled: 09/11/08 12:20**					
Nitrate-Nitrogen	EPA 300.0	**0.210**	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 12:33	LSB	
Sulfate	"	**28.1**	-----	0.800	mg/l	2x	"	"	09/16/08 13:15	LSB	
BRI0213-04 (MW-4)			**Water**			**Sampled: 09/11/08 17:55**					
Nitrate-Nitrogen	EPA 300.0	ND	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 13:20	LSB	
Sulfate	"	**18.2**	-----	0.400	mg/l	"	"	"	"	LSB	
BRI0213-05 (MW-5)			**Water**			**Sampled: 09/11/08 17:15**					
Nitrate-Nitrogen	EPA 300.0	**2.30**	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 13:35	LSB	
Sulfate	"	**31.8**	-----	0.800	mg/l	2x	"	"	09/16/08 13:30	LSB	
BRI0213-06 (MW-6)			**Water**			**Sampled: 09/11/08 16:25**					
Nitrate-Nitrogen	EPA 300.0	**0.680**	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 13:51	LSB	
Sulfate	"	**19.6**	-----	0.800	mg/l	2x	"	"	09/16/08 13:46	LSB	
BRI0213-07 (DUP-1)			**Water**			**Sampled: 09/11/08 17:00**					
Nitrate-Nitrogen	EPA 300.0	ND	-----	0.200	mg/l as N	1x	8I14003	09/13/08 12:33	09/13/08 14:07	LSB	
Sulfate	"	**12.5**	-----	0.400	mg/l	"	"	"	"	LSB	

TestAmerica Seattle

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Arcadis, Geraghty, & Miller - Seattle	Project Name: **301726**	
2300 Eastlake Avenue East, Suite 100	Project Number: [none]	Report Created:
Seattle, WA/USA 98102	Project Manager: Mike Strickler	09/29/08 11:41

Hydrocarbons by GC/FID Headspace

TestAmerica Anchorage

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Analyst	Notes
BRI0213-01 (MW-1)			**Water**			**Sampled: 09/11/08 15:40**					
Methane	GC/FID	**638**	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	
BRI0213-02 (MW-2)			**Water**			**Sampled: 09/11/08 13:25**					
Methane	GC/FID	ND	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	
BRI0213-03 (MW-3)			**Water**			**Sampled: 09/11/08 12:20**					
Methane	GC/FID	**40.5**	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	
BRI0213-04 (MW-4)			**Water**			**Sampled: 09/11/08 17:55**					
Methane	GC/FID	**56.6**	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	
BRI0213-05 (MW-5)			**Water**			**Sampled: 09/11/08 17:15**					
Methane	GC/FID	ND	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	
BRI0213-06 (MW-6)			**Water**			**Sampled: 09/11/08 16:25**					
Methane	GC/FID	**33.6**	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	
BRI0213-07 (DUP-1)			**Water**			**Sampled: 09/11/08 17:00**					
Methane	GC/FID	ND	-----	1.20	ug/l	1x	8090086	09/23/08 09:16	09/23/08 13:26	DS	

TestAmerica Seattle

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Arcadis, Geraghty, & Miller - Seattle	Project Name: **301726**	
2300 Eastlake Avenue East, Suite 100	Project Number: [none]	Report Created:
Seattle, WA/USA 98102	Project Manager: Mike Strickler	09/29/08 11:41

Gasoline Hydrocarbons (n-Hexane to <n-Decane) and BTEX by AK101/EPA 8021B - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 8I16027 **Water Preparation Method: EPA 5030B (P/T)**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8I16027-BLK1)							**Extracted: 09/16/08 11:21**							
Gasoline Range Hydrocarbons	AK 101	ND	---	50.0	ug/l	1x	--	--	--	--	--	--	09/16/08 16:52	
Benzene	"	ND	---	0.200	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Surrogate(s): 4-BFB (FID)		*Recovery: 87.7%*			*Limits: 60-120%*	"							*09/16/08 16:52*	
4-BFB (PID)		*100%*			*68-140%*	"							"	
LCS (8I16027-BS1)							**Extracted: 09/16/08 11:21**							
Gasoline Range Hydrocarbons	AK 101	1090	---	50.0	ug/l	1x	--	1000	109%	(60-120)	--	--	09/16/08 17:25	
Surrogate(s): 4-BFB (FID)		*Recovery: 98.0%*			*Limits: 60-120%*	"							*09/16/08 17:25*	
LCS (8I16027-BS2)							**Extracted: 09/16/08 11:21**							
Benzene	AK 101	33.9	---	0.200	ug/l	1x	--	30.0	113%	(80-120)	--	--	09/16/08 18:30	
Toluene	"	32.1	---	0.500	"	"	--	"	107%	"	--	--	"	
Ethylbenzene	"	32.5	---	0.500	"	"	--	"	108%	"	--	--	"	
Xylenes (total)	"	94.9	---	1.00	"	"	--	90.0	105%	"	--	--	"	
Surrogate(s): 4-BFB (PID)		*Recovery: 101%*			*Limits: 68-140%*	"							*09/16/08 18:30*	
LCS Dup (8I16027-BSD1)							**Extracted: 09/16/08 11:21**							
Gasoline Range Hydrocarbons	AK 101	1200	---	50.0	ug/l	1x	--	1000	120%	(60-120)	9.53%	(20)	09/16/08 17:58	
Surrogate(s): 4-BFB (FID)		*Recovery: 98.8%*			*Limits: 60-120%*	"							*09/16/08 17:58*	
LCS Dup (8I16027-BSD2)							**Extracted: 09/16/08 11:21**							
Benzene	AK 101	33.6	---	0.200	ug/l	1x	--	30.0	112%	(80-120)	0.868%	(25)	09/16/08 19:03	
Toluene	"	31.7	---	0.500	"	"	--	"	106%	"	1.03%	"	"	
Ethylbenzene	"	32.3	---	0.500	"	"	--	"	108%	"	0.633%	"	"	
Xylenes (total)	"	94.4	---	1.00	"	"	--	90.0	105%	"	0.498%	"	"	
Surrogate(s): 4-BFB (PID)		*Recovery: 101%*			*Limits: 68-140%*	"							*09/16/08 19:03*	
Duplicate (8I16027-DUP1)							**QC Source: BRI0212-01**						**Extracted: 09/16/08 11:21**	
Gasoline Range Hydrocarbons	AK 101	839	---	50.0	ug/l	1x	885	--	--	--	5.32%	(20)	09/16/08 20:09	
Benzene	"	47.7	---	0.200	"	"	47.8	--	--	--	0.346%	(25)	"	
Toluene	"	54.4	---	0.500	"	"	54.6	--	--	--	0.325%	"	"	
Ethylbenzene	"	14.2	---	0.500	"	"	14.3	--	--	--	0.422%	"	"	
Xylenes (total)	"	105	---	1.00	"	"	106	--	--	--	0.386%	"	"	
Surrogate(s): 4-BFB (FID)		*Recovery: 96.2%*			*Limits: 60-120%*	"							*09/16/08 20:09*	
4-BFB (PID)		*101%*			*68-140%*	"							"	

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

SEATTLE, WA 11720 NORTH CREEK PKWY N, SUITE 400
BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Gasoline Hydrocarbons (n-Hexane to <n-Decane) and BTEX by AK101/EPA 8021B - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 8I16027 **Water Preparation Method: EPA 5030B (P/T)**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (8I16027-DUP2)				**QC Source: BRI0250-02**					**Extracted: 09/16/08 11:21**					
Gasoline Range Hydrocarbons	AK 101	ND	---	50.0	ug/l	1x	ND	--	--	--	NR	(20)	09/17/08 06:27	
Benzene	"	ND	---	0.200	"	"	ND	--	--	--	NR	(25)	"	
Toluene	"	ND	---	0.500	"	"	ND	--	--	--	NR	"	"	
Ethylbenzene	"	ND	---	0.500	"	"	ND	--	--	--	NR	"	"	
Xylenes (total)	"	ND	---	1.00	"	"	ND	--	--	--	NR	"	"	
Surrogate(s): 4-BFB (FID)		*Recovery: 85.8%*			*Limits: 60-120%*	"							*09/17/08 06:27*	
4-BFB (PID)		*101%*			*68-140%*	"							"	
Matrix Spike (8I16027-MS1)				**QC Source: BRI0212-01**					**Extracted: 09/16/08 11:21**					
Gasoline Range Hydrocarbons	AK 101	1810	---	50.0	ug/l	1x	885	1000	92.6%	(60-120)	--	--	09/16/08 21:13	
Surrogate(s): 4-BFB (FID)		*Recovery: 106%*			*Limits: 60-120%*	"							*09/16/08 21:13*	
Matrix Spike (8I16027-MS2)				**QC Source: BRI0213-03**					**Extracted: 09/16/08 11:21**					
Benzene	AK 101	37.5	---	0.200	ug/l	1x	0.448	30.0	124%	(46-130)	--	--	09/16/08 21:46	
Toluene	"	33.9	---	0.500	"	"	0.302	"	112%	(60-124)	--	--	"	
Ethylbenzene	"	36.3	---	0.500	"	"	0.653	"	119%	(56-141)	--	--	"	
Xylenes (total)	"	104	---	1.00	"	"	1.96	90.0	113%	(66-132)	--	--	"	
Surrogate(s): 4-BFB (PID)		*Recovery: 106%*			*Limits: 68-140%*	"							*09/16/08 21:46*	

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

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PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Diesel Hydrocarbons (C10-C25) and Heavy Oil (C25-C36) by AK102 and AK103 - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 8I15017 **Water Preparation Method: EPA 3520C**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8I15017-BLK1)								**Extracted: 09/15/08 09:20**						
Diesel Range Hydrocarbons	AK102_103	ND	---	0.100	mg/l	1x	--	--	--	--	--	--	09/16/08 20:35	
Residual Range Organics	"	ND	---	0.750	"	"	--	--	--	--	--	--	"	
Surrogate(s): 2-FBP		*Recovery: 82.3%*			*Limits: 50-150%*	"							*09/16/08 20:35*	
Octacosane		*108%*			*50-150%*	"							"	
LCS (8I15017-BS1)								**Extracted: 09/15/08 09:20**						
Diesel Range Hydrocarbons	AK102_103	1.75	---	0.100	mg/l	1x	--	2.00	87.6%	(75-125)	--	--	09/16/08 20:49	
Residual Range Organics	"	1.93	---	0.750	"	"	--	"	96.7%	(60-120)	--	--	"	
Surrogate(s): 2-FBP		*Recovery: 84.5%*			*Limits: 50-150%*	"							*09/16/08 20:49*	
Octacosane		*106%*			*50-150%*	"							"	
LCS Dup (8I15017-BSD1)								**Extracted: 09/15/08 09:20**						
Diesel Range Hydrocarbons	AK102_103	1.84	---	0.100	mg/l	1x	--	2.00	91.9%	(75-125)	4.75%	(20)	09/16/08 21:19	
Residual Range Organics	"	1.98	---	0.750	"	"	--	"	99.1%	(60-120)	2.46%	"	"	
Surrogate(s): 2-FBP		*Recovery: 87.4%*			*Limits: 50-150%*	"							*09/16/08 21:19*	
Octacosane		*102%*			*50-150%*	"							"	

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

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BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Conventional Chemistry Parameters by APHA/EPA Methods - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 8I17056 **Water Preparation Method: General Preparation**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8I17056-BLK1)								**Extracted: 09/17/08 17:29**						
Total Alkalinity	EPA 310.1	ND	---	5.00	mg/L as CaCO3	1x	--	--	--	--	--	--	09/17/08 19:30	
LCS (8I17056-BS1)								**Extracted: 09/17/08 17:29**						
Total Alkalinity	EPA 310.1	54.1	---	5.00	mg/L as CaCO3	1x	--	50.0	108%	(90-110)	--	--	09/17/08 19:30	
LCS (8I17056-BS2)								**Extracted: 09/17/08 17:29**						
Total Alkalinity	EPA 310.1	51.0	---	5.00	mg/L as CaCO3	1x	--	50.0	102%	(90-110)	--	--	09/17/08 19:30	
Duplicate (8I17056-DUP1)					**QC Source: BRI0213-07**			**Extracted: 09/17/08 17:29**						
Total Alkalinity	EPA 310.1	375	---	5.00	mg/L as CaCO3	1x	375	--	--	--	0.0533%	(20)	09/17/08 19:30	
Duplicate (8I17056-DUP2)					**QC Source: BRI0175-03**			**Extracted: 09/17/08 17:29**						
Total Alkalinity	EPA 310.1	1200	---	5.00	mg/L as CaCO3	1x	1200	--	--	--	0.750%	(20)	09/17/08 19:30	

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

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PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Anions by EPA Method 300.0 - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 8I14003 **Water Preparation Method: General Preparation**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8I14003-BLK1)								**Extracted: 09/13/08 12:33**						
Sulfate	EPA 300.0	ND	---	0.400	mg/l	1x	--	--	--	--	--	--	09/13/08 14:38	
Nitrate-Nitrogen	"	ND	---	0.200	mg/l as N	"	--	--	--	--	--	--	"	
LCS (8I14003-BS1)								**Extracted: 09/13/08 12:33**						
Sulfate	EPA 300.0	5.94	---	0.400	mg/l	1x	--	6.00	99.0%	(90-110)	--	--	09/13/08 14:54	
Nitrate-Nitrogen	"	0.980	---	0.200	mg/l as N	"	--	1.00	98.0%	"	--	--	"	
Duplicate (8I14003-DUP1)						**QC Source: BRI0213-06**		**Extracted: 09/13/08 12:33**						
Sulfate	EPA 300.0	19.5	---	0.800	mg/l	2x	19.6	--	--	--	0.921%	(25)	09/16/08 14:49	
Nitrate-Nitrogen	"	0.680	---	0.200	mg/l as N	1x	0.680	--	--	--	0.00%	"	09/13/08 15:56	
Matrix Spike (8I14003-MS1)						**QC Source: BRI0213-06**		**Extracted: 09/13/08 12:33**						
Sulfate	EPA 300.0	24.4	---	0.800	mg/l	2x	19.6	6.00	80.0%	(54-124)	--	--	09/16/08 14:33	
Nitrate-Nitrogen	"	1.54	---	0.200	mg/l as N	1x	0.680	1.00	86.0%	(59-126)	--	--	09/13/08 15:41	

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

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CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Hydrocarbons by GC/FID Headspace - Laboratory Quality Control Results

TestAmerica Anchorage

QC Batch: 8090086 **Water Preparation Method: RSK 175**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (8090086-BLK1)								**Extracted: 09/23/08 09:16**						
Methane	GC/FID	ND	---	1.20	ug/l	1x	--	--	--	--	--	--	09/23/08 13:26	
LCS (8090086-BS1)								**Extracted: 09/23/08 09:16**						
Methane	GC/FID	49.2	---	1.20	ug/l	1x	--	56.3	87.4%	(80-120)	--	--	09/23/08 13:26	
LCS Dup (8090086-BSD1)								**Extracted: 09/23/08 09:16**						
Methane	GC/FID	50.5	---	1.20	ug/l	1x	--	56.3	89.7%	(80-120)	2.59%	(25)	09/23/08 13:26	
Duplicate (8090086-DUP1)					**QC Source: ARI0063-01**			**Extracted: 09/23/08 09:16**						
Methane	GC/FID	31.6	---	1.20	ug/l	1x	28.5	--	--	--	10.5%	(35)	09/23/08 13:26	

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

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BOTHELL, WA 98011-8244
PH: (425) 420.9200 FAX: (425) 420.9210
CS Approval Number: UST-067

Arcadis, Geraghty, & Miller - Seattle	Project Name:	**301726**	
2300 Eastlake Avenue East, Suite 100	Project Number:	[none]	Report Created:
Seattle, WA/USA 98102	Project Manager:	Mike Strickler	09/29/08 11:41

Notes and Definitions

Report Specific Notes:

Q11	-	Detected hydrocarbons in the diesel range do not have a distinct diesel pattern and may be due to heavily weathered diesel.
Q3	-	The chromatographic pattern is not consistent with diesel fuel.
Q8	-	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
ZX	-	Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica Seattle

Curtis D. Armstrong, Project Manager

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: BRI0213

CLIENT: Chevron

REPORT TO: ARCADIS
ADDRESS: 2300 Eastlake Ave. E., Ste. 200
Seattle, WA 98102
PHONE: 206-325-5254 FAX: 206-325-8218

INVOICE TO:

P.O. NUMBER: NWRTB-0301726-1-OML

PROJECT NAME: FIA Texaco
PROJECT NUMBER: 301726
SAMPLED BY: MLS

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: [X] STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

OTHER Specify: Wet Chem 48 Hour Ho

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	BETX 8021B	GRO AK101	DRO AK102	RRO AK103	Tot. Alkalin. 310.1	Sulfate 300.0	Nitrate as Nitrogen 300.0	Methane RSK 175	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			HCl HCl HCl HCl – – – HCl	REQUESTED ANALYSES											
1	MW-1	9/11/08/1540		X	X	X	X	X	X	X	X	W	9		01
2	MW-2	9/11/08/1325		X	X	X	X	X	X	X	X	W	8		02
3	MW-3	9/11/08/1220		X	X	X	X	X	X	X	X	W	9		03
4	MW-4	9/11/08/1755		X	X	X	X	X	X	X	X	W	9		04
5	MW-5	9/11/08/1715		X	X	X	X	X	X	X	X	W	9		05
6	MW-6	9/11/08/1625		X	X	X	X	X	X	X	X	W	9		06
7	DUP-1	9/11/08		X	X	X	X	X	X	X	X	W	9		07
8	Trip Blank	9/11/08		X	X								3		08
9															
10															

RELEASED BY: [signature] DATE: 9/12/08
PRINT NAME: Michael Strickler FIRM: ARCADIS TIME: 0800

RECEIVED BY: Curtis Armstrong [signature] DATE: 9/13/08
PRINT NAME: FIRM: TAL TIME: 12:01

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS: Wet Chemistries have 48-Hour Hold Time

TEMP: 3.8 PAGE 1 OF 1

TAL-1000(0408)

TAT: _____ Paperwork to PM – Date:_____ Time:_____ Non-Conformances?

Page Time & Initials:_____ Circle Y or N

(If Y, see other side)

TEST AMERICA SAMPLE RECEIPT CHECKLIST

~~360~~ 1,365,342

Received By: (applies to temp at receipt)
Date: 9/13/08
Time: 12:01pm
Initials: CF

Logged-in By:
Date: 09/13/08
Time: 1226
Initials: SB

Unpacked/Labeled By:
Date: 09-15-08
Time: 1315
Initials: TH

Cooler ID: _____

Work Order No: BRI 0212 / BRI 0213

Client: _____

Project: _____

Container Type:
X Cooler
___ Box
___ None/Other _____

COC Seals:
X Ship Container
___ On Bottles
Strickler
M S. Sign By
09/12/08 Date
SB 09/13/08 None
SB 09/13/08

Packing Material:
X Bubble Bags ___ Styrofoam
___ Foam Packs
___ None/Other _____

Refrigerant:
___ Gel Ice Pack _____
X Loose Ice _____
___ None/Other _____

Received Via: Bill#_____
X Fed Ex ___ Client
___ UPS ___ TA Courier
___ DHL ___ Mid Valley
___ Senvoy ___ TDP
___ GS ___ Other_____

Cooler Temperature (IR): ___°C Plastic Glass (Frozen filters, Tedlars and aqueous Metals exempt)
(circle one)

Temperature Blank? 3.8 °C or NA 2.2 .5 Trip Blank? Y or N or NA

BP, OPLO,ARCO-Temperature monitoring every 15 minutes:
(initial/date/time): _____
Comments: _____

Sample Containers:		ID			ID
Intact?	Y or N	Broken Amber	Metals Preserved?	Y or N or NA	_____
Provided by TA?	Y or N	_____	Client QAPP Preserved?	Y or N or NA	_____
Correct Type?	Y or N	_____	Adequate Volume? (for tests requested)	Y or N	_____
#Containers match COC?	Y or N	Broken Sample	Water VOAs: Headspace?	Y or N or NA	_____
IDs/time/date match COC?	Y or N	_____	Comments:	MW-1 - 1 Broken Amber	
Hold Times in hold?	Y or N	_____		Trip blank has 4 VOAs.	

PROJECT MANAGEMENT

Is the Chain of Custody complete? Y or N If N, circle the items that were incomplete

Comments/Problems: _____

Total access set up? Y or N
Has client been contacted regarding non-conformances? Y or N If Y, ____/____ Date Time

PM Initials: _____ Date: _____ Time: _____

(rev 4, 01/24/07)

NOTIFICATION OF DISCREPANCY

DATE: 09/13/08 TIME: 1230 PM: CA SC INITIALS: SB

Rush/Short Hold? ☒ Yes ☐ No	

☐ Project Not Set Up in ELM ☐ New Client ☐ COC Received ON HOLD
☐ Analysis Requested on COC – Not Listed for Project in ELM

☐ PM To Add Analysis: _____
☐ Clarification of Analysis: _____
☒ Hold Time ~~Expired~~: (Analysis) not enough time to analyze in hold.
☐ Turnaround Time Not Checked: _____
☐ Did Not Receive Sample(s) Listed on COC: _____
_____
☐ Received Extra Sample(s) Not Listed on COC: _____
_____
☐ Sample Description(s) or Date/Time Sampled Do Not Match COC:
_____
_____
_____

☐ Improper Preservative For method: _____
☒ Sample Received Broken: MW-1 (Broken Amber (HCl)
☐ Insufficient Sample Volume: _____
☒ ~~Sample preserved upon receipt~~: _____
SB 09/13/08
☐ Temperature Outside recommended range (4°C±2°C): _____
☐ Received on-ice within 4 hours of collection, temperature between ambient to 2°C acceptable.
☐ Other:
_____
_____
_____
_____

PROJECT MANAGER RESOLUTION: (Date & Time when returned to SC)
Approval By: Date: Time:

(rev 4, 01/24/07)

Laboratory Data Review Checklist

Completed by: Andrew Ohrt

Title: Staff Engineer | Date: Nov 5, 2008

CS Report Name: 2008 GWM and Geochemical Parameter Monitoring Results | Report Date: Sep 29, 2008

Consultant Firm: ARCADIS U.S., Inc.

Laboratory Name: TestAmerica | Laboratory Report Number: BRI0213

ADEC File Number: 100.38.066 | ADEC RecKey Number: 1992310119101

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

(•) Yes ( ) No

Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

( ) Yes ( ) No

Comments:

N/A

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(•) Yes ( ) No

Comments:

b. Correct analyses requested?

(•) Yes ( ) No

Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(•) Yes ( ) No

Comments:

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

(•) Yes ( ) No Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)?

(•) Yes ( ) No Comments:

A 1 liter amber from well MW-1 was broken during shipment.

d. If there were any discrepancies, were they documented? - For example, incorrect sample containers/ preservation, sample temperature ouside of acceptance range, insufficient or missing samples, etc.?

( ) Yes ( ) No Comments:

N/A

e. Data quality or usability affected? Explain.

Comments:

No

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

b. Discrepancies, errors or QC failures identified by the lab?

(•) Yes ( ) No Comments:

MW-1 and MW-2, DRO surrogate recovery high.

c. Were all corrective actions documented?

( ) Yes (•) No Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Unknown

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

○ Yes ◉ No Comments:

In case narrative, does not specify sample.

c. All soils reported on a dry weight basis?

○ Yes ○ No Comments:

N/A

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

◉ Yes ○ No Comments:

e. Data quality or usability affected? Explain.

Comments:

Unknown

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

◉ Yes ○ No Comments:

ii. All method blank results less than PQL?

◉ Yes ○ No Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No Comments:

N/A

v. Data quality or usability affected? Explain.

Comments:

No

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics - One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

○ Yes ○ No Comments:

Yes

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples?

○ Yes ○ No Comments:

N/A

iii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

iv. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No Comments:

N/A

vii. Data quality or usability affected? Explain.

Comments:

No

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses - field, QC and laboratory samples?

◉ Yes ○ No Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

○ Yes ◉ No Comments:

MW-1 and MW-2, DRO surrogate recovery high.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

◉ Yes ○ No Comments:

iv. Data quality or usability affected? Explain.

Comments:

Unknown

d. Trip Blank - Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

◉ Yes ○ No Comments:

ii. All results less than PQL?

◉ Yes ○ No Comments:

iii. If above PQL, what samples are affected?

Comments:

N/A

iv. Data quality or usability affected? Explain.

Comments:

No

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No Comments:

iv. Data quality or usability affected? Explain.

○ Yes ◉ No Comments:

f. Decontamination or Equipment Blank (if applicable)

○ Yes ○ No ◉ Not Applicable

i. All results less than PQL?

○ Yes ○ No Comments:

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? Explain.

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

◉ Yes ○ No Comments:

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