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Chevron Environmental Management Company

Annual 2013 Groundwater Monitoring Report

Former Chevron Facility 301726

Lot 5A, Block 10, West Ramp

Fairbanks International Airport

Fairbanks, Alaska

Alaska File No. 100.38.066

November 21, 2013

ARCADIS

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Prepared for:

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Date:

November 21, 2013

Appendices

1.0 Introduction

On behalf of Chevron Environmental Management Company (Chevron), ARCADIS US, Inc. (ARCADIS), has prepared this report to document the annual 2013 groundwater sampling event for Former Chevron Facility 301726 (the site) located at Lot 5A, Block 10, West Ramp, Airport Industrial Rd., Fairbanks, Alaska. The site and surrounding area are shown on **Figure 1**. This report summarizes the groundwater gauging conducted by ARCADIS during 2013 and the annual sampling event conducted on July 29, 2013. Work was conducted under the direction of a "qualified person" as defined in 18 Alaska Administrative Code (AAC) 75.990 (100), and 18 AAC 78.995 (118).

2.0 Groundwater Monitoring

2.1 Groundwater Gauging Methods

Groundwater gauging was conducted during the annual 2013 groundwater monitoring event conducted on July 29, 2013. Site monitoring wells were gauged with an oil/water interface probe to determine depth to water and to ascertain if light non-aqueous phase liquids (LNAPL) are present.

The wells were gauged in order from lowest historical concentrations of petroleum constituents to highest in order to prevent cross contamination. Non-disposable groundwater gauging equipment was decontaminated prior to and after each use with a detergent solution and rinsed in potable water. Field notes taken during the annual groundwater monitoring event and 2013 gauging activities are included as **Appendix A**.

2.2 Groundwater Elevation and Flow Direction

On July 29, 2013, groundwater monitoring wells MW-1 through MW-6 were gauged to determine groundwater elevations and the presence of LNAPL. LNAPL was not present in any of the monitoring wells gauged during this event. During the July 2013 gauging event, depth-to-groundwater ranged between 7.48 feet below top of casing (btoc) in monitoring well MW-2 to 7.91 feet btoc in monitoring well MW-3. Groundwater elevations ranged from 418.25 feet above mean sea level (msl) to 419.27 feet msl in monitoring wells MW-3 and MW-1, respectively. Water table elevation data indicate groundwater flow direction is toward the southwest. The historical groundwater flow direction has seasonally fluctuated from the east toward the southwest. Current and historical groundwater elevation data are included in **Table 1**. The horizontal hydraulic gradient present on site during the July 2013 event was approximately 0.01 ft/ft. The Groundwater Elevation Contour Map for the July 29, 2013, monitoring well gauging data is included as **Figure 2**.

2.3 Groundwater Sampling Methods

The annual 2013 groundwater monitoring event was conducted on July 29, 2013. Groundwater samples were collected from monitoring wells MW-1 through MW-6, using no-purge bailer sampling procedures in accordance with ADEC *Draft Field Sampling Guidance* (ADEC, 2010), ARCADIS *Bailer-Grab Groundwater Sampling* (ARCADIS, 2009), and ARCADIS *Groundwater Sampling with Hydrasleeves®* (ARCADIS, 2011). Disposable Hydrasleeves® and Teflon® bailers were used to collect groundwater samples. The top of the Hydrasleeves® were positioned in the monitoring wells below the midpoint of the saturated screened interval by a distance approximately equal to 0.75 times the full length of the Hydrasleeves®. After an equilibration period the Hydrasleeves® were removed from the wells and samples were collected for select analytes using a disposable sampling tip. The Teflon® bailers were then slowly lowered into the water column within the monitoring wells to a depth of approximately three to four feet below the groundwater surface. The bailers were retrieved to limit the amount of possible aeration of the water column. The groundwater samples were collected from the bottom of the bailer using a disposable sampling tip. This technique minimizes the disturbance and aeration of the groundwater within the bailer. The samples were then collected in the appropriate laboratory bottles, labeled, stored in a cooler packed with ice, and submitted to Pace Analytical Services (Pace) in Minneapolis, Minnesota, under proper chain-of-custody procedures. Groundwater samples were submitted to the analytical laboratory for one or more of the following analyses:

- Gasoline range organics (GRO) by method AK101
- Diesel range organics (DRO) by method AK102
- Diesel range organics with Silica Gel Cleanup (DRO SG) by AK102
- Residual Range Organics (RRO) by AK 103
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX), by Environmental Protection Agency (EPA) method 8206B

Duplicate groundwater sample BD-1 was collected from MW-1 and submitted blind to the laboratory for DRO, GRO, and BTEX analysis. The July 29, 2012 groundwater analytical results are included on the site plan included as **Figure 3**.

2.4 Groundwater Analytical Results

During the July 2013 annual groundwater monitoring event, a concentration of GRO above the ADEC groundwater cleanup level (GCL) (2,200 micrograms per liter [µg/L]) was detected in the monitoring well sample MW-1 and BD-1 ranging from 9,500 µg/L (BD-1) to 10,100 µg/L (MW-1). A plot of historical groundwater elevation data and GRO concentration in monitoring well MW-1 is shown on **Figure 4**.

A concentration of DRO greater than the ADEC GCL (1,500 µg/L) was detected in the monitoring well sample MW-1 and BD-1 ranging from 197,000 µg/L (MW-1) to 234,000 µg/L (BD-1). A plot of historical groundwater elevation data and DRO concentration in monitoring well MW-1 is included as **Figure 5**.

RRO was not detected above the ADEC GCL (1,100 µg/L) in the monitoring well groundwater samples collected during the 2013 annual event. However, the laboratory minimum detection limit (MDL) was equal to the RRO GCL. RRO concentrations in the monitoring well sample MW-1 were reported at <1,100 µg/L. The blind duplicate sample collected from MW-1 contained a concentration of RRO at 1,400 µg/L, which is greater than the ADEC GCL.

A concentration of benzene greater than the ADEC GCL (5 µg/L) was detected in the monitoring well samples MW-1 and BD-1 with concentrations of 71.1 µg/L and 80.9 µg/L, respectively. A plot of historical groundwater elevation data and benzene concentration in monitoring well MW-1 is included as **Figure 6**.

Concentrations of toluene, ethylbenzene, and total xylenes were not detected above ADEC GCLs in the monitoring well samples collected from well MW-1. Concentrations of GRO, DRO, RRO, and BTEX constituents were below ADEC GCLs for the remaining monitoring wells sampled during the event. Analytical results for petroleum hydrocarbons are presented in **Table 2** and on **Figure 3**.

3.0 Laboratory Data Quality Assurance Summary

As required by ADEC (Technical Memorandum dated March 2009), ARCADIS completed laboratory data review checklists for the Eurofins Lancaster laboratories report during the annual 2013 reporting period. The laboratory reports are included in **Appendix B** and data review checklists are included in **Appendix C**. The following quality assurance (QA) summary describes six parameters related to the quality and usability of the data presented in this report.

3.1 Precision

The data meet precision objectives for laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) relative percent differences (RPDs).

3.2 Accuracy

All data meet accuracy objectives as indicated by the laboratory quality control samples, which were within method/laboratory limits. Analytes were not detected in the trip blanks submitted with the groundwater samples. The LCS recoveries were within respective limits.

3.3 Representativeness

The data appear to be representative of site conditions and are generally consistent with historical groundwater monitoring results and expected impacts to groundwater.

3.4 Comparability

The laboratory results are presented in the same units as previous reports to allow comparison.

3.5 Completeness

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

3.6 Sensitivity

The sensitivity of the analyses was adequate for the samples as the detection limits were less than the ADEC GCLs for compounds which were not detected.

4.0 Conclusions and Recommendations

The groundwater elevation data collected during the 2013 annual monitoring event indicate groundwater flow direction and horizontal hydraulic gradient to be generally consistent with historical data. Based on historical groundwater analytical results, groundwater impacts appear to be confined to well MW-1. Concentrations of DRO and RRO have periodically been detected in wells MW-2, MW-3, and MW-5 above GCLs during past monitoring events. In general, groundwater impacts at the site are stable. Concentrations of the constituents of concern in the groundwater samples collected during the 2013 annual event are generally consistent with historical data, though there is a marked increase in DRO concentration compared to recent sampling events.

Annual 2014 groundwater sampling is scheduled to be conducted in July 2014 by ARCADIS. If you have any questions or would like to discuss this further, please contact Gregory Montgomery at 206.726.4742.

5.0 References

ADEC 2010. *Draft Field Sampling Guidance*. Division of Spill Prevention and Response Contaminated Sites Program. May.

ADEC 2009. Technical Memorandum. *Environmental Laboratory Data and Quality Assurance Requirements*. ADEC, Division of Spill Prevention and Response Contaminated Sites Program. March.

ARCADIS 2009. *Bailer-Grab Groundwater Sampling – Standard Operating Procedures*. March 10.

ARCADIS 2011. *Groundwater Sampling with Hydrasleeves®. – Standard Operating Procedures for Monitoring Wells.* February 2.

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Tables

Table 1
Groundwater Elevation Data

Former Chevron Facility #301726
Lot 5A, Block 10, West Ramp
Airport Industrial Rd,
Fairbanks, Alaska

Monitoring Well ID	Date Sampled	TOC (feet-amsl)	DTW (feet)	LNAPL Thickness (feet)	GWE (feet-amsl)
MW-1	08/19/04	426.84	6.37	--	420.47
	03/30/05		10.09	--	416.75
	09/19/05		8.12	--	418.72
	09/11/08		8.63	--	418.21
	05/10/09		8.56	--	418.28
	10/04/09		10.55	0.01	416.30
	05/25/10		11.55	0.32	415.55
	06/18/10		9.45	--	417.39
	07/19/10		7.60	--	419.24
	08/16/10		7.25	--	419.59
	09/27/10		8.99	--	417.85
	10/27/10		11.09	--	415.75
	12/15/10[2]		--	--	--
	01/04/11		10.64	--	416.20
	02/07/11		12.05	0.03	414.81
	04/14/11		11.3	--	415.54
	05/05/11		9.75	--	417.09
	06/11/11		9.64	--	417.20
	08/21/11		7.81	--	419.03
	07/24/12		7.17	--	419.67
	07/29/13		**7.57**	**--**	**419.27**
MW-2	08/19/04	426.73	6.29	--	420.44
	03/30/05		9.98	--	416.75
	09/19/05		8.02	--	418.71
	09/11/08		8.52	--	418.21
	05/10/09		8.43	--	418.30
	10/04/09		10.48	--	416.25
	07/19/10		7.90	--	418.83
	05/05/11		9.63	--	417.10
	06/11/11		9.53	--	417.20
	08/21/11		7.52	--	419.21
	07/24/12		7.08	--	419.65
	07/29/13		**7.48**	**--**	**419.25**
MW-3	09/11/08	426.16	6.29	--	419.87
	03/30/05		10.42	--	415.74
	09/19/05		8.47	--	417.69
	09/11/08		8.96	--	417.20
	5/10/09[1]		--	--	--
	10/04/09		10.90	--	415.26
	07/19/10		7.46	--	418.70
	05/05/11		8.12	--	418.04
	06/11/11		9.96	--	416.20
	08/21/11		7.95	--	418.21
	07/24/12		7.51	--	418.65
	07/29/13		**7.91**	**--**	**418.25**

Table 1
Groundwater Elevation Data

Former Chevron Facility #301726
Lot 5A, Block 10, West Ramp
Airport Industrial Rd,
Fairbanks, Alaska

Monitoring Well ID	Date Sampled	TOC (feet-amsl)	DTW (feet)	LNAPL Thickness (feet)	GWE (feet-amsl)
MW-4	08/19/04	427.02	6.59	--	420.43
	03/30/05		10.29	--	416.73
	09/19/05		8.34	--	418.68
	09/11/08		8.71	--	418.31
	05/10/09		8.71	--	418.31
	10/04/09		10.78	--	416.24
	07/19/10		7.56	--	419.46
	05/05/11		9.96	--	417.06
	06/11/11		9.84	--	417.18
	08/21/11		7.83	--	419.19
	07/24/12		7.37	--	419.65
	07/29/13		**7.77**	**--**	**419.25**
MW-5	08/19/04	426.89	6.44	--	420.45
	03/30/05		10.16	--	416.73
	09/19/05		8.19	--	418.70
	09/11/08		8.70	--	418.19
	5/10/09[1]		--	--	--
	10/04/09		10.65	--	416.24
	07/19/10		7.65	--	419.24
	05/05/11		9.86	--	417.03
	06/11/11		9.75	--	417.14
	08/21/11		7.73	--	419.16
	07/24/12		7.29	--	419.60
	07/29/13		**7.70**	**--**	**419.19**
MW-6	08/19/04	426.82	6.36	--	420.46
	03/30/05		10.08	--	416.74
	09/19/05		8.12	--	418.70
	09/11/08		8.66	--	418.16
	05/10/09		8.55	--	418.27
	10/04/09		10.63	--	416.19
	07/19/10		7.69	--	419.13
	06/11/11		9.75	--	417.07
	08/21/11		7.72	--	419.10
	07/24/12		7.3	--	419.52
	07/29/13		**7.77**	**--**	**419.05**

Notes:

[1]Monitoring well was not gauged due to well obstruction.

[2]Monitoring well was not gauged due extremely cold outdoor temperatures.
feet-amsl = feet above sea level
"--" = Indicates no depth measurement was taken,
no LNAPL was present, and no groundwater elevation data is available.
Data associated with current monitoring event in **bold**.
TOC = Top of casing
DTW = Depth to water
GWE = Groundwater elevation
LNAPL = Light Non-Aqueous Phase Liquids

Table 2
Groundwater Analytical Results

Former Chevron Facility #301726
Lot 5A, Block 10, West Ramp
Airport Industrial Rd,
Fairbanks, Alaska

Monitoring Well ID	Date Sampled	DRO[1] (µg/L)	DRO SG[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)	EDB (Methylene bromide) (ug/l)	Lead (ug/l)
ADEC GCLs[5] (µg/L)		1,500		1,100	2,200	5.0	1,000	700	10,000	470	15
MW-1	08/19/04	33,400	--	<480	27,200	1,770	3,790	261	3,750	--	--
	03/30/05	436	--	<388	9,000	729	343	186	936	--	--
	09/19/05	8,660	--	<397	<2,500	153	150	<25	116	--	--
	09/11/08	12,000	--	<708	6,680	357	413	124	815	--	--
	05/10/09	980	--	<420	3,960	28	75.7	72.7	392	--	--
	10/04/09	Not Sampled-LNAPL Detected									
	07/20/10	4,700	--	79,000	<6,600	100	240	65	440	0.0097	9.8
	08/21/11	10,000	--	57,000	<3,300	180	270	170	1400	--	--
	8/21/11D	6,500	--	--	--	130	140	190	1,000	--	--
	07/26/12	19,000	58,000	<3,300	5,800	49	140	110	940	--	--
	07/26/12D	78,000	--	--	5,700	51	130	110	850	--	--
	07/29/13	**197,000**	**213,000**	**<1,100**	**10,100**	**71.1**	**238**	**241**	**2,040**	**--**	**--**
	7/29/2013D	**234,000**	**--**	**1,400**	**9,500**	**80.9**	**261**	**249**	**2,220**	**--**	**--**
MW-2	08/19/04	--	--	--	<50.0	<0.200	<0.500	<0.500	<1.00	--	--
	03/30/05	4,040	--	427	<50.0	<0.500	<0.500	<0.500	<1.50	--	--
	09/19/05	<417	--	<417	<50.0	<0.500	<0.500	<0.500	<1.50	--	--
	09/11/08	<94.3	--	<708	<50.0	<0.200	<0.500	<0.500	<1.00	--	--
	09/11/08 D	<95.2	--	<714	<50.0	<0.200	<0.500	<0.500	<1.00	--	--
	05/10/09	<403	--	<403	<50.0	0.333	<0.500	<0.500	<1.00	--	--
	10/04/09	<391	--	<391	<50.0	<0.500	<1.00	<1.00	<3.00	--	--
	07/19/10	22	--	1,800	210	0.8	<0.5	0.70	<1.5	--	2.0
	08/21/11	<10	--	120	130	<0.5	<0.5	<0.5	<1.5	--	--
	07/26/12	<50	<49	<70	<10	<0.5	<0.5	<0.5	<1.5	--	--
	07/29/13	**<400**	**<400**	**<1000**	**<100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**	**--**
MW-3	08/19/04	1,190	--	<480	89	0.774	<0.500	5.83	3.18	--	--
	03/30/05	<391	--	<391	181	0.979	<0.500	24.1	6.94	--	--
	09/19/05	6,730	--	2,120	<50.0	0.556	<0.500	1.73	<1.50	--	--
	09/11/08	12,000	--	<708	60.3	0.448	<0.500	0.653	1.96	--	--
	10/04/09	1,290	--	438	<50.0	<0.500	<1.00	<1.00	<3.00	--	--
	10/04/09	2,640	--	459	<50.0	<0.500	<1.00	<1.00	<3.00	--	--
	07/19/10	<10	--	88.00	160	<0.5	<0.5	<0.5	<1.5	0.0097	12.9
	08/21/11	<10	--	170.00	370	<0.5	<0.5	<0.5	<1.5	--	--
	07/26/12	2,000	95	210	26	<0.5	1.8	<0.5	1.6	--	--
	07/29/13	**830**	**420**	**<980**	**<100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**	**--**
MW-4	08/19/04	<400	--	<480	<50.0	0.3	<0.500	<0.500	<1.00	--	--
	03/30/05	<385	--	<385	<50.0	<0.500	<0.500	<0.500	<1.50	--	--
	09/19/05	1,310	--	815	<50.0	<0.500	<0.500	<0.500	<1.50	--	--
	09/11/08	<94.3	--	<708	<50.0	<0.200	<0.500	<0.500	<1.00	--	--
	05/10/09	<403	--	<403	<50.0	<0.200	<0.500	<0.500	<1.00		
	05/10/09 D	<427	--	<427	<50.0	<0.200	<0.500	<0.500	<1.00	--	--
	10/04/09	<385	--	<385	<50.0	<0.500	<1.00	<1.00	<3.00	--	--
	07/19/10	<10	--	210	460	<0.5	<0.5	<0.5	<1.5	--	15.5
	08/21/11	<10	--	200	590	<0.5	<0.5	<0.5	<1.5	--	--
	07/26/12	85	<51	350	<10	<0.5	<0.5	<0.5	<1.5	--	--
	07/29/13	**<390**	**<390**	**<980**	**<100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**	**--**
MW-5	08/19/04	<400	--	<480	<50.0	<0.2	<0.500	<0.500	<1.00	--	--
	03/30/05	3,310	--	435	<50.0	<0.500	<0.500	<0.500	<1.50	--	--
	09/19/05	<431	--	782	<50.0	<0.5	<0.500	<0.500	<1.50	--	--
	09/11/08	150	--	<708	<50.0	<0.2	<0.500	<0.500	<1.00	--	--
	10/04/09	559	--	<403	<50.0	<0.500	<1.00	<1.00	<3.00		
	07/20/10	<10	--	110	180	<0.5	<0.5	<0.5	<1.5	0.0097	20.8
	08/21/11	<10	--	120	350	<0.5	<0.5	<0.5	<1.5	--	--
	07/26/12	130	<51	450	<10	<0.5	<0.5	<0.5	<1.5	--	--
	07/29/13	**<400**	**<400**	**<1,000**	**<100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**	**--**
MW-6	08/19/04	<400	--	<480	<50.0	0.351	<0.500	<0.500	<1.00	--	--
	03/30/05	<388	--	<388	<50.0	<0.5	<0.500	<0.500	<1.50	--	--
	09/19/05	<403	--	<403	<50.0	<0.5	<0.500	<0.500	<1.50	--	--
	09/11/08	<100	--	<750	<50.0	<0.2	<0.500	<0.500	<1.0	--	--
	05/10/09	<427	--	<427	<50.0	<0.200	<0.500	<0.500	<1.00	--	--
	10/04/09	<385	--	<385	<50.0	<0.500	<1.00	<1.00	<3.00	--	--
	07/19/10	<10	--	74	110	<0.5	<0.5	<0.5	<1.5	--	0.95
	08/21/11	<10	--	150	210	<0.5	<0.5	<0.5	<1.5	--	--
	07/26/12	<0.5	<52	130	<10	<0.5	<0.5	<0.5	<1.5	--	--
	07/29/13	**<430**	**<430**	**<1,100**	**<100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**	**--**

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.
ADEC Groundwater Cleanup Levels (GCLs) per 18 AAC 75.345, Table C, Register 188, January 2009.

µg/L = micrograms per liter
"--" = Indicates analyte was not sampled or analyzed
Highlighted cell indicates concentration exceeds groundwater cleanup level
"<" = Indicates analyte not detected greater than laboratory reporting limit indicated.
[D] = Indicates sample is a duplicate
SG = Silica Gel Cleanup
Data associated with current monitoring event in **bold**.

Table 2
Groundwater Analytical Results

Former Chevron Facility #301726
Lot 5A, Block 10, West Ramp
Airport Industrial Rd,
Fairbanks, Alaska

Monitoring Well ID	Date Sampled	DRO[1] (µg/L)	DRO SG[1] (µg/L)	RRO[2] (µg/L)	GRO[3] (µg/L)	BTEX[4]				EDB (Methylene bromide) (ug/l)	Lead (ug/l)
						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	470	15

ADEC= Alaska Department of Environmental Conservation
EDB - Dibromomethane

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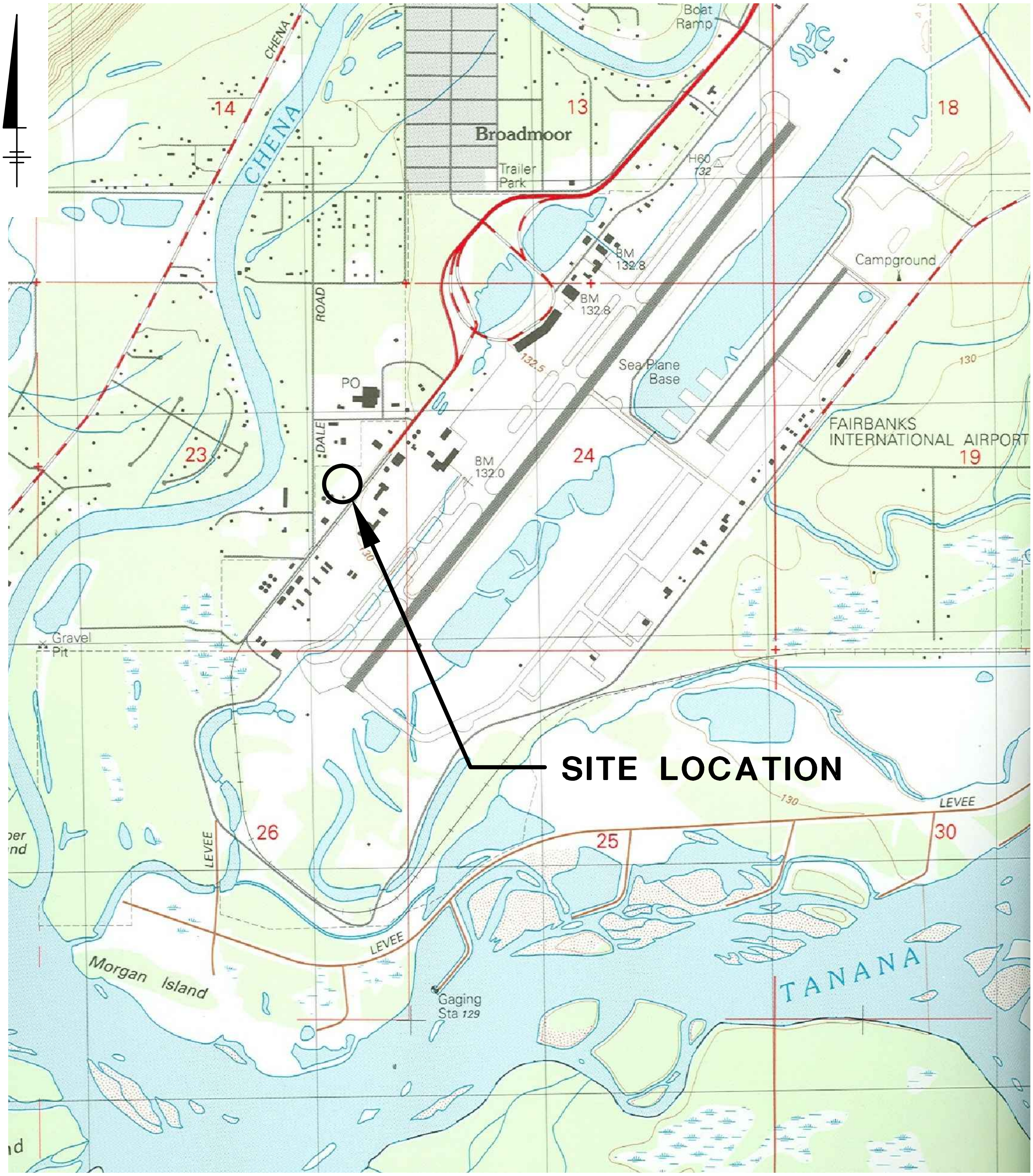
Figures



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

FORMER TEXACO FACILITY NO. 301726
FAIRBANKS INT. AIRPORT, FAIRBANKS, ALASKA
ANNUAL GROUNDWATER MONITORING REPORT 2013

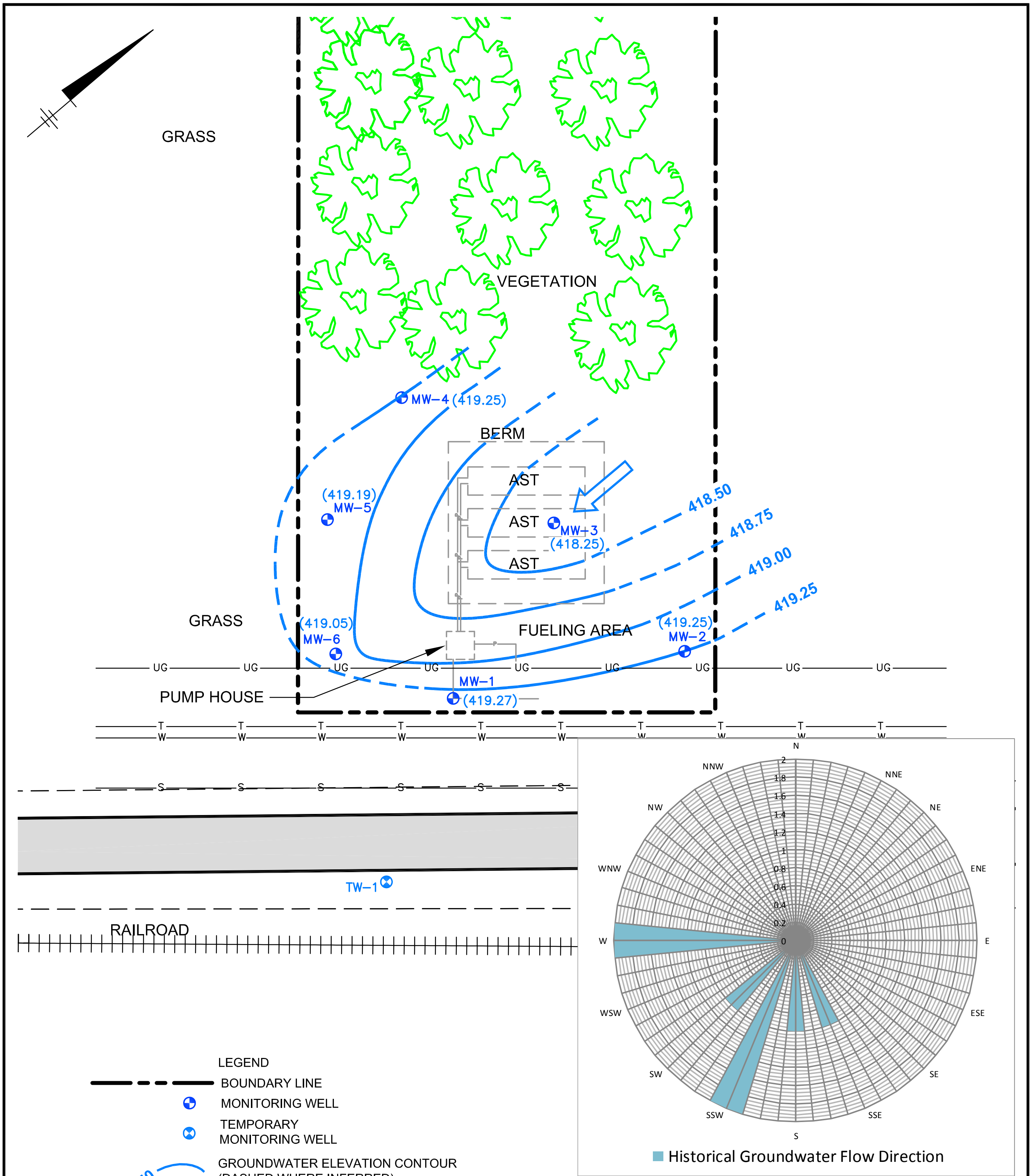
SITE LOCATION MAP

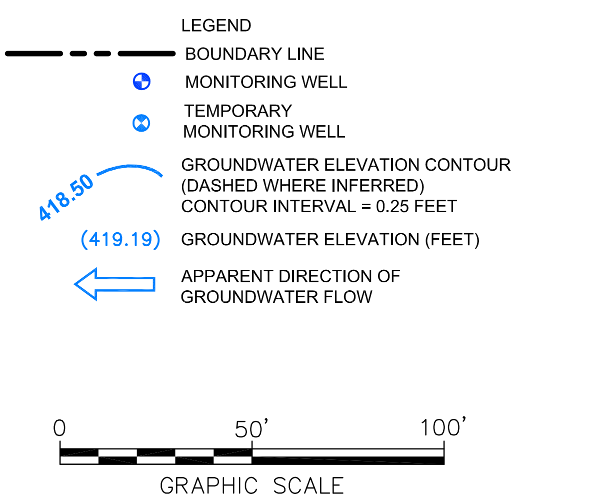
ARCADIS

FIGURE
1

CITY:TMAPA,FL DIV/GROUP:85 DB:JAR LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\TAMPA\ACT\ChevronUSA\Chevron 301726\B0046269\0011\AGMR 2013\B0046269N01.dwg LAYOUT: 1 SAVED: 11/4/2013 1:48 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/4/2013 1:49 PM BY: RICHARDS, JIM

XREFS: IMAGES: ALASKA.jpg Fairbanks-SW.jpg PROJECTNAME: ----





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

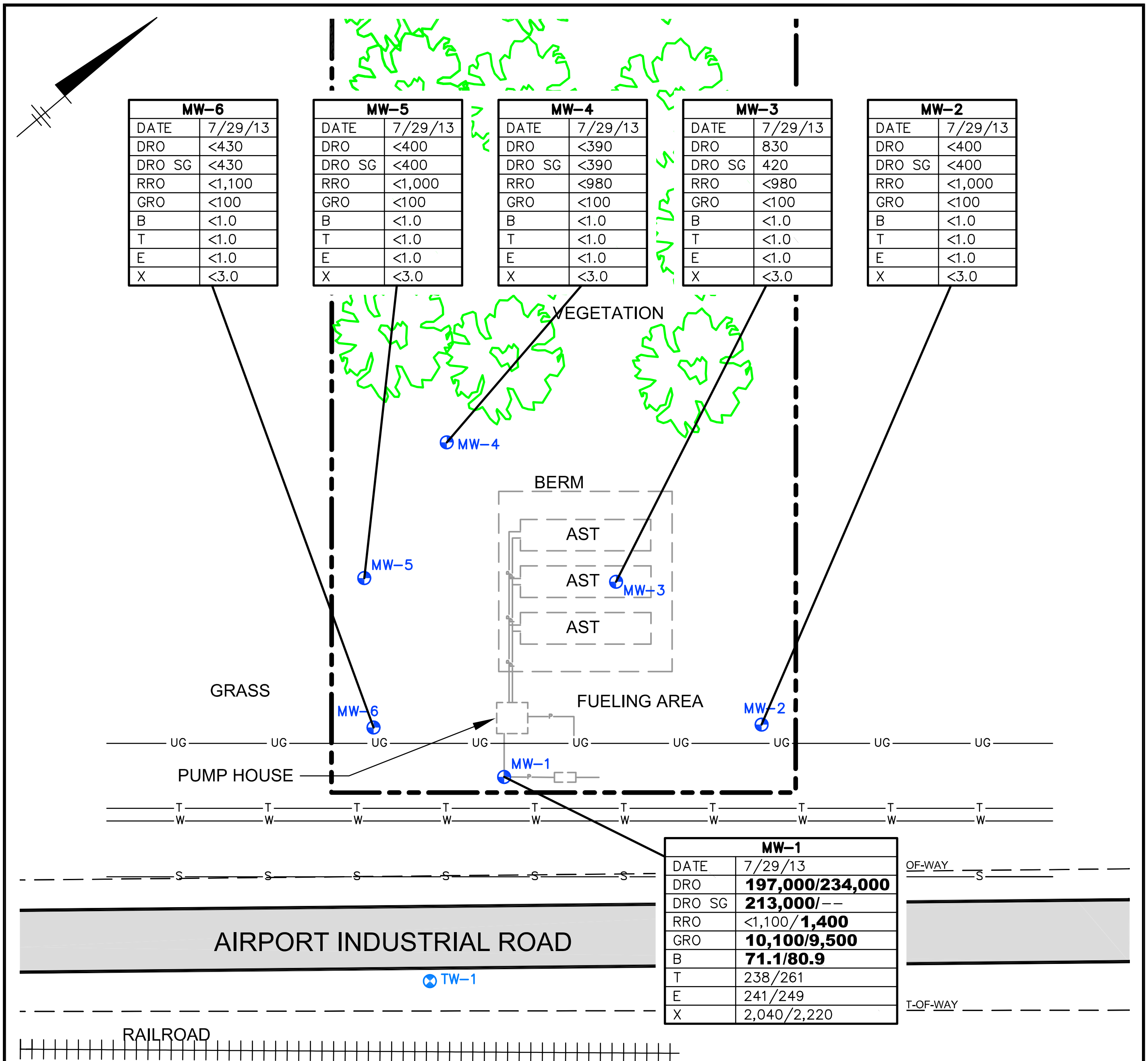
FORMER TEXACO FACILITY NO. 301726
FAIRBANKS INT. AIRPORT, FAIRBANKS, ALASKA
ANNUAL GROUNDWATER MONITORING REPORT 2013

GROUNDWATER ELEVATION CONTOUR MAP - JULY 29, 2013

ARCADIS

FIGURE
2

CITY:TAMPA DIV/GROUP:85 DB:JAR LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\TAMPA\ACT\Chevron\USA\Chevron 301726\B0046269\0011\AGMR 2013\B0046269B01.dwg LAYOUT: 2 SAVED: 11/4/2013 1:45 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/4/2013 1:46 PM BY: RICHARDS, JIM
XREFS: IMAGES: PROJECTNAME: ---



MW-6	
DATE	7/29/13
DRO	<430
DRO SG	<430
RRO	<1,100
GRO	<100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-5	
DATE	7/29/13
DRO	<400
DRO SG	<400
RRO	<1,000
GRO	<100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-4	
DATE	7/29/13
DRO	<390
DRO SG	<390
RRO	<980
GRO	<100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-3	
DATE	7/29/13
DRO	830
DRO SG	420
RRO	<980
GRO	<100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-2	
DATE	7/29/13
DRO	<400
DRO SG	<400
RRO	<1,000
GRO	<100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-1	
DATE	7/29/13
DRO	**197,000/234,000**
DRO SG	**213,000**/--
RRO	<1,100/**1,400**
GRO	**10,100/9,500**
B	**71.1/80.9**
T	238/261
E	241/249
X	2,040/2,220

LEGEND

- MONITORING WELL
- BOUNDARY LINE
- TEMPORARY MONITORING WELL

SAMPLE LOCATION	
DATE	Sample Date
GRO	Gasoline Range Organics
DRO	Diesel Range Organics
RRO	Residual Range Organics
B	Benzene
T	Toluene
E	Ethlybenzene
X	Total Xylenes

0 50' 100'
GRAPHIC SCALE

RESULTS REPORTED IN MICROGRAMS PER LITER (µg/L)
BOLD INDICATES CONCENTRATION EXCEEDS RESPECTIVE GROUNDWATER CLEANUP LEVEL
* = BENZENE CONCENTRATION DETECTED IN USEPA METHOD 8260
ADEC = ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NS = NOT SAMPLED
<1.00/<1.00 = DUPLICATE SAMPLE COLLECTED

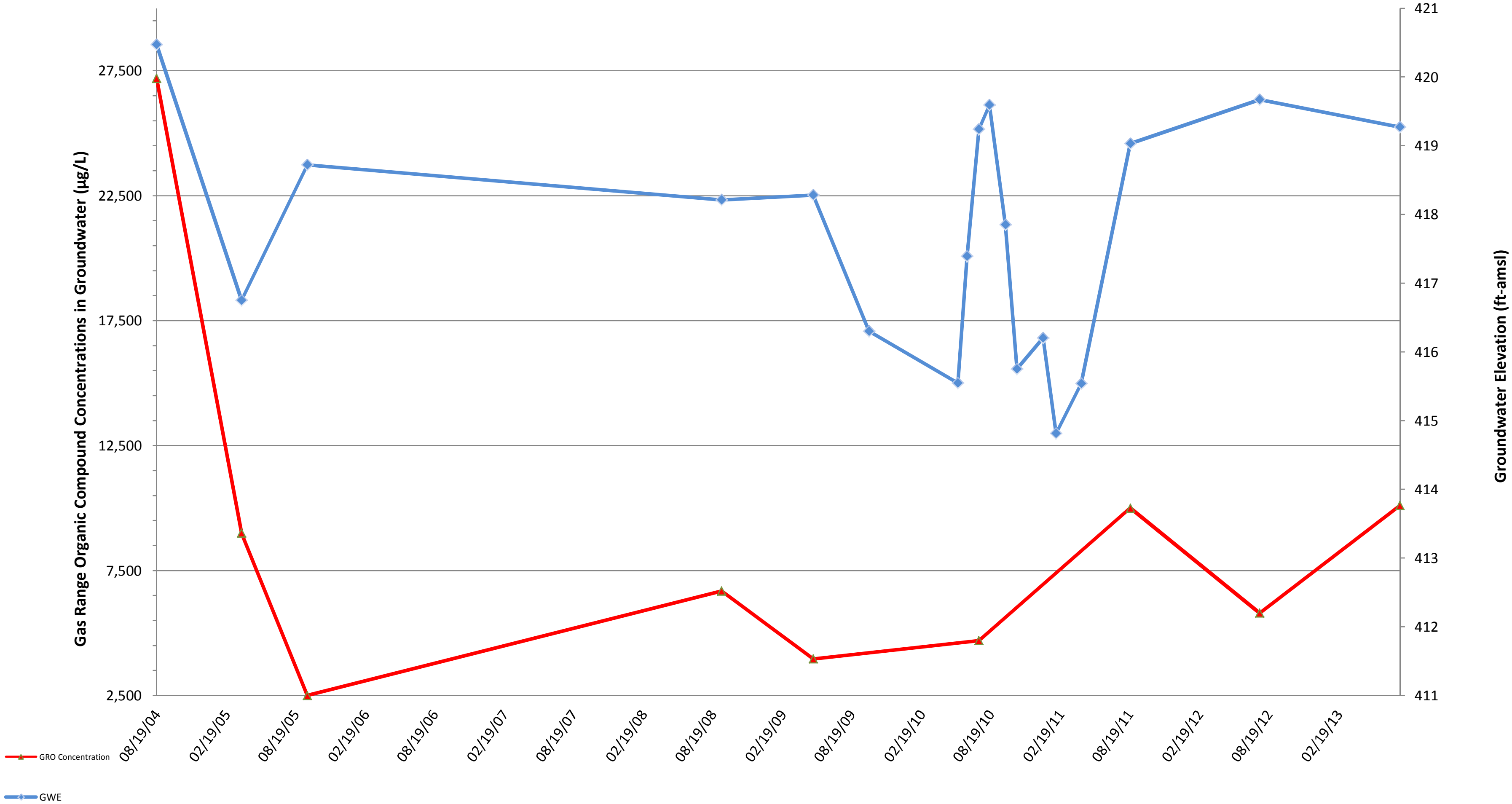
SOURCE: Base map digitized from "SAIC", Date 10/19/05, Scale 1"=30'

FORMER TEXACO FACILITY NO. 301726
FAIRBANKS INT. AIRPORT, FAIRBANKS, ALASKA
ANNUAL GROUNDWATER MONITORING REPORT 2013

GROUNDWATER ANALYTICAL RESULTS PETROLEUM HYDROCARBONS JULY 29, 2013

ARCADIS

FIGURE
3



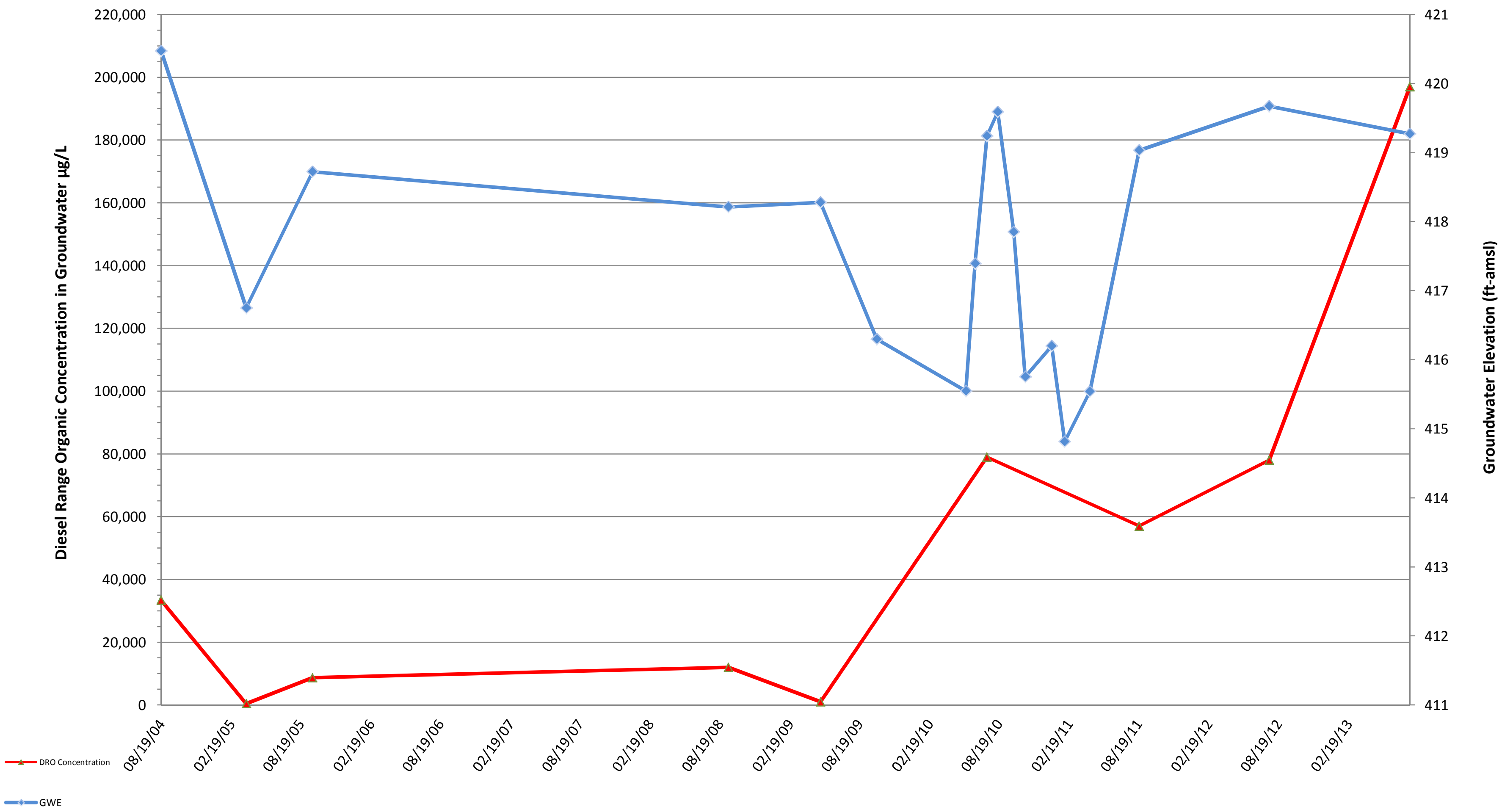
LEGEND:
GWE = Groundwater elevation
GRO= Gas Range Organic Compounds
ft-amsl = Feet above mean sea level

FORMER UNOCAL FACILITY 301726
Lot 5A, Block 10, Aiport Industrial Rd, FAIRBANKS, ALASKA
Annual Grounwater Monitoring Report 2013

Monitoring Well MW-1 Historical Groundwater Elevation and GRO Concentration

ARCADIS
Infrastructure · Water · Environment · Buildings

FIGURE
4



LEGEND:

GWE = Groundwater elevation

DRO= Diesel Range Organic Compounds

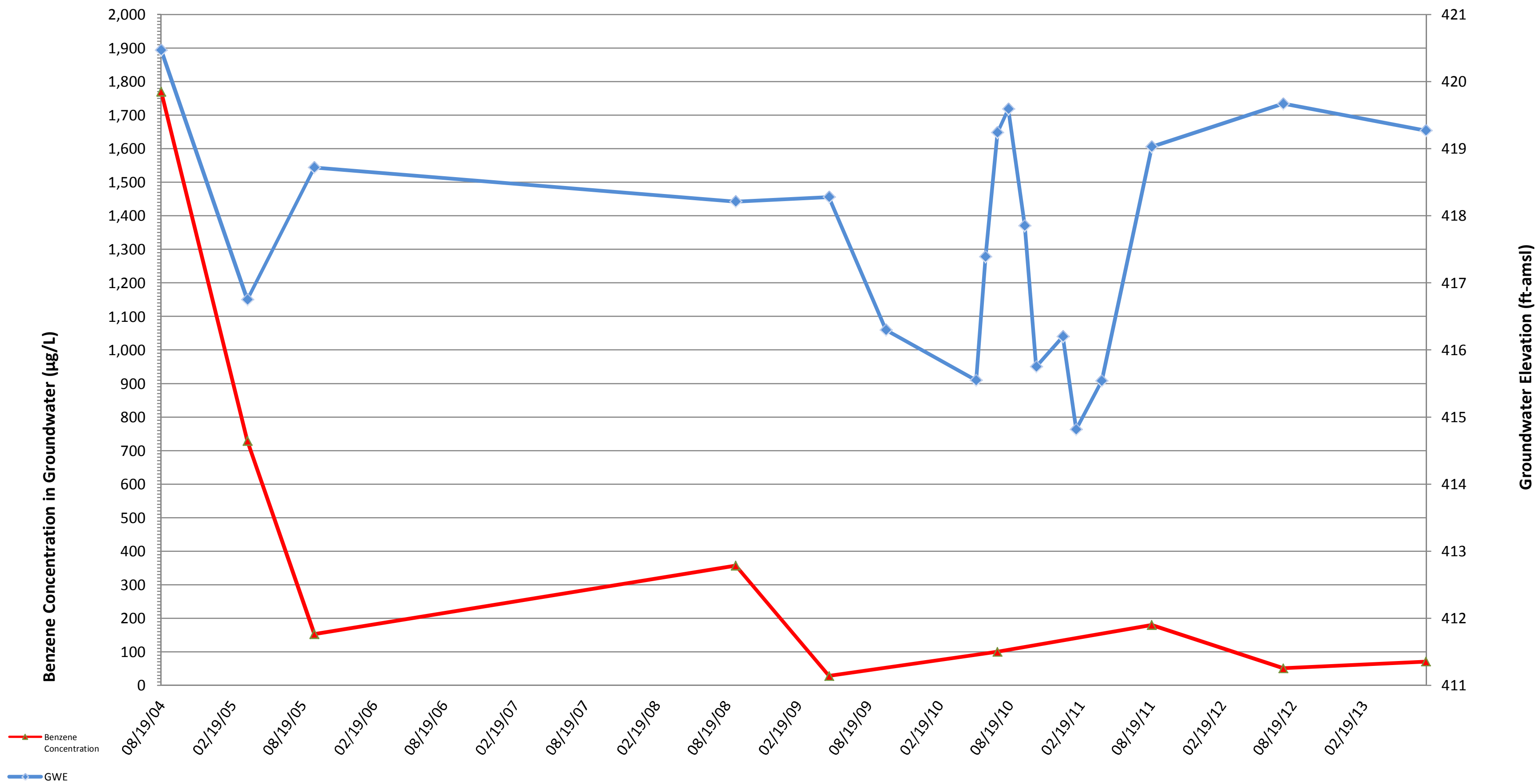
ft-amsl = Feet above mean sea level

FORMER UNOCAL FACILITY 301726
Lot 5A, Block 10, Aiport Industrial Rd, FAIRBANKS, ALASKA
Annual Grounwater Monitoring Report 2013

Monitoring Well MW-1 Historical Groundwater Elevation and DRO Concentration

ARCADIS
Infrastructure · Water · Environment · Buildings

FIGURE
5



LEGEND:

GWE = Groundwater elevation

ft-amsl = Feet above mean sea level

FORMER UNOCAL FACILITY 301726
Lot 5A, Block 10, Aiport Industrial Rd, FAIRBANKS, ALASKA
Annual Grounwater Monitoring Report 2013

Monitoring Well MW-1 Historical Groundwater Elevation and Benzene Concentration

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FIGURE
6

ARCADIS

Appendix A

Field Notes

Location: FIA Texaco Date: 10/8/12

Project / Client: Resurvey

Personnel: M. MacDaniel & A McClane

Weather: Cloudy 49F

1550 Arrive on site. Conduct H+S tailgate, review SOW, discuss Hazard ID, complete PTW.

1605 Began resurvey wells MW-1 thru MW-6

Notes: MW-1: Broken well cover
MW-5: Needs new lock & cap
MW-6: Stripped

1730 Completed work on site. Mobbed off site.

AM

Location: FIA TEXACO 301726 ~~307126~~ Date: 7/29/13

Project / Client: Annual GWM Sampling

Personnel: S. McGuire & M. MacDaniel

Weather: 80F, Mostly Sunny

Activity: Annual GWM

1300 Arrive on site. Conducted H+S tailgate meeting, reviewed hazards, reviewed SOW, completed PTW, signed HASP after reviewing.

1320 Unload equipment and begin gauging wells and setting Hydrasleeves.

Well ID	PID	DTW	DTB	Comments/Analysis
MW-1	684	7.57	13.89	RRO, DRO, GRO, BTEX → BD-1
MW-2	0.2	7.48	13.29	" " " "
MW-3	0.4	7.91	14.21	" " " "
MW-4	0.0	7.77	14.22	" " " "
MW-5	0.0	7.70	14.10	" " " "
MW-6	0.0	7.77	14.31	" " " " → MS/MSD

1500 Completed Gauging. Mobbed off site to pick up ice for samples.

Location FIA Texaco Date 7/29/13

Project / Client Chevron 301726

1600 Returned to site, ~~begand prepping~~ began preparing sample labels and bottles. Allowed hydrasleeves to sit in the monitoring wells for at least 2 hours.

1700 Began sampling wells via hydrasleeves (GRO & BTEX) and bailers (DRO, DRO SG, & RRO).

~~Well~~ Well ID	Sample Time	Comments
MW-1	1700	BD-1
MW-2	1720	
MW-3	1740	
MW-4	1800	
MW-5	1820	
MW-6	1840	MS/MSD

1900 Completed Sampling. Ensured samples were packed on ice, mobbed offsite

Location Date

Project / Client

ARCADIS

Appendix B

Laboratory Analytical Reports

August 13, 2013

Gregory Montgomery
1100 Olive Way
Suite 800
Seattle, WA 98102

RE: Project: 301726 FIA Texaco
Pace Project No.: 10237254

Dear Gregory Montgomery:

Enclosed are the analytical results for sample(s) received by the laboratory on July 31, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Mariah Peronto

mariah.peronto@pacelabs.com
Project Manager

Enclosures

cc: Accounts Payable, Arcadis U.S., Inc.

CERTIFICATIONS

Project:	301726 FIA Texaco
Pace Project No.:	10237254

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Hawaii Certification #Pace
Idaho Certification #: MN00064
Illinois Certification #: 200011
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nebraska Certification #: Pace
Nevada Certification #: MN_00064
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia/DCLS Certification #: 002521
Virginia/VELAP Certification #: 460163
Washington Certification #: C754
West Virginia Certification #: 382
Wisconsin Certification #: 999407970

SAMPLE SUMMARY

Project: 301726 FIA Texaco
Pace Project No.: 10237254

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10237254001	**MW-1-W-072913**	Water	07/29/13 17:00	07/31/13 16:08
10237254002	**MW-2-W-072913**	Water	07/29/13 17:20	07/31/13 16:08
10237254003	**MW-3-W-072913**	Water	07/29/13 17:40	07/31/13 16:08
10237254004	**MW-4-W-072913**	Water	07/29/13 18:00	07/31/13 16:08
10237254005	**MW-5-W-072913**	Water	07/29/13 18:20	07/31/13 16:08
10237254006	**MW-6-W-072913 MS/MSD**	Water	07/29/13 18:40	07/31/13 16:08
10237254007	**BD-1-W-072913**	Water	07/29/13 00:00	07/31/13 16:08
10237254008	**Trip Blank**	Water	07/29/13 00:00	07/31/13 16:08

SAMPLE ANALYTE COUNT

Project: 301726 FIA Texaco
Pace Project No.: 10237254

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10237254001	**MW-1-W-072913**	Alaska 102/103	JRH, MT	5
		Alaska 101	MJH	2
		EPA 8260	EB2	7
10237254002	**MW-2-W-072913**	Alaska 102/103	JRH, MT	5
		Alaska 101	KT1	2
		EPA 8260	EB2	7
10237254003	**MW-3-W-072913**	Alaska 102/103	JRH, MT	5
		Alaska 101	KT1	2
		EPA 8260	EB2	7
10237254004	**MW-4-W-072913**	Alaska 102/103	JRH, MT	5
		Alaska 101	KT1	2
		EPA 8260	EB2	7
10237254005	**MW-5-W-072913**	Alaska 102/103	JRH, MT	5
		Alaska 101	KT1	2
		EPA 8260	EB2	7
10237254006	**MW-6-W-072913 MS/MSD**	Alaska 102/103	JRH, MT	5
		Alaska 101	KT1	2
		EPA 8260	EB2	7
10237254007	**BD-1-W-072913**	Alaska 102/103	JRH	4
		Alaska 101	KT1	2
		EPA 8260	EB2	7
10237254008	**Trip Blank**	Alaska 101	KT1	2
		EPA 8260	EB2	7

ANALYTICAL RESULTS

Project: 301726 FIA Texaco

Pace Project No.: 10237254

Sample: MW-1-W-072913 **Lab ID: 10237254001** Collected: 07/29/13 17:00 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	**197**	mg/L	21.7	50	08/02/13 11:29	08/05/13 16:46		N2
DRO by AK 102 Silica Gel Clean	**213**	mg/L	21.7	50	08/02/13 11:29	08/06/13 16:47		N2
Residual Range Organics AK103	ND	mg/L	1.1	1	08/02/13 11:29	08/04/13 17:52		N2
Surrogates								
o-Terphenyl (S) SG	80	%	50-150	1	08/02/13 11:29	08/06/13 14:33	84-15-1	
n-Triacontane (S) SG	87	%	50-150	1	08/02/13 11:29	08/06/13 14:33		
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	**10100**	ug/L	1000	10		08/07/13 16:40		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	108	%	60-120	10		08/07/13 16:40	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	**71.1**	ug/L	10.0	10		08/02/13 15:40	71-43-2	
Ethylbenzene	**241**	ug/L	10.0	10		08/02/13 15:40	100-41-4	
Toluene	**238**	ug/L	10.0	10		08/02/13 15:40	108-88-3	
Xylene (Total)	**2040**	ug/L	30.0	10		08/02/13 15:40	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	75-125	10		08/02/13 15:40	17060-07-0	
Toluene-d8 (S)	103	%	75-125	10		08/02/13 15:40	2037-26-5	
4-Bromofluorobenzene (S)	104	%	75-125	10		08/02/13 15:40	460-00-4	

Sample: MW-2-W-072913 **Lab ID: 10237254002** Collected: 07/29/13 17:20 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	ND	mg/L	0.40	1	08/02/13 11:29	08/04/13 18:14		N2
DRO by AK 102 Silica Gel Clean	ND	mg/L	0.40	1	08/02/13 11:29	08/06/13 14:55		N2
Residual Range Organics AK103	ND	mg/L	1.0	1	08/02/13 11:29	08/04/13 18:14		N2
Surrogates								
o-Terphenyl (S) SG	60	%	50-150	1	08/02/13 11:29	08/06/13 14:55	84-15-1	
n-Triacontane (S) SG	72	%	50-150	1	08/02/13 11:29	08/06/13 14:55		
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	ND	ug/L	100	1		08/02/13 17:03		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	99	%	60-120	1		08/02/13 17:03	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		08/02/13 14:08	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		08/02/13 14:08	100-41-4	
Toluene	ND	ug/L	1.0	1		08/02/13 14:08	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		08/02/13 14:08	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	116	%	75-125	1		08/02/13 14:08	17060-07-0	

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: 301726 FIA Texaco
Pace Project No.: 10237254

Sample: MW-2-W-072913 **Lab ID: 10237254002** Collected: 07/29/13 17:20 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260							
Surrogates								
Toluene-d8 (S)	102	%	75-125	1		08/02/13 14:08	2037-26-5	
4-Bromofluorobenzene (S)	104	%	75-125	1		08/02/13 14:08	460-00-4	

Sample: MW-3-W-072913 **Lab ID: 10237254003** Collected: 07/29/13 17:40 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	**0.83**	mg/L	0.39	1	08/02/13 11:29	08/04/13 18:37		N2
DRO by AK 102 Silica Gel Clean	**0.42**	mg/L	0.39	1	08/02/13 11:29	08/06/13 15:18		N2
Residual Range Organics AK103	ND	mg/L	0.98	1	08/02/13 11:29	08/04/13 18:37		N2
Surrogates								
o-Terphenyl (S) SG	76	%	50-150	1	08/02/13 11:29	08/06/13 15:18	84-15-1	
n-Triacontane (S) SG	89	%	50-150	1	08/02/13 11:29	08/06/13 15:18		
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	ND	ug/L	100	1		08/02/13 17:23		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	99	%	60-120	1		08/02/13 17:23	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		08/02/13 14:23	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		08/02/13 14:23	100-41-4	
Toluene	ND	ug/L	1.0	1		08/02/13 14:23	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		08/02/13 14:23	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	116	%	75-125	1		08/02/13 14:23	17060-07-0	
Toluene-d8 (S)	103	%	75-125	1		08/02/13 14:23	2037-26-5	
4-Bromofluorobenzene (S)	106	%	75-125	1		08/02/13 14:23	460-00-4	

Sample: MW-4-W-072913 **Lab ID: 10237254004** Collected: 07/29/13 18:00 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	ND	mg/L	0.39	1	08/02/13 11:29	08/04/13 18:59		N2
DRO by AK 102 Silica Gel Clean	ND	mg/L	0.39	1	08/02/13 11:29	08/06/13 15:40		N2
Residual Range Organics AK103	ND	mg/L	0.98	1	08/02/13 11:29	08/04/13 18:59		N2
Surrogates								
o-Terphenyl (S) SG	69	%	50-150	1	08/02/13 11:29	08/06/13 15:40	84-15-1	
n-Triacontane (S) SG	82	%	50-150	1	08/02/13 11:29	08/06/13 15:40		
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	ND	ug/L	100	1		08/02/13 17:43		N2

REPORT OF LABORATORY ANALYSIS

ANALYTICAL RESULTS

Project: 301726 FIA Texaco
Pace Project No.: 10237254

Sample: MW-4-W-072913 **Lab ID: 10237254004** Collected: 07/29/13 18:00 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
AK101 GCV	Analytical Method: Alaska 101							
Surrogates								
a,a,a-Trifluorotoluene (S)	98	%	60-120	1		08/02/13 17:43	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		08/02/13 14:39	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		08/02/13 14:39	100-41-4	
Toluene	ND	ug/L	1.0	1		08/02/13 14:39	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		08/02/13 14:39	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	115	%	75-125	1		08/02/13 14:39	17060-07-0	
Toluene-d8 (S)	103	%	75-125	1		08/02/13 14:39	2037-26-5	
4-Bromofluorobenzene (S)	106	%	75-125	1		08/02/13 14:39	460-00-4	

Sample: MW-5-W-072913 **Lab ID: 10237254005** Collected: 07/29/13 18:20 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	ND	mg/L	0.40	1	08/02/13 11:29	08/04/13 19:21		N2
DRO by AK 102 Silica Gel Clean	ND	mg/L	0.40	1	08/02/13 11:29	08/06/13 16:02		N2
Residual Range Organics AK103	ND	mg/L	1.0	1	08/02/13 11:29	08/04/13 19:21		N2
Surrogates								
o-Terphenyl (S) SG	72	%	50-150	1	08/02/13 11:29	08/06/13 16:02	84-15-1	
n-Triacontane (S) SG	85	%	50-150	1	08/02/13 11:29	08/06/13 16:02		
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	ND	ug/L	100	1		08/02/13 18:03		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	100	%	60-120	1		08/02/13 18:03	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		08/02/13 14:54	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		08/02/13 14:54	100-41-4	
Toluene	ND	ug/L	1.0	1		08/02/13 14:54	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		08/02/13 14:54	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	117	%	75-125	1		08/02/13 14:54	17060-07-0	
Toluene-d8 (S)	103	%	75-125	1		08/02/13 14:54	2037-26-5	
4-Bromofluorobenzene (S)	107	%	75-125	1		08/02/13 14:54	460-00-4	

ANALYTICAL RESULTS

Project: 301726 FIA Texaco

Pace Project No.: 10237254

Sample: MW-6-W-072913 MS/MSD **Lab ID: 10237254006** Collected: 07/29/13 18:40 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	ND	mg/L	0.43	1	08/02/13 11:29	08/04/13 16:00		N2
DRO by AK 102 Silica Gel Clean	ND	mg/L	0.43	1	08/02/13 11:29	08/06/13 16:25		N2
Residual Range Organics AK103	ND	mg/L	1.1	1	08/02/13 11:29	08/04/13 16:00		N2
Surrogates								
o-Terphenyl (S) SG	76	%	50-150	1	08/02/13 11:29	08/06/13 16:25	84-15-1	
n-Triacontane (S) SG	88	%	50-150	1	08/02/13 11:29	08/06/13 16:25		
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	ND	ug/L	100	1		08/02/13 13:22		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	99	%	50-150	1		08/02/13 13:22	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		08/02/13 12:36	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		08/02/13 12:36	100-41-4	
Toluene	ND	ug/L	1.0	1		08/02/13 12:36	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		08/02/13 12:36	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	114	%	75-125	1		08/02/13 12:36	17060-07-0	
Toluene-d8 (S)	102	%	75-125	1		08/02/13 12:36	2037-26-5	
4-Bromofluorobenzene (S)	106	%	75-125	1		08/02/13 12:36	460-00-4	

Sample: BD-1-W-072913 **Lab ID: 10237254007** Collected: 07/29/13 00:00 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
DRO and RRO by AK102/103	Analytical Method: Alaska 102/103 Preparation Method: EPA 3510							
DRO by AK 102	**234**	mg/L	21.7	50	08/02/13 11:29	08/05/13 17:09		N2
Residual Range Organics AK103	**1.4**	mg/L	1.1	1	08/02/13 11:29	08/04/13 19:44		N2
Surrogates								
o-Terphenyl (S)	87	%	50-150	1	08/02/13 11:29	08/04/13 19:44	84-15-1	
n-Triacontane (S)	77	%	50-150	1	08/02/13 11:29	08/04/13 19:44	638-68-6	
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	**9500**	ug/L	500	5		08/02/13 19:04		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	115	%	60-120	5		08/02/13 19:04	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	**80.9**	ug/L	1.0	1		08/02/13 15:25	71-43-2	
Ethylbenzene	**249**	ug/L	1.0	1		08/02/13 15:25	100-41-4	
Toluene	**261**	ug/L	5.0	5		08/07/13 10:49	108-88-3	
Xylene (Total)	**2220**	ug/L	15.0	5		08/07/13 10:49	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	115	%	75-125	1		08/02/13 15:25	17060-07-0	
Toluene-d8 (S)	108	%	75-125	1		08/02/13 15:25	2037-26-5	

ANALYTICAL RESULTS

Project: 301726 FIA Texaco
Pace Project No.: 10237254

Sample: BD-1-W-072913 **Lab ID: 10237254007** Collected: 07/29/13 00:00 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST	Analytical Method: EPA 8260							
Surrogates								
4-Bromofluorobenzene (S)	105	%	75-125	1		08/02/13 15:25	460-00-4	

Sample: Trip Blank **Lab ID: 10237254008** Collected: 07/29/13 00:00 Received: 07/31/13 16:08 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
AK101 GCV	Analytical Method: Alaska 101							
AK101 Gasoline Range Organics	ND	ug/L	100	1		08/02/13 13:02		N2
Surrogates								
a,a,a-Trifluorotoluene (S)	99	%	60-120	1		08/02/13 13:02	98-08-8	
8260 MSV UST	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		08/02/13 12:05	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		08/02/13 12:05	100-41-4	
Toluene	ND	ug/L	1.0	1		08/02/13 12:05	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		08/02/13 12:05	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	115	%	75-125	1		08/02/13 12:05	17060-07-0	
Toluene-d8 (S)	103	%	75-125	1		08/02/13 12:05	2037-26-5	
4-Bromofluorobenzene (S)	107	%	75-125	1		08/02/13 12:05	460-00-4	

QUALITY CONTROL DATA

Project: 301726 FIA Texaco
Pace Project No.: 10237254

QC Batch: GCV/11144 Analysis Method: Alaska 101
QC Batch Method: Alaska 101 Analysis Description: AK101W GCV Water
Associated Lab Samples: 10237254002, 10237254003, 10237254004, 10237254005, 10237254006, 10237254007, 10237254008

METHOD BLANK: 1492458 Matrix: Water
Associated Lab Samples: 10237254002, 10237254003, 10237254004, 10237254005, 10237254006, 10237254007, 10237254008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
AK101 Gasoline Range Organics	ug/L	ND	100	08/02/13 12:42	N2
a,a,a-Trifluorotoluene (S)	%	98	60-120	08/02/13 12:42	

LABORATORY CONTROL SAMPLE & LCSD: 1492459 1492460

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
AK101 Gasoline Range Organics	ug/L	1000	1010	991	101	99	60-120	2	20	N2
a,a,a-Trifluorotoluene (S)	%				104	90	60-120			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1493186 1493187

Parameter	Units	10237254006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
AK101 Gasoline Range Organics	ug/L	ND	1000	1000	1200	1190	120	119	70-142	.6	30	N2
a,a,a-Trifluorotoluene (S)	%						106	107	60-120			

QUALITY CONTROL DATA

Project: 301726 FIA Texaco
Pace Project No.: 10237254

QC Batch:	GCV/11172	Analysis Method:	Alaska 101
QC Batch Method:	Alaska 101	Analysis Description:	AK101W GCV Water
Associated Lab Samples:	10237254001		

METHOD BLANK: 1496659 Matrix: Water

Associated Lab Samples: 10237254001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
AK101 Gasoline Range Organics	ug/L	ND	100	08/07/13 16:00	N2
a,a,a-Trifluorotoluene (S)	%	98	60-120	08/07/13 16:00	

LABORATORY CONTROL SAMPLE & LCSD: 1496660 1496661

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
AK101 Gasoline Range Organics	ug/L	1000	1050	1100	105	110	60-120	5	20	N2
a,a,a-Trifluorotoluene (S)	%				105	105	60-120			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1496662 1496663

Parameter	Units	10237254001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
AK101 Gasoline Range Organics	ug/L	10100	10000	10000	24100	23600	139	135	70-142	2	30	N2
a,a,a-Trifluorotoluene (S)	%						120	118	60-120			

REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL DATA

Project: 301726 FIA Texaco
Pace Project No.: 10237254

QC Batch: MSV/24492 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 10237254001, 10237254002, 10237254003, 10237254004, 10237254005, 10237254006, 10237254007, 10237254008

METHOD BLANK: 1493012 Matrix: Water
Associated Lab Samples: 10237254001, 10237254002, 10237254003, 10237254004, 10237254005, 10237254006, 10237254007, 10237254008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	08/02/13 11:34	
Ethylbenzene	ug/L	ND	1.0	08/02/13 11:34	
Toluene	ug/L	ND	1.0	08/02/13 11:34	
Xylene (Total)	ug/L	ND	3.0	08/02/13 11:34	
1,2-Dichloroethane-d4 (S)	%	115	75-125	08/02/13 11:34	
4-Bromofluorobenzene (S)	%	105	75-125	08/02/13 11:34	
Toluene-d8 (S)	%	103	75-125	08/02/13 11:34	

LABORATORY CONTROL SAMPLE: 1493013

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	21.8	109	75-125	
Ethylbenzene	ug/L	20	20.3	101	75-125	
Toluene	ug/L	20	21.1	105	75-125	
Xylene (Total)	ug/L	60	61.7	103	75-125	
1,2-Dichloroethane-d4 (S)	%			116	75-125	
4-Bromofluorobenzene (S)	%			106	75-125	
Toluene-d8 (S)	%			104	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1493014 1493015

Parameter	Units	10237254006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	20	20	22.9	22.3	114	111	70-135	3	30	
Ethylbenzene	ug/L	ND	20	20	21.7	20.9	108	105	75-125	4	30	
Toluene	ug/L	ND	20	20	22.5	21.6	112	108	75-125	4	30	
Xylene (Total)	ug/L	ND	60	60	65.0	63.2	108	105	75-125	3	30	
1,2-Dichloroethane-d4 (S)	%						116	114	75-125			
4-Bromofluorobenzene (S)	%						105	105	75-125			
Toluene-d8 (S)	%						104	102	75-125			

QUALITY CONTROL DATA

Project: 301726 FIA Texaco
Pace Project No.: 10237254

QC Batch: OEXT/22519 Analysis Method: Alaska 102/103
QC Batch Method: EPA 3510 Analysis Description: AK1023 GCS
Associated Lab Samples: 10237254001, 10237254002, 10237254003, 10237254004, 10237254005, 10237254006, 10237254007

METHOD BLANK: 1493110 Matrix: Water
Associated Lab Samples: 10237254001, 10237254002, 10237254003, 10237254004, 10237254005, 10237254006, 10237254007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
DRO by AK 102	mg/L	ND	0.20	08/04/13 14:30	N2
Residual Range Organics AK103	mg/L	ND	0.50	08/04/13 14:30	N2
n-Triacontane (S)	%	95	60-120	08/04/13 14:30	
o-Terphenyl (S)	%	85	60-120	08/04/13 14:30	

LABORATORY CONTROL SAMPLE: 1493111

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
DRO by AK 102	mg/L	1	0.96	96	75-125	N2
Residual Range Organics AK103	mg/L	1	1.1	111	60-120	N2
n-Triacontane (S)	%			88	60-120	
o-Terphenyl (S)	%			86	60-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1493112 1493113

Parameter	Units	10237254006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
DRO by AK 102	mg/L	ND	2	2	1.8	1.8	85	84	50-150	1	20	N2
Residual Range Organics AK103	mg/L	ND	2	2	2.1	2.0	101	95	50-150	6	20	N2
n-Triacontane (S)	%						86	86	50-150			
o-Terphenyl (S)	%						90	88	50-150			

QUALITY CONTROL DATA

Project: 301726 FIA Texaco
Pace Project No.: 10237254

QC Batch: OEXT/22542 — Analysis Method: Alaska 102/103
QC Batch Method: EPA 3510 — Analysis Description: AK1023 GCS
Associated Lab Samples: 10237254001, 10237254002, 10237254003, 10237254004, 10237254005, 10237254006

METHOD BLANK: 1494893 — Matrix: Water
Associated Lab Samples: 10237254001, 10237254002, 10237254003, 10237254004, 10237254005, 10237254006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
DRO by AK 102 Silica Gel Clean	mg/L	ND	0.40	08/06/13 13:48	N2
n-Triacontane (S) SG	%	87	60-120	08/06/13 13:48	
o-Terphenyl (S) SG	%	77	60-120	08/06/13 13:48	

LABORATORY CONTROL SAMPLE: 1494894

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
DRO by AK 102 Silica Gel Clean	mg/L	2	1.7	84	75-125	N2
n-Triacontane (S) SG	%			80	60-120	
o-Terphenyl (S) SG	%			83	60-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1494895 1494896

Parameter	Units	10237254006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
DRO by AK 102 Silica Gel Clean	mg/L	ND	2	2	1.7	1.6	79	77	50-150	3	20	N2
n-Triacontane (S) SG	%						81	79	50-150			
o-Terphenyl (S) SG	%						85	81	50-150			

QUALIFIERS

Project:	301726 FIA Texaco
Pace Project No.:	10237254

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

N2 The lab does not hold TNI accreditation for this parameter.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 301726 FIA Texaco
Pace Project No.: 10237254

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10237254001	**MW-1-W-072913**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254001	**MW-1-W-072913**	EPA 3510	OEXT/22542	Alaska 102/103	GCSV/11799
10237254002	**MW-2-W-072913**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254002	**MW-2-W-072913**	EPA 3510	OEXT/22542	Alaska 102/103	GCSV/11799
10237254003	**MW-3-W-072913**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254003	**MW-3-W-072913**	EPA 3510	OEXT/22542	Alaska 102/103	GCSV/11799
10237254004	**MW-4-W-072913**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254004	**MW-4-W-072913**	EPA 3510	OEXT/22542	Alaska 102/103	GCSV/11799
10237254005	**MW-5-W-072913**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254005	**MW-5-W-072913**	EPA 3510	OEXT/22542	Alaska 102/103	GCSV/11799
10237254006	**MW-6-W-072913 MS/MSD**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254006	**MW-6-W-072913 MS/MSD**	EPA 3510	OEXT/22542	Alaska 102/103	GCSV/11799
10237254007	**BD-1-W-072913**	EPA 3510	OEXT/22519	Alaska 102/103	GCSV/11787
10237254001	**MW-1-W-072913**	Alaska 101	GCV/11172		
10237254002	**MW-2-W-072913**	Alaska 101	GCV/11144		
10237254003	**MW-3-W-072913**	Alaska 101	GCV/11144		
10237254004	**MW-4-W-072913**	Alaska 101	GCV/11144		
10237254005	**MW-5-W-072913**	Alaska 101	GCV/11144		
10237254006	**MW-6-W-072913 MS/MSD**	Alaska 101	GCV/11144		
10237254007	**BD-1-W-072913**	Alaska 101	GCV/11144		
10237254008	**Trip Blank**	Alaska 101	GCV/11144		
10237254001	**MW-1-W-072913**	EPA 8260	MSV/24492		
10237254002	**MW-2-W-072913**	EPA 8260	MSV/24492		
10237254003	**MW-3-W-072913**	EPA 8260	MSV/24492		
10237254004	**MW-4-W-072913**	EPA 8260	MSV/24492		
10237254005	**MW-5-W-072913**	EPA 8260	MSV/24492		
10237254006	**MW-6-W-072913 MS/MSD**	EPA 8260	MSV/24492		
10237254007	**BD-1-W-072913**	EPA 8260	MSV/24492		
10237254008	**Trip Blank**	EPA 8260	MSV/24492		

CHAIN-OF-CUSTODY / Analytical Request Document

Pace Analytical®
www.pacelabs.com

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

1130, 1131

Page: of

1681737

Section A
Required Client Information:

Company:	ARCADIS
Address:	1100 Olive Way STE 800 Seattle, WA 98102
Email To:	Gregory.montgomery@arcadis-us.com
Phone:	206-726-4743
Fax:	
Requested Due Date/TAT:	STANDARD

Section B
Required Project Information:

Report To:	Gregory Montgomery
Copy To:	Dave Beardon; Michael MacDaniel
Purchase Order No.:	B0046269.0011.00001
Project Name:	FIA Texaco
Project Number:	301726

Section C
Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

NPDES · GROUND WATER · DRINKING WATER
UST · RCRA · OTHER

Site Location
STATE:

Section D
Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes	MATRIX / CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	BTEX by 8260	GRO by AK 101	DRO by AK 102	DRO w/ Silica Gel AK 102	RRO by AK 102							Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Mw-1-W-072913	WT	G	7/29/13	1700								X						X	X	X	X	X								
2	mw-2-W-072913	WT	G	7/29/13	1720								X						X	X	X	X	X								
3	mw-3-W-072913	WT	G	7/29/13	1740								X						X	X	X	X	X								
4	mw-4-W-072913	WT	G	7/29/13	1800								X						X	X	X	X	X								
5	mw-5-W-072913	WT	G	7/29/13	1820								X						X	X	X	X	X								
6	mw-6-W-072913	WT	G	7/29/13	1840								X						X	X	X	X	X								
7	BD-1-W-072913	WT	G	7/29/13	—								X						X	X	X		X								
8	MS-W-072913	WT	G	7/29/13	1840								X						X	X	X		X								
9	MSD-W-072913	WT	G	7/29/13	1840								X						X	X	X		X								
10	Trip Blank	WT	-	—	-																										
11																															
12																															

Requested Analysis Filtered (Y/N)

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature]	7/30/13	930	AA / Pace	7/31/13	1534	2.8	Y	Y	Y
	AA / Pace	7/31/13	1628	[signature] Pace	7/31/13	1628				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Michael MacDaniel

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 07/30/13

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 28Jan2013 Page 1 of 1
	Document No.: **F-MN-L-210-rev.09**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: ARCADIS

Project #: **WO# : 10237254**

10237254

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☑ Other: 2 ziploc bag **Temp Blank?** ☑ Yes ☐ No

Thermom. Used: ☑ B88A912167504 ☐ 80512447 ☐ 72337080 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 2.6 **Cooler Temp Corrected (°C):** 2.8 **Biological Tissue Frozen?** ☐ Yes ☐ No

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** AM 7/31/13

	Yes	No	N/A	Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume (triple volume provided for MS/MSD)?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☐ Yes	~~☑ No~~ 7/31/13 AM	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH>12)	☐ Yes	☐ No	☑ N/A	Sample #
Per method, VOA pH is checked after analysis				Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☑ No	☐ N/A	14.
3 Trip Blanks Present?	☐ Yes	☑ No	☐ N/A	15. 4 Trip blanks present
Trip Blank Custody Seals Present?	☑ Yes	☐ No	☐ N/A	
Pace Trip Blank Lot # (if purchased): 061113-1				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins +0.2		
Opened Time: 1628	Temp: 2.6	Corrected Temp: 2.8
Time: 1640	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: [signature] **Date:** 8/1/13

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (I.e out of hold, incorrect preservative, out of temp, incorrect containers)

Appendix C

ADEC Data Review Checklists

Laboratory Data Review Checklist

Completed by:	David Beaudoin		
Title:	Environmental Scientist II	Date:	Sept 5, 2013
CS Report Name:	Annual 2013 GWM Report	Report Date:	Sept 4, 2013
Consultant Firm:	ARCADIS		
Laboratory Name:	Pace Analytical Inc.	Laboratory Report Number:	10237254
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 ○ NA (Please explain.) 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 ◉ NA (Please explain) Comments:

Samples not transferred

2. Chain of Custody (COC)

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

◉ Yes ○ No ○ NA (Please explain) Comments:

b. Correct analyses requested?

◉ Yes ○ No ○ NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

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

◉ Yes ○ No ○ NA (Please explain) Comments:

Temperature 2.8 degrees C

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No discrepancies to document.

e. Data quality or usability affected? (Please explain)

Comments:

Data quality or usability is not affected.

4. <u>Case Narrative</u>

a. Present and understandable?

◉ Yes ○ No ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No discrepancies

c. Were all corrective actions documented?

○ Yes ○ No ◉ NA (Please explain) Comments:

No corrective actions taken

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

Comments:

Data quality or usability is not affected.

5. Samples Results

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

◉ Yes ○ No ○ NA (Please explain) Comments:

b. All applicable holding times met?

◉ Yes ○ No ○ NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA- only groundwater samples collected

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

◉ Yes ○ No ○ NA (Please explain) Comments:

e. Data quality or usability affected? (Please explain)

Comments:

NA - Data quality or usability is not affected.

6. QC Samples

a. Method Blank

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

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. All method blank results less than PQL?

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. If above PQL, what samples are affected? Comments:

NA

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

○ Yes ○ No ◉ NA (Please explain) Comments:

NA - no affected samples

v. Data quality or usability affected? (Please explain) Comments:

NA

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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

No metal or inorganic analysis requested.

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 ○ NA (Please explain) 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 ○ NA (Please explain) Comments:

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

Comments:

NA

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

◉ Yes ○ No ○ NA (Please explain) Comments:

vii. Data quality or usability affected? (Please explain) Comments:

Data quality or usability is not affected.

c. Surrogates - Organics Only

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

◉ Yes ○ No ○ NA (Please explain) 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 ○ NA (Please explain) Comments:

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

○ Yes ○ No ◉ NA (Please explain) Comments:

iv. Data quality or usability affected? (Use the comment box to explain.).

Comments:

Data quality or usability is not affected.

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

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

◉ Yes ○ No ○ NA (Please explain.) Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

◉ Yes ○ No ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

NA

v. Data quality or usability affected? (Please explain.)

Comments:

NA

e. Field Duplicate

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

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) Comments:

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

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

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

◉ Yes ○ No ○ NA (Please explain) Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality or usability does not appear to be affected.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ◉ No ○ NA (Please explain) Comments:

Equipment blank not collected due to sampling method used in groundwater collection.

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

NA - no equipment blank collected

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

NA

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

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

No other flags/qualifiers

Reset Form