

**RESULTS OF GROUNDWATER MONITORING
FORMER UNOCAL BULK PLANT 0207
GATE 28, WEST RAMP
FAIRBANKS INTERNATIONAL AIRPORT
FAIRBANKS, ALASKA
ADEC FILE NO. 100.26.040**

NOVEMBER 19, 2004

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November 19, 2004

Unocal Alaska
P.O. Box 196247
Anchorage, Alaska 99519-6247

Attention: Bob Shipley

Subject: Results of Groundwater Monitoring
Former Unocal Bulk Plant 0207
Gate 28, West Ramp
Fairbanks International Airport
Fairbanks, Alaska
GeoEngineers File No. 0161-524-02
ADEC File No. 100.26.040

INTRODUCTION

This report presents the results of groundwater monitoring and product recovery testing at the former Unocal Fuel Distribution Facility Number 0207, located at Fairbanks International Airport (FIA), Gate 28, West Ramp, Fairbanks, Alaska. Our services were described in "Work Order Request" dated January 27, 2004. This groundwater monitoring event was completed under the Unocal Alaska Contract 3640-OFF, Work Order Authorization Number 161838-8520762520, authorized on March 8, 2004. The former Unocal lease included Parcel A and Parcel B of FIA Block 1, Lot 8, located at 5245 Airport Road. Currently, Frontier Flying Services, Inc. (Frontier Flying) is leasing all of Lot 8 from the Alaska Department of Transportation and Public Facilities (ADOT&PF). Nearby properties include the ADOT&PF airport maintenance and Alaska Rescue Fire Fighting (ARFF) facility across Brumbaugh Avenue to the northeast, and Northern Air Cargo (NAC) adjacent to the southwest. The property is referred to herein as the "site" or "Unocal lease portion." The site is shown relative to surrounding physical features on Figure 1.

BACKGROUND

The site is currently owned by ADOT&PF which is leasing Block 1, Lot 8 to Frontier Flying. Frontier Flying has been leasing Lot 8 since April 2003; previously Frontier Flying subleased Lot 8 from Falcon Properties. Unocal formerly subleased a portion (Parcels A and B) of Lot 8 from Trans-Arctic Airlines and operated a fuel distribution station that provided aviation gasoline and Jet-A fuel to airplanes at FIA. Parcel A was a rectangular piece of land, 100 feet in length and 50 feet in width, running northwest to southeast approximately 20 feet inside the northeastern lot boundary. Parcel B was a circular parcel of land adjacent to the southeasterly property line of Lot 8 and having a diameter of 200 feet (see Figure 2).

The former Unocal lease portion is presently being used only for periodic vehicle storage, with the exception of the northwest corner of Parcel A. Frontier maintains a 12,000-gallon Jet-A fuel aboveground storage tank (AST) within the asphalt cutout near the northwest corner of Parcel A. It is unclear if the AST is within the limits of former Parcel A; however, the AST is on the gravel that was exposed during the removal of Unocal's fuel distribution system.

In October 1991, Dames & Moore observed and monitored the removal of four 10,000-gallon underground storage tanks (USTs), two pump islands and all associated piping, as reported in "Site Assessment Report for Underground Storage Tank Closure, CEM Leasing, Inc., Fairbanks, Alaska," dated December 17, 1991. The USTs were seated in sandy gravel, covered with 3 feet of silty sand, and capped with asphalt/concrete. Excavation and removal of the underground piping included two 5-foot-deep-by-4-foot-wide trenches. One spanned 200 feet from the Jet-A USTs to the southern pump station (southern trench). The other was 120 feet in total length and connected the aviation gasoline USTs to the northwestern pump station (northwestern trench). Two soil samples from the southern trench had diesel-range organic (DRO) concentrations greater than the Alaska Department of Environmental Conservation (ADEC) cleanup level. Hydrocarbon concentrations in the soil sample from the northwestern trench were less than laboratory method reporting limits. Following piping excavation, the pump stations and ASTs were removed. The UST excavation was approximately 65 feet by 40 feet and averaged 10 feet in depth. All four USTs were "free of dents and holes and appeared to be in good condition," according to Dames & Moore. Groundwater was encountered in the excavation; no free product was observed. DRO concentrations for all samples, and total benzene, ethylbenzene, toluene and xylenes (BETX) and gasoline-range organics (GRO) for several samples, were greater than ADEC cleanup levels. Approximately 1,200 cubic yards of soil were excavated during UST and pipeline removal. The soil, suspected of containing hydrocarbons greater than cleanup levels, was placed back into the excavations. A visqueen separation layer was placed over the contaminated soil, and clean imported fill was used to restore the excavation area to original grade.

GeoEngineers installed nine groundwater monitoring wells in September 2003. Soil samples with GRO/BETX detections were noted by the laboratory to be mostly due to overlap from diesel-range hydrocarbons, with the exception of GEI-4, GEI-7 and GEI-8. Benzene was the only constituent detected in soil samples from GEI-7 and GEI-8. DRO was detected in all groundwater samples except GEI-2. Approximately 2.31 feet of free product was encountered in GEI-5. Hydrocarbon Identification (HCID) analyses indicated the product is a lighter-weight diesel product such as kerosene or jet fuel range hydrocarbon. GeoEngineers conducted groundwater monitoring and a product baildown test in April 2004.

GROUNDWATER MONITORING AND SAMPLING

Groundwater samples were collected for chemical analyses from eight monitoring wells on September 16, 2004. The representative groundwater samples were submitted for analysis of GRO/BETX and DRO. Approximately 2.19 feet of free product was encountered in GEI-5, and no groundwater sample was submitted for analysis. Field procedures are briefly described in Appendix A.

The groundwater flow direction, interpolated from the measured depths to groundwater in September 2004, is to the northwest. The groundwater surface appears to be nearly flat with an approximate gradient of less than 0.001 foot per foot. Groundwater levels were consistently lower during this monitoring event when compared to levels observed during September 2003 monitoring. Free product was measured in well GEI-5 in September at a thickness of 2.19 feet.

Benzene was detected in five wells at concentrations ranging from 1.26 micrograms per liter ($\mu\text{g/l}$) in GEI-3 to 17.3 $\mu\text{g/l}$ in GEI-9. Ethylbenzene was detected in seven wells at concentrations ranging from 0.520 $\mu\text{g/l}$ in GEI-8 to 58.3 $\mu\text{g/l}$ in GEI-9. Toluene was detected in five wells at concentrations ranging from 0.547 $\mu\text{g/l}$ in GEI-2 to 1.83 $\mu\text{g/l}$ in GEI-1. Xylenes were detected in all wells sampled at concentrations ranging from 1.12 $\mu\text{g/l}$ in GEI-8 to 251 $\mu\text{g/l}$ in GEI-1.

GRO was detected in all groundwater samples at concentrations ranging from 0.0766 milligrams per liter (mg/l) in GEI-2 to 1.88 mg/l in GEI-6.

DRO was detected in all wells sampled at concentrations ranging from 1.43 mg/l in GEI-2 to 77.4 mg/l in well GEI-9. DRO concentrations were generally lower during this monitoring event when compared to the April 2004 analytical results.

Current and historical groundwater elevations are included in Table 1 and Figure 2. The groundwater chemical analytical data for monitoring well samples obtained in September 2004 are summarized in Table 2 and are shown on Figure 3. The laboratory reports and chain-of-custody records are included in Appendix B. Well parameter data is presented in Table 3.

CONCLUSIONS

The groundwater flow direction, interpolated from the measured depths to groundwater in September 2004, is to the northwest. Groundwater levels were consistently lower during this monitoring event when compared to levels observed during September 2003 monitoring. BETX was detected in the eight wells sampled for these parameters, at concentrations similar to previous monitoring results. GRO and DRO were detected in all wells sampled in September 2004. DRO concentrations were generally lower during this monitoring event when compared to the April 2004 analytical results. Free product was measured in well GEI-5 in September at a thickness of 2.19 feet.

LIMITATIONS

We have prepared this report for use by Unocal Alaska for the former Unocal fuel distribution facility located at FIA in Fairbanks, Alaska.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form or hard copy of this document (email, text, table, and/or figure), if provided, and any attachments are only a copy of a master document. The master hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

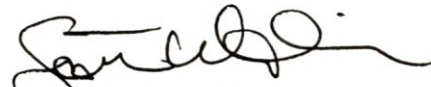
We appreciate the opportunity to be of service to Unocal Alaska. Please contact us if you have questions regarding this report.

Sincerely,

GeoEngineers, Inc.



Deanne K. Hargrave, PE
Geotechnical Engineer



Scott E. Widness, PE
Principal

DKH:SEW:skl
Document ID: Anch\0\00161\00161524\02\Finals\016152402mon2.doc

- Attachments:
- Table 1. Groundwater Elevation Data
 - Table 2. Summary of Groundwater Analytical Results
 - Table 3. Well Parameter Data
 - Figure 1. Vicinity Map
 - Figure 2. Groundwater Elevation and Site Plan
 - Figure 3. Groundwater Chemical Analytical Results
 - Appendix A. Field Activities
 - Appendix B. Chemical Analytical Data

Five copies submitted

TABLE 1
GROUNDWATER ELEVATION DATA
FORMER UNOCAL BULK PLANT
GATE 28, WEST RAMP
FAIRBANKS INTERNATIONAL AIRPORT
FAIRBANKS, ALASKA

Monitoring Well	Top of Casing Elevation (feet)	Date	Depth to Water (top of casing) (feet)	Groundwater Elevation (feet)
GEI-1	99.87	09/04/03	6.32	93.55
		04/24/04	--	--
		09/16/04	8.56	91.31
GEI-2	99.79	09/04/03	6.19	93.60
		04/24/04	--	--
		09/16/04	8.47	91.32
GEI-3	99.73	09/04/03	6.14	93.59
		04/24/04	9.49	90.24
		09/16/04	8.38	91.35
GEI-4	99.66	09/04/03	6.12	93.54
		04/24/04	9.52	90.14
		09/16/04	8.41	91.25
GEI-5	99.88	09/04/03	8.28	93.49 ¹
		04/24/04	10.11	90.09 ¹
		09/16/04	10.40	91.28 ¹
GEI-6	99.95	09/04/03	6.47	93.48
		04/24/04	9.95	90.00
		09/16/04	8.83	91.12
GEI-7	99.44	09/04/03	5.92	93.52
		04/24/04	9.49	89.95
		09/16/04	8.36	91.08
GEI-8	100.01	09/04/03	6.48	93.53
		04/24/04	9.94	90.07
		09/16/04	8.84	91.17
GEI-9	100.02	09/04/03	6.42	93.60
		04/24/04	9.82	90.20
		09/16/04	8.21	91.81

Notes:

¹Groundwater elevation was corrected due to the presence of phase-separated (free) product in the well. Specific gravity of 0.82 was used for the free product (Jet-A Fuel). Approximately 2.19 feet of free product was measured in GEI-5 on 09/16/04.

-- = not monitored because wells were inaccessible.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
FORMER UNOCAL BULK PLANT
GATE 28, WEST RAMP
FAIRBANKS INTERNATIONAL AIRPORT
FAIRBANKS, ALASKA

Monitoring Well	Date Sampled	BETX ¹ (µg/l)				GRO ² (mg/l)	DRO ³ (mg/l)
		B	E	T	X		
GEI-1	09/04/03	5.52	28.7	4.63	223	3.12	62.8
	04/24/04	--	--	--	--	--	--
	09/16/04	7.05	47.9	1.83	251	1.76	151
	09/16/04*	5.40	42.2	2.02	233	--	--
GEI-2	09/04/03	<0.500	<0.500	<0.500	<1.00	0.0948	<0.364
	04/24/04	--	--	--	--	--	--
	09/16/04	2.53	<0.500	0.547	1.81	0.0766	1.43
GEI-3	09/04/03	1.04	23.1	2.03	79.3	1.38	6.40
	04/24/04	<5.00	13.9	<5.00	59.8	1.33	21.0
	09/16/04	1.26	8.27	<0.500	14.9	0.310	18.3
GEI-4	09/04/03	10.0	31.6	<5.00	67.4	3.47	47.7
	04/24/04	<5.00	14.6	<5.00	57.2	1.27	43.6
	09/16/04	15.0	21.8	0.675	35.7	0.638	36.2
GEI-5 ⁴	09/04/03	--	--	--	--	--	--
	04/24/04	--	--	--	--	--	--
	09/16/04	--	--	--	--	--	--
GEI-6	09/04/03	23.3	87.6	<5.00	275	2.91	40.1
	04/24/04	8.17	59.6	<5.00	145	2.93	168
	09/16/04	7.80	23.8	1.57	75.0	1.88	39.6
GEI-7	09/04/03	<0.500	9.08	1.01	21.6	0.841	4.02
	04/24/04	6.97	7.58	<5.00	20.0	2.44	43.2
	09/16/04	<0.500	8.89	1.34	14.2	0.363	5.66
GEI-8	09/04/03	<0.500	0.555	<0.500	1.23	0.184	1.78
	04/24/04	<5.00	11.7	<5.00	30.4	<0.5	7.39
	09/16/04	<0.500	0.520	<0.500	1.12	0.082	8.69
GEI-9	09/04/03	19.2	67.6	0.655	143	2.32	15.0
	04/24/04	9.53	113	<5.00	321	8.37	33.7
	09/16/04	17.3	58.3	<0.500	57.5	1.35	77.4

Notes:

¹B = benzene, E = ethylbenzene, T = toluene, X = xylenes; by EPA Method 8021B

²GRO = Gasoline-Range Organics by Alaska Method AK101

³DRO = Diesel-Range Organics by Alaska Method AK102

⁴Well was not sampled due to the presence of phase-separated product.

µg/l = micrograms per liter

mg/l = milligrams per liter

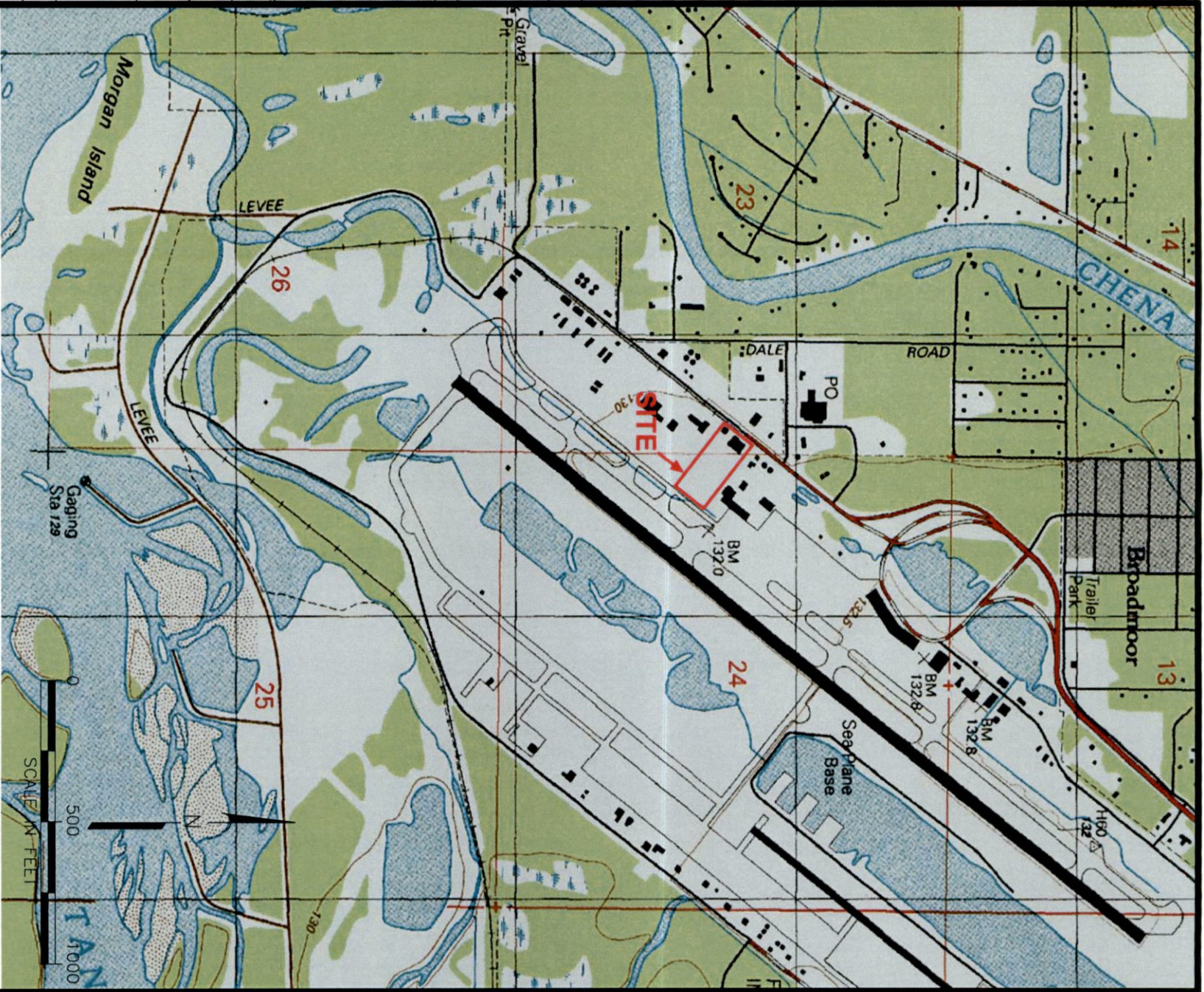
"--" = parameter not analyzed

EPA = U.S. Environmental Protection Agency

TABLE 3
GROUNDWATER PARAMETER DATA
FORMER UNOCAL BULK PLANT
GATE 28, WEST RAMP
FAIRBANKS INTERNATIONAL AIRPORT
FAIRBANKS, ALASKA

Monitoring Well	Date	Dissolved Oxygen ¹ (mg/l)	Temperature ¹ (°F)	Conductivity ¹ (µS/cm)	Specific Conductance ¹ (µS/cm at 25°C)	pH
GEI-1	09/04/03	0.91	39	268	448	6.43
	04/24/04	--	--	--	--	--
	09/16/04	2.95	44	--	--	6.7
GEI-2	09/04/03	1.09	46	96	142	6.50
	04/24/04	--	--	--	--	--
	09/16/04	1.14	47	--	--	6.27
GEI-3	09/04/03	0.9	47	396	652	6.47
	04/24/04	1.47	39	235	394	6.41
	09/16/04	1.18	47	--	--	6.28
GEI-4	09/04/03	0.24	44	418	645	6.40
	04/24/04	0.93	38	588	1,001	6.32
	09/16/04	0.52	45	--	--	6.35
GEI-5	09/04/03	--	--	--	--	--
	04/24/04	--	--	--	--	--
	09/16/04	--	--	--	--	--
GEI-6	09/04/03	1.07	40	751	1,229	6.30
	04/24/04	--	--	--	--	--
	09/16/04	1.03	38	--	--	6.4
GEI-7	09/04/03	0.61	44	372	576	6.44
	04/24/04	1.17	36	520	923	6.06
	09/16/04	1.34	42	--	--	6.37
GEI-8	09/04/03	0.82	38	826	1,444	6.41
	04/24/04	1.83	36	321	595	6.52
	09/16/04	1.95	37	--	--	7.11
GEI-9	09/04/03	0.84	40	253	418	6.51
	04/24/04	1.35	38	581	995	6.63
	09/16/04	1.15	43	--	--	6.83

Notes:
¹Dissolved oxygen conductivity and specific conductance concentrations and temperature measurements were obtained from purge water bailed from the well using a YSI Model 85 water quality meter.
mg/l = milligrams per liter
°F = degrees Fahrenheit
µS/cm = micro-Siemens per centimeter
°C = degrees Celsius
-- = parameter not measured



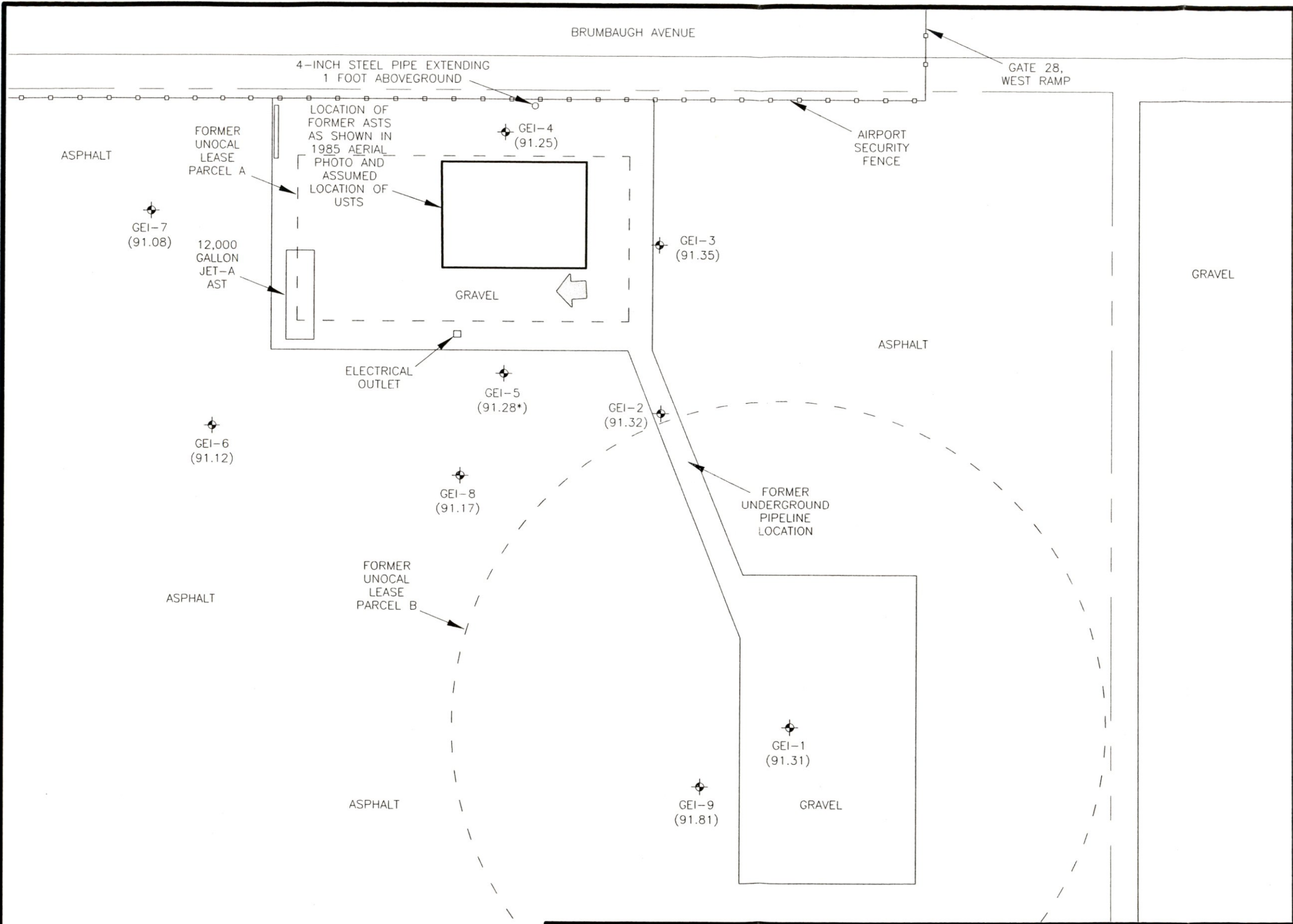
References:
USGS 7.5' topographic quadrangle map "Fairbanks (D-2) SW, AK." 1992.






VICINITY MAP

FIGURE 1

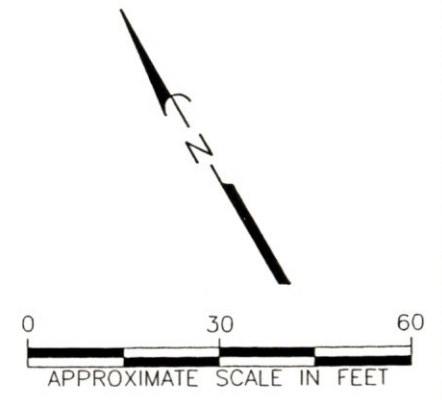
Anchorage P:\0161\524\02\AutoCAD\Site Plan.dwg DKH 8/5/03 rev 9/16/04




LEGEND

-  MONITORING WELL WITH GROUNDWATER ELEVATIONS MEASURED ON 9/16/04
-  NM NOT MONITORED DUE TO INACCESSIBLE WELL
-  APPROXIMATE GROUNDWATER FLOW DIRECTION

Notes:
 The locations of all features shown are approximate.
 Elevations are relative to an arbitrary temporary benchmark.

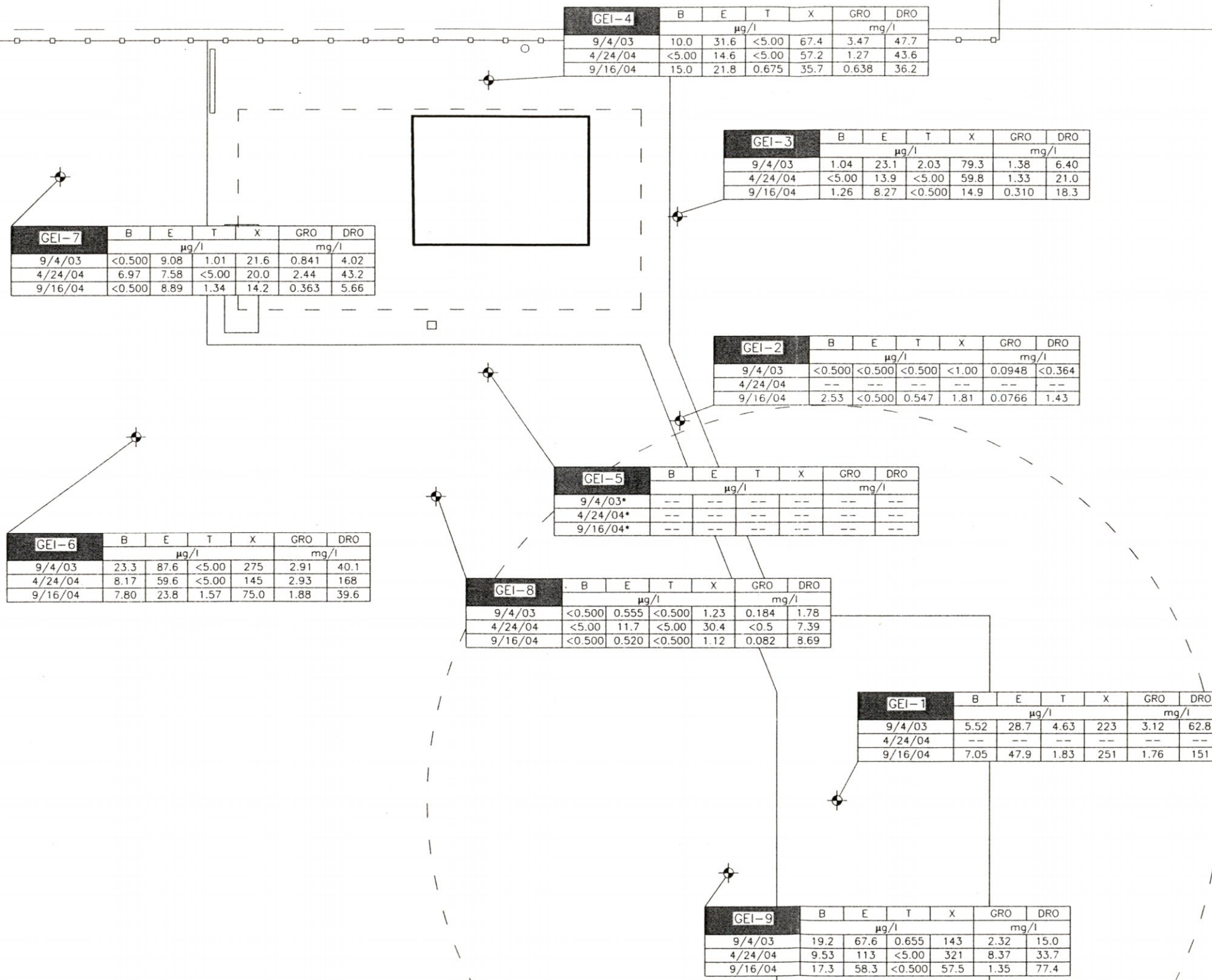


References: Drawing based on field sketch by GeoEngineers on August 22, 2003. Former AST/UST location is based on 1985 aerial photograph. Former Unocal lease Parcels A and B locations are based on Unocal "Fueling Facilities" drawing dated 10/10/69, revised 2/4/70.

 Earth Science + Technology	FORMER UNOCAL FUEL FACILITY	GROUNDWATER ELEVATION AND SITE PLAN
	FAIRBANKS, ALASKA	FIGURE 2

Anchorage P:\0161\524\02\AutoCAD\GW CA.dwg DKH 8/5/03 rev 5/26/04

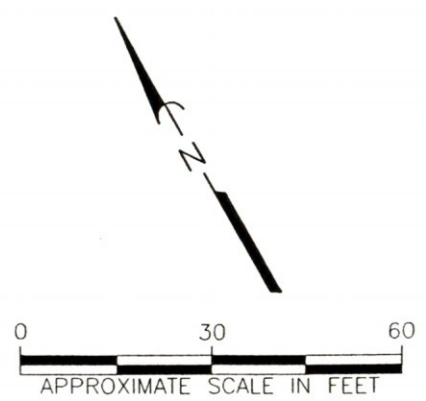
BRUMBAUGH AVENUE



LEGEND

MONITORING WELL
 INSTALLED BY
 GEOENGINEERS, 2003

Note:
 The locations of all features
 shown are approximate.
 "*" Indicates the well was not
 sampled due to the presence of
 free product.



References: Drawing based on field sketch by GeoEngineers on August 22, 2003. Former AST/UST location is based on 1985 aerial photograph. Former Unocal lease Parcels A and B locations are based on Unocal "Fueling Facilities" drawing dated 10/10/69, revised 2/4/70.

<p>Earth Science + Technology</p>	FORMER UNOCAL FUEL FACILITY	GROUNDWATER CHEMICAL ANALYTICAL RESULTS
	FAIRBANKS, ALASKA	FIGURE 3



APPENDIX A
FIELD ACTIVITIES



APPENDIX A FIELD ACTIVITIES

GROUNDWATER ELEVATIONS

The depths to shallow groundwater relative to the monitoring well casing rims were measured in all accessible monitoring wells to the nearest 0.01 foot using an electronic water level indicator on September 16, 2004. Groundwater elevations were calculated by subtracting the depths to water from the casing rim elevations. A decontaminated Oil Recovery Systems, Inc. oil/water interface probe and/or a new polyethylene disposable bailer was used to detect the presence of any measurable free product in select monitoring wells.

GROUNDWATER SAMPLING PROGRAM

Groundwater samples were obtained by GeoEngineers from the monitoring wells on September 16, 2004. At least three standing well volumes of groundwater were removed from each well, or the wells were bailed until dry and allowed to recharge prior to sampling. The monitoring wells were bailed and samples were collected using a disposable polyethylene bailer. A new bailer and nylon cord were used to bail and sample each monitoring well to minimize the possibility of cross-contamination between samples. The GeoEngineers representative also wore clean, disposable, nitrile gloves to minimize the risk of sample contamination. Well parameter data, including dissolved oxygen, temperature, conductivity, specific conductance and pH, was collected during purging.

The groundwater samples were transferred from the bailers to sample containers provided by the analytical laboratory and were kept cool during transport to North Creek Analytical, Inc. in Anchorage, Alaska, and Bothell, Washington. Chain-of-custody procedures were followed during sample transport to the laboratory.

Purge water generated during this sampling event (approximately 10 gallons) was transported to Unocal's Illinois Street site in a labeled, sealed, 55-gallon drum.

APPENDIX B
CHEMICAL ANALYTICAL DATA



APPENDIX B

CHEMICAL ANALYTICAL DATA

SAMPLES

Chain-of-custody procedures were followed during the transport of the field samples to the accredited analytical laboratory. The samples were held in cold storage pending extraction and/or analysis. The analytical results and quality control records are included in this appendix.

ANALYTICAL DATA REVIEW

The laboratory maintains an internal quality assurance (QA) program as documented in its laboratory quality assurance manual. The laboratory uses a combination of blanks, surrogate recoveries, duplicates, matrix spike recoveries, matrix spike duplicate recoveries, blank spike recoveries and blank spike duplicate recoveries to evaluate the analytical results. The laboratory also uses data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods. The data quality goals were included in the laboratory reports. The laboratory compared each group of samples with the existing data quality goals and noted any exceptions in the laboratory report. Any data quality exceptions documented by the accredited laboratory were reviewed by GeoEngineers and are addressed in the data quality exception section of this appendix.

DATA QUALITY EXCEPTION SUMMARY

Based on our data quality review, it is our opinion that the groundwater analytical data are of acceptable quality for their intended use, with the following qualifications:

- GeoEngineers collected a duplicate sample from GEI-1 and submitted it to North Creek Analytical, Inc. (NCA) as a blind duplicate for benzene, ethylbenzene, toluene and xylenes (BETX) analysis. In general, comparison of results from the duplicate and GEI-1 indicate acceptable relative percent differences (RPD). However, benzene results were slightly outside the acceptable precision limits.

SUMMARY

NCA reports for samples collected by GeoEngineers during this subsurface site investigation are included in this appendix. With the exception of the above data quality issues noted during our review of the field and laboratory programs, it is our opinion that the analytical data are acceptable for use on this project.



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

29 October 2004

Deanne Hargrave
GeoEngineers
4951 Eagle Street
Anchorage, AK/USA 99503-7432
RE: Unocal - FIA

Enclosed are the results of analyses for samples received by the laboratory on 09/16/04 20:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Mike Priebe
Technical Services Manager



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

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

Reported:
 10/29/04 09:54

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GEI-1	A4I0035-01	Water	09/16/04 09:00	09/16/04 20:30
GEI-2	A4I0035-02	Water	09/16/04 09:15	09/16/04 20:30
GEI-3	A4I0035-03	Water	09/16/04 09:30	09/16/04 20:30
GEI-4	A4I0035-04	Water	09/16/04 09:45	09/16/04 20:30
GEI-6	A4I0035-05	Water	09/16/04 10:00	09/16/04 20:30
GEI-7	A4I0035-06	Water	09/16/04 10:15	09/16/04 20:30
GEI-8	A4I0035-07	Water	09/16/04 10:30	09/16/04 20:30
GEI-9	A4I0035-08	Water	09/16/04 10:45	09/16/04 20:30
Duplicate	A4I0035-09	Water	09/16/04 00:00	09/16/04 20:30

North Creek Analytical - Alaska

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Mike Priebe, Technical Services Manager

North Creek Analytical, Inc.
 Environmental Laboratory Network



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

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

Reported:
 10/29/04 09:54

Gasoline Range Organics (C6-C10) per AK101
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GEI-1 (A4I0035-01) Water Sampled: 09/16/04 09:00 Received: 09/16/04 20:30									
Gasoline Range Organics	1760	50.0	ug/l	1	4090041	09/20/04	09/20/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	71.4 %	50-150			"	"	"	"	
GEI-2 (A4I0035-02) Water Sampled: 09/16/04 09:15 Received: 09/16/04 20:30									
Gasoline Range Organics	76.6	50.0	ug/l	1	4090041	09/20/04	09/21/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	91.0 %	50-150			"	"	"	"	
GEI-3 (A4I0035-03) Water Sampled: 09/16/04 09:30 Received: 09/16/04 20:30									
Gasoline Range Organics	310	50.0	ug/l	1	4090041	09/20/04	09/20/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	88.5 %	50-150			"	"	"	"	
GEI-4 (A4I0035-04) Water Sampled: 09/16/04 09:45 Received: 09/16/04 20:30									
Gasoline Range Organics	638	50.0	ug/l	1	4090041	09/20/04	09/20/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	84.5 %	50-150			"	"	"	"	
GEI-6 (A4I0035-05) Water Sampled: 09/16/04 10:00 Received: 09/16/04 20:30									
Gasoline Range Organics	1880	100	ug/l	2	4090041	09/20/04	09/21/04	AK101 GRO	R-01
Surrogate: a,a,a-TFT (FID)	85.7 %	50-150			"	"	"	"	
GEI-7 (A4I0035-06) Water Sampled: 09/16/04 10:15 Received: 09/16/04 20:30									
Gasoline Range Organics	363	50.0	ug/l	1	4090041	09/20/04	09/21/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	88.4 %	50-150			"	"	09/21/04	"	
GEI-8 (A4I0035-07) Water Sampled: 09/16/04 10:30 Received: 09/16/04 20:30									
Gasoline Range Organics	82.0	50.0	ug/l	1	4090041	09/20/04	09/20/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	89.7 %	50-150			"	"	"	"	

North Creek Analytical - Alaska

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 425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
 503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588
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 907.563.9200 fax 907.563.9210

GeoEngineers 4951 Eagle Street Anchorage, AK/USA 99503-7432	Project: Unocal - FIA Project Number: 0161-524-02 Project Manager: Deanne Hargrave	Reported: 10/29/04 09:54
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Gasoline Range Organics (C6-C10) per AK101
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GEI-9 (A4I0035-08) Water Sampled: 09/16/04 10:45 Received: 09/16/04 20:30									
Gasoline Range Organics	1350	50.0	ug/l	1	4090041	09/20/04	09/21/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	75.4 %	50-150			"	"	"	"	
Duplicate (A4I0035-09) Water Sampled: 09/16/04 00:00 Received: 09/16/04 20:30									
Gasoline Range Organics	2070	50.0	ug/l	1	4090041	09/20/04	09/21/04	AK101 GRO	
Surrogate: a,a,a-TFT (FID)	68.7 %	50-150			"	"	"	"	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 509.924.9200 fax 509.924.9290
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Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
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 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

Reported:
 10/29/04 09:54

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GEI-1 (A4I0035-01) Water Sampled: 09/16/04 09:00 Received: 09/16/04 20:30									
Diesel Range Organics	151	40.0	mg/l	100	4090054	09/23/04	09/27/04	AK 102	R-01
Surrogate: 1-Chlorooctadecane	79.4 %	50-150			"	"	"	"	S-01
GEI-2 (A4I0035-02) Water Sampled: 09/16/04 09:15 Received: 09/16/04 20:30									
Diesel Range Organics	1.43	0.400	mg/l	1	4090054	09/23/04	09/25/04	AK 102	
Surrogate: 1-Chlorooctadecane	72.8 %	50-150			"	"	"	"	
GEI-3 (A4I0035-03) Water Sampled: 09/16/04 09:30 Received: 09/16/04 20:30									
Diesel Range Organics	18.3	0.400	mg/l	1	4090054	09/23/04	09/25/04	AK 102	
Surrogate: 1-Chlorooctadecane	69.5 %	50-150			"	"	"	"	
GEI-4 (A4I0035-04) Water Sampled: 09/16/04 09:45 Received: 09/16/04 20:30									
Diesel Range Organics	36.2	0.400	mg/l	1	4090054	09/23/04	09/25/04	AK 102	
Surrogate: 1-Chlorooctadecane	72.0 %	50-150			"	"	"	"	
GEI-6 (A4I0035-05) Water Sampled: 09/16/04 10:00 Received: 09/16/04 20:30									
Diesel Range Organics	39.6	0.400	mg/l	1	4090054	09/23/04	09/25/04	AK 102	
Surrogate: 1-Chlorooctadecane	72.5 %	50-150			"	"	"	"	
GEI-7 (A4I0035-06) Water Sampled: 09/16/04 10:15 Received: 09/16/04 20:30									
Diesel Range Organics	5.66	0.400	mg/l	1	4090054	09/23/04	09/25/04	AK 102	
Surrogate: 1-Chlorooctadecane	75.6 %	50-150			"	"	"	"	
GEI-8 (A4I0035-07) Water Sampled: 09/16/04 10:30 Received: 09/16/04 20:30									
Diesel Range Organics	8.69	0.400	mg/l	1	4090054	09/23/04	09/25/04	AK 102	
Surrogate: 1-Chlorooctadecane	71.9 %	50-150			"	"	"	"	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
 503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers 4951 Eagle Street Anchorage, AK/USA 99503-7432	Project: Unocal - FIA Project Number: 0161-524-02 Project Manager: Deanne Hargrave	Reported: 10/29/04 09:54
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Diesel Range Organics (C10-C25) per AK102
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
GEI-9 (A410035-08) Water Sampled: 09/16/04 10:45 Received: 09/16/04 20:30									
Diesel Range Organics	77.4	4.00	mg/l	10	4090054	09/23/04	09/27/04	AK 102	R-01
<i>Surrogate: 1-Chlorooctadecane</i>	71.4 %	50-150			"	"	"	"	

North Creek Analytical - Alaska

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
 503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

Reported:
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BTEX by EPA Method 8021B
North Creek Analytical - Alaska

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
GEI-1 (A4I0035-01) Water Sampled: 09/16/04 09:00 Received: 09/16/04 20:30										
Benzene	7.05	0.500		ug/l	1	4100080	09/20/04	09/20/04	EPA 8021B	
Toluene	1.83	0.500		"	"	"	"	"	"	
Ethylbenzene	47.9	0.500		"	"	"	"	"	"	
Xylenes (total)	251	1.00		"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	79.7 %	0-200				"	"	"	"	
GEI-2 (A4I0035-02) Water Sampled: 09/16/04 09:15 Received: 09/16/04 20:30										
Benzene	2.53	0.500		ug/l	1	4100080	09/20/04	09/21/04	EPA 8021B	J, P-02
Toluene	0.547	0.500		"	"	"	"	"	"	
Ethylbenzene	ND	0.500		"	"	"	"	"	"	
Xylenes (total)	1.81	1.00		"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	101 %	0-200				"	"	"	"	
GEI-3 (A4I0035-03) Water Sampled: 09/16/04 09:30 Received: 09/16/04 20:30										
Benzene	1.26	0.500		ug/l	1	4100080	09/20/04	09/20/04	EPA 8021B	J, P-02
Toluene	ND	0.500		"	"	"	"	"	"	
Ethylbenzene	8.27	0.500		"	"	"	"	"	"	
Xylenes (total)	14.9	1.00		"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	89.8 %	0-200				"	"	"	"	
GEI-4 (A4I0035-04) Water Sampled: 09/16/04 09:45 Received: 09/16/04 20:30										
Benzene	15.0	0.500		ug/l	1	4100080	09/20/04	09/20/04	EPA 8021B	
Toluene	0.675	0.500		"	"	"	"	"	"	J, P-02
Ethylbenzene	21.8	0.500		"	"	"	"	"	"	
Xylenes (total)	35.7	1.00		"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	88.3 %	0-200				"	"	"	"	

North Creek Analytical - Alaska

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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 541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

Reported:
 10/29/04 09:54

BTEX by EPA Method 8021B
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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GEI-6 (A4I0035-05) Water Sampled: 09/16/04 10:00 Received: 09/16/04 20:30

Benzene	7.80	1.00	ug/l	2	4100080	09/20/04	09/21/04	EPA 8021B	
Toluene	1.57	1.00	"	"	"	"	"	"	J, P-02
Ethylbenzene	23.8	1.00	"	"	"	"	"	"	J, P-02
Xylenes (total)	75.0	2.00	"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	84.7 %	0-200			"	"	"	"	

GEI-7 (A4I0035-06) Water Sampled: 09/16/04 10:15 Received: 09/16/04 20:30

Benzene	ND	0.500	ug/l	1	4100080	09/20/04	09/21/04	EPA 8021B	
Toluene	1.34	0.500	"	"	"	"	"	"	
Ethylbenzene	8.89	0.500	"	"	"	"	"	"	
Xylenes (total)	14.2	1.00	"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	97.8 %	0-200			"	"	"	"	

GEI-8 (A4I0035-07) Water Sampled: 09/16/04 10:30 Received: 09/16/04 20:30

Benzene	ND	0.500	ug/l	1	4100080	09/20/04	09/20/04	EPA 8021B	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	0.520	0.500	"	"	"	"	"	"	J, P-02
Xylenes (total)	1.12	1.00	"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	84.0 %	0-200			"	"	"	"	

GEI-9 (A4I0035-08) Water Sampled: 09/16/04 10:45 Received: 09/16/04 20:30

Benzene	17.3	0.500	ug/l	1	4100080	09/20/04	09/21/04	EPA 8021B	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	58.3	0.500	"	"	"	"	"	"	
Xylenes (total)	57.5	1.00	"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	79.9 %	0-200			"	"	"	"	

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
 503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

Reported:
 10/29/04 09:54

BTEX by EPA Method 8021B
North Creek Analytical - Alaska

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Duplicate (A4I0035-09) Water Sampled: 09/16/04 00:00 Received: 09/16/04 20:30										
Benzene	5.40	0.500		ug/l	1	4100080	09/20/04	09/21/04	EPA 8021B	
Toluene	2.02	0.500		"	"	"	"	"	"	
Ethylbenzene	42.2	0.500		"	"	"	"	"	"	
Xylenes (total)	233	1.00		"	"	"	"	"	"	
Surrogate: a,a,a-TFT (PID)	65.9 %	0-200				"	"	"	"	

North Creek Analytical - Alaska

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Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 4090041: Prepared 09/20/04 Using EPA 5030

Blank (4090041-BLK1)

Gasoline Range Organics	ND	50.0	ug/l							
Surrogate: a,a,a-TFT (FID)	92.8		"	100		92.8	50-150			

LCS (4090041-BS1)

Gasoline Range Organics	489	50.0	ug/l	550		88.9	60-120			
Surrogate: a,a,a-TFT (FID)	91.6		"	100		91.6	50-150			

LCS Dup (4090041-BSD1)

Gasoline Range Organics	473	50.0	ug/l	550		86.0	60-120	3.33	20	
Surrogate: a,a,a-TFT (FID)	95.5		"	100		95.5	50-150			

Duplicate (4090041-DUP1)

Source: A410035-11

Gasoline Range Organics	21600	500	ug/l		23000			6.28	50	
Surrogate: a,a,a-TFT (FID)	94.8		"	100		94.8	50-150			

North Creek Analytical - Alaska

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 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
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 541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
 Project Number: 0161-524-02
 Project Manager: Deanne Hargrave

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 4090054: Prepared 09/23/04 Using EPA 3510

Blank (4090054-BLK1)

Diesel Range Organics	ND	0.500	mg/l							
Surrogate: 1-Chlorooctadecane	0.778		"	1.02		76.3	50-150			

LCS (4090054-BS1)

Diesel Range Organics	8.08	0.500	mg/l	9.14		88.4	75-125			
Surrogate: 1-Chlorooctadecane	0.817		"	1.00		81.7	50-150			

LCS Dup (4090054-BSD1)

Diesel Range Organics	7.30	0.455	mg/l	9.05		80.7	75-125	10.1	20	
Surrogate: 1-Chlorooctadecane	0.755		"	0.991		76.2	50-150			

Duplicate (4090054-DUP1)

Source: A410033-01

Diesel Range Organics	0.334	0.385	mg/l		0.349			4.39	50	
Surrogate: 1-Chlorooctadecane	0.633		"	0.838		75.5	50-150			

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 509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
 503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
 541.383.9310 fax 541.382.7588
Anchorage 2000 W International Airport Road, Suite A-10, Anchorage, AK 99502-1119
 907.563.9200 fax 907.563.9210

GeoEngineers
 4951 Eagle Street
 Anchorage, AK/USA 99503-7432

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 Project Manager: Deanne Hargrave

Reported:
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BTEX by EPA Method 8021B - Quality Control
North Creek Analytical - Alaska

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 4100080: Prepared 09/20/04 Using EPA 5030

Blank (4100080-BLK1)

Benzene	ND	0.500	ug/l							
Toluene	3.42	0.500	"							A-01
Ethylbenzene	ND	0.500	"							
Xylenes (total)	4.50	1.00	"							A-01
<i>Surrogate: a,a,a-TFT (PID)</i>	<i>100</i>		<i>"</i>	<i>100</i>		<i>100</i>	<i>0-200</i>			

LCS (4100080-BS1)

Benzene	8.41	0.500	ug/l	6.80		124	70-130			
Toluene	43.3	0.500	"	41.3		105	70-130			
Ethylbenzene	8.58	0.500	"	9.70		88.5	70-130			
Xylenes (total)	56.5	1.00	"	48.9		116	70-130			
<i>Surrogate: a,a,a-TFT (PID)</i>	<i>99.8</i>		<i>"</i>	<i>100</i>		<i>99.8</i>	<i>0-200</i>			

LCS Dup (4100080-BSD1)

Benzene	8.67	0.500	ug/l	6.80		128	70-130	3.04	40	
Toluene	40.3	0.500	"	41.3		97.6	70-130	7.18	40	
Ethylbenzene	9.49	0.500	"	9.70		97.8	70-130	10.1	40	
Xylenes (total)	52.1	1.00	"	48.9		107	70-130	8.10	40	
<i>Surrogate: a,a,a-TFT (PID)</i>	<i>105</i>		<i>"</i>	<i>100</i>		<i>105</i>	<i>0-200</i>			

North Creek Analytical - Alaska

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Mike Priebe, Technical Services Manager

North Creek Analytical, Inc.
 Environmental Laboratory Network



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

GeoEngineers
4951 Eagle Street
Anchorage, AK/USA 99503-7432

Project: Unocal - FIA
Project Number: 0161-524-02
Project Manager: Deanne Hargrave

Reported:
10/29/04 09:54

Notes and Definitions

- S-01 The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
- R-01 Reporting limit raised due to dilution necessary for analysis.
- P-02 Greater than 40% difference between two dissimilar columns. After evaluation, the higher result has been reported.
- J Estimated value.
- A-01 Analyte detected in the method blank greater than the method reporting limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

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