ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

Chevron Environmental Management Company

Cleanup Plan

Former Unocal #306456
328 ½ Illinois Street
Fairbanks, Alaska

ADEC File # 102.38.004

January 15, 2014

ARCADIS

Ryan Shatt
Project Geologist

Greg Montgomery
Senior Project Manager

Rebecca Andresen
Associate Vice President

Cleanup Plan

Former Unocal #306456
328 ½ Illinois Street
Fairbanks, Alaska

Prepared for:
Chevron Environmental Management Company

Prepared by:
ARCADIS U.S., Inc.
1100 Olive Way
Suite 800
Seattle
Washington 98101
Tel 206 325 5254
Fax 206 325 8218

Our Ref.:
B0045506.0012

Date:
January 15, 2014

ARCADIS

Table of Contents

Appendices

Acronyms and Abbreviation

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ARCADIS	ARCADIS U.S., Inc.
ARRC	Alaska Railroad Commission
AS	air sparge
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
btoc	below top of casing
CATOX	catalytic oxidation
Chevron	Chevron Environmental Management Company
COC	constituent of concern
cy	cubic yards
DRO	diesel range organics
ELCR	excess lifetime cancer risk
GAC	granular activated carbon
GCL	groundwater cleanup level
GRO	gasoline range organics
IC	institutional control
LNAPL	light nonaqueous phase liquid
mg/kg	milligrams per liter
MPE	multiphase extraction
O&M	operation and maintenance
ROW	right of way
RRO	residual range organics

SCL	soil cleanup level
site	former Unocal Bulk Terminal Facility No. 0208 (currently Chevron Facility No. 306456)
SVE	soil vapor extraction
SWI	Shannon & Wilson, Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
µg/L	micrograms per liter

Cleanup Plan

Former Unocal Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

1. Introduction

On behalf of Chevron Environmental Management Company (Chevron), ARCADIS U.S., Inc. (ARCADIS) prepared this Cleanup Plan for the former Unocal Bulk Terminal Facility No. 0208 (currently Chevron Facility No. 306456) (site). In a March 19, 2012 letter, the Alaska Department of Environmental Conservation requested a Cleanup Plan to remediate and/or mitigate the risks associated with the complete exposure pathways. A Site Location Map is provided on Figure 1. The site and surrounding features are shown on Figure 2.

This Cleanup Plan presents a description and history of the site, revises the Conceptual Site Model, formally evaluates three potential remedial alternatives, and identifies the preferred site remedial alternative.

This Cleanup Plan consists of the 10 sections described below and includes supporting tables, figures, and an appendix. The organization and content of the 10 sections are as follows:

- *Section 1 – Introduction,* This section provides the purpose, scope, and organization of this Cleanup Plan.
- *Section 2 – Site Background.* This section provides a brief site description and history, including past and current occupants, buildings and structures, and historical land use. This section also summarizes the site and regulatory history.
- *Section 3 – Geology and Hydrogeology.* This section summarizes the regional and geologic and hydrogeologic conditions at the site.
- *Section 4 – Site Characterizations,* This section summarizes the regulatory history, subsurface investigations, and remediation activities conducted at the site.
- *Section 5 – Current Site Monitoring Activities.* This section describes the monitoring activities that are currently being conducted at the site.
- *Section 6 – Constituents of Concern.* This section discusses the constituents of concern (COCs) present at the site.

- *Section 7 – Conceptual Site Model.* This section describes the local and regional hydrogeologic setting, groundwater flow conditions, the distribution of COCs, source identification, and a site exposure assessment.

- *Section 8 – Identification and Evaluation of Remedial Alternatives.* This section identifies the three most viable remedial alternatives for the site, describes the criteria against which each alternative is evaluated, and assesses each alternative against these criteria.

- *Section 9 – Selection of Recommended Remedial Alternative.* This section identifies and presents the basis for selecting the preferred remedial alternative.

- *Section 10 – References.* This section lists the references used to prepare this Cleanup Plan.

2. Site Background

2.1 Site Description and History

The 3.11-acre site is located at 328½ Illinois Street in Fairbanks, Alaska (Figure 1). Unocal used the western 1.84 acres of the site to store and dispense fuel between 1952 and 1982, and added the westernmost 1.27 acres to the lease in 1961. Former fuel facilities included two 55,000-gallon and nine 20,000-gallon aboveground storage tanks (ASTs), underground pipelines, pumping facilities, loading docks, and fuel dispensing pumps located in the southern and south-central areas of the site. Diesel fuel and aviation gas were stored on site.

The Alaska Railroad Corporation (ARRC) leased the westernmost 1.27 acres of the site from 1941 to 1981. The entire site was leased by Interior Leasing from 1982 to 1989 and by CEM Leasing from 1989 to 2001. Petroleum Sales operated the facility from 1982 to 2001. According to the Subsurface Site Investigation – Phase II (GeoEngineers Inc. 2003), and Mr. Phil Tannehill, co-owner of Petroleum Sales, the ASTs were removed in 1993, and the piping and dispensing pumps were removed in 1997.

Figure 2 depicts the site location and surrounding features on an aerial photograph. Surrounding properties include the former Chevron Facility (#1001430) to the north, former Texaco Facility (#211815) to the northwest, and Alaska Communication Systems Property to the west. Site features, including monitoring wells and the site boundary are presented on Figure 3.

2.2 Regional Setting

The former Chevron, Texaco, and Unocal bulk plants are located adjacent to one another. The ARRC has owned the properties since the early 1900s. The properties are located within the Fairbanks Area-Wide Industrial Reclamation Area, which is bordered by Noyes Slough to the north and east and Chena River to the south (Figure 1). Land use in the area consists primarily of industrial activities including: railroad facilities, bulk fuel terminals, gasoline stations, miscellaneous light industrial, and warehousing.

3. Geology and Hydrogeology

3.1 Regional Geology

The Fairbanks region is typically underlain by approximately 330 to 600 feet of Quaternary fluvial and glaciofluvial sediment (sand and gravel covered by fine sediment and organic matter) originating from the Alaska Range (Natural Resources Conservation Service 2004).

3.2 Site Geology

Previous assessments at the site have observed well- to poorly graded sand and silt from the ground surface to approximately 5 to 8 feet below ground surface (bgs), followed by gravels, sands, and silts to approximately 30 feet bgs. Permafrost has not been observed at the site during any of the previous assessments.

3.3 Regional Hydrogeology

Fairbanks water supply wells are located south (crossgradient) of the site on the south side of the Chena River. The meandering Chena River lies approximately 1,600 feet to the south and southwest of the site. To the northeast, the Noyes Slough lies approximately 1,800 feet from the site (Figure 1).

3.4 Site Hydrogeology

Groundwater elevation data have been collected at the site since October 2002 (Table 1). Depth to groundwater typically ranges from approximately 14 to 18 feet below top of casing (btoc) at the site. Groundwater elevations fluctuate seasonally; higher groundwater elevations in the subsurface are generally observed in the summer and fall. Groundwater flow direction is to the west under a low hydraulic gradient (approximately 0.0008 foot per foot in July 2013). The groundwater elevations and flow directions during the most recent sampling event are consistent with historical groundwater monitoring events. Groundwater elevation data collected from adjacent former Chevron and former Texaco properties were used develop the groundwater potentiometric map. The July 2013 potentiometric surface map is included on Figure 4.

4. Site Characterizations

Investigation activities were conducted at the site beginning in June 1989 and finished in October 2012. In June 1989, Shannon & Wilson, Inc. (SWI) installed two monitoring wells (former MW-41 and former MW-42) at the site. According to the Subsurface Site Investigation – Phase II (GeoEngineers Inc. 2003), SWI conducted a site investigation that was documented in the Soil Sampling and Installation of Groundwater Monitoring Wells (SWI 1989). These wells were located on the western side of the site and have been abandoned. Monitoring well MW-41 was located just south of the former truck loading rack and MW-42 was located just north of the pump house. Odor and sheen were noted for soil samples recovered from the borings, and headspace gas concentrations ranged from 40 to 300 parts per million by volume. Light nonaqueous phase liquid (LNAPL) was encountered in both wells, at thicknesses of 0.01 foot in MW-41 and 0.03 foot in MW-42.

In September 2002, GeoEngineers conducted a subsurface site investigation to evaluate the nature and extent of soil and groundwater contamination. Six monitoring wells (GEI-1 through GEI-6) were installed (Figure 3); soil samples were collected from the borings and groundwater samples were later collected from the wells. Analytical results for soil (Table 2) and groundwater (Table 3) indicate that petroleum impacts are present at varying degrees throughout the site. Approximately 0.67 foot of LNAPL was encountered in GEI-4 on October 22, 2002. Laboratory analyses identified the LNAPL as Jet-A-range fuel with hydrocarbons primarily eluting in the C8 to C20 range (GeoEngineers 2003).

GeoEngineers installed three wells in August 2003 (GEI-7, GEI-8, and GEI-9) and three wells in September 2005 (GEI-10, GEI-11, and GEI-12) (Figure 3). Soil and groundwater samples were collected from these locations (Tables 2 and 3). LNAPL was measured in GEI-7 in April 2004. Laboratory analysis in GEI-7 identified the product as Jet-A-range fuel with hydrocarbons primarily eluting in the C8 to C20 range (GeoEngineers 2005).

In July 2007, ARCADIS performed a site assessment (ARCADIS 2008) and installed five borings (SB-1 through SB-5) and one monitoring well (MW-13).In addition, vapor probe (VP-3) was installed and samples were collected at the site near the former building, south of the former train and loading rack. The analytical results indicate that the screening levels for benzene, toluene, and ethylbenzene were exceeded in multiple samples. The highest concentrations of benzene, toluene, ethylbenzene, and

total xylenes (BTEX) in shallow (less than 5 feet bgs) and deep (more than 5 feet bgs) were detected in VP-3. Soil analytical results are included in Table 2. Soil vapor results are presented in Table 4 (shallow) and Table 5 (deep).

In August 2008, ARCADIS conducted an additional vapor assessment at the site (ARCADIS 2009b). Vapor samples were collected from vapor probe locations VP-3 and VP-5 (Figure 5). The vapor sample collected from VP-3 indicated exceedances of the screening levels for BTEX. These high detections were anticipated because the vapor probe was installed in an open surface area of known highest groundwater petroleum impact and proximal to known areas of LNAPL. Soil vapor results are presented in Tables 4 and 5.

In August 2009, an additional vapor assessment was conducted off site (ARCADIS 2010). Vapor samples were collected from vapor probe VP-7; analytical data indicated an exceedance of the deep soil gas target level for benzene at 8.5 feet bgs. The assessment concluded that the estimated excess lifetime cancer risk (ELCR) and noncancer hazard quotient for potential commercial worker exposures to benzene in indoor air are below the -established acceptable target ELCR of 1×10^{-5} (one in 100,000) and below the noncancer hazard target of 1. Soil vapor analytical results for shallow and deep soil gas are presented in Tables 4 and 5, respectively.

In 2010, ARCADIS conducted an assessment to better define the downgradient extent of impacts and to determine the effectiveness of surfactant injections to remove LNAPL from monitoring wells at the site (ARCADIS 2011b). The 2010 assessment activities included installation of two off-site monitoring wells (MW-14 and MW-15) and a surfactant injection pilot test (Tables 6 and 7).

The surfactant-enhanced LNAPL recovery pilot test was performed to assess the potential recovery of persistent measureable LNAPL in well GEI-7 (ARCADIS 2011b). The pilot test involved injection of surfactant into the formation. After allowing the injected surfactant to remain in the formation for approximately 24 hours, groundwater and surfactant were extracted using a submersible pump, followed by vacuum extraction. Subsequent monthly groundwater gauging of GEI-7 indicated that LNAPL decreased initially, but returned in September 2010 (Table 1).

Soil and groundwater monitoring indicated that off-site monitoring well MW-15 contained LNAPL. Fingerprinting analysis was conducted on LNAPL from MW-15 and compared to LNAPL from site monitoring wells GEI-7 and GEI-8. The fingerprinting analysis indicated that the LNAPL from MW-15 was different in composition and did

not originate from the site. Additional information is presented in Section 7.3.4 and Appendix A.

In August 2011, ARCADIS conducted an assessment to better define the vertical and horizontal extents of petroleum impacts at the site (ARCADIS 2012). Twelve soil borings (SB-7 through SB 18) were advanced at the site during the 2011 assessment activities (Figure 5). Petroleum hydrocarbons were detected above soil cleanup levels (SCLs) in soil samples collected from SB-7 through SB-12, SB-14, SB-15, SB-17, and SB-18 (Table 2).

In October 2012, ARCADIS performed additional site assessment activities including further delineation of the shallow soil petroleum impacts at the site (ARCADIS 2013a). Eleven shallow soil borings (HA-1 through HA-11) were advanced to delineate the shallow impacts in the area of soil borings SB-7, SB-8, and SB-9. Petroleum hydrocarbons were detected above their respective SCLs in the soil samples collected from HA-2 and HA-9 only (Table 2). Soil boring locations are presented on Figure 5.

5. Current Site Monitoring Activities

Currently, groundwater is gauged and sampled annually at the site. This section discusses groundwater gauging, sampling, and sample results for the site.

5.1 Groundwater Gauging

The most recent annual groundwater gauging event was conducted on July 30 through August 5, 2013 (ARCADIS 2013b). Site monitoring wells were gauged with an oil/water interface probe to determine depth to water and to ascertain if LNAPL was present. Monitoring wells that are a part of the annual gauging program include: GEI-1 through GEI-10, MW-1 through MW-6, MW-14, MW-15, and K-5.

Groundwater elevation data were summarized in Table 1.

5.2 Groundwater Sampling

Monitoring activities at the site included monitoring wells GEI-1 through GEI-10, MW-1 through MW-6, MW-14, and MW-15 (ARCADIS 2013b). Groundwater sampling activities were conducted using no-purge sampling procedures in accordance with the Draft Field Sampling Guidance (2011), Bailer-Grab Groundwater Sampling (ARCADIS 2009a), and Groundwater Sampling with HydraSleeves – Standard Operating Procedure (ARCADIS 2011a). Disposable Teflon® bailers and HydraSleeves™ were used to collect the samples. HydraSleeves™ were lowered into the water column and were allowed to sit in the monitoring wells for at least 2 hours prior to sampling. After the necessary sample bottles were filled using the HydraSleeves™ for analysis of gasoline range organics (GRO) and BTEX, Teflon® disposable bailers were used to fill the remaining sample bottles for analysis of diesel range organics (DRO). Bailers were lowered slowly into the water column to mitigate potential volatilization.

Samples were submitted for the following analyses:

- GRO by Alaska Method AK101
- DRO by Alaska Method AK102
- DRO with Silica Gel Cleanup by Alaska Method AK102
- Residual range organics (RRO) by Alaska Method AK103

- BTEX and methyl tert-butyl ether by United States Environmental Protection Agency (USEPA) Method 8021B

5.3 Recent Groundwater Sampling Results

Groundwater samples collected from monitoring wells GEI-1 through GEI-4, GEI-6 through GEI-10, and MW-5 contained concentrations greater than their respective ADEC groundwater cleanup levels (GCLs) for one or more of the following analytes: GRO, DRO, RRO, benzene, toluene, ethylbenzene, and total xylenes.

Groundwater samples collected during the annual 2013 monitoring event contained concentrations of GRO greater than the ADEC GCL (2,200 micrograms per liter [µg/L]) in monitoring well samples GEI-1, GEI-2, GEI-3, GEI-7, GEI-8, and MW-5, ranging from 8,620 µg/L (GEI-3) to 230,000 µg/L (GEI-2).

Concentrations of DRO greater than the ADEC GCL (1,500 µg/L) were detected in monitoring well samples GEI-2, GEI-3, GEI-4, GEI-6, GEI-7, GEI-8, GEI-9, GEI-10, and MW-5, ranging from 3,500 µg/L (MW-5) to 1,740,000 µg/L (GEI-8).

Concentrations of RRO greater than the ADEC GCL (1,100 µg/L) were detected in monitoring well samples GEI-1, GEI-2, GEI-3, GEI-6, GEI-7, GEI-8, GEI-9, and MW-5, ranging from 1,600 µg/L (MW-5) to 5,200 µg/L (GEI-3).

Concentrations of benzene greater than the ADEC GCL (5 µg/L) were detected in monitoring well samples GEI-1, GEI-2, GEI-4, GEI-7, MW-3, MW-5, and MW-15, ranging from 7.7 µg/L (GEI-4) to 3,330 µg/L (GEI-1).

Benzene concentrations are generally co-located with toluene, ethylbenzene, and xylenes concentrations; therefore, benzene is used as a surrogate for petroleum hydrocarbon volatile organic compound (VOCs) at the site

Groundwater analytical results are presented in Table 3 and on Figure 6. Monitoring well construction details are provided in Table 8.

6. Constituents of Concern

This section discusses the site COCs in soil and groundwater.

6.1 Soil

COCs in soil include GRO, DRO, and BTEX. The applicable cleanup criteria for closure are presented in the table below. The cleanup criteria for soil at this site are the ADEC Method 2 standards.

Compounds of Concern	Soil Cleanup Levels (Method 2 Standards – Migration to Groundwater) (mg/kg)	Soil Cleanup Levels (Ingestion and Inhalation – Under 40 in Zone) (mg/kg)
GRO	300	1,400/1,400 (ingestion/inhalation)
DRO	250	10,250/12,500 (ingestion/inhalation)
Benzene	0.025	150/11 (direct contact/inhalation)
Toluene	6.5	8,100/220 (direct contact/inhalation)
Ethylbenzene	6.9	10,100/110 (direct contact/inhalation)
Xylenes	63	20,300/63 (direct contact/inhalation)

Note:
mg/kg = milligrams per kilogram

6.2 Groundwater

COCs in groundwater include GRO, DRO, and BTEX. The following maximum concentrations for each COC in the observed groundwater plume during the most recent sampling event (August 2013) are presented in the table below, along with GCLs.

Compounds of Concern	Current Maximum Concentrations in Groundwater (µg/L) (August 2013)	Groundwater Cleanup Levels (µg/L)
GRO	230,000 (GEI-2)	2,200
DRO	1,740,000 (GEI-8)	1,500
Benzene	3,300 (GEI-2)	5
Toluene	37,100 (GEI-2)	1,000
Ethylbenzene	3,210 (GEI-2)	700
Xylenes	26,700 (GEI-2)	10,000

7. Conceptual Site Model

7.1 Sources

The sources of COCs in soil and groundwater media are likely the former fuel storage tanks and associated facilities described in Section 2.1. Former fuel facilities included two 55,000-gallon and nine 20,000-gallon ASTs, loading docks, and associated underground pipelines, pumping facilities, and fuel dispensing pumps (Figure 3). Fuel stored on the site consisted of diesel fuel and aviation gasoline.

7.2 Release Mechanisms

Potential release mechanisms include releases from the sources identified above, including former ASTs and related infrastructure, and potential surface releases to the ground surface during former site activities.

7.3 Extent of Impacts

7.3.1 Soil

As described above, primary soil COCs are GRO, DRO, and BTEX. Benzene concentrations are generally co-located with toluene, ethylbenzene, and xylenes concentrations; therefore, benzene is used as a surrogate for petroleum hydrocarbon VOCs at the site. Concentrations of DRO, GRO, and benzene exceed ADEC SCLs for direct contact, inhalation, and migration to groundwater in surface soil (0 to 2 feet bgs) and subsurface soil (2 to 15 feet bgs). The nature and extent of COCs are described below. Soil analytical data are presented on Figure 7 (0 to 8 feet bgs), Figure 8 (8 to 12 feet bgs), and Figure 9 (12 to 27 feet bgs). Soil analytical data are presented in Table 2.

7.3.1.1 Gasoline Range Organics

In surface soil, exceedances of the ADEC SCL for GRO are limited to isolated areas in the northern portion of the site. Locations include soil borings SB-7 and HA-2, and SB-9[1] (Figure 8). The source of GRO impacts in surface soil at these locations is likely

[1] Soil sample SB-9 was collected at 2.1 feet bgs.

from historical surface releases. The highest concentration of GRO in surface soil is at location SB-9 (30,000 mg/kg). Borings advanced surrounding SB-9 did not indicate exceedances of the ADEC SCL.

In subsurface soil, exceedances of the ADEC SCL for GRO are generally present at the water table elevation, originating from the former ASTs and loading dock area. The highest concentrations are centrally located at GEI-2 (9,050 mg/kg) at the approximate water table elevation. Exceedances of ADEC SCLs for GRO (1,400 mg/kg) are also present beneath the railway and to the west at location SB-11 from 15 to 17 feet bgs at the approximate water table elevation (2,100 mg/kg). Elevated concentrations and depth are consistent with smear zone conditions.

7.3.1.2 Diesel Range Organics

Similar to GRO, exceedances of the ADEC SCL for DRO in surface soil are present in the northern area of the site at locations SB-7, SB-8, and SB-9. In the south and south-central areas of the site, near the former ASTs and loading docks, exceedances of DRO in surface soil are centered surrounding SB-4 (2,600 mg/kg). To the west of the railway, an isolated area exceeding ADEC SCLs is present at soil boring location SB-11. The highest concentration of DRO in surface soil is at location SB-9 (54,000 mg/kg) in the northern area of the site.

In subsurface soil, elevated concentrations of DRO are similar in extent to GRO and are generally present at the approximate water table elevation, in the area adjacent to the former ASTs and loading docks (DRO was detected in SB-18 and GEI-8 at concentrations of 5,800 and 10,800 mg/kg, respectively). Impacts extend to the northern portion of the site; the highest concentration is present at SB-7 from 15 to 17 feet bgs (14,000 mg/kg), located adjacent to the railway. To the west of the railway, DRO exceeds ADEC SCLs in SB-11 at the approximate water table elevation (3,400 mg/kg).

7.3.1.3 Benzene

In surface soil, exceedances of the ADEC SCL for benzene are limited to two isolated locations (SB-9 and SB-7) ADEC SCL in the northern area of the site. Detections of benzene are not present in soil borings advanced on the west side of the railway. The highest concentration of benzene in surface soil is at location SB-9 (450 mg/kg).

In subsurface soil, exceedances of the ADEC SCL for benzene are similar in extent to GRO and are generally located adjacent to the former ASTs and loading docks. Elevated benzene concentrations are generally present at the water table. The highest concentrations at the water table are located at GEI-2 (21.6 mg/kg) and SB-18 (26 mg/kg), and to the north at SB-7 (30 mg/kg) and SB-9 (68 mg/kg).

7.3.2 Soil Gas Concentrations

As described in Section 4.1, soil gas concentrations have been investigated during three field mobilizations between 2007 and 2009. Soil vapor sample location VP-3 was advanced near GEI-1 to evaluate conditions in the area where LNAPL was observed. Soil vapor locations VP-5 and VP-7 were advanced to evaluate risk and were located to evaluate soil vapor concentrations near existing buildings (Figure 5).Soil vapor sampling locations at the site exceeded the deep soil gas target level for benzene at 8.5 feet bgs.

Data from soil vapor samples collected in 2007 through 2009 were compared to ADEC commercial target levels for shallow gas ($\leq$ 5 feet bgs) and deep gas ($\geq$ 5 feet bgs). Analytical results indicated that the screening levels for benzene, ethylbenzene, and total xylenes were exceeded in multiple samples (Tables 4 and 5).

The data were subsequently evaluated using ADEC health-based target criteria to evaluate the potential for exposures to volatile constituents in indoor air for commercial workers. The study concluded that risk to potential commercial workers was found to be within acceptable limits (ARCADIS 2010).

7.3.3 Groundwater

The highest concentrations of COCs are generally located in the area of the former ASTs and loading docks, including monitoring wells GEI-1, GEI-2, GEI-7, GEI-8, and GEI-11. High concentrations of DRO are also present in monitoring wells GEI-3, GEI-4, and GEI-9. As described in Section 3.4, historical groundwater levels range from 14 to 18 feet btoc. Groundwater flow direction is to the west. The extent of groundwater impacted with COCs is described below. Groundwater isoconcentration contour maps for benzene, GRO, and DRO are presented on Figures 10, 11, and 12, respectively. These figures also present interpreted isoconcentration maps for the adjacent sites as described in Section 2.1. Groundwater analytical data are presented in Table 3.

7.3.3.1 Benzene

The highest concentrations of benzene in groundwater are detected in the area of the former ASTs and loading docks, as described in Section 7.3.1.3. The highest concentrations of benzene are detected in GEI-11 (5, 530 µg/L), GEI-2 (3,330 µg/L), and GEI-1 (2,920 µg/L). Other monitoring wells that exceed groundwater criteria for benzene include GEI-4, GEI-7, and GEI-12. On the western side of the active railway, MW-5 exceeds the ADEC GCL (Figure 10).

Further downgradient to the west, off-site monitoring wells are impacted with benzene; however, based on the fingerprinting analysis conducted for MW-15 (Appendix A), these impacts in groundwater are not believed to originate from the site. A geochemical evaluation of these two separate plumes is in process and will be summarized in an upcoming memo (ARCADIS 2013c). Based on these findings, the isoconcentration contours for benzene in groundwater at the site and adjacent properties are presented on Figure 10.

7.3.3.2 Gasoline Range Organics

The extent of GRO in groundwater is similar to benzene. The highest concentrations of GRO are detected at GEI-2 (230,000 µg/L) and GEI-11 (103,000 µg/L). Other monitoring wells at the site that exceed the ADEC GCL for GRO include GEI-1, GEI-3, GEI-7, GEI-8, and GEI-12. On the western side of the active railway, MW-5 exceeds the ADEC GCL (8,610 µg/L) (Figure 11).

Similar to benzene in groundwater, further downgradient to the west, monitoring wells are impacted with GRO. However, based on the fingerprinting analysis conducted for MW-15 (Appendix A), these impacts are not believed to originate from the site. Isoconcentration contours for GRO in groundwater at the site and at the adjacent properties are presented on Figure 11.

7.3.3.3 Diesel Range Organics

The highest concentration of DRO in groundwater is present at GEI-8 (1,740,000 µg/L). Other monitoring wells at the site that exceed the ADEC GCL for DRO include downgradient monitoring wells GEI-1, GEI-2, GEI-3, GEI-7, GEI-9, GEI-10, GEI-11,and GEI-12. On the western side of the active railway, MW-5 exceeds the ADEC GCL (145,000 µg/L) (Figure 12).

Similar to benzene and GRO in groundwater, further downgradient to the west, monitoring wells are impacted with DRO. Based on the fingerprinting analysis conducted for MW-15 (Appendix A), these impacts are not believed to originate from the site. Isoconcentration contours for GRO in groundwater at the site and adjacent properties are presented on Figure 12.

7.3.4 Light Nonaqueous Phase Liquid

Historically, LNAPL has been observed in nine monitoring wells at the site. As recently as 2012, LNAPL was observed in seven of the site monitoring wells. LNAPL was described as globules (not measurable on oil/water interface probe) in GEI-1, GEI-2, GEI-3, GEI-4, GEI-8, and GEI-12. An LNAPL thickness of 0.06 foot was measured in GEI-7 in July 2012.

During the most recent sampling event (July 2013), LNAPL was not measured in any of the wells during groundwater elevation measurement activities.

Historically, LNAPL has also been observed in GEI-9 (September 2003 and September 2011) and GEI-11 (March 2007). LNAPL thicknesses vary with the season, and are typically observed during the winter when groundwater elevations are lower. Fluctuating groundwater levels, varying measured LNAPL thicknesses, and elevated soil concentrations at the approximate water table elevation indicate smear zone conditions.

As presented in Appendix A, fingerprinting analysis of LNAPL from site wells GEI-1, GEI-3, and GEI-7 was conducted in 2010 and indicates a mixture of kerosene/jet fuel and gasoline. Additional fingerprinting analysis of LNAPL collected from off-site downgradient well MW-15 did not match the LNAPL collected from site wells GEI-7 and GEI-8. The fingerprinting analysis concluded that the LNAPL from MW-15 originated from a different source than the LNAPL from site wells GEI-7 and GEI-8.

7.4 Potential Exposure Pathways and Receptors

Potential exposure pathways and receptors are identified in the March 9, 2012 letter (ADEC 2012a) and listed in the table below.

Exposure Route	Pathway Status	Explanation	Receptors	Exposure Risk
Direct contact with soil	Potentially complete	Contaminants present above ingestion cleanup levels in soil between 0 and 15 feet bgs	Workers, site occupants, and visitors for soil at 0 to 2- feet bgs Excavation workers for soil at 2 to 15 feet bgs	Current for 0 to 2 feet bgs Future for 2 to 15 feet bgs
Water ingestion (groundwater)	Potentially complete	Contaminants present in groundwater above the GCLs Impacts in soil between 2 and 15 feet above SCLs for migration to groundwater	No drinking water wells currently on site or nearby	Future
Inhalation of outdoor air	Potentially complete	Contaminants present above inhalation cleanup levels in soil between 0 and 15 feet	Workers, site occupants, and visitors	Current
Inhalation of indoor air	Potentially complete	Volatile contaminants present in groundwater above the screening level for groundwater	Building occupants	Potential (future)
Dermal absorption of contaminants in groundwater	Potentially complete	Contaminants present in groundwater above the cleanup levels	No pumping wells currently on site or nearby	Future

Current and future receptors that may be adversely affected by impacts at the site include commercial or industrial workers, site visitors, construction workers, and trespassers. Likely exposure pathways for each receptor include direct contact with COC-impacted soil or groundwater (i.e., dermal absorption) during excavation activities and inhalation of outdoor air. Less likely or insignificant exposure pathways for each receptor include incidental ingestion of COC-impacted soil or groundwater, inhalation of indoor air if structures are built in the future, and dermal absorption of COCs in groundwater.

Although groundwater at the site is a potential drinking water source, drinking water wells are not currently present at the site. Domestic water supply wells were visually observed in the area, crossgradient from the plume. Based on available data, it is not believed that the existing plume is impacting or has the potential to impact these supply wells.

8. Identification and Evaluation of Remedial Alternatives

This section identifies and evaluates three remedial alternatives that address the risks associated with the complete exposure pathways summarized in Section 7.4 and satisfy the remedial action objectives discussed in Section 8.1. Section 9 identifies the preferred remedial alternative, based on the evaluation performed in this section.

8.1 Remedial Action Objectives

Remedial action objectives include the following:

- Reduce the concentration of dissolved-phase COCs (GRO and BTEX) in groundwater to within one order of magnitude of ADEC cleanup levels.
- Reduce the concentration of COCs in soil from 0 to 2 feet bgs to below ADEC cleanup levels to eliminate direct contact (ingestion) pathways at the site.
- Remove LNAPL from monitoring wells to the extent practicable.
- Manage concentrations of DRO in soil and groundwater in place.
- Eliminate the potential for vapor intrusion risk following the remedial action.

8.2 Identification of Remedial Alternatives

The following three alternatives were selected for evaluation in this Cleanup Plan:

- Alternative 1: Excavation with institutional controls (ICs)
- Alternative 2: Air sparge (AS)/soil vapor extraction (SVE) with ICs
- Alternative 3: Multiphase extraction (MPE) with ICs

These three alternatives use remedial technologies that are proven to address the types of soil impacts at the site. The three alternatives require the use of ICs, which are described below, and involve continued groundwater monitoring to confirm that concentrations are stable or declining.

ICs, sometimes referred to as land-use controls, include any type of physical, legal, or administrative mechanism that restricts the use of, or limits access to, real property. The objective of an IC is to prevent or reduce risks to human health, safety, and the

environment. ICs ensure that future land use remains compatible with the land use that was the basis for the evaluation, selection, and implementation of the remedial alternative. ICs will supplement engineering controls as appropriate for short-term and long-term management. As such, ICs will be a key component of the final remedial alternative. While the site will not be available for unrestricted land use following completion of the response action, the site will be available for land uses appropriate for current zoning. ICs that will be put in place will follow ADEC requirements as described in 18 Alaska Administrative Code (AAC) 75.375 (ADEC 2012b).

All three alternatives will also include soil excavation throughout the impacted area from 0 to 2 feet bgs, except areas that are not able to be excavated as described below. Excavation of impacted soil in the source area from 0 to 2 feet bgs (approximately 100 tons of material) would eliminate the current and future receptor pathways for direct contact for site workers and visitors.

8.3 Evaluation Criteria

The three remedial alternatives are evaluated against the following five evaluation criteria:

- *Protectiveness*. Overall degree of protection of human health and the environment.
- *Feasibility*. The implementability, logistical challenges, and availability of local resources.
- *Cost*. The estimated cost associated with implementation, maintenance, and monitoring.
- *Compliance with State regulations*. See Section 8.3.1.
- *Environmental footprint*. Qualitative assessment of the carbon footprint, which includes the following environmental footprint elements:
  - Energy required to implement
  - Mass emissions to atmosphere
  - Quantity of materials consumed and waste generated
  - Impacts to land and ecosystems
  - Water requirements and impacts to local water resources.

ADEC provides rules for site cleanup in Chapter 18 AAC 75 Regulations for Oil and Other Hazardous Substances Pollution Control. The requirements of 18 AAC 75.325 - 18 AAC 75.390 are referred to in this chapter as the "site cleanup rules." The site cleanup rules establish administrative processes and standards to determine the necessity for and degree of cleanup required to protect human health, safety, and welfare, and the environment at a site where a hazardous substance is located (ADEC 2012b).

As summarized from 18 AAC 75.325(f)(1) (2012b), the responsible person will, to the maximum extent practicable, use:

- Permanent remedies
- Recover free product in a manner that minimizes the spread of contamination, avoids additional discharge, and disposes appropriately in compliance with applicable local, state, and federal requirements
- Complete cleanup in a period of time that the department determines to be protective of human health, safety, and welfare, of the environment
- Prevent, eliminate, or minimize potential adverse impacts to human health, safety, and welfare, and to the environment, onsite and offsite, from any hazardous substance remaining at the site.

Per 18 AAC 75.325(f)(2), the responsible person will meet cleanup levels determined under 18 AAC 75.340 - 18 AAC 75.350.

As described in 18 AAC 75.325(f)(3) (2012b), the responsible person will provide for long-term care and management of a site as required under the site cleanup rules, including proper operation and maintenance of:

- Cleanup techniques and equipment
- Monitoring wells and equipment, if required
- Institutional controls, if required under 18 AAC 75.375

8.4 Alternative 1: Excavation with Institutional Controls

Excavation involves the mechanical removal of all accessible impacted soil located on site with concentrations of COCs exceeding cleanup levels and that contain LNAPL. Because not all impacted soil is accessible for excavation, ICs would be used to

prevent or reduce risks to human health, safety, and the environment. Impacted soil on the western boundary at the railroad right of way (ROW) would not be removed because it is not accessible due to the risk of compromising the integrity of the active railway.

Based on the location of impacted soil, the quantity of soil requiring excavation is estimated to be 15,000 to 25,000 cubic yards. The approximate area requiring remedial action is approximately 50,000 square feet as presented on Figure 13. It is assumed that the excavation would extend from 2 to 15 feet bgs. As described above, Alternative 1 also includes excavation of impacted soil in the source area from 0 to 2 feet bgs.

During and following excavation, impacted soil would be transported off site by rail to permitted disposal facility. The use of ICs as part of this alternative is described in Section 8.4.6. This alternative would cause significant disruption to local businesses due to the approximate area of the excavation and the resulting increased truck traffic.

8.4.1 Overall Protection of Human Health and the Environment

The majority of the soil at the site exceeding cleanup levels would be removed and treated; however, soil impacted with COCs and residual LNAPL would remain at depths greater than 15 feet bgs. As mentioned above, impacted soil on the western boundary at the railroad ROW would not be removed because it is not accessible due to the risk of compromising the integrity of the active railway. The extent of excavation to maintain protectiveness of the active railway would be determined during the design phase. The excavation would not directly address groundwater impacts, but would promote monitored natural attenuation by removing the secondary source of the existing groundwater plume.

Excavation may expose future receptors (commercial/industrial workers, construction workers, site visitors, and trespassers) to site contaminants while implementing the remedial alternative at the site. Exposure pathways would be addressed to a limited extent through excavation, and the potential for human health risk at the site would be reduced, but not eliminated, after excavation actions are completed. The remaining exposure pathways and the potential human health risk would be addressed by ICs. This alternative meets the protectiveness evaluation criteria because it includes land use controls that address the remaining soil impacts.

8.4.2 Feasibility

Excavation below the groundwater table will be required to remove soil greater than ADEC cleanup levels and that contain LNAPL, which may require extensive dewatering operations. Dewatering activities, if conducted, would generate significant amounts of impacted groundwater that would have to be treated and discharged or transported for eventual disposal. Impacted soil on the western boundary at the railroad ROW would not be removed in order to maintain the integrity of the active railway. Additionally, the shoring or sloping that would be required to keep the active railway structurally sound during excavation activities reduces the feasibility of this alternative. The presence of this material would be addressed using ICs as described below. This Alternative would cause significant disruption to current tenant and surrounding local businesses due to the approximate area of the excavation and the resulting increased truck traffic.

8.4.3 Cost

The cost for excavation and disposal is high. The most significant cost for this alternative is the transportation and disposal of the approximately 15,000 to 25,000 cubic yards of impacted soil and LNAPL that would be excavated. Costs are also included for long-term monitoring and land use controls, which would be required with this alternative because some impacted soil would remain in place.

8.4.4 Compliance with State Regulations

Soil excavation, treatment, and disposal, if appropriately implemented, is a remedial alterative that meets applicable ADEC regulations in 18 AAC 75 regarding the protection of human health and the environment. Excavation alone does not meet all regulatory standards because it is expected that impacted soil and groundwater will remain following excavation activities, but with the addition of ICs, regulatory requirements are addressed.

8.4.5 Environmental Footprint

The quantity of materials consumed and waste generated would be expected to generate a moderate to high contribution to the overall environmental footprint. The emissions to atmosphere and the energy required to implement the alternative through transportation of impacted soil would be expected to generate a moderate to high contribution to the overall environmental footprint. Moderate to high energy would be

consumed by heavy equipment used to excavate the impacted soil, and by transporting the material for disposal. The overall environmental footprint associated with this alternative is medium to high.

8.4.6 Institutional Controls

As part of this alternative, ICs will be required because impacted soil above ADEC cleanup levels (protection of groundwater and ingestion/inhalation) will remain in the subsurface. ICs will meet requirements as described in 18 AAC 75.375 (ADEC 2012b).

ICs include the following:

- Preparing and implementing a Soil and Groundwater Management Plan.
- Placing restrictions on the installation of potable wells at the site.
- Maintaining the property zoning as commercial/industrial.
- Installing vapor barriers, if needed, as part of the design of new construction.

8.4.7 Summary

Excavation with ICs receives a favorable evaluation for many of the criteria, as described in Sections 8.4.1 through 8.4.6. Excavation alone would not fully mitigate potential exposure pathways because impacted soil above ADEC cleanup levels (for protection of groundwater) and impacted groundwater above ADEC cleanup levels would remain adjacent and beneath the active railway immediately to the west of the property. ICs would be required. Excavation would reduce human health and environmental risks, but would potentially expose site workers to impacted soil while implementing the remedial alternative. Significant costs associated with excavation, transportation and treatment of soil, as well as the potential need for dewatering, significantly decreases the cost-effectiveness of this alternative. Excavation activities would also cause significant impact to the current property tenant and surrounding businesses. Lastly, the environmental footprint for this alternative is medium to high.

8.5 Alternative 2: Air Sparge/Soil Vapor Extraction with Institutional Controls

An AS/SVE system involves injecting air under pressure into the saturated zone to increase dissolved-phase oxygen concentrations, thus degrading dissolved-phase COC concentrations through aerobic degradation. AS also increases volatilization of dissolved-phase petroleum hydrocarbon related impacts through phase transfer from dissolved-phase to vapor phase. SVE removes residual light-end LNAPL and sorbed-phase hydrocarbons from vadose zone soil and captures the vapor phase from AS

activities. An AS/SVE system would consist of a series of AS and SVE wells connected to a blower and compressor via manifold piping. Based on the expected effluent concentrations, extracted vapor is unlikely to require treatment prior to discharge to the atmosphere. GRO and BTEX compounds in soil and groundwater can be removed using this technology. This technology may not be effective for DRO and LNAPL containing DRO.

As described above, Alternative 2 also includes excavation of impacted soil in the source area from 0 to 2 feet bgs to eliminate the current and future receptor pathways for direct contact for site workers and visitors.

This alternative would cause less disruption to local businesses compared to Alternative 1.

8.5.1 Overall Protection of Human Health and the Environment

Implementation and operation of AS/SVE would effectively reduce GRO and BTEX concentrations to below ADEC cleanup levels and eliminate the presence of light-end LNAPL to the extent practical. Operation of an AS/SVE treatment system may not be as effective on reducing concentrations of DRO and/or addressing the component of residual LNAPL containing DRO. The treatment system would be designed to treat the highest concentrations of COCs and areas that contain LNAPL. The remaining exposure pathways and the potential human health risk would be addressed by ICs. This alternative meets the protectiveness evaluation criteria because it includes land use controls that address the remaining soil impacts that extend beneath the ROW of the active railway.

8.5.2 Feasibility

The site layout and access is feasible for the construction and implementation of a AS/SVE treatment system. Following removal of 0 to 2 feet bgs of soil and backfill, minimal site grading will be required as part of treatment system design installation.

System equipment (i.e., blower, compressor, moisture separator) will be housed in a small, portable shed such as a conex box. Piping will be trenched underground and daylight near the system building. System and piping design will have to take into account the following considerations:

- Because a high potential for groundwater freezing is present during the winter and spring months, heat trace and insulation would be required for SVE piping where the potential exists for vapor moisture to condense.

- During winter and spring months, frozen soil and heave have been observed in the shallow subsurface. Buried AS/SVE lines would need to be buried deep enough to avoid damage that may be caused by frozen conditions.

- Operation of the system would require appropriate winterization for operation.

This Alternative would cause less disruption during installation and operation to the current property tenant and surrounding local businesses compared to Alternative 1. This Alternative also may be less effective on remediating the diesel range LNAPL present at the site. The LNAPL will be eliminated to the extent practical using passive recovery techniques.

8.5.3 Cost

Costs to install an AS/SVE system and implement the selected remedial action are moderate. Costs include ARCADIS labor costs, drilling subcontractor costs, borehole clearance, system purchase, installation, and operation and maintenance (O&M).

8.5.4 Compliance with State Regulations

Implementation and operation of an AS/SVE system is a remedial alterative that meets applicable ADEC regulations at 18 AAC 75 regarding the protection of human health and the environment. Operation of AS/SVE alone does not meet all regulatory standards, but with the addition of ICs this alternative addresses regulatory requirements.

8.5.5 Environmental Footprint

The quantity of materials consumed and waste generated would be expected to generate a low to moderate contribution to the overall environmental footprint. Some impacted material from trenching would require transportation and disposal; however, the volume of this material would be minimal. Granular activated carbon (GAC) or catalytic oxidation (CATOX) may be used in conjunction with operation of the system to minimize air emissions. The emissions to atmosphere and the energy required to implement the alternative would be expected to generate a low to moderate

contribution to the overall environmental footprint. Low to moderate energy would be consumed by system equipment, and energy required to transport material for disposal would be low to moderate. The overall environmental footprint associated with AS/SVE is low to medium.

8.5.6 Institutional Controls

Similar to Alternative 1, ICs will be required for Alternative 2 because DRO-impacted soil above ADEC cleanup levels will remain in the subsurface.

ICs include the following:

- Preparing and implementing a Soil and Groundwater Management Plan.
- Placing restrictions on the installation of potable wells at the site.
- Maintaining the property zoning as commercial/industrial.
- Installing vapor barriers, if needed, as part of the design of new construction.

8.5.7 Summary

AS/SVE receives a favorable evaluation for many of the criteria, as described in Sections 8.5.1 through 8.5.6. AS/SVE alone would not fully mitigate potential exposure pathways because DRO-impacted soil above ADEC cleanup levels would remain adjacent and beneath the active railway immediately to the west of the site and is expected to remain at depth beneath the site. DRO-impacted soil and residual LNAPL containing DRO may be less effectively treated by AS/SVE. Therefore, ICs and passive LNAPL recovery may still be required. The environmental footprint for AS/SVE with ICs alternative is low to medium.

8.6 Alternative 3: Multiphase Extraction with Institutional Controls

MPE involves extracting impacted groundwater and vapors and LNAPL from the subsurface. Extracted groundwater and vapor would be treated prior to disposal or discharge. LNAPL that is collected from the system would be disposed of at an appropriate waste/recycling facility. MPE can be used to address subsurface contamination in both the saturated and vadose zones. Mass removal is achieved by volatilization, dissolution, and advective transport (USEPA 1999).

The MPE system consists of an extraction well network. Extraction wells may be dual purpose and extract liquids and vapors simultaneously using a vacuum-only system or a combination of a vacuum and pump system. Another potential set-up consists of a

network of groundwater and vapor extraction wells. The MPE system is designed to depress the water table around select extraction wells to effectively expose more of the formation for treatment. Once above ground, extracted vapors, groundwater, and LNAPL are separated and treated using an aboveground treatment system. Vapor media is then discharged into the environment. Treated water would be discharged appropriately. Due to ambient conditions in Fairbanks, Alaska, it is likely the aboveground treatment system would have to be located in an enclosed, insulated, and heated building. This technology is effective for GRO and BTEX compounds in soil, groundwater, and LNAPL; however, this technology may not be as effective for DRO in soil. Some treatment of DRO in groundwater and extracted LNAPL is possible using MPE.

As described above, Alternative 3 also includes excavation of impacted soil in the source area from 0 to 2 feet bgs to eliminate the current and future receptor pathways for direct contact and outdoor inhalation for site workers and visitors.

8.6.1 Overall Protection of Human Health and the Environment

Successful implementation and operation of MPE would effectively reduce GRO and BTEX concentrations to below cleanup levels and eliminate the presence of LNAPL to the extent practical. However, several factors hinder the successful treatment of impacted soil and groundwater using MPE; these factors are described in Section 8.6.2.

Operation of an MPE treatment system may not effectively reduce concentrations of DRO to below ADEC cleanup levels and/or address the component of LNAPL containing DRO. The treatment system would be designed to treat the highest concentrations of COCs and areas that contain LNAPL. The remaining exposure pathways and the potential human health risk would be addressed by ICs. This alternative, if operated successfully, would meet the protectiveness evaluation criteria because it includes land use controls that address the remaining soil impacts at the site and impacts that remain beneath the ROW of the active railway.

8.6.2 Feasibility

Implementation of MPE may not be as feasible as Alternatives1 and 2 due to the locality of the site. Extreme cold temperatures during the winter and spring are not ideal for groundwater extraction in Fairbanks, Alaska.

Several additional factors hinder the successful treatment of impacted soil and groundwater using MPE:

- The high transmissivity of the aquifer will limit successful drawdown of the water table required to volatize COCs originating from LNAPL.
- A large volume of water would likely be generated, which would require treatment prior to discharge or disposal.
- A high potential for groundwater freezing is present during the winter and spring months. Heat trace and insulation would be required for all piping.
- Buried groundwater extraction lines would need to be buried deep enough to avoid freezing.
- Operation of the system would require appropriate winterization for operation.

Options to address these weather conditions include using heat trace on all piping to prevent ice buildup inside wells and conveyance lines, and installation of frost sleeves around the top 4 feet of wells to prevent heaving.

The site layout and access is feasible for the construction and implementation of an MPE treatment system. Following the removal of the existing 0 to 2 feet bgs of soil and backfill, minimal site grading would be required as part of treatment system design installation.

This alternative may be more effective for addressing residual LNAPL containing DRO than the SVEAS alternative but less effective than the excavation alternative. This alternative would cause the same disruption to the current property tenant and surround business as the SVE/AS alternative but less than the excavation alternative.

8.6.3 Cost

Costs to install an MPE system and implement the selected remedial action range are moderate to moderately high. Costs include ARCADIS labor costs, drilling subcontractor costs, borehole clearance, system purchase, installation, and O&M.

8.6.4 Compliance with State Regulations

Implementation and operation of an MPE system is a remedial alterative that meets applicable Alaska regulations at 18 AAC 75 regarding the protection of human health and the environment. Operation of MPE alone does not meet all regulatory standards, addresses the regulatory requirements with the addition of ICs.

8.6.5 Environmental Footprint

The quantity of materials consumed and waste generated would be expected to generate a moderate to high contribution to the overall environmental footprint. Moderate energy would be required for water treatment and disposal. The emissions to atmosphere and energy required to implement the alternative would be expected to generate a moderate contribution to the overall environmental footprint. GAC or CATOX may be used in conjunction with operation of the system to minimize air emissions. High to moderate energy would be consumed by heavy equipment used to run the system, maintain heating and lighting to the aboveground treatment system, and energy required for water treatment and disposal would be high to moderate. The overall environmental footprint associated with MPE is medium to high.

8.6.6 Institutional Controls

Similar to Alternatives 1 and 2, ICs would be required for Alternative 3 because impacted soil above ADEC cleanup levels would remain in the subsurface.

ICs include the following:

- Preparing and implementing a Soil and Groundwater Management Plan.
- Placing restrictions on the installation of potable wells at the site.
- Maintaining the property zoning as commercial/industrial.
- Installing vapor barriers, if needed, as part of the design of new construction.

8.6.7 Summary

MPE receives both favorable and unfavorable evaluation for the criteria, as described in sections 8.6.1 through 8.6.6. MPE alone would not fully mitigate potential exposure pathways because impacted soil above ADEC cleanup levels would remain at depth adjacent and beneath the active railway immediately to the west of the property. DRO impacted soil may not be effectively treated by MPE. The MPE alternative may be more effective treating residual LNAPL containing DRO than the SVE alternative but

less than the excavation alternative. Therefore, ICs would still be required. MPE is also an unfavorable option due to the cold weather conditions during the winter and spring in Fairbanks, AK, including the high costs associated with maintaining operations under these conditions. The environmental footprint for MPE with ICs alternative is medium to high.

9. Selection of Recommended Remedial Alternative

9.1 Comparative Evaluation of Alternatives

The three remedial alternatives use proven remedial technologies, meet applicable ADEC regulations if designed and implemented properly, and address risks to human health and the environment, with varying levels of feasibility. The table below summarizes the evaluation of each alternative against the five evaluation criteria.

Evaluation Criteria	Excavation with ICs	AS/SVE with ICs	MPE with ICs
Protectiveness	Fully Meets	Fully Meets	Fully Meets
Feasibility	Partially Meets	Fully Meets	Partially Meets
Cost	Significantly High	Moderate	Moderate to Moderately High
Compliance with State regulations	Fully Meets	Fully Meets	Fully Meets
Environmental Footprint	Medium to High	Low to Medium	Medium to High

The three alternatives evaluated would reduce the volume of contaminated soil that remains at the site. However, land use controls (ICs) would be required to address all exposure pathways and sufficiently reduce the risk to human health and the environment. The three alternatives evaluated contain varying levels of feasibility, cost, and environmental footprint, as presented above.

The Alaska regulations provide that remedial actions will be practicable (18 AAC 75.325(f)); practicability is defined in 18 AAC 75.990 (93) to mean that the remedy is capable of being designed, constructed, and implemented in a reliable and cost-effective manner. A remedial alternative is not practicable if the incremental cost of the alternative is substantial and disproportionate to the incremental degree of protection provided by that alternative compared to another lower cost alternative. In this case, the cost of excavation is substantial and disproportionate compared to the AS/SVE and MPE alternatives.

9.2 Recommended Remedy

Based on the criteria evaluated in this Cleanup Plan, Alternative 2 (AS/SVE with ICs) is the preferred alternative. The three alternatives evaluated are practicable, as defined in 18 AAC 75.990 (93); however, Alternative 2 is the most feasible.

The incremental cost of the excavation alternative is substantial and disproportionate to the incremental degree of protection provided by the excavation compared to the AS/SVE and MPE alternatives. The MPE alternative is less preferred due to extreme seasonal temperature conditions and costs associated with year-round operation. Therefore, Alternative 2 (AS/SVE with ICs) is selected as the recommended alternative because it satisfies the remedial objectives and meets the evaluation criteria.

10. References

Alaska Department of Environmental Conservation. 2011. Draft Field Sampling Guidance. Division of Spill Prevention and Response Contaminated Sites Program. May 2011.

Alaska Department of Environmental Conservation. 2012a. Letter to Mr. Dan Carrier Re: Former Chevron 306456 (Petroleum Sales/ Former Unocal Facility 0208). March 19.

Alaska Department of Environmental Conservation. 2012b. Oil and Other Hazardous Substances Pollutions Control). April 8, 2012.

ARCADIS U.S., Inc. 2008. 2007 Site Assessment Report. Former Chevron Bulk Plant 1001430, Former Texaco Bulk Plant 211815, and Former Unocal Bulk Plant 306456. January 18.

ARCADIS U.S, Inc. 2009a. Bailer-Grab Groundwater Sampling. March 10.

ARCADIS U.S., Inc. 2009b. 2008 Vapor Assessment Report. January 27.

ARCADIS U.S, Inc. 2010. 2009 Vapor Assessment Report. March 1.

ARCADIS U.S., Inc. 2011a. Groundwater Sampling with HydraSleeves – Standard Operating Procedure. February.

ARCADIS U.S., Inc. 2011b. 2010 Additional Site Assessment Report. March 2.

ARCADIS U.S., Inc. 2012. 2010 and 2011 Site Assessment Report. January 27.

ARCADIS U.S., Inc. 2013a. 2012 Site Assessment Report. April 4.

ARCADIS U.S., Inc. 2013b. Annual 2013 Groundwater Monitoring Report. Former Chevron Bulk Plant 1001430, Former Texaco Bulk Plant 211815, Former Unocal Bulk Plant 306456. September.

ARCADIS U.S., Inc. 2013c. *[in progress report]*

GeoEngineers Inc. 2003. Subsurface Site Investigation – Phase II. Former Unocal Bulk Plant 306456. October 31.

GeoEngineers Inc. 2005. Results of Groundwater Monitoring. Former Unocal Bulk Plant 0208. May 18.

Natural Resources Conservation Service and U.S. Department of Agriculture. 2004 Soil Survey of Greater Fairbanks Area, Alaska. Natural Resource Conservation and U.S. Department of Agriculture. 2004.

Shannon & Wilson. 1989. Soil Sampling and Installation of Groundwater Monitoring Wells, Petroleum Sales, Fairbanks, Alaska. July 19. United States Environmental Protection Agency. 1999. Multi-phase Extraction: State of the Practice. EPA 542-R-99-004. June.

ARCADIS

Tables

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-1	10/07/02	443.88	15.20	--	428.68
	09/03/03		13.83	0.01	430.06
	04/23/04		17.41	--	426.47
	09/16/04		17.22	0.01	426.67
	04/20/05		18.13	--	425.75
	10/01/05		14.08	--	429.80
	04/18/06	Well not sampled			
	09/17/06		14.98	--	428.90
	03/16/07		17.06	0.05	426.86
	09/12/07	443.91	15.28	--	428.63
	04/04/08	Well not sampled - ice in well			
	09/16/08		14.96	0.67	429.49
	03/25/09		NM	NM	NM
	04/20/09		NM	NM	NM
	05/26/09		NM	NM	NM
	06/24/09		NM	NM	NM
	07/27/09		16.55	0.43	427.70
	08/26/09		NM	NM	NM
	09/17/09	Unable to locate well			
	10/22/09		16.36	0.31	427.80
	11/03/09	Unable to locate well			
	12/14/09	Unable to locate well			
	01/12/10		NM	NM	NM
	02/29/10	Unable to locate well			
	03/18/10	Unable to locate well			
	04/21/10	Well frozen			
	05/26/10		16.80	0.41	427.11
	06/15/10		18.54	--	425.37
	07/21/10		16.29	0.27	427.84
	08/16/10		NM	NM	NM
	09/22/10	443.90	16.03	0.13	427.97
	10/27/10		17.10	0.46	427.17
	11/15/10		16.62	0.12	427.38
	12/13/10		17.11	0.34	427.06
	01/04/11		17.34	0.38	426.86
	02/07/11		17.32	--	426.58
	03/22/11		17.61	0.32	426.55
	04/13/11	Well not gauged - obstructed with ice at approximately 2 feet btoc			
	06/15/11		16.02	0.21	428.05
	09/20/11		14.24	Trace	429.66
	07/23/12		15.29	Trace	428.61
	07/30/13		**16.2**	**--**	**427.70**

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-2	10/07/02	444.93	15.25	--	429.68
	09/03/03		13.94	--	430.99
	04/23/04		17.44	--	427.49
	09/16/04		17.22	--	427.71
	04/20/05		18.05	--	426.88
	10/01/05		15.1	--	429.83
	04/18/06	Well not sampled			
	09/17/06		15.92	--	429.01
	03/16/07	Well not sampled - covered with equipment			
	09/12/07	444.84	16.21		428.63
	04/04/08		18.18	0.02	426.68
	09/16/08		15.32	--	429.52
	03/25/09		NM	NM	NM
	04/20/09		NM	NM	NM
	05/26/09		NM	NM	NM
	06/24/09		NM	NM	NM
	07/27/09		17.07	--	427.77
	08/01/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	01/12/10		NM	NM	NM
	02/09/10		NM	NM	NM
	03/18/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		16.95	--	427.89
	08/16/10		NM	NM	NM
	09/22/10	444.78	NM	NM	NM
	10/27/10		NM	NM	NM
	11/15/10		NM	NM	NM
	12/13/10		NM	NM	NM
	01/04/11		NM	NM	NM
	02/07/11		NM	NM	NM
	09/21/11		15.15	Trace	429.63
	07/23/12	Obstructed			
	07/30/13		**16.5**	**--**	**428.28**

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-3	10/07/02	444.29	14.7	--	429.59
	09/03/03		13.42	--	430.87
	04/23/04		16.78	--	427.51
	09/16/04		16.65	--	427.64
	04/20/05		Well not sampled		
	10/01/05		14.55	--	429.74
	04/18/06		17.45	--	426.84
	09/16/06		15.35	--	428.94
	03/17/07		17.43	--	426.86
	09/11/07	444.29	15.65	--	428.64
	04/04/08		17.63	--	426.66
	09/16/08		14.81	--	429.48
	03/25/09		NM	NM	NM
	04/20/09		NM	NM	NM
	05/26/09		NM	NM	NM
	06/24/09		NM	NM	NM
	07/27/09		16.60	--	427.69
	08/01/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		16.7	--	427.59
	12/14/09		NM	NM	NM
	01/12/10		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		16.4	--	427.89
	08/16/10		NM	NM	NM
	09/22/10	444.24	NM	NM	NM
	10/27/10		NM	NM	NM
	11/15/10		NM	NM	NM
	12/13/10		NM	NM	NM
	01/04/11		NM	NM	NM
	02/07/11		NM	NM	NM
	09/20/11		15.13	Trace	429.11
	07/23/12		15.64	Trace	428.60
	07/30/13		**17.04**	**--**	**427.20**

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-4	10/07/02	444.56	15.68	0.67	429.42
	09/03/03		13.64	0.01	430.93
	04/23/04		17.2	--	427.36
	09/16/04		17.01	0.01	427.56
	04/20/05		17.8	--	426.76
	10/01/05		14.77	--	429.79
	04/18/06		17.72	--	426.84
	09/16/06		15.61	--	428.95
	11/30/06		16.88	0.02	427.70
	12/22/06		17.13	--	427.43
	02/06/07		17.39	--	427.17
	03/17/07		17.65	--	426.91
	04/30/07		17.07	--	427.49
	05/18/07		16.87	--	427.69
	09/11/07	444.56	15.98		428.58
	10/15/07		16.48	--	428.08
	11/19/07		16.18	--	428.38
	01/29/08		17.10	--	427.46
	02/13/08		17.33	--	427.23
	04/04/08		17.90	--	426.66
	05/23/08	Absorbent sock frozen in well			
	06/25/08		16.53	--	428.03
	07/14/08		16.30	0.02	428.28
	08/06/08		13.59	Sheen	430.97
	09/16/08		15.03	0.01	429.54
	10/27/08		16.39	0.03	428.19
	11/24/08		16.42	0.05	428.18
	12/19/08		16.92	0.14	427.75
	01/30/09		17.57	0.23	427.17
	02/19/09		17.79	0.26	426.98
	03/25/09	Unable to locate			
	04/20/09		18.08	0.33	426.74
	05/26/09		NM	NM	NM
	06/24/09		16.81	--	427.75
	07/27/09		16.80	--	427.76
	08/01/09		16.32	--	428.24
	09/17/09		15.68	--	428.88
	10/22/09		16.49	--	428.07
	11/03/09		16.85	--	427.71

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-4	12/14/09		17.20	--	427.36
Cont.	01/12/10		NM	NM	NM
	02/09/10		18.72	--	425.84
	03/18/10		18.10	0.16	426.33
	04/21/10	Well frozen			
	05/26/10	Well frozen			
	06/15/10		15.99	--	428.57
	07/21/10		16.40	--	428.16
	08/16/10		16.57	--	427.99
	09/22/10	444.49	16.25	--	428.24
	10/27/10		17.5	--	426.99
	11/15/10		16.88	--	427.61
	12/13/10		17.15	--	427.34
	01/04/11		17.35	--	427.14
	02/07/11		17.72	--	426.77
	03/22/11	Well obstructed by parked bus			
	04/13/11	Well obstructed by parked bus			
	06/15/11		16.43	--	428.06
	09/20/11		14.82	Trace	429.67
	07/23/12		15.83	Trace	428.66
	07/30/13		**16.74**	**--**	**427.75**
GEI-5	10/07/02	441.93	12.35	--	429.58
	09/03/03		11.11	--	430.82
	04/23/04	Well not sampled			
	09/16/04		14.26	--	427.67
	04/20/05		15.24	--	426.69
	10/01/05		12.23	--	429.70
	04/18/06	Well not sampled			
	09/16/06		12.98	--	428.95
	03/16/07	Well not sampled due to damage			
	09/11/07	Well not sampled due to damage			
	04/04/08	Well not sampled - well underwater			
	09/16/08		12.49	0.01	429.45
	03/25/09		NM	NM	NM
	04/20/09		NM	NM	NM
	05/26/09		NM	NM	NM
	06/24/09		NM	NM	NM
	07/27/09		14.20	--	427.73
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	01/12/10		NM	NM	NM

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-5	02/09/10		NM	NM	NM
Cont.	03/18/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		13.73	--	428.2
	08/16/10		NM	NM	NM
	09/22/10	442.15	NM	NM	NM
	10/27/10		NM	NM	NM
	11/15/10		NM	NM	NM
	12/13/10		NM	NM	NM
	01/04/11		NM	NM	NM
	02/07/11		NM	NM	NM
	09/21/11		12.42	--	429.51
	07/23/12		13.42	--	428.73
	07/30/13		**14.38**	**--**	**427.77**
GEI-6	10/07/02	441.83	12.2	--	429.63
	09/03/03		10.94	--	430.89
	04/23/04	Well not sampled			
	09/16/04		14.15	--	427.68
	04/20/05	Well not sampled			
	10/01/05		12.09	--	429.74
	04/18/06	Well not sampled			
	09/16/06		12.82	--	429.01
	03/17/07		14.87	--	426.96
	09/11/07	441.97	13.11	--	428.86
	04/04/08	Well not sampled - well underwater			
	09/16/08	Unable to locate well			
	03/25/09		NM	NM	NM
	04/20/09		NM	NM	NM
	05/26/09		NM	NM	NM
	06/24/09		NM	NM	NM
	07/27/09		14.02	0.02	427.97
	08/01/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	01/12/10		NM	NM	NM
	02/09/10		NM	NM	NM
	03/18/10		NM	NM	NM

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-6 Cont.	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10	Not Sampled Well Underwater			
	08/16/10		NM	NM	NM
	09/22/10		NM	NM	NM
	10/27/10		NM	NM	NM
	11/15/10		NM	NM	NM
	12/13/10		NM	NM	NM
	01/04/11		NM	NM	NM
	02/07/11		NM	NM	NM
	09/21/11		12.10	--	429.87
	07/23/12		13.09	--	428.88
	07/30/13		**13.90**	**--**	**428.07**
GEI-7	09/03/03	444.26	13.24	0.01	431.03
	04/23/04		17.07	0.41	427.52
	09/16/04		16.55	0.09	427.78
	04/20/05		18.11	0.93	426.89
	10/01/05		14.44	0.01	429.83
	04/18/06	Well not sampled			
	09/17/06		15.27	--	428.99
	02/06/07	Well not sampled - unable to locate			
	03/16/07	Well not sampled - covered with forklifts			
	04/30/07		16.69	--	427.57
	05/18/07		16.48	--	427.78
	09/12/07	444.22	15.56	--	428.66
	10/15/07		16.14		428.08
	11/19/07		16.01	--	428.21
	01/29/08		17.19	0.09	427.10
	02/13/08		17.37	0.21	427.02
	04/04/08	Well not sampled - ice at 4.4 feet btoc			
	05/23/08		15.83	--	428.39
	06/25/08		16.10	--	428.12
	07/14/08		16.18	--	428.04
	08/06/08		13.14	--	431.08
	09/16/08		14.68	--	429.54
	10/27/08		16.03	--	428.19
	11/24/08		16.04	--	428.18
	12/19/08		16.45	--	427.77
	01/30/09		17.04	0.02	427.20
	02/19/09		17.25	0.03	426.99

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-7	03/25/09	Unable to locate			
Cont.	04/20/09		17.53	0.08	426.75
	06/24/09		16.15	--	428.07
	07/27/09		16.44	--	427.78
	08/26/09		16.20	--	428.02
	09/17/09		15.56	--	428.66
	10/22/09		16.41	--	427.81
	11/03/09		16.57	--	427.65
	12/14/09		16.85	--	427.37
	02/09/10		18.11	0.85	426.79
	04/21/10	Well frozen			
	05/26/10		16.76	--	427.46
	06/15/10		15.84	--	428.38
	07/21/10		13.3	--	430.92
	08/16/10		16.46	--	427.76
	09/22/10	444.18	16.15	--	428.03
	10/27/10		17.4	0.47	427.16
	11/15/10		16.91	0.2	427.43
	12/13/10		17.56	0.62	427.12
	01/04/11		17.91	0.8	426.91
	02/07/11		18.42	0.97	426.54
	03/22/11		18.38	1.0	426.60
	04/13/11		18.34	0.92	426.58
	06/15/11		16.26	0.21	428.09
	09/20/11		14.47	Trace	429.71
	07/23/12		15.54	0.06	428.69
	07/30/13		**16.38**	**--**	**427.80**
GEI-8	09/03/03	444.55	13.64	--	430.91
	04/23/04		17.15	--	427.4
	09/16/04		16.95	--	427.6
	04/20/05		17.77	0.14	426.89
	10/01/05		14.73	--	429.82
	04/18/06		17.71	--	426.84
	09/16/06		15.92	--	428.63
	11/30/06		16.85	0.01	427.71
	12/22/06		17.07	--	427.48
	02/06/07		17.35	--	427.2
	03/16/07		17.60	--	426.95
	04/30/07	Well not sampled due to ice			
	05/08/07	Well not sampled due to ice			
	09/11/07	444.54	15.87	--	428.67
	10/15/07		16.47	--	428.07
	01/29/08		17.48	0.04	427.09
	02/13/08		17.57	0.04	427.00
	04/04/08	Well not sampled - inaccessible			
	05/23/08	Well not sampled - inaccessible			
	06/25/08	Well not sampled - inaccessible			
	07/14/08	Well not sampled - inaccessible			
	08/06/08	Well not sampled - inaccessible			
	09/16/08	Well not sampled - inaccessible			

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-8 Cont.	10/27/08		16.37	--	428.17
	11/24/08		16.35	--	428.19
	12/19/08		16.77	--	427.77
	01/30/09		17.42	0.10	427.20
	02/19/09		17.67	0.16	427.00
	03/25/09	Unable to locate			
	04/20/09	Flooded - ice at 1.41 feet btoc			
	06/24/09		16.49	--	428.05
	07/27/09		16.71	--	427.83
	08/26/09		16.50	--	428.04
	09/17/09		15.89	--	428.65
	10/22/09		16.71	--	427.83
	11/03/09		16.84	--	427.7
	12/14/09		17.18	--	427.36
	02/09/10		17.74	--	426.8
	04/21/10	Well frozen			
	05/26/10	Well frozen			
	06/15/10		21.1	--	423.44
	07/21/10		16.6	--	427.94
	08/16/10		16.79	0.01	427.76
	09/22/10	444.51	16.46	--	428.05
	10/27/10		17.30	--	427.21
	11/15/10		17.10	--	427.41
	12/13/10		17.38	--	427.13
	01/04/11		17.62	0.04	426.92
	02/07/11		17.89	0.36	426.91
	03/22/11		18.35	0.57	426.62
	04/13/11	Well was not gauged - submerged in large puddle			
	06/15/11		16.42	--	428.12
	09/20/11		14.81	Trace	429.73
	07/23/12		15.83	Trace	428.71
	07/30/13		**16.70**	**--**	**427.81**
GEI-9	09/03/03	444.32	13.43	0.01	430.90
	04/23/04		16.87	--	427.45
	09/16/04		16.67	--	427.65
	04/20/05		17.47	0.01	426.86
	10/01/05		14.53	--	429.79
	04/18/06		17.39	--	426.93
	09/16/06		15.37	--	428.95
	03/17/07		17.41	--	426.91
	09/11/07	444.32	15.63	--	428.69
	04/04/08		17.62	--	426.70
	09/16/08		14.78	--	429.54
	07/27/09		16.61	--	427.71
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-9	04/21/10		NM	NM	NM
Cont.	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10	Unable to locate			
	08/16/10		NM	NM	NM
	09/22/10	444.27	NM	NM	NM
	09/20/11		14.59	Trace	429.68
	07/23/12		15.61	--	428.66
	07/30/13		**16.50**	--	**427.77**
GEI-10	10/01/05	443.48	13.74	--	429.74
	04/1806		16.73	--	426.75
	09/16/06		14.29	--	429.19
	03/16/07	Well not sampled - unable to locate			
	09/09/07	443.31	14.58	--	428.73
	04/04/08		16.51	--	426.80
	09/16/08		13.70	--	429.61
	07/27/09		15.45	--	427.86
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09			NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		15.3	--	428.01
	08/16/10	443.22	NM	NM	NM
	09/20/11		13.43	--	429.79
	07/23/12		14.48	--	428.74
	07/30/13		**15.34**	**--**	**427.88**
GEI-11	10/01/05	443.81	14.10	--	429.71
	04/18/06		17.58	--	426.23
	09/17/06		14.91	--	428.90
	11/30/06		16.30	0.14	427.62
	12/24/06		16.44	--	427.37
	02/06/07		16.69	--	427.12
	03/16/07		16.96	0.02	426.87
	04/30/07		16.73	0.47	427.46
	05/18/07		16.30	0.20	427.67
	09/12/07	443.78	15.22	--	428.56
	10/15/07		15.81	--	427.97
	11/19/07		15.71	--	428.07
	01/29/08		16.83	0.03	426.97

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-11 Cont.	02/13/08		16.91	0.03	426.89
	04/04/08		17.55	0.44	426.58
	05/23/08		15.48	--	428.30
	06/25/08		15.83	0.05	427.99
	07/14/08		16.19	--	427.59
	08/06/08		12.78	Sheen	431.00
	09/16/08		14.31	--	429.47
	10/27/08		15.69	--	428.09
	11/24/08		15.69	--	428.09
	12/19/08		16.15	0.05	427.67
	01/30/09		16.83	0.19	427.10
	02/19/09		17.04	0.20	426.90
	03/25/09	Unable to locate			
	04/20/09		17.32	0.32	426.72
	06/24/09		15.76	--	428.02
	07/27/09	No current access to well - under permit stipulation			
	08/26/09	No current access to well - under permit stipulation			
	09/17/09	No current access to well - under permit stipulation			
	10/22/09	No current access to well - under permit stipulation			
	11/03/09	No current access to well - under permit stipulation			
	12/14/09	No current access to well - under permit stipulation			
	02/09/10	No current access to well - under permit stipulation			
	04/21/10	No current access to well - under permit stipulation			
	05/26/10	No current access to well - under permit stipulation			
	06/15/10	No current access to well - under permit stipulation			
	07/21/10	No current access to well - under permit stipulation			
	08/16/10	No current access to well - under permit stipulation			
	09/21/11		14.1	--	429.68
	07/23/12	No current access to well - under permit stipulation			
	07/30/13	**No current access to well - under permit stipulation**			
GEI-12	10/01/05	443.55	13.72	--	429.83
	04/1806		16.71	--	426.84
	09/16/06		14.61	--	428.94
	03/16/07		16.65	0.04	426.93
	09/09/07	443.52	14.89	--	428.63
	04/04/08		16.98	0.13	426.64
	09/16/08		14.00	--	429.52
	07/27/09		15.80	--	427.72
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	11/03/09		NM	NM	NM

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
GEI-12 Cont.	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		15.61	--	427.91
	08/16/10	443.45	NM	NM	NM
	09/20/11		13.8	Trace	429.65
	07/23/12		14.79	Trace	428.66
	07/30/13	**Obstructed**			
MW-1	09/20/12	443.97	14.5	--	429.47
	07/23/12		15.54	--	428.43
	07/30/13		**16.47**		**427.50**
MW-2	10/01/05	444.07	14.43	--	429.64
	04/1806		17.47	--	426.60
	09/15/06		15.31	--	428.76
	03/17/07		17.36	--	426.71
	09/09/07	444.03	15.60	--	428.43
	04/04/08		17.60	--	426.43
	09/16/08		14.71	--	429.32
	07/27/09		16.78	--	427.25
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		16.45	--	427.58
	08/16/10	443.94	NM	NM	NM
	09/21/11		14.51	--	429.43
	07/23/12		15.55	--	428.39
	07/30/13		**16.47**	**--**	**427.47**
MW-3	07/21/10	NM	16.2	**--**	NM
	08/16/10	444.24	NM	NM	NM
	09/21/11		14.87	--	429.37
	07/23/12		15.94	--	428.30
	07/30/13		**16.55**	**--**	**427.69**
MW-4	10/01/05	Well not sampled			
	04/1806		20.63	--	--
	09/15/06		18.48	--	--
	03/16/07		20.60	--	--
	09/09/07	447.09	18.82	--	428.27
	04/04/08		20.82	--	426.27
	09/16/08		17.90	--	429.19
	07/27/09		19.78	--	427.31

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
MW-4	08/26/09		NM	NM	NM
Cont.	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		19.39	--	427.70
	08/16/10		NM	NM	NM
	09/21/11		17.7	--	429.39
	07/23/12		18.72	--	428.37
	07/30/13		**19.63**	**--**	**427.46**
MW-5	10/01/05	444.05	14.3	--	429.75
	04/1806		17.33	--	426.72
	09/15/06		15.11	--	428.94
	03/16/07		17.31	--	426.74
	09/12/07	444.01	15.42	--	428.59
	04/04/08		17.44	--	426.57
	09/16/08		14.56	--	429.45
	07/27/09		16.44	--	427.57
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		16.05	--	427.96
	08/16/10	444	NM	NM	NM
	09/21/11		14.43	Trace	429.57
	07/23/12		15.43	--	428.57
	07/30/13		**16.30**	**--**	**427.70**
MW-6	10/01/05	Well not sampled			
	04/1806		20.26	--	--
	09/15/06		18.11	--	--
	03/16/07		20.23	--	--
	09/11/07	446.92	18.53	--	428.39
	04/04/08		20.48	--	426.44
	09/16/08		17.54	--	429.38

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
MW-6	07/27/09		19.40	--	427.52
Cont.	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		NM	NM	NM
	08/16/10	446.92	NM	NM	NM
	09/21/11		17.46	--	429.46
	07/23/12		18.56	--	428.36
	07/30/13		**19.95**	**--**	**426.97**
MW-13	09/09/07	443.29	14.76	--	428.53
	04/04/08	Well not sampled - ice at 4.5 feet btoc			
	09/16/08		13.87	--	429.42
	07/27/09	No current access to well - under permit stipulation			
	08/26/09	No current access to well - under permit stipulation			
	09/17/09	No current access to well - under permit stipulation			
	10/22/09	No current access to well - under permit stipulation			
	11/03/09	No current access to well - under permit stipulation			
	12/14/09	No current access to well - under permit stipulation			
	02/09/10	No current access to well - under permit stipulation			
	04/21/10	No current access to well - under permit stipulation			
	05/26/10	No current access to well - under permit stipulation			
	06/15/10		NM	NM	NM
	07/21/10		NM	NM	NM
	08/16/10		NM	NM	NM
	09/21/11		13.64	--	429.65
	07/23/12	No current access to well - under permit stipulation			
	07/30/13	**No current access to well - under permit stipulation**			
MW-14	09/22/11	443.42	15.57	--	427.85
	10/27/10		16.41	--	427.01
	11/15/11		16.26	--	427.16
	12/13/10		16.51	--	426.91
	01/04/11		16.72	--	426.7
	02/07/11		17.13	--	426.29
	03/22/11		17.06	--	426.36
	04/13/11		17.1	--	426.32
	09/21/11		13.98	--	429.44
	07/23/12		15.02	--	428.40
	07/30/13		**15.79**	**--**	**427.63**

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
MW-15	09/22/11	443.22	15.42	--	427.8
	10/27/10		17.5	--	425.72
	11/15/11		16.1	--	427.12
	12/13/10		16.36	--	426.86
	01/04/11		16.56	0.01	426.67
	02/07/11		16.96	--	426.26
	03/22/11		16.95	0.06	426.32
	04/13/11		16.99	0.06	426.28
	06/15/11		15.38	--	427.84
	09/21/11		13.84	--	429.38
	07/23/12		14.88	--	428.34
	07/30/13		**15.64**	--	**427.58**
K-5	10/01/05	443.55	13.82	--	429.73
	04/1806	Well not sampled			
	09/17/06		15.14	--	428.41
	03/16/07	Well not sampled - unable to open Robco cover			
	09/09/07	443.75	15.02	--	428.73
	04/04/08		17.00	--	426.75
	09/16/08		14.15	--	429.60
	07/27/09		15.94	--	427.81
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09	No current access to well - under permit stipulation			
	02/09/10	No current access to well - under permit stipulation			
	04/21/10	No current access to well - under permit stipulation			
	05/26/10	No current access to well - under permit stipulation			
	06/15/10	No current access to well - under permit stipulation			
	07/21/10		15.6	--	428.15
	08/16/10	443.76	NM	NM	NM
	09/21/11		13.97	--	429.79
	07/23/12	Obstructed			
	07/30/13		**16.00**	**--**	**427.76**

Table 1
Groundwater Elevation Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	Well Elevation (feet msl) [1]	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Groundwater Elevation (feet msl) [2]
K-7	10/01/05	442.49	12.72	--	429.77
	04/1806		16.92	--	425.57
	09/16/06		13.49	--	429.00
	03/16/07	Well not sampled - unable to locate			
	09/09/07	442.55	13.78	--	428.77
	04/04/08	Well not sampled - ice in well			
	09/16/08		12.91	--	429.64
	07/27/09		14.63	--	427.92
	08/26/09		NM	NM	NM
	09/17/09		NM	NM	NM
	10/22/09		NM	NM	NM
	11/03/09		NM	NM	NM
	12/14/09		NM	NM	NM
	02/09/10		NM	NM	NM
	04/21/10		NM	NM	NM
	05/26/10		NM	NM	NM
	06/15/10		NM	NM	NM
	07/21/10		14.4	--	428.15
	08/16/10	442.49	NM	NM	NM
	09/20/11		12.72	--	429.77
	07/23/12	Obstructed			
	07/30/13	**Obstructed**			

Notes:

[1] Elevations are relative to an on-site Temporary Benchmark, based on vertical control point Fire Hydrant 08-05.

btoc = below top of casing

LNAPL = light nonaqueous phase liquid

[2] Where LNAPL was present, groundwater elevations were adjusted using an average specific gravity of 0.80.

msl = above mean sea level

-- = not encountered

NM = not measured

Bold type = Results of most recent sampling event.

Table 2
Soil Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Boring Location	Depth (feet bgs)	Date Sampled	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
ADEC Soil Cleanup Level [a]			**300**	**250**	**11,000**	**0.025**	**6.5**	**6.9**	**63**	**1.3**
GEI-1	14.0-14.5	09/24/02	769	1,660	--	2.69	15.3	7.22	35.8	--
GEI-2	14.0-14.5	09/24/02	9,050	6,900	--	21.6	410	115	1,270	--
	15.0-15.5	09/24/02	4,440	3,070	--	16.8	275	86.8	580	--
GEI-3	14.0-14.5	09/24/02	742	3,590	--	0.442	4.58	0.858	115	--
	19.0-19.5	09/24/02	2,400	999	--	1.30	27.5	13.3	185	--
GEI-4	15.0-15.5	09/25/02	516	6,490	--	<0.489	<1.22	<1.22	7.63	--
GEI-5	11.5-12.0	09/25/02	45.9	5.35	--	0.142	<0.150	<0.150	0.443	--
GEI-6	11.5-12.0	09/25/02	4.05	19.3	--	0.0983	0.326	<0.0381	0.157	--
GEI-7	15.5-16.0	08/23/03	572	2,950	--	0.546	7.98	3.09	43.1	--
GEI-8	14.0-14.5	08/23/03	1,200	10,800	--	0.272	4.17	2.67	68.6	--
GEI-9	15.5-16.0	08/23/03	307	3,920	--	<0.106	<0.265	<0.265	5.58	--
GEI-10	8.0-9.0	09/25/05	<3.36	<25.0	<50.0	<0.0134	<0.0336	<0.0336	<0.504	--
	15.0-16.0	09/25/05	10.4	507	<50.0	<0.0124	<0.0310	0.104	0.143	--
GEI-11	8.0-9.0	09/25/05	<2.93	<25.0	<50.0	0.0119	<0.0293	<0.0293	<0.0439	--
	15.0-16.0	09/25/05	1,770	5,150	<500	19.7	182	41.1	237	--
GEI-12	6.0-7.0	09/25/05	242	4,140	<500	0.289	0.775	0.153	3.73	--
	15.0-16.0	09/25/05	362	3,030	<500	0.254	2.50	2.61	15.2	--
MW-13	9.5-11.5	07/26/07	14	<4.0	<4.0	<0.005	0.03	<0.005	0.02	--
	14.5-16.5	07/26/07	1.7	<4.1	19	<0.005	0.02	<0.005	<0.02	--
SB-1	2.0	07/31/07	<6.3	26	49	<0.036	<0.072	<0.072	<0.072	<0.036
SB-2	2.0	07/31/07	61	280	48	<0.028	<0.055	<0.055	0.074	<0.028
SB-3	2.0	07/31/07	8.6	590	<210	<0.047	<0.095	<0.095	<0.095	<0.047
SB-4	2.0	07/31/07	210	2,600	<420	<0.025	0.060	<0.050	0.361	<0.025
SB-5	2.0	07/31/07	<5.2	450	200	<0.011	<0.022	<0.022	<0.022	<0.011
SB-6	2.0	07/31/07	45	91	230	<0.056	0.12	<0.11	0.12	<0.056
VP-5	4.0	08/07/08	<3.67	<4.36	<27.2	<0.0220	<0.0367	<0.0367	<0.0735	--
VP-5	8.0	08/07/08	<2.34	<21.6	<135	<0.0141	<0.0234	<0.0234	<0.0469	--
VP-7	2.0	08/07/08	<3.09	<20.6	<129	<0.0186	<0.0309	<0.0309	<0.0619	--
VP-7	6.0	08/07/08	<4.07	<21.8	<136	0.0418	0.0572	<0.0407	0.133	--
MW-14	2.0	08/23/10	2.1	23	200	<0.01	0.04	0.01	0.04	--
	14.0-16.0	08/24/10	<0.6	<5.8	<5.8	<0.006	0.01	<0.006	<0.02	--
BD-1	14.0-16.0	08/24/10	<0.6	<5.3	<270	<0.006	0.05	<0.006	<0.02	--
	16.0-18.0	08/24/10	<0.6	<5.5	<5.5	<0.006	0.02	<0.006	<0.02	--
	18.0-20.0	08/24/10	<0.6	<5.6	<5.6	<0.006	0.01	<0.006	<0.02	--
BD-2	18.0-20.0	08/24/10	<0.6	<5.3	<5.3	<0.006	0.05	<0.006	<0.02	--
MW-15	2.0	08/23/10	<0.6	<5.2	<5.2	<0.006	0.01	<0.006	<0.02	--
	14.0-16.0	08/23/10	430	1,600	<260	0.2	0.5	<2.1	8.9	--
	18.0-20.0	08/23/10	1,500	4,000	<540	1.5	25	22	150	--
	28.0-30.0	08/23/10	14	21	<5.4	0.02	0.07	0.09	0.6	--
SB-7	2.0	08/03/11	5,900	16,000	<1100	2.6	23	43	460	--
	8.0	08/03/11	1,200	2,600	<510	0.65	3.8	1.6	72	--
	15.0-17.0	08/03/11	8,600	14,000	<1200	30	370	88	780	--
	25.0-27.0	08/03/11	130	63	<5.5	0.30	1.8	0.50	3.7	--
SB-8	1.5-2.2	08/03/11	<11	350	530	<0.11	<0.11	<0.11	<0.33	--
	6.0-7.0	08/03/11	1,300	12,000	<1500	<0.29	<0.29	<0.29	11	--
	15.0-17.0	08/03/11	2,300	2,400	<280	1.0	16	13	110	--
	22.0-24.0	08/03/11	4.6	<5.7	<5.7	0.098	0.065	0.11	0.74	--
SB-9	2.1	08/03/11	30,000	54,000	<7500	450	3600	720	5300	--
	8.0	08/03/11	11,000	1,800	<530	79	890	100	1000	--
BD-1	8.0[D]	8/3/2011[D]	11,000	3,100	--	91	970	110	1100	--
	10.0-12.0	08/03/11	1,800	650	<52	8.9	130	28	220	--
	15.0-17.0	08/03/11	8,600	1,500	<530	68	780	130	850	--
	27.0-29.0	08/03/11	29	48	130	0.16	0.65	0.15	0.91	--
SB-10	1.0	08/03/11	1.0	<5.4	15	0.019	0.050	<0.0063	<0.019	--
	8.0	08/03/11	0.8	<5.1	<5.1	0.038	0.14	0.0076	0.041	--
BD-2	8.0[D]	8/3/2011[D]	2	<4.1	--	0.14	0.38	0.015	0.076	--
	15.0-17.0	08/04/11	870	2700	<270	<0.24	<0.24	0.29	8.0	--
	22.0-24.0	08/04/11	7	21	<5.3	<0.0057	0.015	0.0099	0.062	--
BD-1	22.0-24.0[D]	8/4/2011[D]	4.4	--	--	<0.0059	0.024	0.0060	0.036	--
SB-11	2.0	08/04/11	300	2,200	<350	<0.19	<0.19	0.69	2.5	--
	8.0	08/04/11	14	42	11	0.0068	0.024	0.028	0.12	--
	14.0-15.0	08/04/11	180	380	<54	0.058	0.43	0.74	4.0	--
	15.0-17.0	08/04/11	2,100	3,400	<280	<1.3	10	12	69	--
	25.0-27.0	08/04/11	<0.8	<6.4	<6.4	<0.0079	0.022	<0.0079	<0.024	--

Table 2
Soil Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Boring Location	Depth (feet bgs)	Date Sampled	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
ADEC Soil Cleanup Level [a]			**300**	**250**	**11,000**	**0.025**	**6.5**	**6.9**	**63**	**1.3**
SB-12	2.0	08/04/11	2.8	380	250	0.015	0.069	0.0060	0.10	--
	8.0	08/04/11	70	430	<51	<0.012	0.015	<0.021	0.48	--
	16.5-17.0	08/04/11	11	32	<5.4	<0.0059	0.015	<0.0059	0.08	--
	19.0-20.0	08/04/11	410	490	<57	<0.094	<0.094	0.16	1.6	--
	25.0-27.0	08/04/11	3.7	5.7	<5.3	<0.0066	0.082	0.0069	0.025	--
SB-13	2.0	08/04/11	1.5	170	220	<0.0068	0.021	<0.0068	<0.020	--
	8.0	08/04/11	<0.5	<5.1	<5.1	<0.0049	0.029	<0.0049	<0.015	--
	16.0-18.0	08/05/11	<0.5	<5.4	<5.4	<0.0053	0.0089	<0.0053	<0.016	--
BD-1	16.0-18.0[D]	08/05/11	<0.9	--	--	<0.0091	0.020	<0.0091	<0.027	--
	18.0-20.0	08/05/11	<0.7	<5.5	<5.5	<0.0066	0.041	<0.0066	<0.020	--
SB-14	2.0	08/04/11	1.1	88	110	0.0082	0.099	0.012	0.14	--
	8.0	08/04/11	<0.5	11	68	<0.0054	0.023	<0.0054	<0.0016	--
	15.0-16.0	08/05/11	160	880	<130	<0.058	<0.058	<0.058	0.53	--
	21.0-22.0	08/05/11	99	180	<28	<0.020	<0.020	0.049	0.32	--
	23.0-24.0	08/05/11	1	<5.5	<5.5	<0.0060	0.018	<0.0060	<0.018	--
SB-15	2.0	08/04/11	<7.0	350	700	<0.070	0.26	<0.070	0.30	--
	8.0	08/04/11	<0.5	8.7	16	<0.0053	0.023	<0.0053	0.017	--
BD-2	8.0[D]	08/04/11	<0.5	NA	NA	<0.0047	0.018	<0.0047	<0.014	--
	14.0-16.0	08/05/11	0.7	<5.4	<5.4	<0.0060	0.011	<0.0060	<0.18	--
	18.0-20.0	08/05/11	510	2,000	<280	<0.14	<0.14	0.56	2.0	--
	22.0-24.0	08/05/11	2.3	<5.4	<5.4	<0.0050	0.043	0.0056	<0.015	--
SB-16	2.0	08/05/11	1.7	14	43	<0.0077	0.014	<0.0077	<0.023	--
	8.0	08/05/11	<0.5	5.3	32	<0.0049	0.015	<0.0049	<0.015	--
	12.0-14.0	08/06/11	<0.5	<5.1	<5.1	<0.0053	0.015	<0.0053	<0.016	--
	16.0-18.0	08/06/11	<0.5	<5.4	<5.4	<0.0055	0.0091	<0.0055	<0.016	--
	18.0-20.0	08/06/11	<0.6	<5.5	5.5	<0.0057	0.019	<0.0057	<0.017	--
SB-17	2.0	08/05/11	<0.7	69	94	0.014	0.038	<0.0069	<0.021	--
	8.0	08/05/11	0.6	<5.2	9.2	0.028	0.0055	<0.0052	<0.015	--
	15.0-16.0	08/06/11	<0.5	<5.4	<5.4	<0.0054	0.017	<0.0054	<0.016	--
BD-1	15.0-16.0[D]	08/06/11	<0.6	--	--	<0.0058	0.017	<0.0058	<0.018	--
	18.0-20.0	08/06/11	<0.5	<5.5	<5.5	<0.0054	0.011	<0.0054	<0.016	--
SB-18	2.0	08/05/11	<0.7	<6.0	23	<0.0071	0.016	<0.0071	<0.021	--
	8.0	08/05/11	2.3	6.1	36	0.049	0.096	0.051	0.34	--
	14.0-15.5	08/05/11	7,400	5,800	<680	26	280	130	790	--
BD-3	14.0-15.5[D]	08/05/11	8,900	--	--	21	280	140	880	--
	15.5-16.0	08/05/11	4,200	3,100	<530	9.8	120	57	360	--
	22.0-24.0	08/05/11	340	<330	<66	<0.25	6.0	3.0	19.0	--
BD-2	22.0-24.0[D]	08/05/11	440	--	--	2.2	16.0	5.0	29.0	--
	26.0-26.5	08/05/11	15	<6.6	<6.6	0.066	0.39	0.14	0.84	--
HA-1	1.5	10/22/12	<0.9	13 J	80	<0.0094	0.011 J	<0.0094	<0.028	--
	3.5	10/22/12	<0.7	<5.2	57	<0.0068	<0.0068	<0.0068	<0.020	--
	5.5	10/22/12	<0.5	<5.1	<5.1	<0.0051	0.013 J	<0.051	0.015	--
HA-2	1.5	10/22/12	5,300	5,700	3,600	<0.64[1]	<0.64	3.9	43	--
	3.5	10/22/12	190	430	<52	<0.063	<0.063	<0.063	0.19	--
	5.5	10/22/12	2.8 J	180	<26	<0.0058	0.011J	<0.0058	0.027 J	--
HA-3	0.5	10/22/12	<5.6	240	800	<0.056	<0.056	<0.056	0.17	--
	3.5	10/22/12	8.3	41	7.7 J	<0.0066	<0.020 J	<0.0066	0.063 J	--
	5.0	10/22/12	9.1	26	<5.2	<0.0053	0.0092 J	<0.0053	0.016	--
HA-4	1.5	10/23/12	<0.7	86	98	<0.0066	0.012 J	<0.0066	<0.020	--
	3.5	10/23/12	<0.7	<5.3	21	<0.0068	0.011 J	<0.0068	<0.0068	--
	5.5	10/23/12	<0.7	18	140	<0.0072	0.0075 J	<0.0072	0.022	--
HA-5	1.5	10/24/12	<0.7	77	390	<0.0074	0.014 J	<0.0074	<0.0074	--
	2.5	10/24/12	<0.7	5.7 J	56	<0.0068	0.02	<0.0068	<0.0068	--
	4.5	10/24/12	<0.4	9.4 J	78	<0.0044	0.014 J	<0.0044	<0.0044	--
HA-6	1.5	10/23/12	<0.5	<5.1	13	<0.0053	<0.0053	<0.0053	0.016	--
	3.5	10/23/12	<0.07	<5.3	17	<0.0068	<0.0068	<0.0068	<0.020	--
	5.5	10/23/12	<0.6	<5.2	13	<0.0061	0.0078 J	<0.0061	<0.018	--
HA-7	1.5	10/23/12	<0.6	33	150	<0.0064	0.014 J	<0.0064	<0.019	--
	3.5	10/23/12	1 J	16	48	<0.0055	0.025	<0.0055	<0.0055	--
	5.5	10/23/12	<0.6	6.2 J	24	<0.0056	0.0068 J	<0.0056	<0.0056	--
HA-8	1.5	10/24/12	<0.7	160	400	<0.0071	0.021	<0.0071	<0.0071	--
	2.5	10/24/12	0.6 J	46	150	<0.0059	0.028	<0.0059	<0.0059	--

Table 2
Soil Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Boring Location	Depth (feet bgs)	Date Sampled	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE
ADEC Soil Cleanup Level [a]			**300**	**250**	**11,000**	**0.025**	**6.5**	**6.9**	**63**	**1.3**
HA-9	0.5	10/24/12	<5.6	270	1,000	<0.056[1]	0.18 J	<0.056	0.29	--
	1.5	10/24/12	2.3 J	66	220	0.010 J	0.098	0.023 J	0.13	--
HA-10	1.5	10/24/12	<0.5	<5.2	21	<0.0051	0.0082 J	<0.0051	<0.0051	--
	2.5	10/24/12	<0.6	95	120	<0.0056	0.016 J	0.0056	0.023 J	--
HA-11	1.5	10/24/12	0.8 J	9.0 J	57	<0.031	0.081	<0.0063	<0.0063	--
	2.5	10/24/12	1.6 J	29	150	<0.0060	0.025 J	<0.0060	0.042 J	--

Notes:
bgs = below ground surface
GRO = gasoline range organics analyzed by AK Method 101.
DRO = diesel range organics analyzed by AK Method 102.
RRO = residual range organics analyzed by AK Method 103.
Benzene, toluene, ethylbenzene, and total xylenes were analyzed by United States Environmental Protection Agency Method 8021B.
MTBE = methyl tertiary-butyl ether
[a] ADEC Soil Cleanup Levels (SCLs) per 18 AAC 75.355, Table B1. Register 188, October 2008, and Technical Memorandum 02-006 (Migration to Groundwater).
ADEC = Alaska Department of Environmental Conservation
All results are reported in milligrams per kilogram (mg/kg).
Highlighted values indicate an exceedance of the respective ADEC SCL.
-- = not analyzed
< = not detected at concentrations greater than the laboratory reporting limit indicated
[D] Duplicate sample collected.
NA = not applicable
J = estimate value - the result is ≥ the Method Detection Limit and < the Limit of Quantitation.
[1] Additional soil samples were collected due to laboratory error.

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
GEI-1	10/07/02	31,700	218,000	--	--	5,630	6,770	704	3,860	--
	09/03/03	LNAPL present - 0.01 foot - well not sampled								
	04/23/04	26,600	11,200	--	--	2,910	5,300	582	2,990	--
	09/16/04	LNAPL present - 0.01 foot - well not sampled								
	04/20/05	35,300	307,000	--	--	4,300	6,300	649	3,620	--
	10/01/05	39,700	18,800	--	617	3,050	5,350	662	3,820	--
	04/18/06	Well not sampled - not accessible								
	09/17/06	31,000	29,000	--	<970	3,200	4,500	540	3,100	--
	03/17/07	LNAPL present - 0.05 foot - well not sampled								
	09/12/07	27,000	44,000	--	<2,200	2,600	3,600	400	2,600	--
	04/04/08	Well not sampled - ice in well								
	09/18/08	LNAPL present - 0.67 foot - well not sampled								
	07/27/09	LNAPL present - 0.43 foot - well not sampled								
	07/21/10	LNAPL present - 0.27 foot - well not sampled								
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/02/13	**42,200**	**418,000**	**330,000**	**4,200**	**2,920**	**5,060**	**538**	**3,410**	--
GEI-2	10/07/02	170,000	86,500	--	--	15,100	56,200	3,810	22,000	--
	09/03/03	265,000	28,700	--	--	7,250	42,400	3,430	21,300	--
	04/23/04	150,000	17,900	--	--	7,500	39,700	3,140	17,900	--
	09/16/04	214,000	109,000	--	--	8,490	48,700	3,310	24,400	--
	04/20/05	196,000	88,700	--	--	7,520	49,800	3,490	23,100	--
	10/01/05	201,000	--	--	--	5,900	47,200	3,480	22,500	--
	04/18/06	219,000	33,100	--	904	5,510	46,200	3,380	24,100	--
	09/17/06	190,000	25,000	--	<970	6,000	42,000	3,300	22,000	--
	03/17/07	Well not sampled - buried under equipment								
	09/12/07	170,000	75,000	--	<1,100	4,900	37,000	3,100	20,000	--
	04/11/08	184,000	45,700	--	<3,750	4,530	49,300	3,520	22,200	--
	09/18/08	216,000	189,000	--	<16,700	5,530	45,300	3,950	28,300	--
	09/18/08[D]	151,000	207,000	--	<16,700	4,360	32,800	2,580	18,500	--
	07/30/09	220,000 [1]	70,600 [1]	--	6,910 [1]	5,430 [1,3]	96,200 [1,2]	3,980 [1]	24,170 [1,3]	--
	07/30/09[D]	200,000 [1]	71,400	--	5,280 [3]	4,990 [1]	45,700 [1]	3,610 [1]	24,380 [1,3]	--
	07/21/10	160,000	22,000	--	<1,300	2,900	41,000	3,500	23,000	10.4
Duplicate	07/21/10	160,000	52,000	--	<6,800	2,800	36,000	3,300	22,000	--
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/02/13	**230,000**	**96,300**	**68,100**	**3,200**	**3,330**	**37,100**	**3,210**	**26,700**	--

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
GEI-3	10/07/02	36,600	101,000	--	--	178	3,070	339	12,000	--
	09/03/03	35,800	82,700	--	--	86.0	1,070	122	7,840	--
	04/23/04	16,600	25,200	--	--	66.0	758	63.1	5,920	--
	09/16/04	23,000	52,300	--	--	44.0	903	138	9,640	--
	09/16/04	--	--	--	--	35.2	835	77.7	6,610	--
	04/20/05	Well not sampled - not accessible								
	10/01/05	18,200	58,300	--	1,500	30.1	485	67.8	5,940	--
	10/01/05	19,100	--	--	--	<50.0	468	<50.0	6,280	--
	04/18/06	21,700	70,300	--	1,220	28.3	1,290	173	6,970	--
	09/16/06	16,000	62,000	--	<2,000	20.0	280	61	5,100	--
	03/17/07	32,000	42,000	--	<2,000	30	1,200	200	6,700	--
	09/11/07	17,000	70,000	--	<2,000	20	800	200	5,500	--
	04/11/08	30,500	40,800	--	<3,540	<100	1,460	359	8,440	--
	09/18/08	20,300	97,400	--	<7,500	16.8	484	131	6,380	--
	07/28/09	16,900 [1]	37,200	--	2,720	6.10 [1]	202 [1]	89.2 [1]	4,770 [1]	--
	07/21/10	23,000	92,000	--	<14,000	16	870	200	6,400	--
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/02/13	**8,620**	**188,000**	**141,000**	**5,200**	**<5.0**	**144**	**63.7**	**2,100**	--
GEI-4	10/07/02	LNAPL present - 0.67 foot - well not sampled								
	09/03/03	LNAPL present - 0.01 foot - well not sampled								
	04/23/04	3,720	30,200	--	--	30.7	76.7	55.5	76.7	--
	09/16/04	LNAPL present - 0.01 foot - well not sampled								
	04/20/05	807	195,000	--	--	15.1	3.83	48.2	3.83	--
	10/01/05	2,560	44,000	--	601	13.4	<1.00	52.3	<1.00	--
	04/18/06	1,180	95,700	--	<8,060	15.2	2.18	66.4	2.18	--
	04/18/06	1,010	--	--	--	14.4	<0.500	53.6	<0.500	--
	09/16/06	1,400	39,000	--	<960	16	1.8	40	190	--
	03/17/07	1,400	54,000	--	<1,900	20	2	40	200	--
	09/11/07	2,700	100,000	--	<2,100	10	<10	70	300	--
	04/11/08	1,780	192,000	--	<4,120	15.0	<2.50	56.8	229	--
	04/11/08[D]	2,140	215,000	--	<3,680	13.4	<10.0	60	268	--
	09/18/08	LNAPL present - 0.01 foot - well not sampled								
	07/29/09	1,190 [1]	1,620,000 [1]	--	<39,100 [1]	5.10 [1]	<10.0 [1]	25.0 [1]	147 [1]	--
	07/21/10	440	24,000	--	<3,300	0.9	<0.5	8.9	35	--
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/02/13	**1,290**	**159,000**	**122,000**	**1,600**	**7.7**	**2.9**	**42.0**	**238**	--

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
GEI-5	10/07/02	12,400	47,600	--	--	2,310	813	119	1,660	--
	10/07/02	10,800	--	--	--	2,360	841	127	1,660	--
	09/03/03	10,100	68,000	--	--	1,420	205	32.9	650	--
	04/23/04	Well not sampled - not accessible.								
	09/16/04	12,000	18,000	--	--	2,330	549	66.3	1,200	--
	04/20/05	7,050	71,500	--	--	1,240	444	44.0	1,040	--
	10/01/05	10,700	67,400	--	2,020	1,430	239	37.8	922	--
	04/18/06	--	--	--	--	--	--	--	--	--
	09/16/06	6,200	22,000	--	<500	910	290	45	850	--
	03/17/07	Well not sampled due to damage								
	09/11/07	Well not sampled due to damage								
	04/04/08	Well not sampled - well underwater								
	09/18/08	LNAPL present - 0.01 foot - well not sampled								
	07/29/09	Well dry								
	07/22/10	270	3,500	--	2,500	13	4.9	<0.5	9.7	--
	09/24/11	1,400	6,200	--	950	290	14	1.5	35	--
	07/25/12	1,600	100,000	99,000	28,000	270	24	4	74	--
	08/02/13	**Well not sampled - dry**								
GEI-6	10/07/02	58,800	5,790	--	--	1.26	1.95	<0.500	2.99	--
	09/03/03	<80	3,520	--	--	0.717	<0.500	<0.500	<1.00	--
	04/23/04	Well not sampled - not accessible.								
	09/16/04	58.8	7,580	--	--	0.758	<0.500	<0.500	1.72	--
	04/20/05	Well not sampled - not accessible.								
	10/01/05	<50	2,180	--	1,140	0.768	<0.500	<0.500	<1.50	--
	04/18/06	Well not sampled - not accessible.								
	09/16/06	51	3,400	--	2,300	1.0	<0.5	<0.5	<1.5	--
	03/17/07	<10	800	--	770	<1	<1	<1	<2	--
	09/11/07	20	2,200	--	1,000	<1	<1	<1	<2	--
	04/04/08	Well not sampled - well underwater								
	09/18/08	Well not sampled - unable to locate								
	07/30/09	<50.0	5,260	--	2,120	<0.500	<1.00	<1.00	<3.00	--
	07/22/10	Well not sampled- under water								
	09/24/11	<10	2,700	--	2,200	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	<10	3,000	81	1,800	<0.5	<0.5	<0.5	<1.5	--
Duplicate	07/25/12	<10	--	--	--	<0.5	<0.5	<0.5	<1.5	--
	08/02/13	**<100**	**4,100**	**610**	**1,700**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	--

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
GEI-7	09/03/03	LNAPL present - 0.01 foot - well not sampled								
	04/23/04	LNAPL present - 0.41 foot - well not sampled								
	09/16/04	LNAPL present - 0.09 foot - well not sampled								
	04/20/05	LNAPL present - 0.93 foot - well not sampled								
	10/01/05	15,400	98,700	--	<4,240	299	2,180	246	2,560	--
	04/18/06	Well not sampled - not accessible.								
	09/17/06	15,000	110,000	--	<2,000	360	2,000	250	2,400	--
	03/17/07	Well not sampled - buried under equipment								
	09/12/07	13,000	79,000	--	<2,200	300	1,800	300	2,100	--
	04/04/08	Well not sampled - ice in well								
	09/18/08	16,600	295,000	--	<15,000	459	2,710	257	4,450	--
	07/30/09	19,900 [1]	110,000 [1]	--	<4,030 [1]	395 [1,3]	2,260 [1,3]	267 [1,3]	2,830 [1,3]	--
	07/30/09[D]	19,800 [1]	100,000 [1]	--	<4,000 [1]	371 [1,3]	2,110 [1,3]	244 [1]	2,800 [1]	--
	07/22/10	14,000	120,000	--	<14,000	280	1,900	230	2,500	6.7
Duplicate	07/22/10	14,000	140,000	--	<14,000	290	2,000	240	2,500	--
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL present - 0.06 inch - well not sampled								
	08/02/13	**16,400**	**175,000**	**166,000**	**2,700**	**186**	**1,530**	**200**	**2,400**	**--**
GEI-8	09/03/03	11,000	83,900	--	--	38.4	342	229	2,350	--
	04/23/04	8,850	107,000	--	--	152	834	161	1,930	--
	09/16/04	10,700	515,000	--	--	22.7	172	210	3,500	--
	04/20/05	6,920	571,000	--	--	14.9	189	136	1,740	--
	10/01/05	7,520	59,100	--	983	15.6	91.0	105	1,710	--
	04/18/06	4,870	43,600	--	1,110	14.8	131	148	1,620	--
	09/16/06	4,200	27,000	--	<960	14	93	89	1,200	--
	03/17/07	4,900	11,000	--	290	20	100	100	1,400	--
	09/11/07	4,000	48,000	--	<1000	20	100	100	1,300	--
	04/04/08	Well not sampled - inaccessible								
	09/18/08	Well not sampled - inaccessible								
	07/29/09	6,760	42,800	--	1,930	8.60	39.6	112	1,090	--
	07/22/10	4,900	280,000	--	<13,000	9.4	53	96	1,400	--
	09/24/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/02/13	**11,000**	**1,740,000**	**1,330,000**	**3,900**	**<5.0**	**49.5**	**111**	**2,160**	--

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
GEI-9	09/03/03	LNAPL present - 0.01 foot - well not sampled								--
	04/23/04	1,030	51,600	--	--	5.01	29.0	12.2	161	--
	09/16/04	1,490	276,000	--	--	1.58	2.63	6.73	59.3	--
	04/20/05	1,480	517,000	--	--	1.70	<0.500	7.31	41.9	--
	10/01/05	1,090	93,900	--	<4,030	1.44	<0.500	5.68	43.3	--
	04/18/06	881	97,800	--	<7,940	2.02	<0.500	8.10	57.0	--
	09/16/06	410	56,000	--	<2,000	2.1	<0.5	6.6	36	--
	03/17/07	600	17,000	--	290	3	<1	10	70	--
	09/11/07	400	80,000	--	<1,900	<10	<10	<10	60	--
	04/11/08	397	34,100	--	<3,610	<2.50	<2.50	9.61	42.7	--
	09/18/08	491	113,000	--	<7,430	1.40	<2.50	5.94	35.1	--
	07/28/09	464	58,400	--	3,180	0.850	<1.00	7.31	26.5	--
	07/22/10	Well not sampled - unable to locate								
	09/24/11	LNAPL globules present - well not sampled								
	07/25/12	3,200	30,000	34,000	<1,400	0.9	<0.5	11	66	--
	08/02/13	**419**	**124,000**	**84,900**	**4,300**	**<1.0**	**<1.0**	**3.3**	**15.4**	--
GEI-10	10/01/05	551	45,800	--	412	<0.500	<0.500	7.71	42.9	--
	04/18/06	689	43,400	--	510	<0.500	<0.500	40.0	135	--
	09/16/06	500	23,000	--	<500	<0.5	<0.5	13.0	53	--
	09/16/06[D]	510	22,000	--	<500	<0.5	<0.5	13.0		--
	03/17/07	Well not sampled - unable to locate								
	09/09/07	700	19,000	--	<200	<1	<1	10	40	--
	09/09/07[D]	400	32,000	--	<410	<10	<10	10	50	--
	04/12/08	640	18,700	--	<3,570	<2.50	<2.50	16.4	66.9	--
	09/18/08	256	19,300	--	<4,170	<1.00	<2.50	<2.50	8.48	--
	07/30/09	608	3,320	--	<394	<0.500	<1.00	7.64	31.9	--
	07/22/10	520	74,000	--	<6,800	<0.5	<2.0	6.5	27	--
	09/24/11	110	17,000	--	<3,400	<0.5	<0.5	0.7	3.8	--
Duplicate	09/24/11	290	3,900	--	<660	<0.5	<0.5	1.1	4.6	--
	07/25/12	330	40,000	19,000	<3,400	<0.5	<0.5	3.5	13	--
Duplicate	07/25/12	370	--	--	--	<0.5	<0.5	4.1	16	--
	08/02/13	**151**	**59,100**	**55,000**	**<1,000**	**<1.0**	**<1.0**	**1.9**	**7.8**	**--**
GEI-11	10/01/05	161,000	61,900	--	2,810	8,060	21,500	1,340	8,570	--
	04/18/06	--	--	--	--	--	--	--	--	--
	09/17/06	92,000	55,000	--	<3,900	6,300	19,000	1,500	9,100	--
	03/17/07	LNAPL present - 0.02 foot - well not sampled								
	09/12/07	100,000	93,000	--	<1,900	5,100	18,000	1,900	11,000	--
	04/12/08	101,000	439,000	--	<3,640	5,630	21,300	1,930	11,100	--
	09/18/08	103,000	71,100	--	<7,080	5,530	20,800	1,560	10,200	--
	07/27/09	No current access to well - under permit stipulation								
	07/21/10	No current access to well - under permit stipulation								
	09/24/11	No current access to well - under permit stipulation								
	07/25/12	No current access to well - under permit stipulation								
	08/02/13	**No current access to well - under permit stipulation**								

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
GEI-12	10/01/05	9,920	43,900	--	<410	233	478	290	2,040	--
	04/18/06	5,480	68,100	--	466	136	250	158	1,110	--
	09/16/06	6,200	56,000	--	<1,000	130	300	150	1,100	--
	03/17/07	LNAPL present - 0.04 foot - well not sampled								
	09/09/07	5,000	63,000	--	<2,000	100	300	100	1,100	--
	04/12/08	4,900	126,000	--	<3,610	86.3	102	145	979	--
	09/18/08	8,850	85,300	--	<7,080	334	598	214	1,740	--
	07/29/09	8,540 [1]	42,800	--	471	72.4 [1]	256 [1]	166 [1]	1,190 [1]	--
	07/22/10	6,800	77,000	--	<6,700	99	480	170	1,300	--
	09/24/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/02/13	**Well obstructed - not sampled**								
MW-1	09/23/11	37	110	--	<67	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	35	190	<49	100	<0.5	<0.5	<0.5	<1.5	--
	08/05/13	**<100**	**<430**	**--**	**<1,100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**
Duplicate	**08/05/13**	**<100**	**<430**	**--**	**<1,100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**
MW-2	10/01/05	94.4	<403	--	<403	<0.500	<0.500	<0.500	<1.50	--
	04/18/06	<500	918	--	<391	<0.500	<0.500	<0.500	<1.50	--
	09/15/06	14	260	--	490	<0.5	<0.5	<0.5	<1.5	--
	03/17/07	20	470	--	310	<1	<1	<1	<2	--
	09/09/07	<10	160	--	87	<1	<1	<1	<2	--
	09/09/07[D]	<10	210	--	160	<1	<1	<1	<2	--
	04/12/08	<50.0	1,130	--	<708	<0.500	<0.500	<0.500	<1.00	--
	09/18/08	<50.0	613	--	<743	0.210	<0.500	<0.500	<1.00	--
	07/30/09	12,100[1]	8,470[1]	--	1,100[1]	1,220[1]	61.0[1]	263[1]	1,680[1]	--
	07/22/10	13	300	--	140	<0.5	<0.5	<0.5	<1.5	
	09/23/11	25	710	--	360	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	33	200	<48	79	<0.5	<0.5	<0.5	<1.5	--
	08/05/13	**<100**	**<450**	**--**	**<1,100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
MW-3	07/22/10	16	330	--	1,900	<0.5	<0.5	<0.5	<1.5	--
	09/23/11	400	7,500	--	<1,300	22	9.3	6.9	63	--
	07/25/12	6,100	7,200	1,800	1,700	630	24	180	1,200	--
	08/05/13	**2,110**	**3,500**	**1,300**	**<1,200**	**298**	**8.2**	**43.2**	**292**	**--**
MW-4	10/01/05	--	--	--	--	--	--	--	--	--
	04/18/06	<500	<407	--	<407	<0.500	<0.500	<0.500	<1.50	--
	09/15/06	<10	98	--	200	<0.5	<0.5	<0.5	<1.5	--
	03/16/07	60	85	--	110	30	<1	<1	<2	--
	09/09/07	<10	65	--	140	<1	<1	<1	<2	--
	04/11/08	<50.0	<106	--	<798	<0.500	<0.500	<0.500	<1.00	--
	09/18/08	<50.0	164	--	<743	<0.200	<0.500	<0.500	<1.00	--
	07/30/09	<50.0	<391	--	803	<0.500	<1.00	<1.00	<3.00	--
	07/22/10	<10	62	--	93	<0.5	<0.5	<0.5	<1.5	--
	09/23/11	<10	68	--	69	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	<10	<50	<50	<70	<0.5	<0.5	<0.5	<1.5	--
	08/05/13	**<100**	**<450**	**--**	**<1,100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**
MW-5	10/01/05	16,200	51,500	--	668	245	1,620	270	3,070	--
	04/18/06	21,500	114,000	--	<7,810	287	3,220	498	3,910	--
	09/15/06	18,000	42,000	--	<1,000	220	1,700	370	2,800	--
	09/15/06[D]	18,000	77,000	--	<1,900	230	1,900	410	3,400	--
	03/17/07	Well not sampled - sheen present								
	09/12/07	14,000	53,000	--	<990	200	1,900	400	2,700	--
	04/12/08	29,700	165,000	--	<3,540	152	2,530	627	6,030	--
	09/18/08	29,900	58,600	--	<7,430	163	1,080	464	4,900	--
	07/30/09	16,500[1]	10,000[1]	--	492[1]	84.7[1]	977[1]	367[1]	2,130[1]	--
	07/22/10	22,000	380,000	--	<17,000	140	1,600	360	4,000	--
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	8,000	450,000	480,000	<18,000	56	640	310	2,300	--
	08/02/13	**8,610**	**146,000**	**119,000**	**1,600**	**84.7**	**764**	**179**	**1,860**	**--**
MW-6	10/01/05	Well not sampled - not accessible.								
	04/18/06	624	1,120	--	<391	138	<0.500	10.0	7.50	--
	09/15/06	39	210	--	260	8.1	<0.5	1.0	<1.5	--
	03/16/07	200	280	--	170	30	<1	1	<2	--
	03/16/07[D]	100	250	--	180	30	<1	1	<2	--
	09/11/07	40	300	--	280	7	<1	<1	<2	--
	04/11/08	77.1	1,100	--	<750	17.4	<0.500	<0.500	<1.00	--
	09/18/08	<50.0	398	--	<743	0.525	<0.500	<0.500	<1.00	--
	07/30/09	<50.0	<403	--	<403	2.44	<1.00	<1.00	<3.00	--
	07/22/10	160	390	--	150	15	2.1	1.6	12	--
	09/23/11	<10	100	--	150	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	<10	180	<50	140	1	<0.5	<0.5	<1.5	--
	08/02/13	**<100**	**550**	**<450**	**<1,100**	**<1.0**	**<1.0**	**<1.0**	**<3.0**	**--**

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
MW-13	08/03/07	40	44	--	51	1	<1	<1	<2	--
	09/09/07	70	70	--	63	2	<1	<1	<2	--
	04/04/08	Well not sampled - ice in well								
	09/18/08	62.7	151	--	<708	0.814	<0.500	<0.500	<1.00	--
	07/27/09	No current access to well - under permit stipulation								
	07/22/10	No current access to well - under permit stipulation								
	09/24/11	No current access to well - under permit stipulation								
	07/25/12	No current access to well - under permit stipulation								
	08/02/13	**No current access to well - under permit stipulation**								
MW-14	09/22/10	200	900	--	260	14	<0.5	<0.5	2	--
	09/23/11	300	820	--	400	12	<0.5	2.8	8.9	--
	07/25/12	360	540	60	150	14	<0.5	<0.5	3.9	--
	08/05/13	**226**	**600**	**<400**	**<1,000**	**10.5**	**<1.0**	**3.1**	**7.4**	--
MW-15	09/22/10	38,000	40,000	--	<3,900	1,300	5,700	920	6,700	--
	09/23/11	LNAPL globules present - well not sampled								
	07/25/12	LNAPL globules present - well not sampled								
	08/05/13	**73,300**	**68,500**	**63,700**	**<1,200**	**1,520**	**6,730**	**1,180**	**8,480**	--
K-5	08/25/99	LNAPL present - 0.29 foot - well not sampled								
	08/16/00	4,140	133,000	--	<4,030	<12.5	<12.5	<19.2	<54.0	--
	10/01/05	18,100	86,600	--	<4,030	<0.500	<0.500	2.26	7.56	--
	04/18/06	--	--	--	--	--	--	--	--	--
	09/27/06	610	17,000	--	<480	<0.5	<0.5	0.5	<1.5	--
	03/17/07	Well not sampled - unable to remove cover								
	09/09/07	1,800	110,000	--	<1,900	<1	<1	2	10	--
	04/12/08	195	24,000	--	<3,680	<0.500	<0.500	0.758	2.80	--
	09/18/08	484	69,700	--	<7,500	<0.200	<0.500	0.749	4.38	--
	07/29/09	493	9,160	--	397	<0.500	<1.00	<1.00	4.16	--
	07/22/10	360	78,000	--	<6,900	<0.5	<0.5	1	6	--
	09/24/11	86	11,000	--	<680	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	Well not sampled - inaccessible								
	07/30/13	**Well not sampled**								

Table 3
Groundwater Analytical Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Monitoring Well ID	Date	GRO	DRO	DRO SG	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Dissolved Lead
ADEC GCL		**2,200**	**1,500**	**NE**	**1,100**	**5.0**	**1,000**	**700**	**10,000**	**15**
K-7	10/01/05	<50	421	--	<417	<0.500	<0.500	<0.500	<1.50	--
	04/1806	429	--	--	--	<0.500	<0.500	1.71	5.28	--
	09/16/06	<10	72	--	250	<0.5	<0.5	<0.5	<1.5	--
	03/17/07	Well not sampled - unable to locate								
	09/09/07	<100	71	--	240	<10	<10	<10	<20	--
	04/04/08	Well not sampled - ice in well								
	09/18/08	<50.0	<100	--	<750	<0.200	<0.500	<0.500	<1.00	--
	07/29/09	<50.0	416	--	504	<0.500	<1.00	<1.00	<3.00	--
	07/22/10	<10	62	--	100	<0.5	<0.5	<.05	<1.5	--
	09/24/11	<10	71	--	140	<0.5	<0.5	<0.5	<1.5	--
	07/25/12	Well not sampled - obstructed								
	07/30/13	**Well not sampled - obstructed**								

Notes:

GRO = gasoline range organics, analyzed by GRO AK101

DRO = diesel range organics, analyzed by DRO AK102

DRO SG = diesel range organics, analyzed by DRO AK102

RRO = residual range organics, analyzed by RRO AK103

Benzene, toluene, ethylbenzene, total xylenes by United States Environmental Protection Agency (USEPA) Method 8021B

Dissolved lead by USEPA Method 200.8

ADEC = Alaska Department of Conservation

GCL = ADEC 18 AAC 75 Groundwater Cleanup Level

All results are reported in micrograms per liter (µg/L)

NE = not established

Highlighted concentrations are greater than the applicable ADEC GCL.

-- = analyte not included in sampling event

LNAPL = light nonaqueous phase liquid

< = Less than reporting limit

Bold type = Results of most recent sampling event.

[D] = duplicate sample

[1] = Sample required dilution due to high concentrations of target analyte.

[2] = Initial analysis within holding time. Reanalysis for the required dilution was past holding time.

[3] = Concentration reported by the USEPA 8260B method was greater than concentration reported by the AK 101 method. The listed concentrations are results from the 8260B analysis.

Table 4
Soil Vapor Analytical Data (Shallow Soil Gas)

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

			USEPA TO-15														USEPA TO-17	
Vapor Probe	Depth Below Ground Surface (feet)	Sample Date	Benzene	Toluene	Ethylbenzene	Total Xylenes[1]	Styrene	Isopropylbenzene (Cumene)	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Butylbenzene	Propylbenzene	sec-Butylbenzene	tert-Butylbenzene	1,2,4-Trichlorobenzene[2]	Naphthalene	1-Methylnaphthalene	2-Methylnaphthalene
ADEC Commercial Target Level (Shallow Gas ≤5 feet):			**49**	**58,200**	**260**	**1,000**	**10,300**	**3,600**	**62**	**62**	**280**	**310**	**280**	**280**	**24**	**6.9**	**110**	**110**
VP-3	**5.0**	08/10/07	53,000	38,000	1,600	15,700	--	--	--	--	--	--	--	--	--	<600[3]	--	--
	Duplicate	08/10/07	48,000	44,000	1,400	22,400	--	--	--	--	--	--	--	--	--	<400[3]	--	--
		08/19/08	23,000	21,000	<780[3]	79,000	--	--	--	--	--	--	--	--	--	<2,300[3]	--	--
		08/04/09	**36,000**	**32,000**	**<2,800[3]**	**130,000**	**<2,800**	**<2,800**	**11,000**	**16,000**	**<11,000[3]**	**<2,800[3]**	**<11,000[3]**	**<11,000[3]**	**--**	**<11,000[3]**	**<24**	**<24**
VP-5	**3.5**	08/19/08	<0.30	0.35	<0.30	<0.60	--	--	--	--	--	--	--	--	--	<0.50	--	**--**
	Duplicate	08/19/08	<0.30	0.35	<0.30	<0.60	--	--	--	--	--	--	--	--	--	<0.50	--	**--**
		08/04/09	**<5.2**	**<5.2**	**<5.2**	**<5.2**	**<5.2**	**<5.2**	**<5.2**	**<5.2**	**<21**	**<5.2**	**<21**	**<21**	**--**	**<21[3]**	**<24**	**<24**
VP-7	**3.5**	08/19/08	19	12	1.6	8.9	--	--	--	--	--	--	--	--	--	<0.50	--	--
		08/05/09	**0.20**	**0.49**	**<0.16**	**<0.16**	**<0.16**	**<0.16**	**<0.16**	**<0.16**	**<0.79**	**<0.16**	**<0.79**	**<0.79**	**--**	**<0.79**	**<24**	**<24**

Notes:
Analysis by United States Environmental Protection Agency Method TO-15 and TO-17.
[1]Total xylenes reported as the sum of m/p-xylenes and o-xylene.
[2]Due to laboratory dilution, the method detection limit was raised to a level that is higher than the screening level.
ADEC = Alaska Department of Conservation
≤ = less than or equal to
All results are reported in parts per billion by volume.
Highlighted values indicate an exceedance of the respective commercial target level.
-- = not applicable/not analyzed
< = less than reporting limit
[3]Compound erroneously analyzed and reported by the laboratory.
Bold type indicates results of most recent sampling event.

Table 5
Soil Vapor Analytical Data (Deep Soil Gas)

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

			USEPA TO-15													USEPA TO-17	
Vapor Probe	Depth Below Ground Surface (feet)	Sample Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	Styrene	Isopropylbenzene (Cumene)	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Butylbenzene	Propylbenzene	sec-Butylbenzene	tert-Butylbenzene	Naphthalene	1-Methylnaphthalene	2-Methylnaphthalene
ADEC Commercial Target Level (Deep Gas >5 feet):			**490**	**582,000**	**2,600**	**10,000**	**103,000**	**36,000**	**620**	**620**	**2,800**	**3,100**	**2,800**	**2,800**	**69**	**1,100**	**1,100**
VP-3	**8.5**	08/10/07	100,000	92,000	1,400	6,100	--	--	--	--	--	--	--	--	<400[1]	--	--
		08/19/08	190,000	410,000	<1,900[1]	94,000	--	--	--	--	--	--	--	--	<5,700[1]	--	--
		08/04/09	**240,000**	**510,000**	**<2,700[1]**	**114,000**	**<2,700**	**<2,700**	**<2,700[1]**	**<5,700[1]**	**<11,000[1]**	**<2,700**	**<11,000[1]**	**<11,000[1]**	**<11,000[1]**	**<24**	**<24**
VP-5	**8.5**	08/19/08	<0.30	0.81	<0.30	0.73	--	--	--	--	--	--	--	--	<0.50	--	--
		08/04/09	**<0.19**	**0.74**	**<0.19**	**0.24**	**<0.19**	**<0.19**	**<0.19**	**<0.19**	**<0.94**	**<0.19**	**<0.94**	**<0.94**	**<0.94**	**<24**	**<24**
VP-7	**8.5**	08/19/08	1,000	290	15	162	--	--	--	--	--	--	--	--	<30	--	--
		08/05/09	**1,500**	**440**	**<200**	**<200**	**<200**	**<200**	**<200**	**<200**	**<800**	**<200**	**<800**	**<800**	**<800[1]**	**<24**	**<24**

Notes:
Analysis by United States Environmental Protection Agency Method TO-15 and TO-17.
ADEC = Alaska Department of Conservation
> = greater than
All results are reported in parts per billion by volume.
Highlighted values indicate an exceedance of the respective commercial target level.
-- Not applicable/not analyzed
< = less than reporting limit
[1]Due to laboratory dilution, the method detection limit was raised to a level that is higher than the screening level.
Bold type indicates results of most recent sampling event.

Table 6
Surfactant Enhanced LNAPL Recovery Operations Groundwater Monitoring Data

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Well	Date	Time	Depth to Water (feet btoc)	Depth to LNAPL (feet btoc)	Specific Conductivity µS/cm	Notes
Surfactant Solution					*656*	
GEI-1	8/18/2010	13:30	--	--	--	LNAPL, no conductivity measurement taken
	8/19/2010	14:00	16.36	16.22	--	no suds observed
GEI-7	8/18/2010	13:30	16.51	--	857	pre-injection sampling, no sheen observed
	8/19/2010	8:30	16.53	--	778	pre-extraction sampling
	8/19/2010	10:20	--	--	815	--
	8/19/2010	11:18	--	--	866	--
	8/19/2010	12:30	--	--	850	approximately 240 gallons extracted
	8/19/2010	13:45	--	--	831	appears the same as pre-injection sample
	9/22/2010	14:30	16.15	--	790	some suds
	10/27/2010	12:50	17.40	16.93	--	0.47 foot of LNAPL measured in well
	11/15/2010	14:45	16.91	16.71	--	0.20 foot of LNAPL measured in well
GEI-8	8/16/2010	10:05	16.79	16.78	--	
	8/18/2010	13:30	--	--	--	sheen, no conductivity measurement taken

Notes:

btoc = below top of casing

µS/cm = microSiemens per centimeter

LNAPL = light nonaqueous phase liquid

-- = no data

Table 7
Surfactant Enhanced LNAPL Recovery

Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Date	Time	GRO	DRO	Benzene	Toluene	Ethylbenzene	Total Xylenes	Notes
ADEC GCL:		**2,200**	**1,500**	**5**	**1,000**	**700**	**10,000**	
7/22/2010	16:30	14,000	120,000	280	230	1,900	2,500	pre-injection sampling
8/19/2010	8:30	130,000	2,500,000	210	2,500	670	7,700	post-injection/pre-extraction
8/19/2010	10:20	46,000	200,000	220	1,900	410	3,800	after 1 injection volume extracted
8/19/2010	11:18	15,000	53,000	180	1,500	260	2,200	after 2 volume extracted
8/19/2010	12:30	11,000	71,000	180	1,500	250	2,100	after 3 volume extracted
8/19/2010	13:45	18,000	600,000	170	1,500	240	2,500	post extraction
9/22/2010	14:30	13,000	180,000	180	1,400	180	2,000	1 month post extraction

Notes:
GRO = gasoline range organics
DRO = diesel range organics
ADEC = Alaska Department of Environmental Conservation
GCL = groundwater cleanup level
All results reported in micrograms per liter (µg/L).
Highlighted cells indicate concentration exceeds the applicable ADEC GCL.
Analytical results were collected from monitoring well GEI-7.

Table 8
Well Construction Details

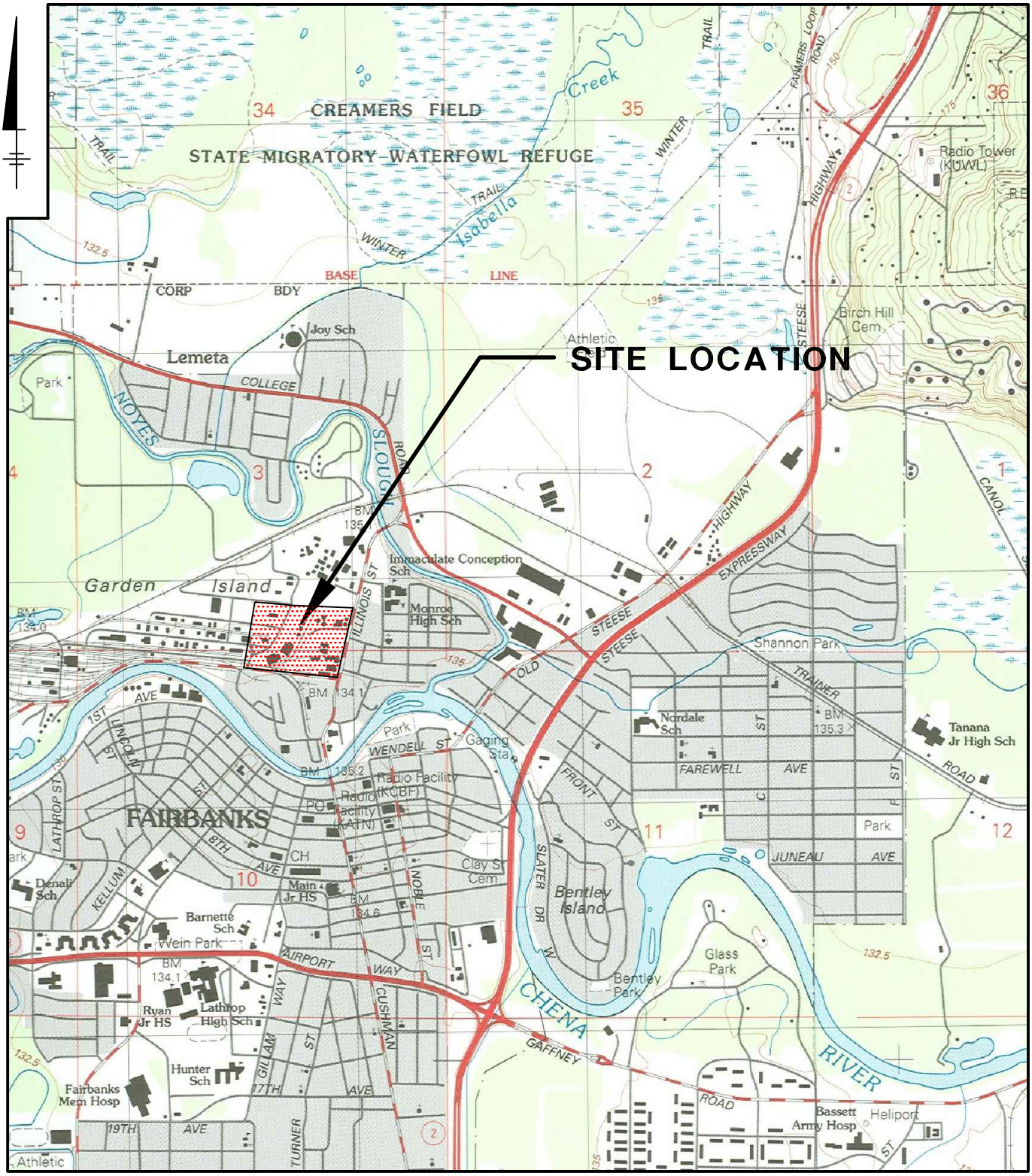
Former UNOCAL Bulk Terminal Facility No. 0208 (Chevron Facility No. 306456)
328½ Illinois Street
Fairbanks, Alaska

Well ID	Date of Installation	Well Casing Diameter (inches)	Total Depth (feet bgs)	Screened Interval (feet bgs)	Filter Pack Interval (feet bgs)	Bentonite Seal Interval (feet bgs)
GEI-1	09/24/02	2	20.0	10-20	8-20	6-8
GEI-2	09/24/02	2	20.0	10-20	8-20	6-8
GEI-3	09/24/02	2	20.0	10-20	8-20	6-8
GEI-4	09/25/02	2	20.0	10-20	8-20	6-8
GEI-5	09/25/02	2	17.0	7-17	5-17	3-5
GEI-6	09/25/02	2	18.0	8-18	6-18	4-6
GEI-7	08/23/03	2	20.0	10-20	8-20	6-8
GEI-8	08/23/03	2	20.0	10-20	8-20	6-8
GEI-9	08/23/03	2	20.0	10-20	8-20	6-8
GEI-10	09/29/05	2	20.0	10-20	8-20	3-8
GEI-11	09/29/05	2	20.0	10-20	8-20	3-8
GEI-12	09/29/05	2	20.0	10-20	8-20	3-8
K-5	NA	2	NA	NA	NA	NA
K-7	NA	2	NA	NA	NA	NA
MW-1	05/04/99	2	23.0	13-23	11-24.5	9-11
MW-2	05/05/99	2	24.0	14-24	12-24	10-12
MW-3	05/06/99	2	23.0	13-23	11-23	9-11
MW-4	10/05/99	2	21.6	11.4-21.4	9.5-21.6	7.5-9.5
MW-5	10/06/99	2	21.9	11.7-21.7	7.5-21.9	1.5-7.5
MW-6	10/06/99	2	22.3	12.1-22.1	8-22.3	1.5-8
MW-13	07/26/07	2	25.0	10-25	8-25	2-8

Notes:
bgs = below ground surface
NA = information not available

ARCADIS

Figures



SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: FAIRBANKS (D-2) SE, AK., 1992, FAIRBANKS NORTH STAR BOROUGH, SECTION: 3, TOWNSHIP: 1S, RANGE: 1W

0 2000' 4000'

APPROXIMATE GRAPHIC SCALE

FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 1/2 ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY:TMAPA,FL DIV/GROUP:85 DB:JAR LD:(Opt) PIC:(Opt) PM:M.Strickler TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\TAMPA\ACTIChevron\USA\FAIR Site\45512.0008\Cleanup Report Oct 2013\B0045512N01.dwg LAYOUT: 1 SAVED: 12/23/2013 2:48 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/23/2013 2:50 PM BY: RICHARDS, JIM
XREFS: IMAGES: ALASKA.jpg Fairbanks-SE.jpg PROJECTNAME: ----

LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,

0 120' 240'

APPROXIMATE GRAPHIC SCALE

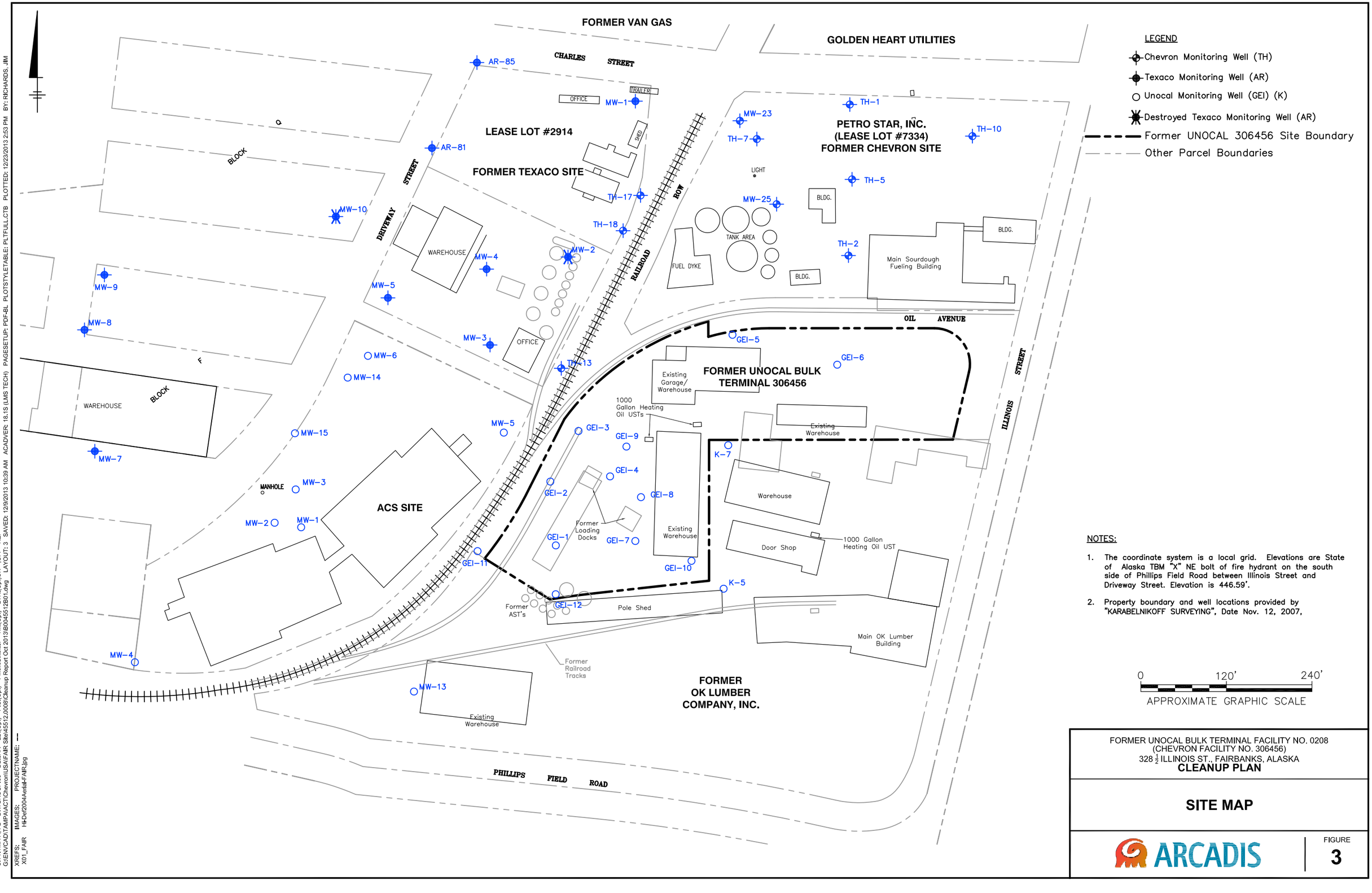
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

AERIAL PHOTOGRAPH

ARCADIS

FIGURE
2

CITY:TMA-A, FL DIV/GROUP:85 DB:JAR LD:(Opt) PIC:(Opt) PM:M.Strickler TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\TAMPA\ACT\Chevron\USA\FAIR Site\45512.0008\Cleanup Report Oct 2013\B00455122N02.dwg LAYOUT: 2 SAVED: 12/23/2013 2:51 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/23/2013 2:52 PM BY: RICHARDS, JIM
XREFS: X01_FAIR IMAGES: Hi-Def2004Aerial-FAIR.jpg PROJECTNAME: ----



LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)
- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,

0 120' 240'

APPROXIMATE GRAPHIC SCALE

FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA

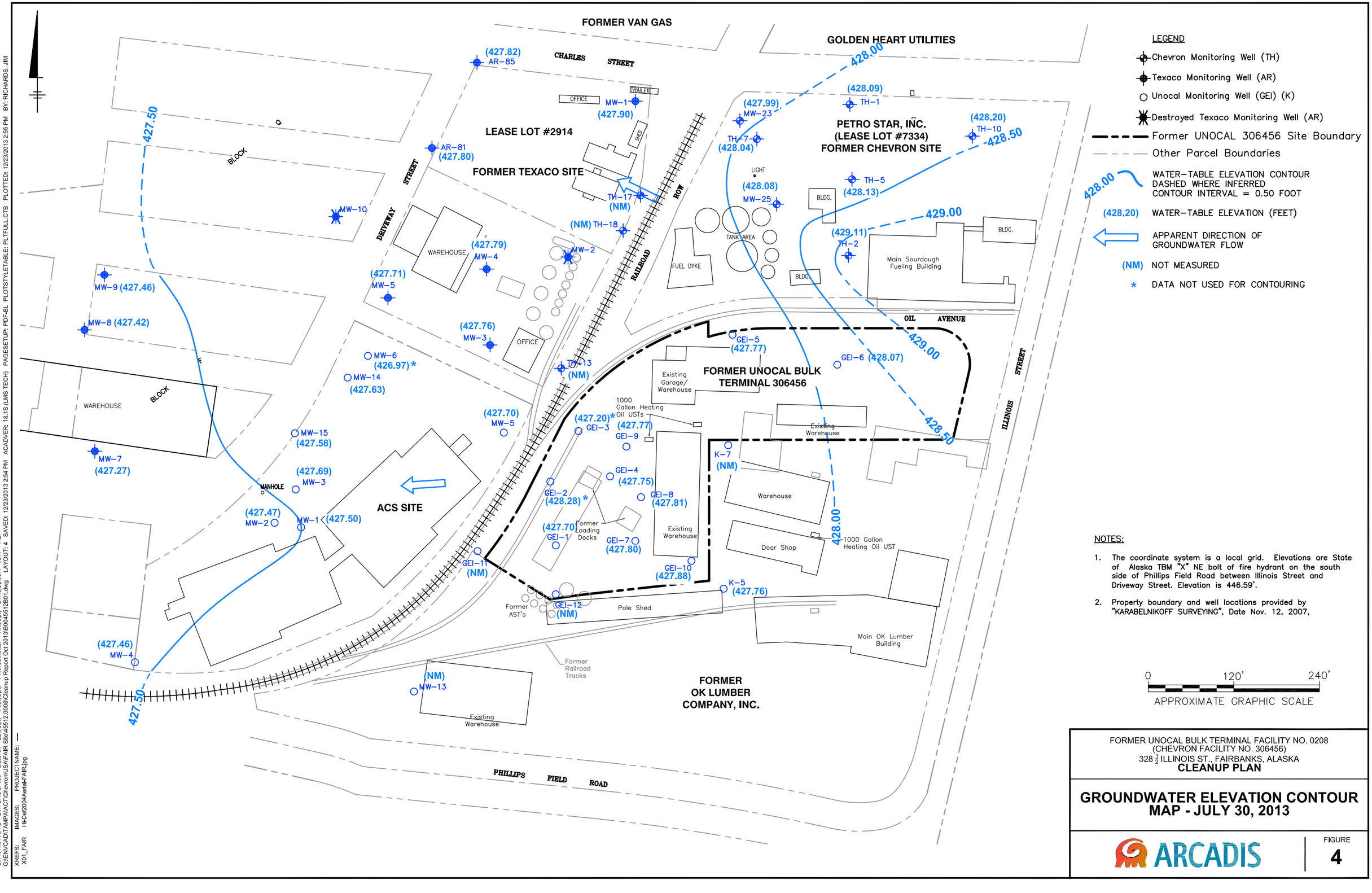
CLEANUP PLAN

SITE MAP

ARCADIS

FIGURE 3

CITY:TMA-A, FL DIV/GROUP:85 DB:JAR LD:(Opt) PIC:(Opt) PM:M.Strickler TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\TAMPA\ACT\Chevron\USA\FAIR Site\45512.0008\Cleanup Report Oct 2013\B0045512B01.dwg LAYOUT: 3 SAVED: 12/9/2013 10:39 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: PDF-BL PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/23/2013 2:53 PM BY: RICHARDS, JIM
XREFS: IMAGES: PROJECTNAME: ---
X01_FAIR HHDef2004Aerial-FAIR.jpg



NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,

0 120' 240'

APPROXIMATE GRAPHIC SCALE

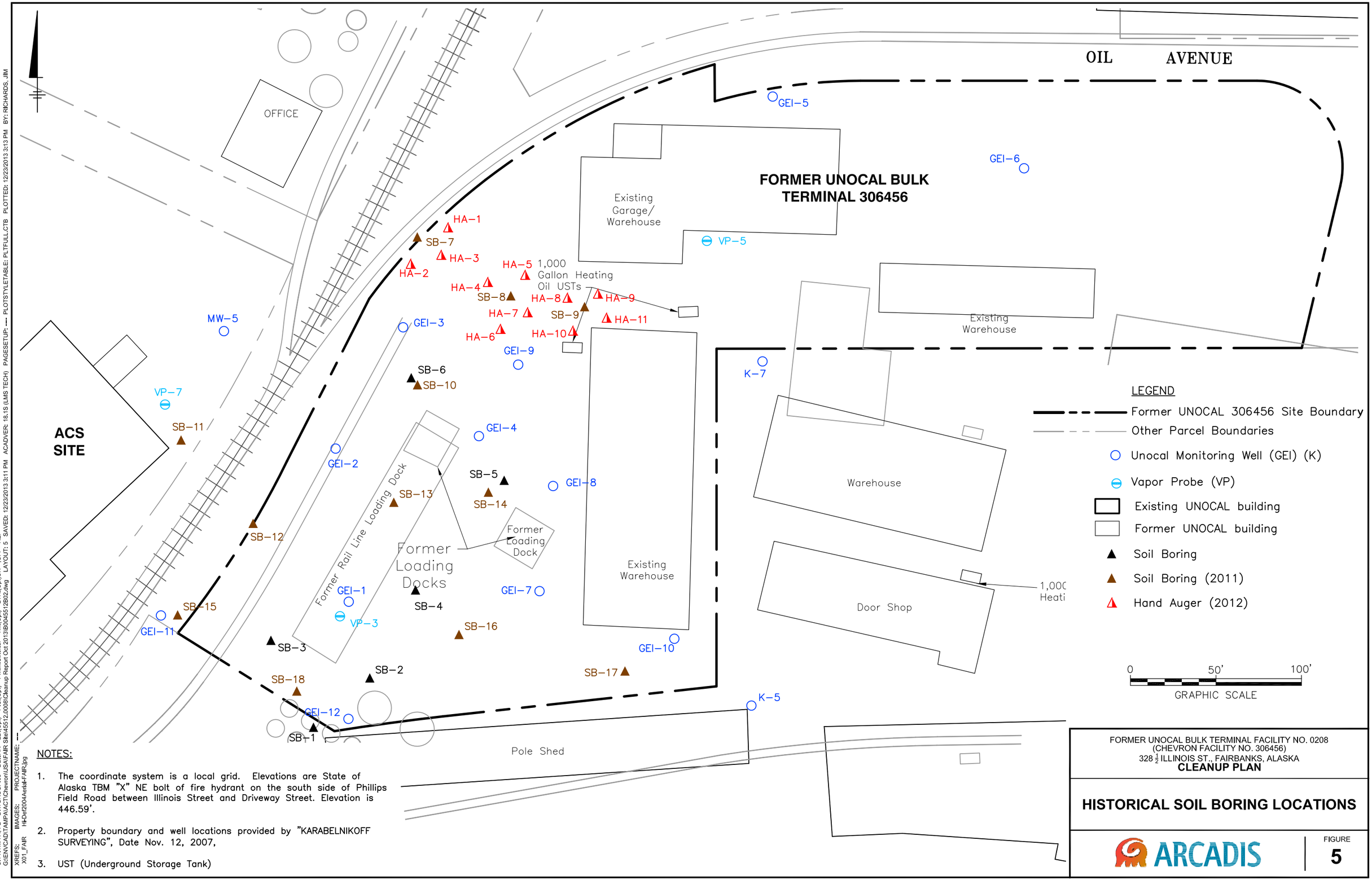
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 1/2 ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

GROUNDWATER ELEVATION CONTOUR MAP - JULY 30, 2013

ARCADIS

FIGURE 4

CITY:TMA-FL DIV/GROUP:ES DB:JAR LD:(Opt) PIC:(Opt) PM:MStrickler TM:(Opt) LYR:(Opt)ON=*OFF=*REF*
G:\ENVCAD\TAMPA\ACTIChevron\USA\FAIR Site\455512.0008\Cleanup Report Oct 2013\B0045512B01.dwg LAYOUT: 4 SAVED: 12/23/2013 2:54 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: PDF-BL PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/23/2013 2:55 PM BY: RICHARDS, JIM
XREFS: IMAGES: PROJECTNAME: ---
X01_FAIR HHDef2004Aerial-FAIR.jpg



NOTES:

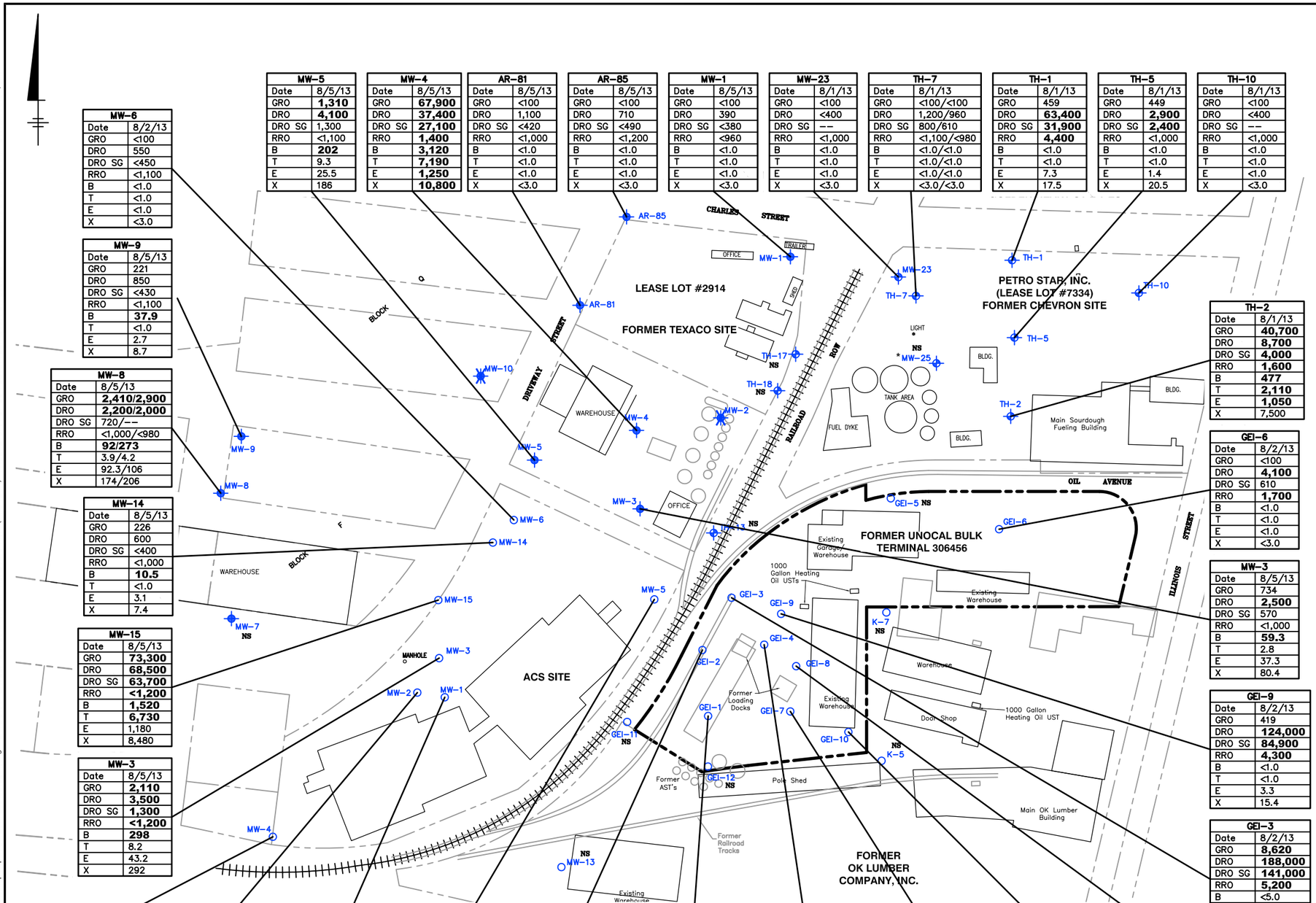
1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. UST (Underground Storage Tank)

FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 1/2 ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

HISTORICAL SOIL BORING LOCATIONS

ARCADIS

FIGURE 5



MW-5	
Date	8/5/13
GRO	**1,310**
DRO	**4,100**
DRO SG	1,300
RRO	<1,100
B	**202**
T	9.3
E	25.5
X	186

MW-4	
Date	8/5/13
GRO	**67,900**
DRO	**37,400**
DRO SG	**27,100**
RRO	**1,400**
B	**3,120**
T	**7,190**
E	**1,250**
X	**10,800**

AR-81	
Date	8/5/13
GRO	<100
DRO	1,100
DRO SG	<420
RRO	<1,000
B	<1.0
T	<1.0
E	<1.0
X	<3.0

AR-85	
Date	8/5/13
GRO	<100
DRO	710
DRO SG	<490
RRO	<1,200
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-1	
Date	8/5/13
GRO	<100
DRO	390
DRO SG	<380
RRO	<960
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-23	
Date	8/1/13
GRO	<100
DRO	<400
DRO SG	--
RRO	<1,000
B	<1.0
T	<1.0
E	<1.0
X	<3.0

TH-7	
Date	8/1/13
GRO	<100/<100
DRO	1,200/960
DRO SG	800/610
RRO	<1,100/<980
B	<1.0/<1.0
T	<1.0/<1.0
E	<1.0/<1.0
X	<3.0/<3.0

TH-1	
Date	8/1/13
GRO	459
DRO	**63,400**
DRO SG	**31,900**
RRO	**4,400**
B	<1.0
T	<1.0
E	7.3
X	17.5

TH-5	
Date	8/1/13
GRO	449
DRO	**2,900**
DRO SG	**2,400**
RRO	<1,000
B	<1.0
T	<1.0
E	1.4
X	20.5

TH-10	
Date	8/1/13
GRO	<100
DRO	<400
DRO SG	--
RRO	<1,000
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-6	
Date	8/2/13
GRO	<100
DRO	550
DRO SG	<450
RRO	<1,100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-9	
Date	8/5/13
GRO	221
DRO	850
DRO SG	<430
RRO	<1,100
B	**37.9**
T	<1.0
E	2.7
X	8.7

MW-8	
Date	8/5/13
GRO	**2,410/2,900**
DRO	**2,200/2,000**
DRO SG	720/--
RRO	<1,000/<980
B	**92/273**
T	3.9/4.2
E	92.3/106
X	174/206

MW-14	
Date	8/5/13
GRO	226
DRO	600
DRO SG	<400
RRO	<1,000
B	**10.5**
T	<1.0
E	3.1
X	7.4

MW-15	
Date	8/5/13
GRO	**73,300**
DRO	**68,500**
DRO SG	**63,700**
RRO	**<1,200**
B	**1,520**
T	**6,730**
E	1,180
X	8,480

MW-3	
Date	8/5/13
GRO	**2,110**
DRO	**3,500**
DRO SG	**1,300**
RRO	**<1,200**
B	**298**
T	8.2
E	43.2
X	292

TH-2	
Date	8/1/13
GRO	**40,700**
DRO	**8,700**
DRO SG	**4,000**
RRO	**1,600**
B	**477**
T	**2,110**
E	**1,050**
X	7,500

GEI-6	
Date	8/2/13
GRO	<100
DRO	**4,100**
DRO SG	610
RRO	**1,700**
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-3	
Date	8/5/13
GRO	734
DRO	**2,500**
DRO SG	570
RRO	<1,000
B	**59.3**
T	2.8
E	37.3
X	80.4

GEI-9	
Date	8/2/13
GRO	419
DRO	**124,000**
DRO SG	**84,900**
RRO	**4,300**
B	<1.0
T	<1.0
E	3.3
X	15.4

GEI-3	
Date	8/2/13
GRO	**8,620**
DRO	**188,000**
DRO SG	**141,000**
RRO	**5,200**
B	<5.0
T	144
E	63.7
X	2,100

MW-4	
Date	8/5/13
GRO	<100
DRO	<450
DRO SG	--
RRO	<1,100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-2	
Date	8/5/13
GRO	<100
DRO	<450
DRO SG	--
RRO	<1,100
B	<1.0
T	<1.0
E	<1.0
X	<3.0

MW-1	
Date	8/5/13
GRO	<100/<100
DRO	<430/<430
DRO SG	--
RRO	<1,100/<1,100
B	<1.0/<1.0
T	<1.0/<1.0
E	<1.0/<1.0
X	<3.0/<3.0

MW-5	
Date	8/2/13
GRO	**8,610**
DRO	**146,000**
DRO SG	**119,000**
RRO	**1,600**
B	**84.7**
T	764
E	179
X	1,860

GEI-2	
Date	8/2/13
GRO	**230,000**
DRO	**96,300**
DRO SG	**68,100**
RRO	**3,200**
B	**3,330**
T	**37,100**
E	**3,210**
X	**26,700**

GEI-1	
Date	8/2/13
GRO	**42,200**
DRO	**418,000**
DRO SG	**330,000**
RRO	**4,200**
B	**2,920**
T	**5,060**
E	538
X	3,410

GEI-4	
Date	8/2/13
GRO	1,290
DRO	**159,000**
DRO SG	**122,000**
RRO	**1,600**
B	**7.7**
T	2.9
E	42.0
X	238

GEI-7	
Date	8/2/13
GRO	**16,400**
DRO	**175,000**
DRO SG	**166,000**
RRO	**2,700**
B	**186**
T	**1,530**
E	200
X	2,400

GEI-10	
Date	8/2/13
GRO	151
DRO	**59,100**
DRO SG	**55,000**
RRO	<1,000
B	<1.0
T	<1.0
E	1.9
X	7.8

GEI-8	
Date	8/2/13
GRO	**11,000**
DRO	**1,740,000**
DRO SG	**1,330,000**
RRO	**3,900**
B	<5.0
T	49.5
E	111
X	2,160

LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)
- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries

SAMPLE LOCATION	
DATE	SAMPLE DATE
GRO	GASOLINE RANGE ORGANICS
DRO	DIESEL RANGE ORGANICS
DRO SG	DIESEL RANGE ORGANICS WITH SILICA GEL
RRO	RESIDUAL RANGE ORGANICS
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES

RESULTS REPORTED IN MICROGRAMS PER LITER (µg/L)

220/210 = DUPLICATE SAMPLE COLLECTED

BOLD VALUE INDICATES CONCENTRATION GREATER THAN ADEC GROUNDWATER CLEANUP LEVELS 18 AAC 75.

* = GROUNDWATER SAMPLES WERE NOT COLLECTED DUE TO THE PRESENCE OF LNAPL

NS = SAMPLE COULD NOT BE COLLECTED FROM THE MONITORING WELL

NA = NOT ANALYZED

< = LESS THAN REPORTING LIMIT

LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID

ADEC = ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AAC = ALASKA ADMINISTRATIVE CODE

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,

0 150' 300'

GRAPHIC SCALE

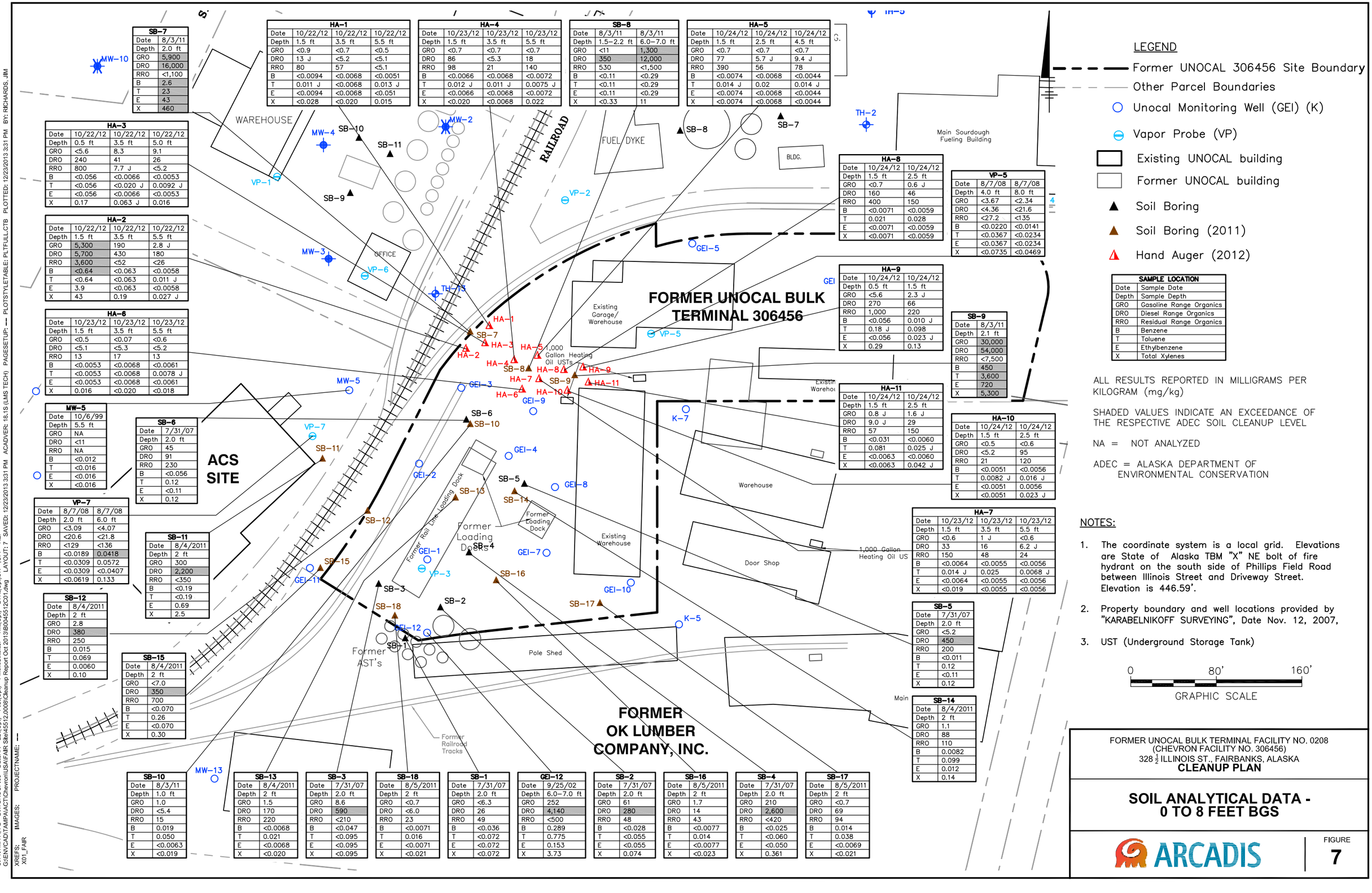
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 1/2 ILLINOIS ST., FAIRBANKS, ALASKA

CLEANUP PLAN

GROUNDWATER ANALYTICAL RESULTS AUGUST 2013

ARCADIS

FIGURE **6**



SB-7	
Date	8/3/11
Depth	2.0 ft
GRO	5,900
DRO	16,000
RRO	<1,100
B	2.6
T	23
E	43
X	460

HA-1			
Date	10/22/12	10/22/12	10/22/12
Depth	1.5 ft	3.5 ft	5.5 ft
GRO	<0.9	<0.7	<0.5
DRO	13 J	<5.2	<5.1
RRO	80	57	<5.1
B	<0.0094	<0.0068	<0.0051
T	0.011 J	<0.0068	0.013 J
E	<0.0094	<0.0068	<0.051
X	<0.028	<0.020	0.015

HA-4			
Date	10/23/12	10/23/12	10/23/12
Depth	1.5 ft	3.5 ft	5.5 ft
GRO	<0.7	<0.7	<0.7
DRO	86	<5.3	18
RRO	98	21	140
B	<0.0066	<0.0068	<0.0072
T	0.012 J	0.011 J	0.0075 J
E	<0.0066	<0.0068	<0.0072
X	<0.020	<0.0068	0.022

SB-8		
Date	8/3/11	8/3/11
Depth	1.5–2.2 ft	6.0–7.0 ft
GRO	<11	1,300
DRO	350	12,000
RRO	530	<1,500
B	<0.11	<0.29
T	<0.11	<0.29
E	<0.11	<0.29
X	<0.33	11

HA-5			
Date	10/24/12	10/24/12	10/24/12
Depth	1.5 ft	2.5 ft	4.5 ft
GRO	<0.7	<0.7	<0.7
DRO	77	5.7 J	9.4 J
RRO	390	56	78
B	<0.0074	<0.0068	<0.0044
T	0.014 J	0.02	0.014 J
E	<0.0074	<0.0068	<0.0044
X	<0.0074	<0.0068	<0.0044

HA-3			
Date	10/22/12	10/22/12	10/22/12
Depth	0.5 ft	3.5 ft	5.0 ft
GRO	<5.6	8.3	9.1
DRO	240	41	26
RRO	800	7.7 J	<5.2
B	<0.056	<0.0066	<0.0053
T	<0.056	<0.020 J	0.0092 J
E	<0.056	<0.0066	<0.0053
X	0.17	0.063 J	0.016

HA-2			
Date	10/22/12	10/22/12	10/22/12
Depth	1.5 ft	3.5 ft	5.5 ft
GRO	5,300	190	2.8 J
DRO	5,700	430	180
RRO	3,600	<52	<26
B	<0.64	<0.063	<0.0058
T	<0.64	<0.063	0.011 J
E	3.9	<0.063	<0.0058
X	43	0.19	0.027 J

HA-6			
Date	10/23/12	10/23/12	10/23/12
Depth	1.5 ft	3.5 ft	5.5 ft
GRO	<0.5	<0.07	<0.6
DRO	<5.1	<5.3	<5.2
RRO	13	17	13
B	<0.0053	<0.0068	<0.0061
T	<0.0053	<0.0068	0.0078 J
E	<0.0053	<0.0068	<0.0061
X	0.016	<0.020	<0.018

MW-5	
Date	10/6/99
Depth	5.5 ft
GRO	NA
DRO	<11
RRO	NA
B	<0.012
T	<0.016
E	<0.016
X	<0.016

SB-6	
Date	7/31/07
Depth	2.0 ft
GRO	45
DRO	91
RRO	230
B	<0.056
T	0.12
E	<0.11
X	0.12

VP-7		
Date	8/7/08	8/7/08
Depth	2.0 ft	6.0 ft
GRO	<3.09	<4.07
DRO	<20.6	<21.8
RRO	<129	<136
B	<0.0189	0.0418
T	<0.0309	0.0572
E	<0.0309	<0.0407
X	<0.0619	0.133

SB-11	
Date	8/4/2011
Depth	2 ft
GRO	300
DRO	2,200
RRO	<350
B	<0.19
T	<0.19
E	0.69
X	2.5

SB-12	
Date	8/4/2011
Depth	2 ft
GRO	2.8
DRO	380
RRO	250
B	0.015
T	0.069
E	0.0060
X	0.10

SB-15	
Date	8/4/2011
Depth	2 ft
GRO	<7.0
DRO	350
RRO	700
B	<0.070
T	0.26
E	<0.070
X	0.30

SB-10	
Date	8/3/11
Depth	1.0 ft
GRO	1.0
DRO	<5.4
RRO	15
B	0.019
T	0.050
E	<0.0063
X	<0.019

SB-13	
Date	8/4/2011
Depth	2 ft
GRO	1.5
DRO	170
RRO	220
B	<0.0068
T	0.021
E	<0.0068
X	<0.020

SB-3	
Date	7/31/07
Depth	2.0 ft
GRO	8.6
DRO	590
RRO	<210
B	<0.047
T	<0.095
E	<0.095
X	<0.095

SB-18	
Date	8/5/2011
Depth	2 ft
GRO	<0.7
DRO	<6.0
RRO	23
B	<0.0071
T	0.016
E	<0.0071
X	<0.021

SB-1	
Date	7/31/07
Depth	2.0 ft
GRO	<6.3
DRO	26
RRO	49
B	<0.036
T	<0.072
E	<0.072
X	<0.072

GEI-12	
Date	9/25/02
Depth	6.0–7.0 ft
GRO	252
DRO	4,140
RRO	<500
B	0.289
T	0.775
E	0.153
X	3.73

SB-2	
Date	7/31/07
Depth	2.0 ft
GRO	61
DRO	280
RRO	48
B	<0.028
T	<0.055
E	<0.055
X	0.074

SB-16	
Date	8/5/2011
Depth	2 ft
GRO	1.7
DRO	14
RRO	43
B	<0.0077
T	0.014
E	<0.0077
X	<0.023

SB-4	
Date	7/31/07
Depth	2.0 ft
GRO	210
DRO	2,600
RRO	<420
B	<0.025
T	<0.060
E	<0.050
X	0.361

SB-17	
Date	8/5/2011
Depth	2 ft
GRO	<0.7
DRO	69
RRO	94
B	0.014
T	0.038
E	<0.0069
X	<0.021

HA-8		
Date	10/24/12	10/24/12
Depth	1.5 ft	2.5 ft
GRO	<0.7	0.6 J
DRO	160	46
RRO	400	150
B	<0.0071	<0.0059
T	0.021	0.028
E	<0.0071	<0.0059
X	<0.0071	<0.0059

VP-5		
Date	8/7/08	8/7/08
Depth	4.0 ft	8.0 ft
GRO	<3.67	<2.34
DRO	<4.36	<21.6
RRO	<27.2	<135
B	<0.0220	<0.0141
T	<0.0367	<0.0234
E	<0.0367	<0.0234
X	<0.0735	<0.0469

HA-9		
Date	10/24/12	10/24/12
Depth	0.5 ft	1.5 ft
GRO	<5.6	2.3 J
DRO	270	66
RRO	1,000	220
B	<0.056	0.010 J
T	0.18 J	0.098
E	<0.056	0.023 J
X	0.29	0.13

SB-9	
Date	8/3/11
Depth	2.1 ft
GRO	30,000
DRO	54,000
RRO	<7,500
B	450
T	3,600
E	720
X	5,300

HA-11		
Date	10/24/12	10/24/12
Depth	1.5 ft	2.5 ft
GRO	0.8 J	1.6 J
DRO	9.0 J	29
RRO	57	150
B	<0.031	<0.0060
T	0.081	0.025 J
E	<0.0063	<0.0060
X	<0.0063	0.042 J

HA-10		
Date	10/24/12	10/24/12
Depth	1.5 ft	2.5 ft
GRO	<0.5	<0.6
DRO	<5.2	95
RRO	21	120
B	<0.0051	<0.0056
T	0.0082 J	0.016 J
E	<0.0051	0.0056
X	<0.0051	0.023 J

HA-7			
Date	10/23/12	10/23/12	10/23/12
Depth	1.5 ft	3.5 ft	5.5 ft
GRO	<0.6	1 J	<0.6
DRO	33	16	6.2 J
RRO	150	48	24
B	<0.0064	<0.0055	<0.0056
T	0.014 J	0.025	0.0068 J
E	<0.0064	<0.0055	<0.0056
X	<0.019	<0.0055	<0.0056

SB-5	
Date	7/31/07
Depth	2.0 ft
GRO	<5.2
DRO	450
RRO	200
B	<0.011
T	0.12
E	<0.11
X	0.12

SB-14	
Date	8/4/2011
Depth	2 ft
GRO	1.1
DRO	88
RRO	110
B	0.0082
T	0.099
E	0.012
X	0.14

LEGEND

- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- Unocal Monitoring Well (GEI) (K)
- Vapor Probe (VP)
- Existing UNOCAL building
- Former UNOCAL building
- Soil Boring
- Soil Boring (2011)
- Hand Auger (2012)

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

ALL RESULTS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)

SHADED VALUES INDICATE AN EXCEEDANCE OF THE RESPECTIVE ADEC SOIL CLEANUP LEVEL

NA = NOT ANALYZED

ADEC = ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. UST (Underground Storage Tank)

0 80' 160'

GRAPHIC SCALE

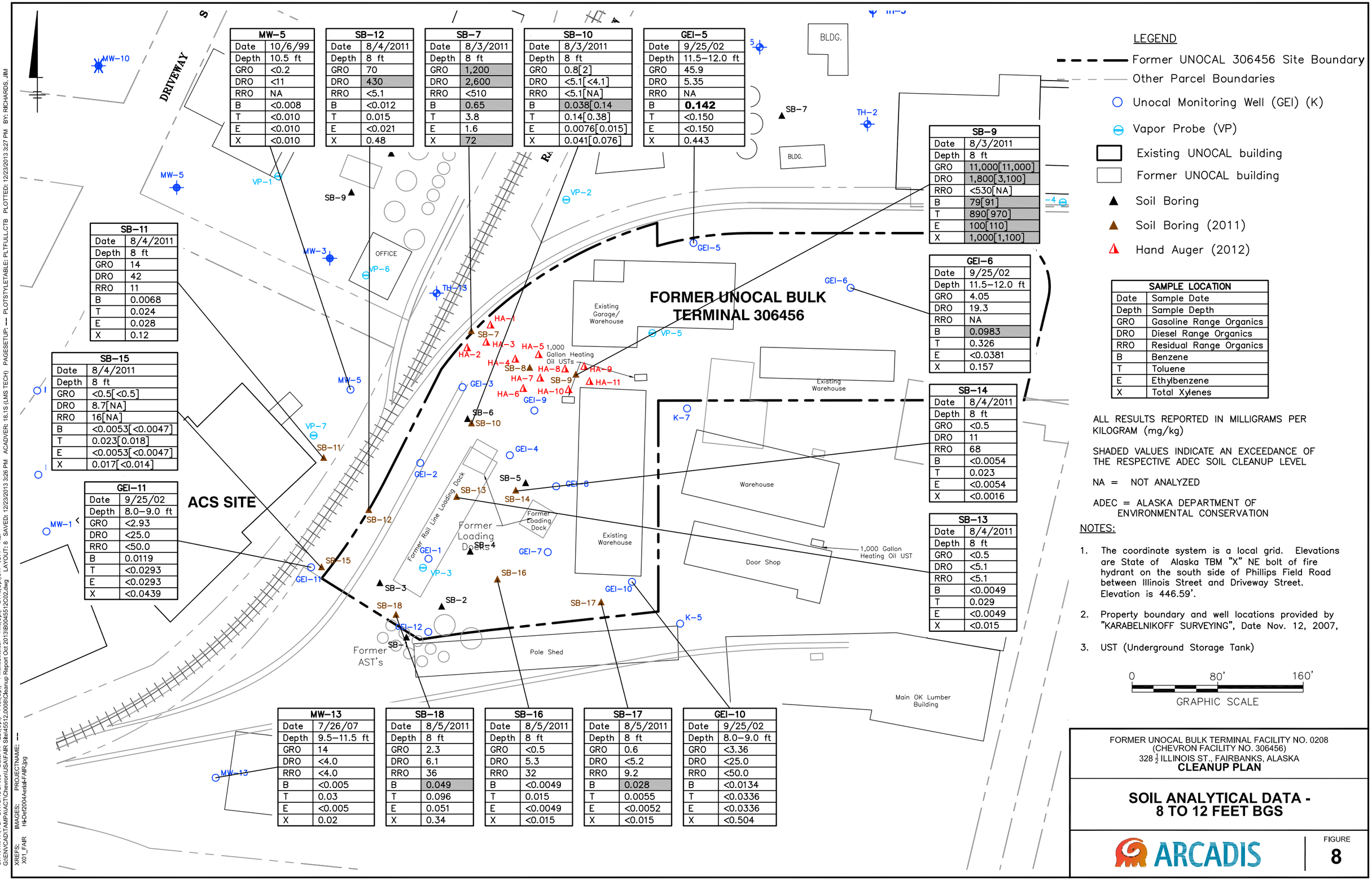
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA

CLEANUP PLAN

SOIL ANALYTICAL DATA - 0 TO 8 FEET BGS

ARCADIS

FIGURE 7



MW-5	
Date	10/6/99
Depth	10.5 ft
GRO	<0.2
DRO	<11
RRO	NA
B	<0.008
T	<0.010
E	<0.010
X	<0.010

SB-12	
Date	8/4/2011
Depth	8 ft
GRO	70
DRO	430
RRO	<5.1
B	<0.012
T	0.015
E	<0.021
X	0.48

SB-7	
Date	8/3/2011
Depth	8 ft
GRO	1,200
DRO	2,600
RRO	<510
B	0.65
T	3.8
E	1.6
X	72

SB-10	
Date	8/3/2011
Depth	8 ft
GRO	0.8[2]
DRO	<5.1[<4.1]
RRO	<5.1[NA]
B	0.038[0.14
T	0.14[0.38]
E	0.0076[0.015]
X	0.041[0.076]

GEI-5	
Date	9/25/02
Depth	11.5–12.0 ft
GRO	45.9
DRO	5.35
RRO	NA
B	**0.142**
T	<0.150
E	<0.150
X	0.443

SB-9	
Date	8/3/2011
Depth	8 ft
GRO	11,000[11,000]
DRO	1,800[3,100]
RRO	<530[NA]
B	79[91]
T	890[970]
E	100[110]
X	1,000[1,100]

GEI-6	
Date	9/25/02
Depth	11.5–12.0 ft
GRO	4.05
DRO	19.3
RRO	NA
B	0.0983
T	0.326
E	<0.0381
X	0.157

SB-14	
Date	8/4/2011
Depth	8 ft
GRO	<0.5
DRO	11
RRO	68
B	<0.0054
T	0.023
E	<0.0054
X	<0.0016

SB-13	
Date	8/4/2011
Depth	8 ft
GRO	<0.5
DRO	<5.1
RRO	<5.1
B	<0.0049
T	0.029
E	<0.0049
X	<0.015

SB-11	
Date	8/4/2011
Depth	8 ft
GRO	14
DRO	42
RRO	11
B	0.0068
T	0.024
E	0.028
X	0.12

SB-15	
Date	8/4/2011
Depth	8 ft
GRO	<0.5[<0.5]
DRO	8.7[NA]
RRO	16[NA]
B	<0.0053[<0.0047]
T	0.023[0.018]
E	<0.0053[<0.0047]
X	0.017[<0.014]

GEI-11	
Date	9/25/02
Depth	8.0–9.0 ft
GRO	<2.93
DRO	<25.0
RRO	<50.0
B	0.0119
T	<0.0293
E	<0.0293
X	<0.0439

MW-13	
Date	7/26/07
Depth	9.5–11.5 ft
GRO	14
DRO	<4.0
RRO	<4.0
B	<0.005
T	0.03
E	<0.005
X	0.02

SB-18	
Date	8/5/2011
Depth	8 ft
GRO	2.3
DRO	6.1
RRO	36
B	0.049
T	0.096
E	0.051
X	0.34

SB-16	
Date	8/5/2011
Depth	8 ft
GRO	<0.5
DRO	5.3
RRO	32
B	<0.0049
T	0.015
E	<0.0049
X	<0.015

SB-17	
Date	8/5/2011
Depth	8 ft
GRO	0.6
DRO	<5.2
RRO	9.2
B	0.028
T	0.0055
E	<0.0052
X	<0.015

GEI-10	
Date	9/25/02
Depth	8.0–9.0 ft
GRO	<3.36
DRO	<25.0
RRO	<50.0
B	<0.0134
T	<0.0336
E	<0.0336
X	<0.504

LEGEND

- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- Unocal Monitoring Well (GEI) (K)
- Vapor Probe (VP)
- Existing UNOCAL building
- Former UNOCAL building
- Soil Boring
- Soil Boring (2011)
- Hand Auger (2012)

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

ALL RESULTS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)

SHADED VALUES INDICATE AN EXCEEDANCE OF THE RESPECTIVE ADEC SOIL CLEANUP LEVEL

NA = NOT ANALYZED

ADEC = ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. UST (Underground Storage Tank)

0 80' 160'

GRAPHIC SCALE

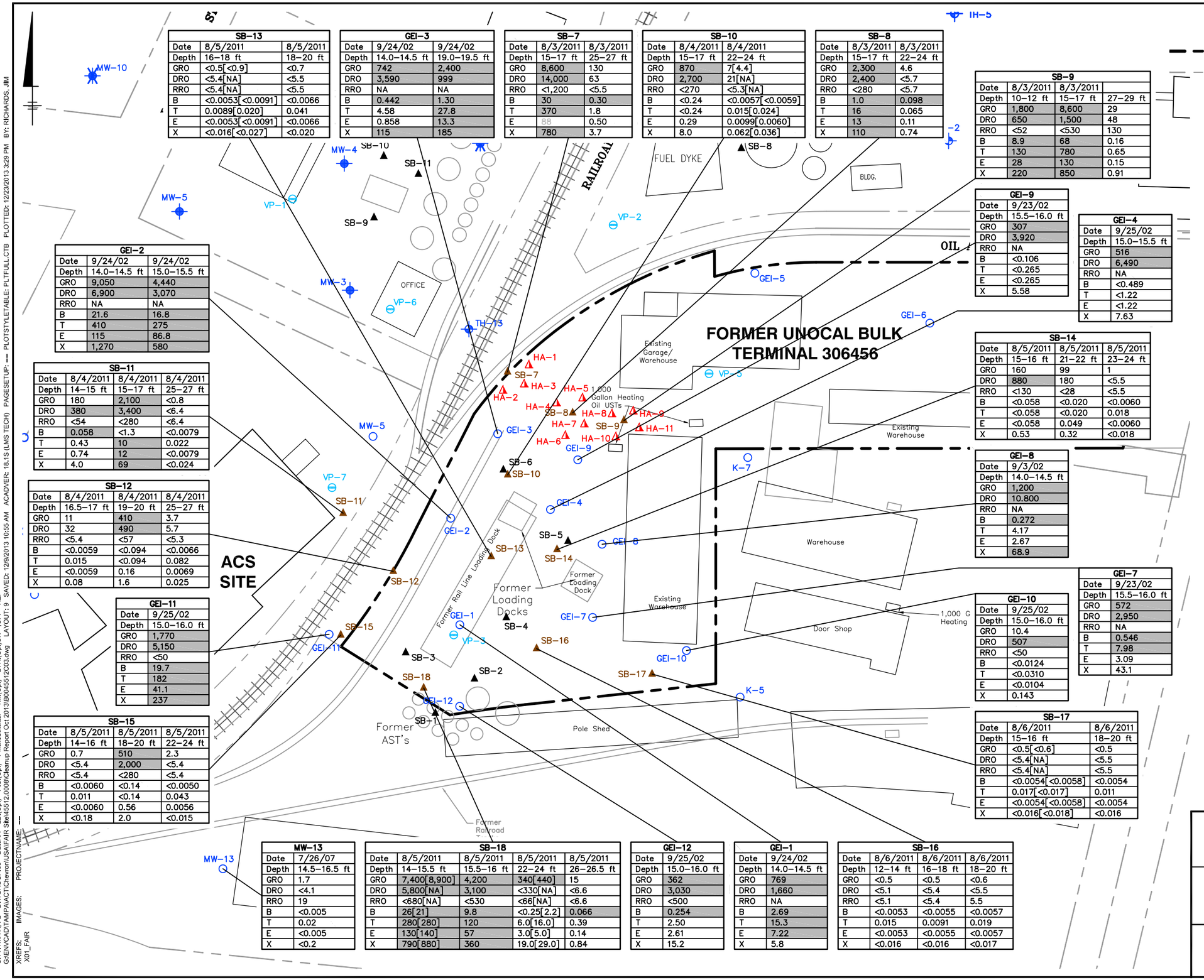
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA

CLEANUP PLAN

SOIL ANALYTICAL DATA - 8 TO 12 FEET BGS

ARCADIS

FIGURE 8



SB-13		
Date	8/5/2011	8/5/2011
Depth	16–18 ft	18–20 ft
GRO	<0.5[<0.9]	<0.7
DRO	<5.4[NA]	<5.5
RRO	<5.4[NA]	<5.5
B	<0.0053[<0.0091]	<0.0066
T	0.0089[0.020]	0.041
E	<0.0053[<0.0091]	<0.0066
X	<0.016[<0.027]	<0.020

GEI-3		
Date	9/24/02	9/24/02
Depth	14.0–14.5 ft	19.0–19.5 ft
GRO	742	2,400
DRO	3,590	999
RRO	NA	NA
B	0.442	1.30
T	4.58	27.8
E	0.858	13.3
X	115	185

SB-7		
Date	8/3/2011	8/3/2011
Depth	15–17 ft	25–27 ft
GRO	8,600	130
DRO	14,000	63
RRO	<1,200	<5.5
B	30	0.30
T	370	1.8
E	88	0.50
X	780	3.7

SB-10		
Date	8/4/2011	8/4/2011
Depth	15–17 ft	22–24 ft
GRO	870	7[4.4]
DRO	2,700	21[NA]
RRO	<270	<5.3[NA]
B	<0.24	<0.0057[<0.0059]
T	<0.24	0.015[0.024]
E	0.29	0.0099[0.0060]
X	8.0	0.062[0.036]

SB-8		
Date	8/3/2011	8/3/2011
Depth	15–17 ft	22–24 ft
GRO	2,300	4.6
DRO	2,400	<5.7
RRO	<280	<5.7
B	1.0	0.098
T	16	0.065
E	13	0.11
X	110	0.74

SB-9			
Date	8/3/2011	8/3/2011	
Depth	10–12 ft	15–17 ft	27–29 ft
GRO	1,800	8,600	29
DRO	650	1,500	48
RRO	<52	<530	130
B	8.9	68	0.16
T	130	780	0.65
E	28	130	0.15
X	220	850	0.91

GEI-9	
Date	9/23/02
Depth	15.5–16.0 ft
GRO	307
DRO	3,920
RRO	NA
B	<0.106
T	<0.265
E	<0.265
X	5.58

GEI-4	
Date	9/25/02
Depth	15.0–15.5 ft
GRO	516
DRO	6,490
RRO	NA
B	<0.489
T	<1.22
E	<1.22
X	7.63

GEI-2		
Date	9/24/02	9/24/02
Depth	14.0–14.5 ft	15.0–15.5 ft
GRO	9,050	4,440
DRO	6,900	3,070
RRO	NA	NA
B	21.6	16.8
T	410	275
E	115	86.8
X	1,270	580

SB-14			
Date	8/5/2011	8/5/2011	8/5/2011
Depth	15–16 ft	21–22 ft	23–24 ft
GRO	160	99	1
DRO	880	180	<5.5
RRO	<130	<28	<5.5
B	<0.058	<0.020	<0.0060
T	<0.058	<0.020	0.018
E	<0.058	0.049	<0.0060
X	0.53	0.32	<0.018

SB-11			
Date	8/4/2011	8/4/2011	8/4/2011
Depth	14–15 ft	15–17 ft	25–27 ft
GRO	180	2,100	<0.8
DRO	380	3,400	<6.4
RRO	<54	<280	<6.4
B	0.058	<1.3	<0.0079
T	0.43	10	0.022
E	0.74	12	<0.0079
X	4.0	69	<0.024

GEI-8	
Date	9/3/02
Depth	14.0–14.5 ft
GRO	1,200
DRO	10,800
RRO	NA
B	0.272
T	4.17
E	2.67
X	68.9

SB-12			
Date	8/4/2011	8/4/2011	8/4/2011
Depth	16.5–17 ft	19–20 ft	25–27 ft
GRO	11	410	3.7
DRO	32	490	5.7
RRO	<5.4	<57	<5.3
B	<0.0059	<0.094	<0.0066
T	0.015	<0.094	0.082
E	<0.0059	0.16	0.0069
X	0.08	1.6	0.025

GEI-10	
Date	9/25/02
Depth	15.0–16.0 ft
GRO	10.4
DRO	507
RRO	<50
B	<0.0124
T	<0.0310
E	<0.0104
X	0.143

GEI-7	
Date	9/23/02
Depth	15.5–16.0 ft
GRO	572
DRO	2,950
RRO	NA
B	0.546
T	7.98
E	3.09
X	43.1

GEI-11	
Date	9/25/02
Depth	15.0–16.0 ft
GRO	1,770
DRO	5,150
RRO	<50
B	19.7
T	182
E	41.1
X	237

SB-17		
Date	8/6/2011	8/6/2011
Depth	15–16 ft	18–20 ft
GRO	<0.5[<0.6]	<0.5
DRO	<5.4[NA]	<5.5
RRO	<5.4[NA]	<5.5
B	<0.0054[<0.0058]	<0.0054
T	0.017[<0.017]	0.011
E	<0.0054[<0.0058]	<0.0054
X	<0.016[<0.018]	<0.016

SB-15			
Date	8/5/2011	8/5/2011	8/5/2011
Depth	14–16 ft	18–20 ft	22–24 ft
GRO	0.7	510	2.3
DRO	<5.4	2,000	<5.4
RRO	<5.4	<280	<5.4
B	<0.0060	<0.14	<0.0050
T	0.011	<0.14	0.043
E	<0.0060	0.56	0.0056
X	<0.18	2.0	<0.015

MW-13	
Date	7/26/07
Depth	14.5–16.5 ft
GRO	1.7
DRO	<4.1
RRO	19
B	<0.005
T	0.02
E	<0.005
X	<0.2

SB-18				
Date	8/5/2011	8/5/2011	8/5/2011	8/5/2011
Depth	14–15.5 ft	15.5–16 ft	22–24 ft	26–26.5 ft
GRO	7,400[8,900]	4,200	340[440]	15
DRO	5,800[NA]	3,100	<330[NA]	<6.6
RRO	<680[NA]	<530	<66[NA]	<6.6
B	26[21]	9.8	<0.25[2.2]	0.066
T	280[280]	120	6.0[16.0]	0.39
E	130[140]	57	3.0[5.0]	0.14
X	790[880]	360	19.0[29.0]	0.84

GEI-12	
Date	9/25/02
Depth	15.0–16.0 ft
GRO	362
DRO	3,030
RRO	<500
B	0.254
T	2.50
E	2.61
X	15.2

GEI-1	
Date	9/24/02
Depth	14.0–14.5 ft
GRO	769
DRO	1,660
RRO	NA
B	2.69
T	15.3
E	7.22
X	5.8

SB-16			
Date	8/6/2011	8/6/2011	8/6/2011
Depth	12–14 ft	16–18 ft	18–20 ft
GRO	<0.5	<0.5	<0.6
DRO	<5.1	<5.4	<5.5
RRO	<5.1	<5.4	5.5
B	<0.0053	<0.0055	<0.0057
T	0.015	0.0091	0.019
E	<0.0053	<0.0055	<0.0057
X	<0.016	<0.016	<0.017

LEGEND

- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- Unocal Monitoring Well (GEI) (K)
- Vapor Probe (VP)
- Existing UNOCAL building
- Former UNOCAL building
- Soil Boring
- Soil Boring (2011)
- Hand Auger (2012)

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

ALL RESULTS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)

SHADED VALUES INDICATE AN EXCEEDANCE OF THE RESPECTIVE ADEC SOIL CLEANUP LEVEL

NA = NOT ANALYZED

ADEC = ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. UST (Underground Storage Tank)

0 80' 160'

GRAPHIC SCALE

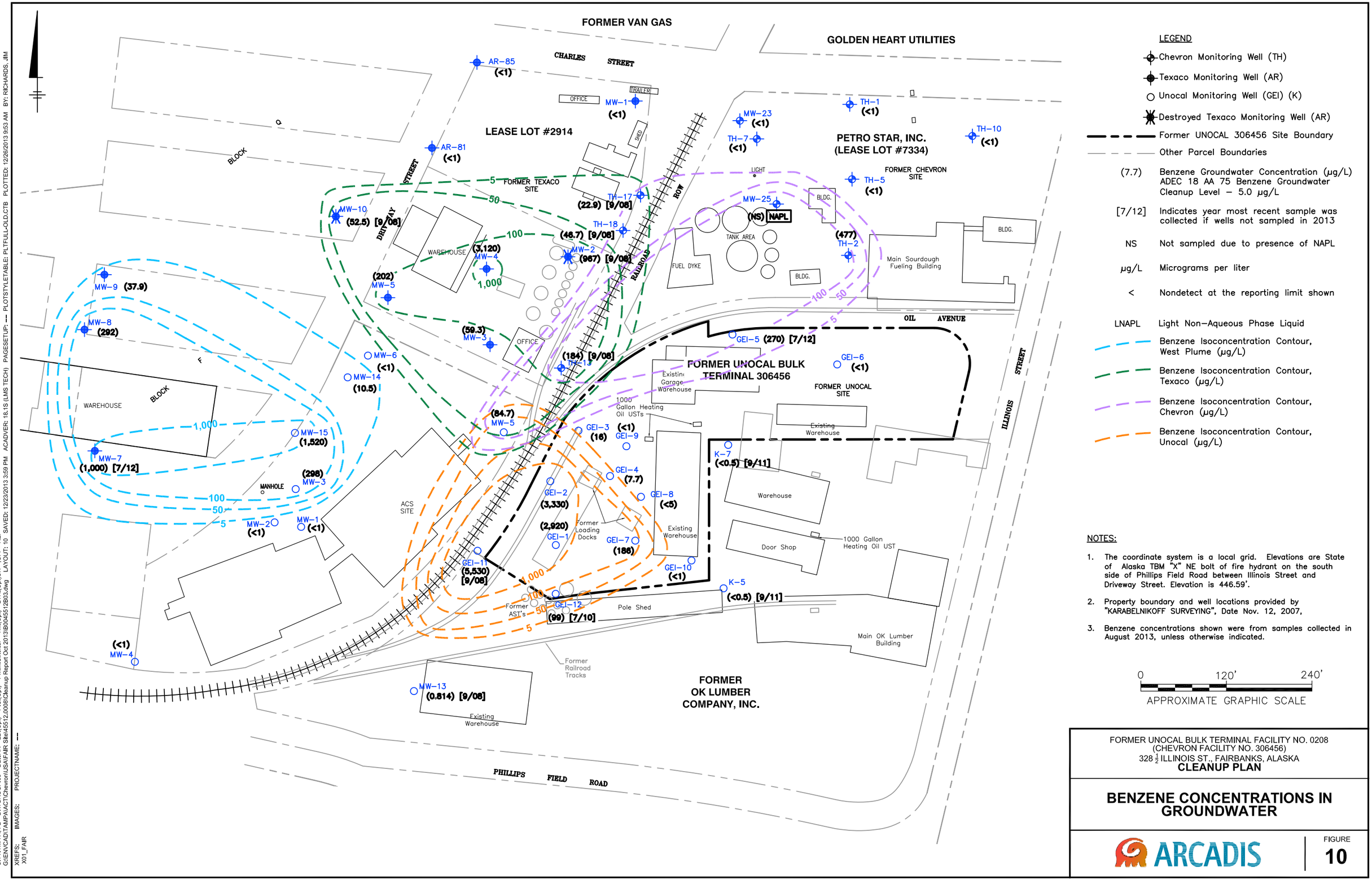
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA

CLEANUP PLAN

SOIL ANALYTICAL DATA - 12 TO 27 FEET BGS

ARCADIS

FIGURE 9



LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)
- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- (7.7) Benzene Groundwater Concentration (µg/L) ADEC 18 AA 75 Benzene Groundwater Cleanup Level – 5.0 µg/L
- [7/12] Indicates year most recent sample was collected if wells not sampled in 2013
- NS Not sampled due to presence of NAPL
- µg/L Micrograms per liter
- < Nondetect at the reporting limit shown
- LNAPL Light Non-Aqueous Phase Liquid
- Benzene Isoconcentration Contour, West Plume (µg/L)
- Benzene Isoconcentration Contour, Texaco (µg/L)
- Benzene Isoconcentration Contour, Chevron (µg/L)
- Benzene Isoconcentration Contour, Unocal (µg/L)

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. Benzene concentrations shown were from samples collected in August 2013, unless otherwise indicated.

0 120' 240'

APPROXIMATE GRAPHIC SCALE

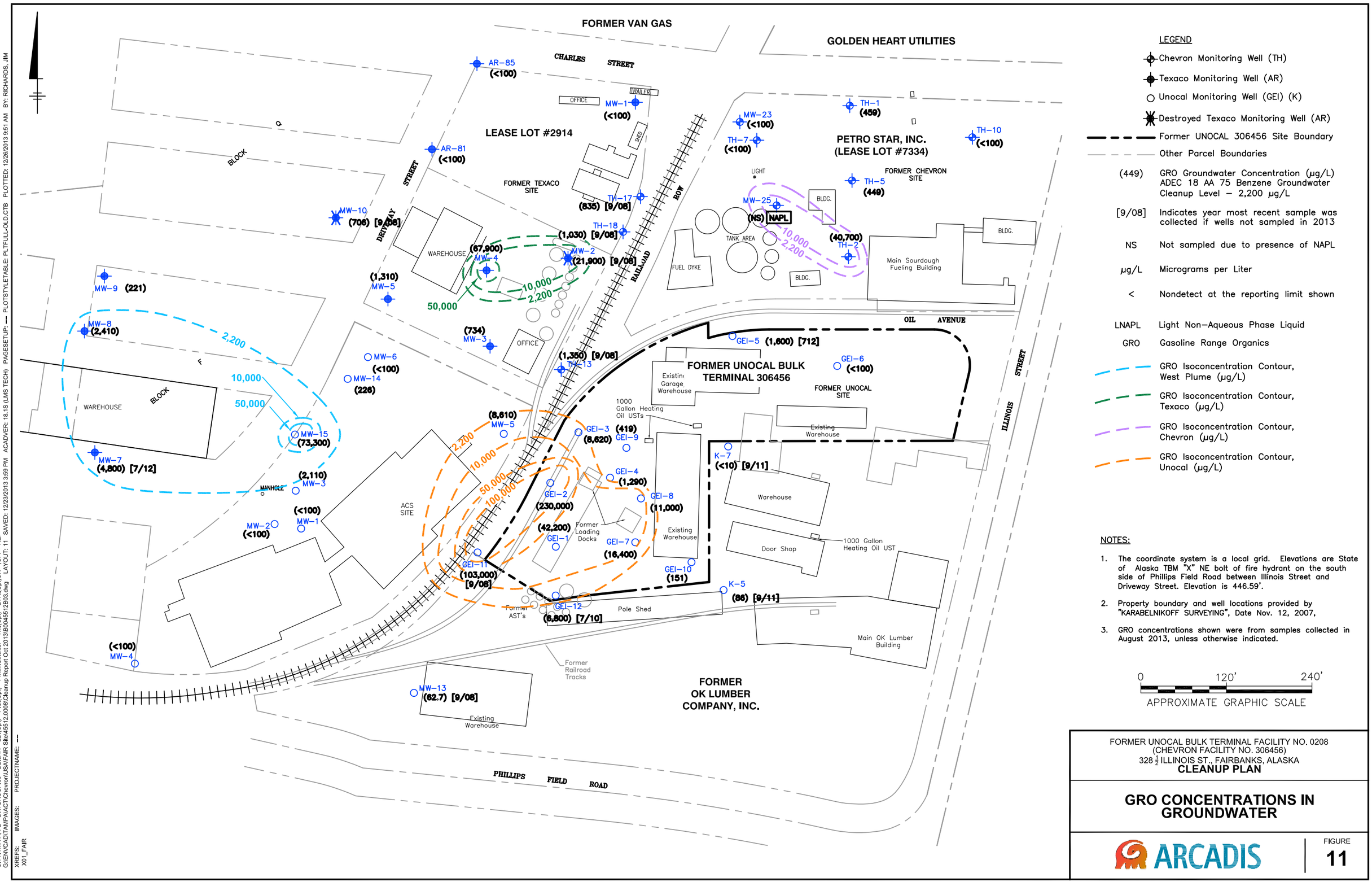
FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

BENZENE CONCENTRATIONS IN GROUNDWATER

ARCADIS

FIGURE 10

CITY:TMA-A, FL DIV/GROUP:85 DB:JAR LD:(Opt) PIC:(Opt) PM:M.Strickler TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\TAMPA\ACT\Chevron\USA\FAIR Site\45512.0008\Cleanup Report Oct 2013\B0045512B03.dwg LAYOUT: 10 SAVED: 12/23/2013 3:59 PM ACADVER: 18.1S (LMS TECH) PAGESETUP:---- PLOTSTYLETABLE: PLTFULL-OLD.CTB PLOTTED: 12/26/2013 9:53 AM BY: RICHARDS, JIM
XREFS:
X01_FAIR
IMAGES:
PROJECTNAME: ---



LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)
- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- (449) GRO Groundwater Concentration (µg/L) ADEC 18 AA 75 Benzene Groundwater Cleanup Level – 2,200 µg/L
- [9/08] Indicates year most recent sample was collected if wells not sampled in 2013
- NS Not sampled due to presence of NAPL
- µg/L Micrograms per Liter
- < Nondetect at the reporting limit shown
- LNAPL Light Non-Aqueous Phase Liquid
- GRO Gasoline Range Organics
- GRO Isoconcentration Contour, West Plume (µg/L)
- GRO Isoconcentration Contour, Texaco (µg/L)
- GRO Isoconcentration Contour, Chevron (µg/L)
- GRO Isoconcentration Contour, Unocal (µg/L)

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. GRO concentrations shown were from samples collected in August 2013, unless otherwise indicated.

0 120' 240'

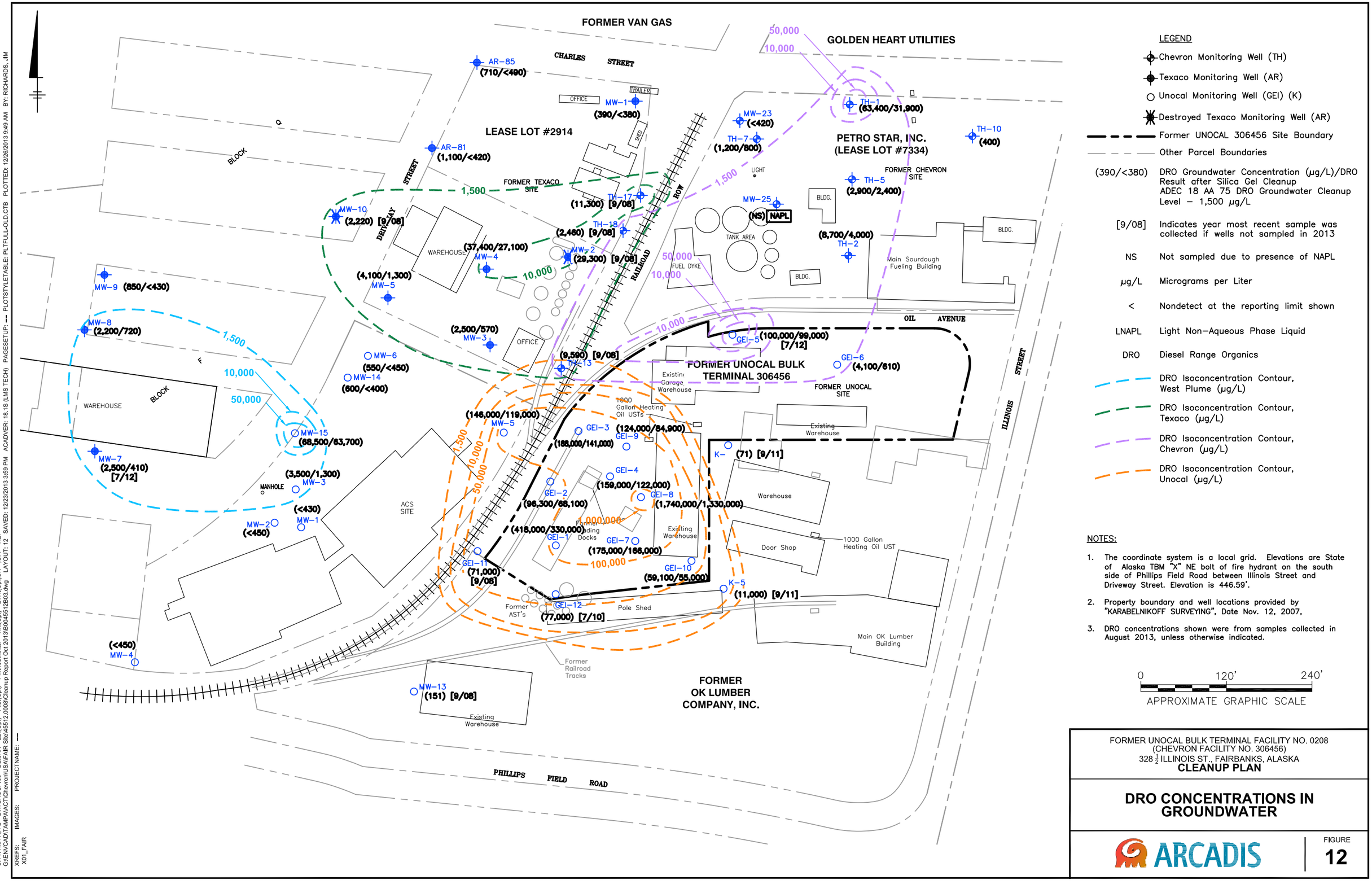
APPROXIMATE GRAPHIC SCALE

FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

GRO CONCENTRATIONS IN GROUNDWATER

ARCADIS

FIGURE 11



LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)
- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- (390/<380) DRO Groundwater Concentration (µg/L)/DRO Result after Silica Gel Cleanup ADEC 18 AA 75 DRO Groundwater Cleanup Level – 1,500 µg/L
- [9/08] Indicates year most recent sample was collected if wells not sampled in 2013
- NS Not sampled due to presence of NAPL
- µg/L Micrograms per Liter
- < Nondetect at the reporting limit shown
- LNAPL Light Non-Aqueous Phase Liquid
- DRO Diesel Range Organics
- DRO Isoconcentration Contour, West Plume (µg/L)
- DRO Isoconcentration Contour, Texaco (µg/L)
- DRO Isoconcentration Contour, Chevron (µg/L)
- DRO Isoconcentration Contour, Unocal (µg/L)

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,
3. DRO concentrations shown were from samples collected in August 2013, unless otherwise indicated.

0 120' 240'

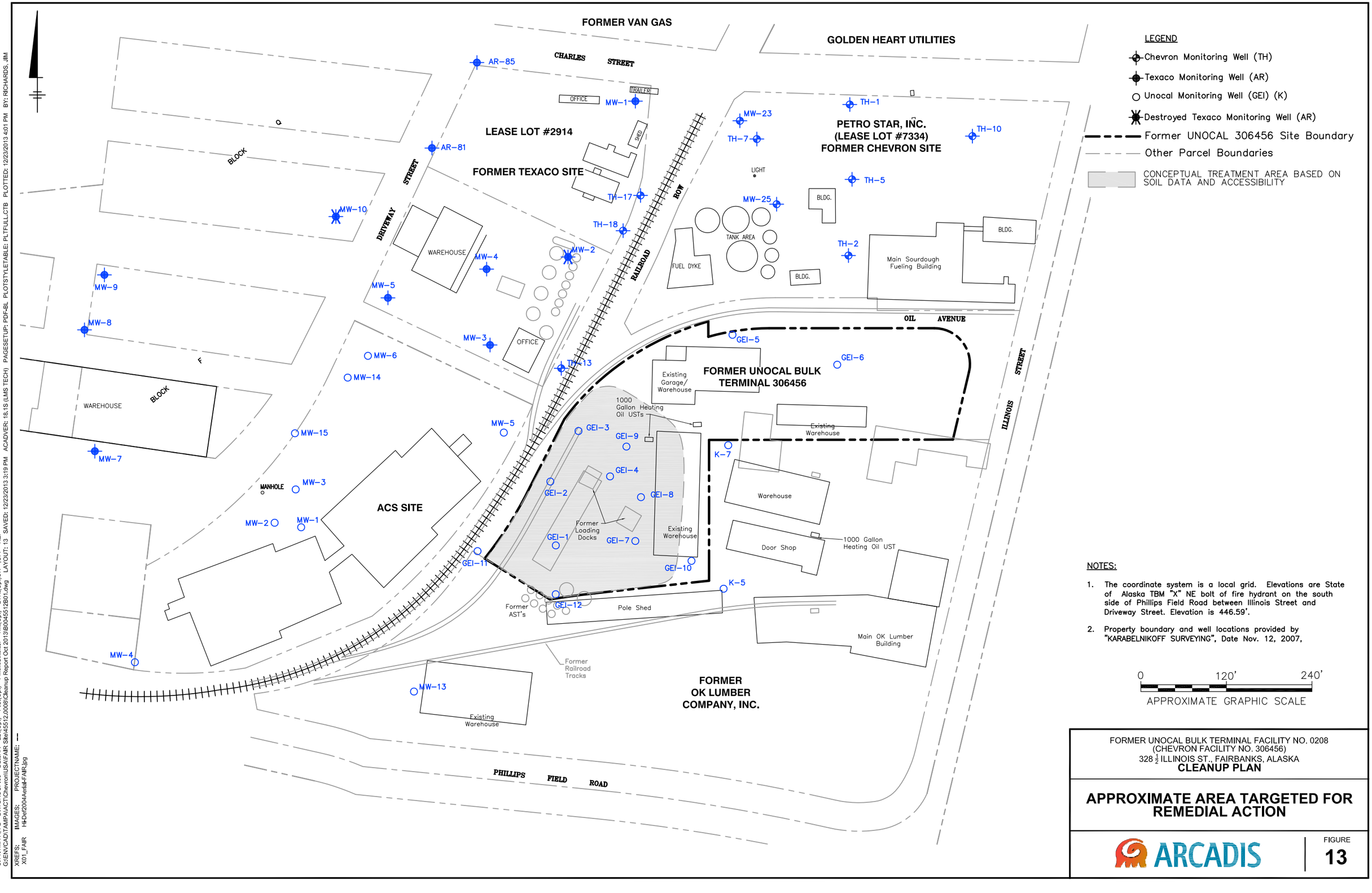
APPROXIMATE GRAPHIC SCALE

FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 ½ ILLINOIS ST., FAIRBANKS, ALASKA
CLEANUP PLAN

DRO CONCENTRATIONS IN GROUNDWATER

ARCADIS

FIGURE
12



LEGEND

- Chevron Monitoring Well (TH)
- Texaco Monitoring Well (AR)
- Unocal Monitoring Well (GEI) (K)
- Destroyed Texaco Monitoring Well (AR)
- Former UNOCAL 306456 Site Boundary
- Other Parcel Boundaries
- CONCEPTUAL TREATMENT AREA BASED ON SOIL DATA AND ACCESSIBILITY

NOTES:

1. The coordinate system is a local grid. Elevations are State of Alaska TBM "X" NE bolt of fire hydrant on the south side of Phillips Field Road between Illinois Street and Driveway Street. Elevation is 446.59'.
2. Property boundary and well locations provided by "KARABELNIKOFF SURVEYING", Date Nov. 12, 2007,

0 120' 240'

APPROXIMATE GRAPHIC SCALE

FORMER UNOCAL BULK TERMINAL FACILITY NO. 0208
(CHEVRON FACILITY NO. 306456)
328 1/2 ILLINOIS ST., FAIRBANKS, ALASKA

CLEANUP PLAN

APPROXIMATE AREA TARGETED FOR REMEDIAL ACTION

ARCADIS

FIGURE
13

ARCADIS

Appendix A

LNAPL Fingerprinting Summary

April 6, 2010

Greg Montgomery
ARCADIS
2300 Eastlake Avenue E., Suite 200
Seattle, WA 98102

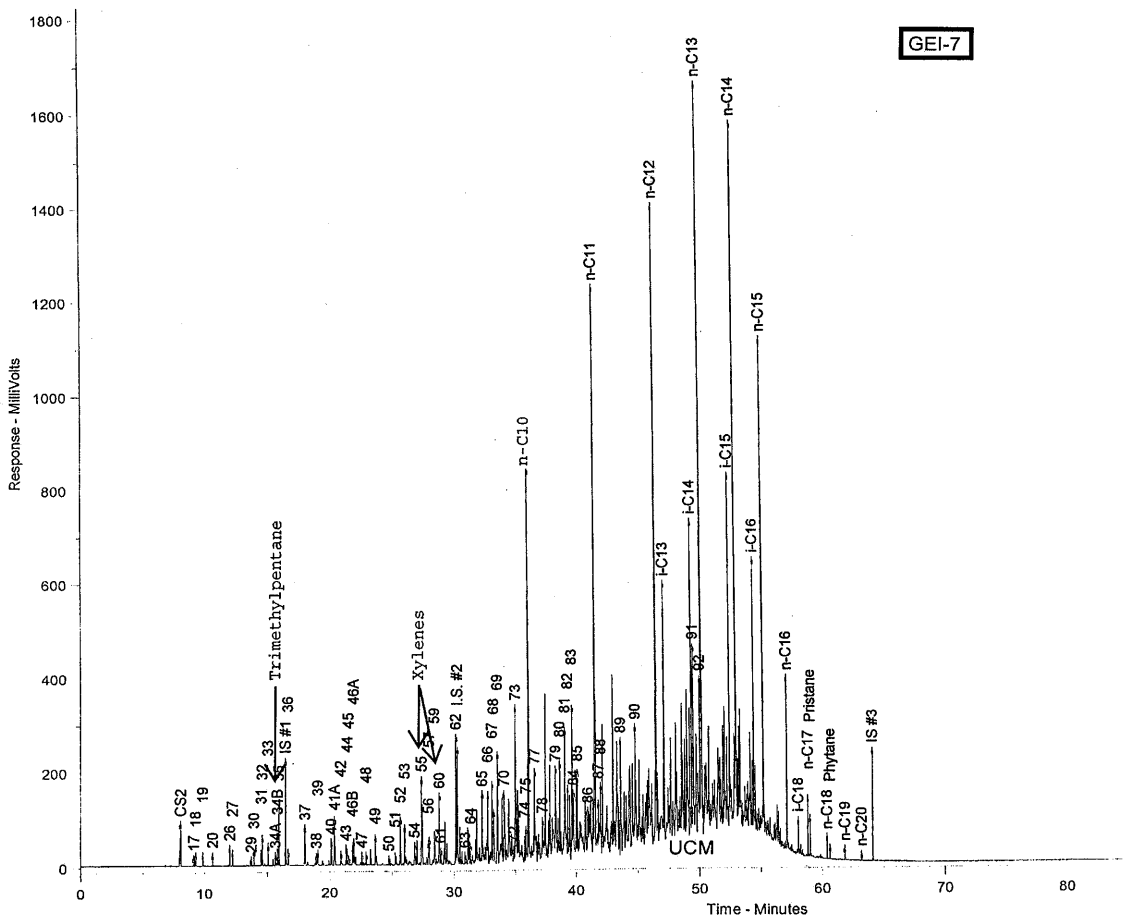
RE: FAIR-Unocal

Dear Mr Montgomery,

Attached are analytical data for three product samples, labeled GEI-1-PROD-100318, GEI-3-PROD-100318, and GEI-7-PROD-100318, which were received at ZymaX on March 22, 2010. The following analyses were performed.

1. C_3-C_{44} hydrocarbon fingerprint analysis by GC/FID
2. EDB, MMT, and Alkyl lead speciation by GC/ECD
3. Fuel oxygenates by EPA 1624 modified

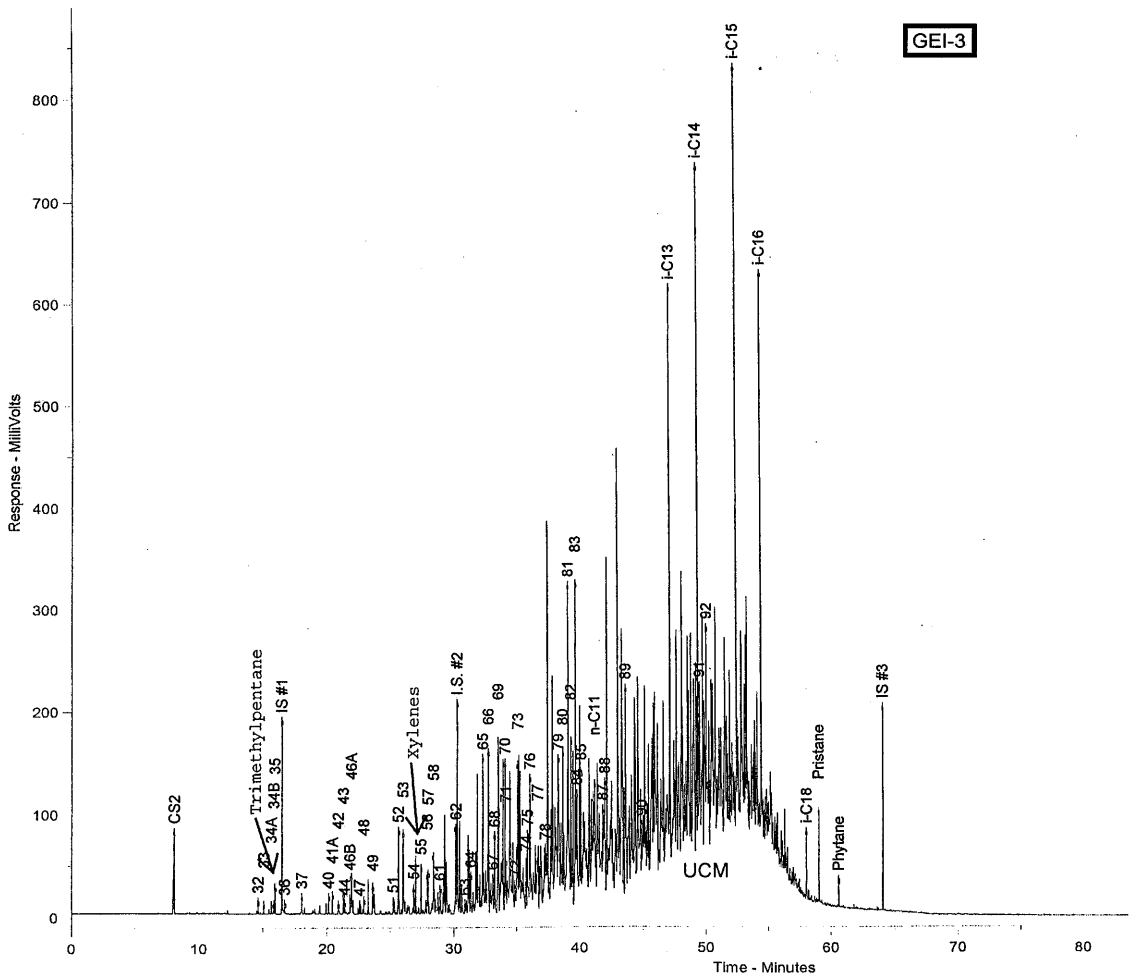
The C_3-C_{44} GC/FID gas chromatogram of GEI-7, shown below contains a small group of peaks from 9 min to about 35 min retention time that is indicative of a volatile distillate, and a larger group of peaks from about 35 min to 65 min retention time is characteristic of a middle distillate. Complete peak identifications are given in the data package



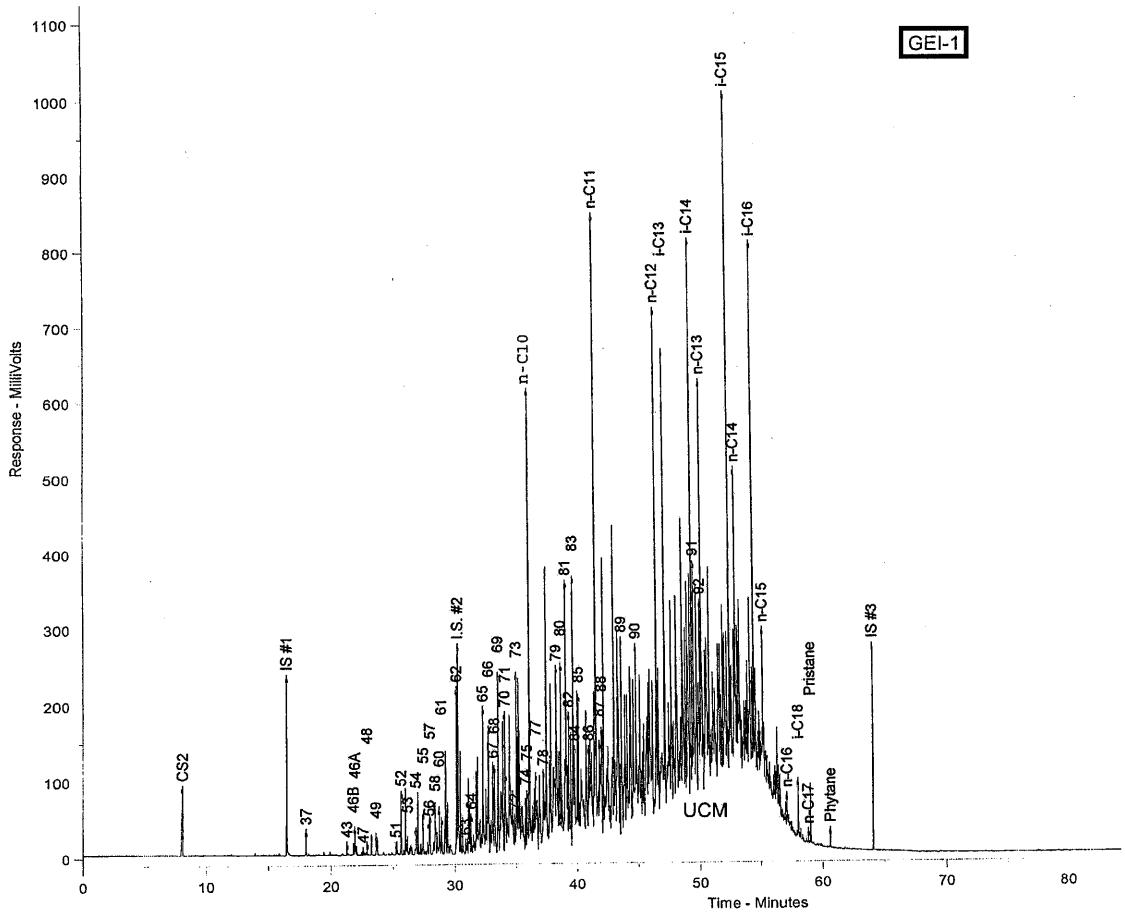
The volatile component contains BTEX compounds and trimethylpentanes, which are characteristic of gasoline. Gasoline oxygenate additives were not detected. However, a small amount of tetraethyl lead, which is a leaded gas additive that was introduced in the US market in 1922 and banned in 1996, was identified. The small gasoline component is weathered.

The middle distillate component has a hydrocarbon distribution starting at C10 and dropping off sharply above C16. This is characteristic of kerosene and several jet fuels, including the commercial fuel, Jet A. N-alkanes are very abundant, indicating that any biodegradation of the fuel has been relatively mild.

The gas chromatogram of GEI-3, below, has a distribution that shows some similarities to GEI-7. The small gasoline component is even more weathered than in GEI-7, but shows a similar distribution, indicating that it is probably the same gasoline. The middle distillate component has a hydrocarbon distribution that drops off sharply above C16, indicating kerosene or jet fuel. However, the fuel contains no n-alkanes, which is a characteristic of severe biodegradation, caused by degradation of the more readily assimilable n-alkanes by microbes in the environment. The distribution of the isoalkanes – iC13, iC14, iC15, iC16, iC18, Pristane, and Phytane – which are more resistant to biodegradation, is similar in GEI-3 and GEI-7. This suggests that GEI-3 contains the same products as GEI-7, but considerably more weathered.



The gas chromatogram of GEI-1, below, also shows similarities to GEI-7 and GEI-3. However, there is no evidence of gasoline in GEI-1. The middle distillate again shows a distribution characteristic of kerosene or jet fuel. The distribution of the isoalkanes is similar to that in GEI-7 and GEI-3. However, GEI-1 also contains a suite of n-alkanes from C10 to C17. This n-alkane suite, which peaks at nC11, is different from that in GEI-7, which peaks at nC13. So GEI-1 is not simply a mixture of degraded kerosene/jet fuel, like that in GEI-3, and undegraded kerosene/jet fuel, like that in GEI-7. The n-alkane suite in GEI-1 represents either a lighter product than kerosene/jet fuel, or the remains of partial biodegradation of the kerosene/jet fuel in GEI-7 and GEI-3.



A partially biodegraded kerosene/jet fuel appears to be more likely. The n-alkane distribution in GEI-1 does not represent any common petroleum products; light distillates such as mineral spirits and Stoddard Solvent do not typically contain hydrocarbons above C13. Also, there is no evidence of an additional Unresolved Complex Mixture (UCM) or hump, which underlies the kerosene/jet fuel in all three samples, beneath the n-alkane distribution in GEI-1. However, if there is documentation of the use of distillates lighter than kerosene on the site, this product could be analyzed to determine if it matches the n-alkane distribution in GEI-1.

In summary, the GEI-7 and GEI-3 product samples contain kerosene or jet fuel mixed with traces of leaded gasoline released before 1996. GEI-3 is considerably more weathered. GEI-1 probably contains the same kerosene/jet fuel, but showing a degree of weathering intermediate between the other two samples, and no gasoline.

Sincerely,

Alan Jeffrey, Ph.D.
Senior Geochemist

CHAIN of CUSTODY

Zymax
600 S Andreasen Dr. Ste. B
Escondido, California 92029
tel 760.781.3338
fax 760.781.3339

CLIENT EDD ☐ LUFT EDF ☐ DW EDT ☐

11782

report to Greg Montgomery
company ARCADIS
address 2300 Eastlake Ave E. Ste 700
Seattle, WA 98102

tel (206) 726-4742 fax
proj FIA - Unocal
proj # B0045507.0003.00001
sampler AO/OB

ANALYSIS REQUESTED

Turnaround Time: ASAP ☐ 48hr ☐ 12hr ☐ 72hr ☐ 24hr ☐ std ☐

ZymaX use only	SAMPLE DESCRIPTION	Date Sampled	Time	Matrix	Preserve	Fuel ID		C3-C44 GC/FID	EPA 1625m GC/MS	EDB, mnT, prg, 1 only								# of containers	Remarks
2	GEI-1-PROD-100318	3/18/10	16:45	Product	None	X		X	X	X								3	
3	GEI-3-PROD-100318	3/18/10	1630	Product	None	X		X	X	X								3	

Bill To: Same as Above ☒ OR
Company: E-mail results to: Gregory.Montgomery@arcadis-us.com
Address:

Relinquished by:
Signature
Print Andrew Ortt
Company ARCADIS
Date 3/19/10 Time 1000

Received by:
Signature
Print Tanya Pippen-Jones
Company Zymax
Date 3/22/10 Time 1000

Relinquished by:
Signature
Print
Company
Date Time

Received by ZymaX:
Signature
Print
Company
Date Time

Sample integrity upon receipt:
Samples received intact ☐
Samples received cold ☐
Custody seals ☐
Correct container types ☐

PO#:
Quote yes ☐ no ☐

ZymaX

600 S Andreasen Dr. Ste. B
Escondido, California 92029

tel 760.781.3338
fax 760.781.3339

CLIENT EDD ☐ LUFT EDF ☐ DW EDT ☐

CHAIN of CUSTODY

report to	Greg Montgomery	tel (206) 726-4742	fax
company	ARCADIS	proj	FAIR - Unocal
address	2300 Eastlake Ave E Ste 200 Seattle, WA 98102	proj #	B0045506.0004.00001
		sampler	AO/DB

ANALYSIS REQUESTED

Turnaround Time: ASAP ☐ 48 hr ☐ 12 hr ☐ 72 hr ☐ 24 hr ☐ std ☐

ZymaX use only	SAMPLE DESCRIPTION	Date Sampled	Time	Matrix	Preserve	Fuel ID	Cx-Cyy GC/FID	EPA 1625m GC/MS	# of containers	Remarks
41782-1	GEI-7-PROD-100318	3/18/10	12:00	Product	None	X	X	X	3	

Bill To: Same as Above ☒ OR

Company: E-mail Results to:

Address: Gregory.Montgomery@Arcadis-us.com

Sample integrity upon receipt:
- Samples received intact ☐
- Samples received cold ☐
- Custody seals ☐
- Correct container types ☐

PO#: _____
Quote yes ☐ no ☐

Relinquished by:
Signature: Andrew Out
Print: Andrew Out
Company: ARCADIS
Date: 3/19/10 Time: 1000

Received by:
Signature: Tanya Pippen Jones
Print: Tanya Pippen Jones
Company: Zymax
Date: 3/22/10 Time: 1000

Relinquished by:
Signature: _____
Print: _____
Company: _____
Date: _____ Time: _____

Received by ZymaX:
Signature: _____
Print: _____
Company: _____
Date: _____ Time: _____

Page ____ of ____

REPORT OF ANALYTICAL RESULTS

Client:	**Greg Montgomery** **ARCADIS** **2300 Eastlake Ave. E., Suite 200** **Seattle, WA. 98102**
Project:	**FIA- Unocal**
Project Number:	**B0045507.0003.00001**
Collected by:	**AO/DB**

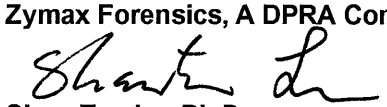
Lab Number:	**41782**
Collected:	**3/18/2010**
Received:	**3/22/2010**
Matrix:	**Product**
Sample Description:	**See Below**
Analyzed:	**3/29/2010**
Method:	**GC/ECD**

EDB and ORGANIC LEAD SPECIATION

LAB NUMBER	SAMPLE DESCRIPTION	EDB mg/L	TML mg/L	TMEL mg/L	DMDEL mg/L	MTEL mg/L	TEL mg/L	MMT mg/L
41782-1	GEI-7-PROD-100318	<5	<5	<5	<5	<5	7.7	<5
41782-2	GEI-1-PROD-100318	<5	<5	<5	<5	<5	<5	<5
41782-3	GEI-3-PROD-100318	<5	<5	<5	<5	<5	5.2	<5
Detection Limit:		0.5	5.0	5.0	5.0	5.0	5.0	5.0
Method Blank:		<0.5	<5	<5	<5	<5	<5	<5

EDB: Ethylene Dibromide
TML: Tetramethyl Lead
TMEL: Trimethylethyl Lead
DMDEL: Dimethyldiethyl Lead
MTEL: Methyltriethyl Lead
TEL: Tetraethyl Lead
MMT: Methylcyclopentadienyl Manganese Tricarbonyl

Submitted by,
Zymax Forensics, A DPRA Company



Shan-Tan Lu, Ph.D.
Director of Forensic Geochemistry

41782e.xls
STL

QUALITY ASSURANCE REPORT

Client:	
	ARCADIS
	2300 Eastlake Ave. E., Suite 200
	Seattle, WA. 98102

Lab Number:	41782
Analyzed:	3/29/2010
Method:	GC/ECD

QA DATA FOR EDB and TEL

ANALYTES	RF	RF_D	%D	ACCEPTANCE LIMIT %
EDB	0.684	0.68	0.50	± 15
TEL	0.038	0.033	13.50	± 15

EDB: Ethylene Dibromide
TEL: Tetraethyl Lead
RF = Mean response factor from 3 point calibration
RF_D= Daily calibration standard response factor
% D = % Difference
Calibration file: ORG07168.M / MMT07168.M

Submitted by,
Zymax Forensics, a DPRA Company

Shan-Tan Lu, Ph.D.
Director of Forensic Geochemistry

41782e.xls
STL

REPORT OF ANALYTICAL RESULTS

Client:	**Greg Montgomery**
	ARCADIS
	2300 Eastlake Ave. E., Suite 200
	Seattle, WA. 98102

Lab Number:	**41782-1**
Collected:	**3/18/2010**
Received:	**3/22/2010**
Matrix:	**Product**

Project:	**FIA- Unocal**
Project Number:	**B0045507.0003.00001**
Collected by:	**AO/DB**

Sample Description:	**GEI-7-PROD-100318**
Analyzed:	**3/23/2010**
Method:	**EPA 1624 GC/MS SIM**

CONSTITUENT	PQL* mg/Kg	RESULT** mg/Kg
t-Amyl Methyl Ether (TAME)	100	ND
t-Butyl Alcohol (TBA)	10	ND
Diisopropyl Ether (DIPE)	100	ND
Ethanol	10	ND
Ethyl-t-Butyl Ether (ETBE)	50	ND
Methyl-t-Butyl Ether (MTBE)	50	ND
Percent Surrogate Recovery (MTBE-d3)		118

***PQL - Practical Quantitation Limit**

****Results listed as ND would have been reported if present at or above the listed PQL.**

Submitted by,
Zymax Forensics, a DPRA Company

Shan-Tan Lu, Ph.D.
Director, Forensic Geochemistry

MSD #9
41782-1.OXY.xls
STL

REPORT OF ANALYTICAL RESULTS

Client:	**Greg Montgomery**
	ARCADIS
	2300 Eastlake Ave. E., Suite 200
	Seattle, WA. 98102

Lab Number:	**41782-2**
Collected:	**3/18/2010**
Received:	**3/22/2010**
Matrix:	**Product**

Project:	**FIA- Unocal**
Project Number:	**B0045507.0003.00001**
Collected by:	**AO/DB**

Sample Description:	**GEI-1-PROD-100318**
Analyzed:	**3/23/2010**
Method:	**EPA 1624 GC/MS SIM**

CONSTITUENT	PQL* mg/Kg	RESULT** mg/Kg
t-Amyl Methyl Ether (TAME)	100	ND
t-Butyl Alcohol (TBA)	10	ND
Diisopropyl Ether (DIPE)	100	ND
Ethanol	10	ND
Ethyl-t-Butyl Ether (ETBE)	50	ND
Methyl-t-Butyl Ether (MTBE)	50	ND
Percent Surrogate Recovery (MTBE-d3)		119

***PQL - Practical Quantitation Limit**

****Results listed as ND would have been reported if present at or above the listed PQL.**

Submitted by,
Zymax Forensics, a DPRA Company

Shan-Tan Lu, Ph.D.
Director, Forensic Geochemistry

MSD #9
41782-2.OXY.xls
STL

REPORT OF ANALYTICAL RESULTS

Client:	**Greg Montgomery**
	ARCADIS
	2300 Eastlake Ave. E., Suite 200
	Seattle, WA. 98102

Lab Number:	**41782-3**
Collected:	**3/18/2010**
Received:	**3/22/2010**
Matrix:	**Product**

Project:	**FIA- Unocal**
Project Number:	**B0045507.0003.00001**
Collected by:	**AO/DB**

Sample Description:	**GEI-3-PROD-100318**
Analyzed:	**3/23/2010**
Method:	**EPA 1624 GC/MS SIM**

CONSTITUENT	PQL* mg/Kg	RESULT** mg/Kg
t-Amyl Methyl Ether (TAME)	100	ND
t-Butyl Alcohol (TBA)	10	ND
Diisopropyl Ether (DIPE)	100	ND
Ethanol	10	ND
Ethyl-t-Butyl Ether (ETBE)	50	ND
Methyl-t-Butyl Ether (MTBE)	50	ND
Percent Surrogate Recovery (MTBE-d3)		116

***PQL - Practical Quantitation Limit**

****Results listed as ND would have been reported if present at or above the listed PQL.**

Submitted by,
Zymax Forensics, a DPRA Company

Shan-Tan Lu, Ph.D.
Director, Forensic Geochemistry

MSD #9
41782-3.OXY.xls
STL

ZymaX FORENSICS

3/30/2010

ZymaX ID	41782-1
Sample ID	GEI-7-PROD-100318

Evaporation

n-Pentane / n-Heptane	0.00
2-Methylpentane / 2-Methylheptane	0.34

Waterwashing

Benzene / Cyclohexane	0.00
Toluene / Methylcyclohexane	1.83
Aromatics / Total Paraffins (n+iso+cyc)	2.25
Aromatics / Naphthenes	22.84

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	414.96
3-Methylhexane / n-Heptane	1.63
Methylcyclohexane / n-Heptane	4.03
Isoparaffins + Naphthenes / Paraffins	1.07

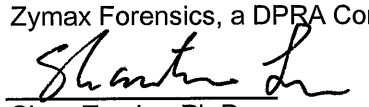
Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	1.57

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	14.60
% Isoparaffinic	12.59
% Aromatic	67.71
% Naphthenic	2.96
% Olefinic	2.14

Submitted by,
Zymax Forensics, a DPRA Company



Shan-Tan Lu, Ph.D.
Director of Forensic Geochemistry

ZymaX FORENSICS

3/30/2010

ZymaX ID	41782-1
Sample ID	GEI-7-PROD-100318

1	Propane	0.00
2	Isobutane	0.00
3	Isobutene	0.00
4	Butane/Methanol	0.00
5	trans-2-Butene	0.00
6	cis-2-Butene	0.00
7	3-Methyl-1-butene	0.00
8	Isopentane	0.00
9	1-Pentene	0.00
10	2-Methyl-1-butene	0.00
11	Pentane	0.00
12	trans-2-Pentene	0.00
13	cis-2-Pentene/t-Butanol	0.00
14	2-Methyl-2-butene	0.00
15	2,2-Dimethylbutane	0.00
16	Cyclopentane	0.00
17	2,3-Dimethylbutane/MTBE	0.05
18	2-Methylpentane	0.10
19	3-Methylpentane	0.11
20	Hexane	0.13
21	trans-2-Hexene	0.00
22	3-Methylcyclopentene	0.00
23	3-Methyl-2-pentene	0.00
24	cis-2-Hexene	0.00
25	3-Methyl-trans-2-pentene	0.00
26	Methylcyclopentane	0.26
27	2,4-Dimethylpentane	0.19
28	Benzene	0.00
29	5-Methyl-1-hexene	0.03
30	Cyclohexane	0.21
31	2-Methylhexane/TAME	0.18
32	2,3-Dimethylpentane	0.50
33	3-Methylhexane	0.32
34A	1-trans-3-Dimethylcyclopentane	0.12
34B	1-cis-3-Dimethylcyclopentane	0.20
35	2,2,4-Trimethylpentane	1.25
I.S. #1	à,à,à-Trifluorotoluene	0.00

ZymaX FORENSICS

3/30/2010

ZymaX ID 41782-1
Sample ID GEI-7-PROD-100318

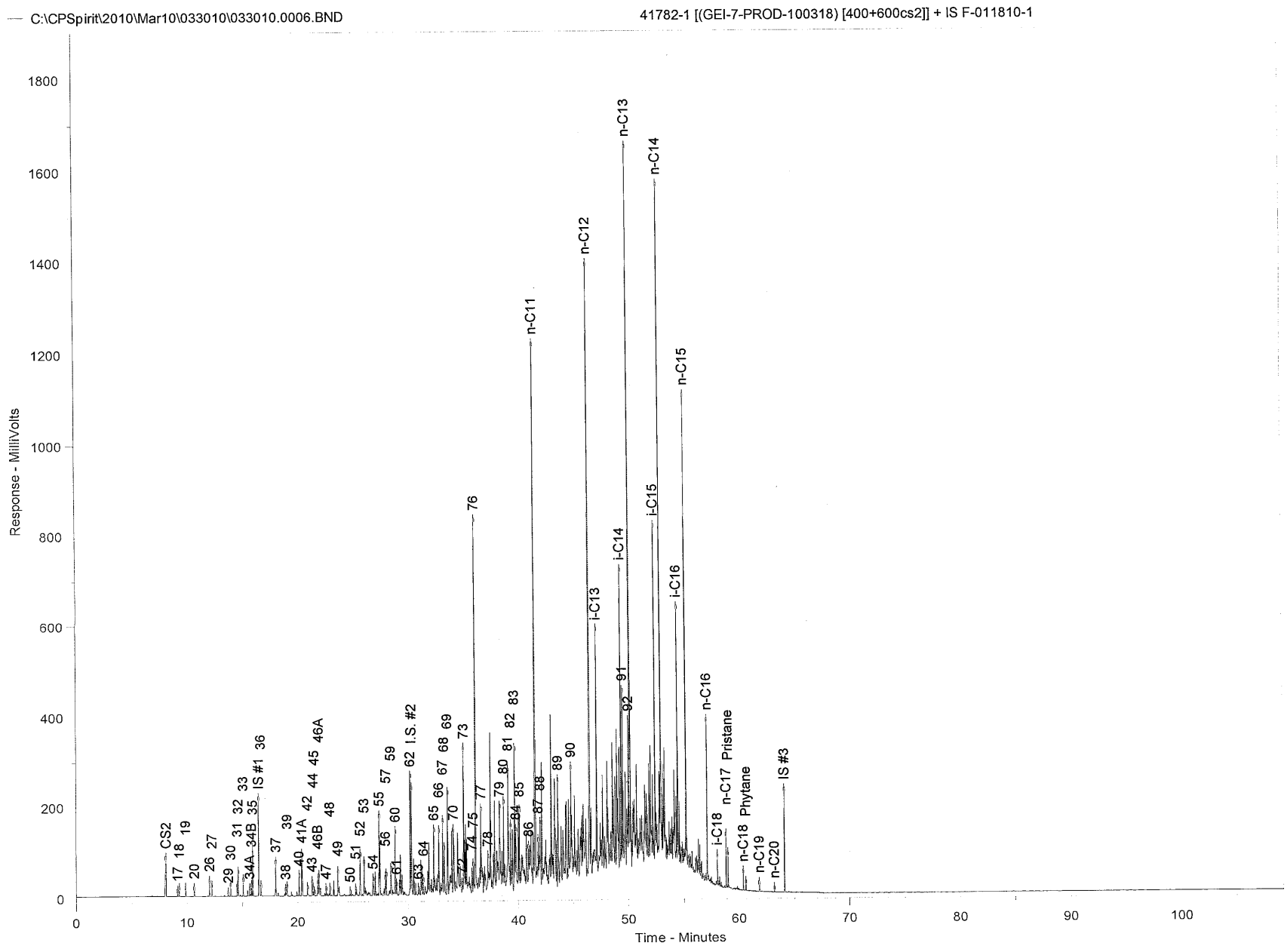
36	n-Heptane	0.20
37	Methylcyclohexane	0.80
38	2,5-Dimethylhexane	0.11
39	2,4-Dimethylhexane	0.18
40	2,3,4-Trimethylpentane	0.44
41	Toluene/2,3,3-Trimethylpentane	1.46
42	2,3-Dimethylhexane	0.23
43	2-Methylheptane	0.29
44	4-Methylheptane	0.13
45	3,4-Dimethylhexane	0.08
46A	3-Ethyl-3-methylpentane	0.59
46B	1,4-Dimethylcyclohexane	0.28
47	3-Methylheptane	0.12
48	2,2,5-Trimethylhexane	0.12
49	n-Octane	0.60
50	2,2-Dimethylheptane	0.04
51	2,4-Dimethylheptane	0.11
52	Ethylcyclohexane	1.10
53	2,6-Dimethylheptane	0.77
54	Ethylbenzene	0.64
55	m+p Xylenes	3.18
56	4-Methyloctane	0.41
57	2-Methyloctane	0.44
58	3-Ethylheptane	0.00
59	3-Methyloctane	0.85
60	o-Xylene	1.70
61	1-Nonene	0.36
62	n-Nonane	3.00
I.S.#2	p-Bromofluorobenzene	0.00
63	Isopropylbenzene	0.16
64	3,3,5-Trimethylheptane	0.44
65	2,4,5-Trimethylheptane	1.58
66	n-Propylbenzene	1.84
67	1-Methyl-3-ethylbenzene	1.85
68	1-Methyl-4-ethylbenzene	1.76
69	1,3,5-Trimethylbenzene	3.50
70	3,3,4-Trimethylheptane	2.70

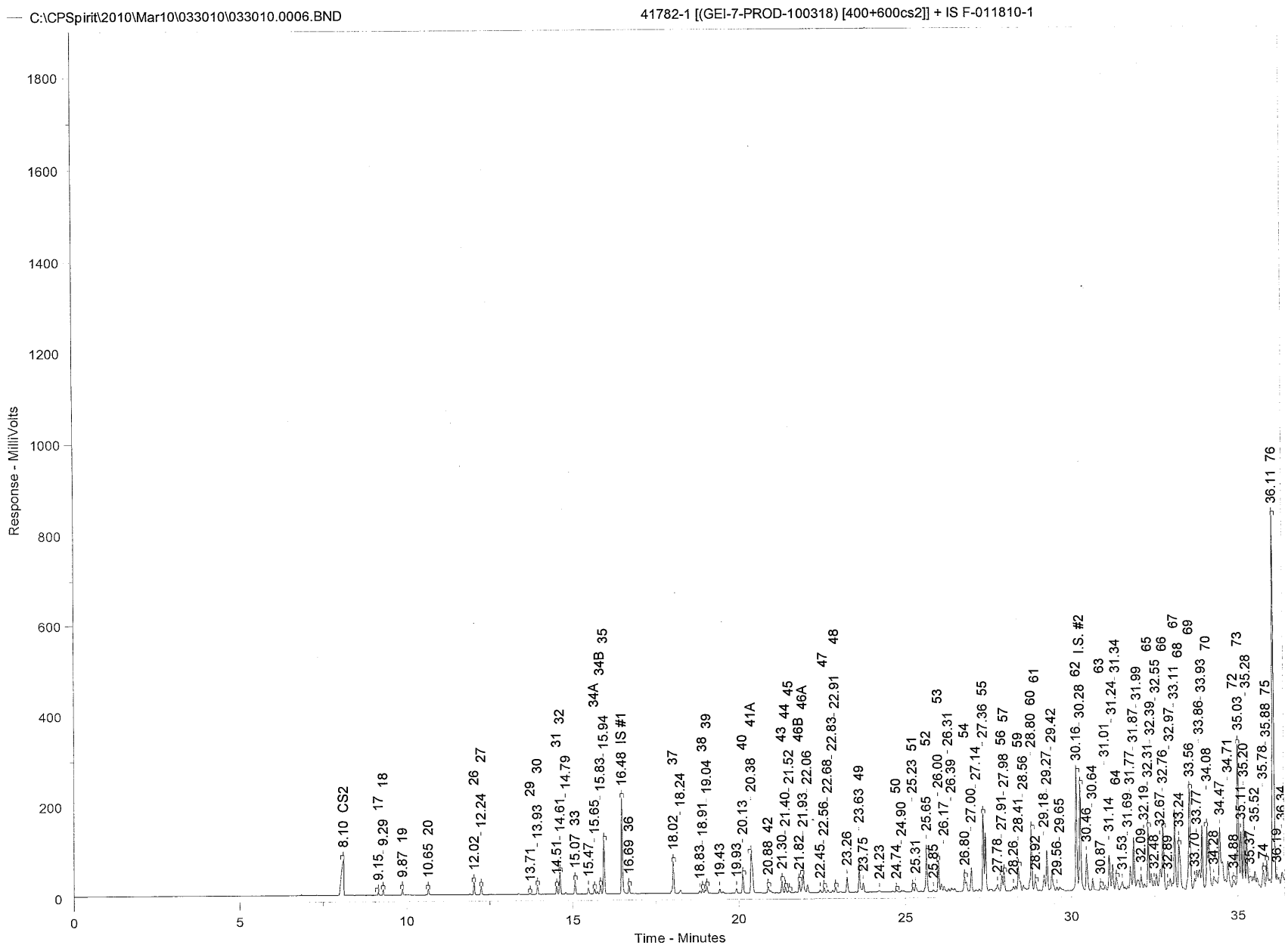
ZymaX FORENSICS

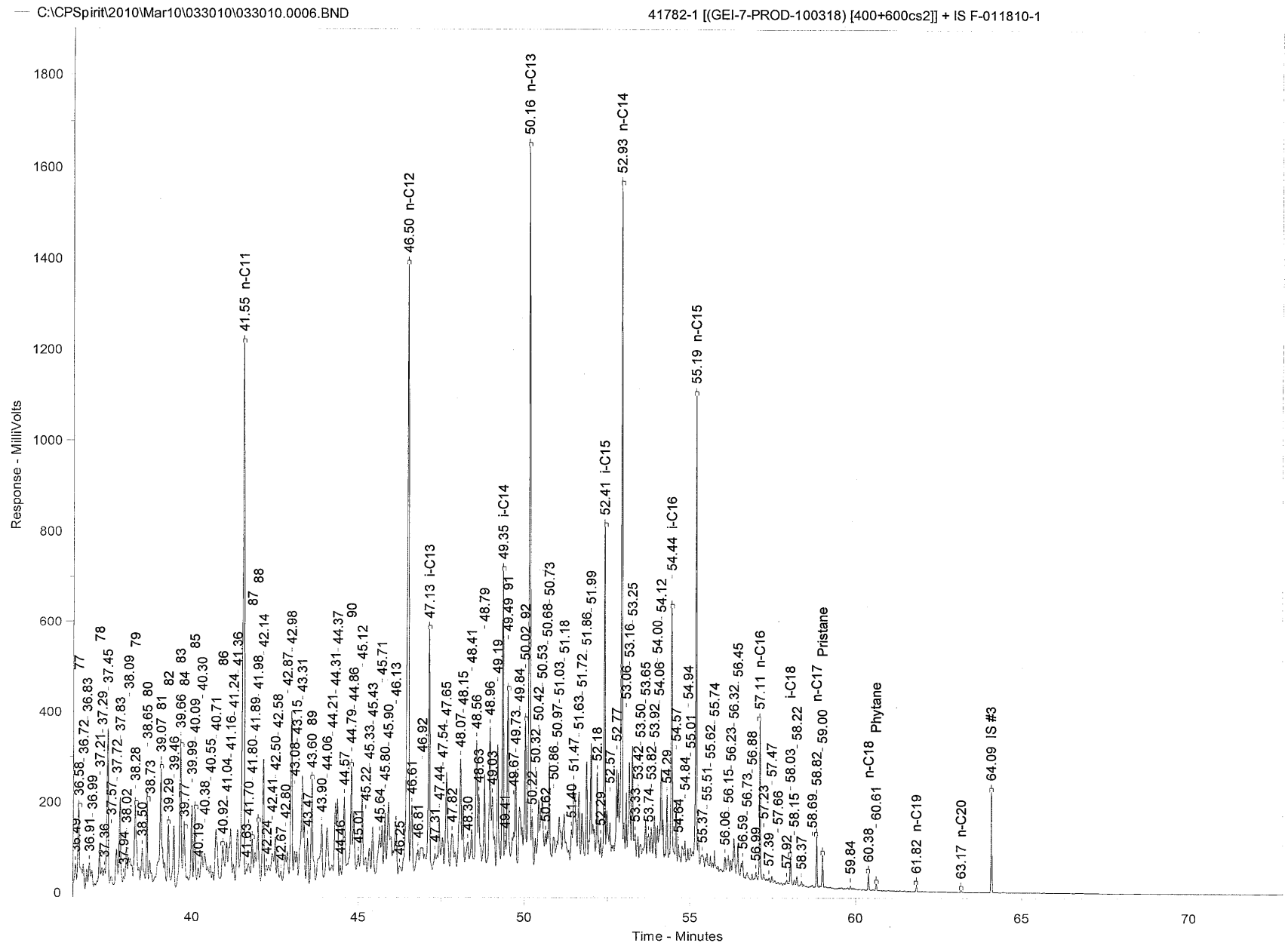
3/30/2010

ZymaX ID	41782-1
Sample ID	GEI-7-PROD-100318

71	1-Methyl-2-ethylbenzene	0.00
72	3-Methylnonane	0.24
73	1,2,4-Trimethylbenzene	3.60
74	Isobutylbenzene	0.52
75	sec-Butylbenzene	0.70
76	n-Decane	10.67
77	1,2,3-Trimethylbenzene	2.83
78	Indan	1.23
79	1,3-Diethylbenzene	3.03
80	1,4-Diethylbenzene	1.99
81	n-Butylbenzene	5.94
82	1,3-Dimethyl-5-ethylbenzene	1.82
83	1,4-Dimethyl-2-ethylbenzene	4.48
84	1,3-Dimethyl-4-ethylbenzene	2.26
85	1,2-Dimethyl-4-ethylbenzene	2.14
86	Undecene	1.75
87	1,2,4,5-Tetramethylbenzene	1.30
88	1,2,3,5-Tetramethylbenzene	2.10
89	1,2,3,4-Tetramethylbenzene	3.73
90	Naphthalene	3.95
91	2-Methyl-naphthalene	5.68
92	1-Methyl-naphthalene	4.33


C:\CPSpirit\2010\Mar10\033010\033010.0006.BND
41782-1 [(GEI-7-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
0
200
400
600
800
1000
1200
1400
1600
1800
0
10
20
30
40
50
60
70
80
90
100
CS2
17
18
19
20
26
27
29
30
31
32
33
34A
34B
35
IS #1
36
37
38
39
40
41A
42
43
44
45
46A
46B
47
48
49
50
51
52
53
54
55
56
57
59
60
61
62
I.S. #2
63
64
65
66
67
68
69
70
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
n-C11
n-C12
i-C13
n-C13
i-C14
n-C14
i-C15
n-C15
i-C16
n-C16
n-C17
Pristane
i-C18
n-C18
Phytane
n-C19
n-C20
IS #3


C:\CPSpirit\2010\Mar10\033010\033010.0006.BND
41782-1 [(GEI-7-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
8.10 CS2
9.15 17
9.29 18
9.87 19
10.65 20
12.02 26
12.24 27
13.71 29
13.93 30
14.51 31
14.61 32
14.79 33
15.07
15.47
15.65
15.83 34A
15.94 34B 35
16.48 IS #1
16.69 36
18.02 37
18.24
18.83
18.91 38
19.04 39
19.43
19.93
20.13 40
20.38 41A
20.88 42
21.30
21.40
21.52 43
21.82
21.93
22.06 46B
22.45
22.56
22.68
22.83
22.91 47
23.26
23.63 49
23.75
24.23
24.74
24.90 50
25.23 51
25.31
25.65
25.85
26.00 52
26.17
26.31 53
26.39
26.80
27.00
27.14
27.36 55
27.78
27.91
27.98 56
28.26
28.41
28.56 59
28.80 60
28.92
29.18
29.27
29.42 61
29.56
29.65
30.16
30.28 62 I.S. #2
30.46
30.64
30.87
31.01
31.14 64
31.24
31.34
31.53
31.69
31.77
31.87
31.99
32.09
32.19
32.31
32.39
32.48
32.55 66
32.67
32.76
32.89
32.97
33.11 68
33.24
33.56
33.70
33.77
33.86
33.93 70
34.08
34.28
34.47
34.71
34.88
35.03
35.11
35.20
35.28 73
35.37
35.52
35.74
35.78
35.88 75
36.11 76
36.19


C:\CPSpirit\2010\Mar10\033010\033010.0006.BND
41782-1 [(GEI-7-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
41.55 n-C11
46.50 n-C12
47.13 i-C13
50.16 n-C13
52.41 i-C15
52.93 n-C14
54.44 i-C16
55.19 n-C15
57.11 n-C16
58.22 i-C18
59.00 n-C17 Pristane
60.61 n-C18 Phytane
61.82 n-C19
63.17 n-C20
64.09 IS #3

Sample Name = **41782-1 [(GEI-7-PROD-100318) [400+600cs2]] + IS F-011810-1**

Instrument = Instrument 1
Heading 1 =
Heading 2 =

Acquisition Port = DP#

Raw File Name = **C:\CPSpirit\2010\Mar10\033010\033010.0006.RAW**
Method File Name = C:\CPSpirit\C344.met
Calibration File Name = C:\CPSpirit\010510.cal

Date Taken (end) = 3/31/2010 6:05:13 AM
Method Version = 44
Calibration Version = 7

Peak Name	Ret. Time	Area %	Area
CS2	8.10	0.3164	394825.40
17	9.15	0.0093	11596.42
18	9.29	0.0188	23454.73
19	9.87	0.0215	26788.26
20	10.65	0.0251	31328.39
26	12.02	0.0514	64161.97
27	12.24	0.0362	45224.82
29	13.71	0.0063	7889.02
30	13.93	0.0399	49758.11
31	14.51	0.0349	43570.67
32	14.61	0.0974	121560.40
	14.79	0.0079	9857.39
33	15.07	0.0628	78363.91
	15.47	0.0259	32308.94
34A	15.65	0.0235	29342.30
34B	15.83	0.0393	49008.04
35	15.94	0.2433	303545.00
IS #1	16.48	0.4273	533142.50
36	16.69	0.0385	48060.93
37	18.02	0.1552	193679.80
	18.24	0.0192	23926.25
	18.83	0.0121	15131.59
38	18.91	0.0211	26311.11
39	19.04	0.0348	43417.15
	19.43	0.0187	23322.21
	19.93	0.0204	25496.36
40	20.13	0.0863	107626.10
41A	20.38	0.2833	353503.60
42	20.88	0.0444	55355.55
43	21.30	0.0559	69753.46
44	21.40	0.0257	32004.86
45	21.52	0.0149	18542.86
46B	21.82	0.0534	66653.84
46A	21.93	0.1139	142057.10
	22.06	0.0370	46159.03
	22.45	0.0126	15670.32
47	22.56	0.0239	29852.78
	22.68	0.0109	13660.53
	22.83	0.0102	12693.25
48	22.91	0.0240	29983.50
	23.26	0.0709	88427.36
49	23.63	0.1170	145980.40
	23.75	0.0460	57398.85
	24.23	0.0108	13528.94
50	24.74	0.0075	9346.19
	24.90	0.0135	16801.72
51	25.23	0.0208	25988.07
	25.31	0.0385	48058.39
52	25.65	0.2127	265444.30
	25.85	0.0084	10509.19
53	26.00	0.1501	187234.40
	26.17	0.0289	36117.16
	26.31	0.0111	13864.85
	26.39	0.0140	17410.10
54	26.80	0.1237	154383.20

Peak Name	Ret. Time	Area %	Area
	27.00	0.1117	139337.60
	27.14	0.0072	8940.23
55	27.36	0.6168	769605.00
	27.78	0.0481	60002.31
56	27.91	0.0796	99275.42
57	27.98	0.0861	107390.00
	28.26	0.0288	35907.13
59	28.41	0.1658	206874.50
	28.56	0.0445	55505.01
60	28.80	0.3307	412592.40
61	28.92	0.0698	87036.59
	29.18	0.0928	115767.60
	29.27	0.2046	255336.80
	29.42	0.1239	154571.00
	29.56	0.0190	23728.17
	29.65	0.0322	40132.52
62	30.16	0.5817	725785.20
I.S. #2	30.28	0.5672	707669.90
	30.46	0.1991	248389.20
	30.64	0.0539	67266.22
63	30.87	0.0301	37504.03
	31.01	0.0294	36633.48
	31.14	0.1815	226479.30
	31.24	0.1364	170248.50
64	31.34	0.0856	106812.00
	31.53	0.0618	77112.34
	31.69	0.0229	28612.07
	31.77	0.1256	156731.60
	31.87	0.2631	328244.60
	31.99	0.0987	123156.60
	32.09	0.0831	103654.10
	32.19	0.0474	59163.93
65	32.31	0.3075	383721.50
	32.39	0.0986	122991.80
	32.48	0.0466	58124.63
	32.55	0.0910	113543.40
	32.67	0.1547	192989.40
66	32.76	0.3575	446002.50
	32.89	0.0420	52452.06
	32.97	0.0605	75476.93
67	33.11	0.3586	447421.50
68	33.24	0.3426	427501.90
69	33.56	0.6799	848302.70
	33.70	0.0503	62767.57
	33.77	0.1074	134055.80
	33.86	0.1393	173845.70
	33.93	0.2976	371377.70
70	34.08	0.5237	653428.90
	34.28	0.0641	79948.52
	34.47	0.2107	262880.30
	34.71	0.1236	154233.90
72	34.88	0.0474	59181.41
73	35.03	0.6979	870804.30
	35.11	0.2456	306413.40
	35.20	0.3138	391506.40
	35.28	0.2422	302135.80
	35.37	0.0541	67461.01
	35.52	0.0427	53323.89
74	35.78	0.1009	125873.00
75	35.88	0.1358	169438.20
76	36.11	2.0715	2584655.00
	36.19	0.0198	24645.84
	36.34	0.0955	119099.00
	36.49	0.1390	173387.20
77	36.58	0.5499	686082.80
	36.72	0.1239	154536.90
	36.83	0.0994	124013.70

Peak Name	Ret. Time	Area %	Area
	36.91	0.1579	197065.90
	36.99	0.0900	112330.70
78	37.21	0.2387	297803.30
	37.29	0.1156	144294.90
	37.36	0.0972	121279.00
	37.45	0.8833	1102129.00
	37.57	0.0591	73798.15
	37.72	0.2054	256308.30
	37.83	0.4595	573260.80
	37.94	0.0140	17508.99
	38.02	0.1142	142434.00
	38.09	0.0242	30188.01
79	38.28	0.5881	733836.50
	38.50	0.2143	267367.60
80	38.65	0.3857	481277.50
	38.73	0.1440	179624.00
81	39.07	1.1529	1438454.00
82	39.29	0.3526	439922.80
	39.46	0.3607	450017.10
83	39.66	0.8704	1086059.00
84	39.77	0.4378	546255.20
	39.99	0.4580	571510.70
85	40.09	0.4145	517189.60
	40.19	0.1121	139872.40
	40.30	0.2509	313110.50
	40.38	0.2812	350796.40
	40.55	0.1150	143506.90
	40.71	0.5013	625424.80
86	40.92	0.3401	424297.10
	41.04	0.2806	350090.10
	41.16	0.4846	604670.00
	41.24	0.1126	140492.70
	41.36	0.3815	475946.90
n-C11	41.55	3.5625	4444944.00
	41.63	0.0769	95974.65
	41.70	0.1468	183131.60
87	41.80	0.2529	315569.70
	41.89	0.2000	249507.00
88	41.98	0.4078	508780.70
	42.14	0.6059	755983.90
	42.24	0.0309	38604.51
	42.41	0.1469	183266.10
	42.50	0.1835	228902.60
	42.58	0.0871	108710.10
	42.67	0.0402	50104.41
	42.80	0.1834	228799.20
	42.87	0.1813	226261.20
	42.98	0.9421	1175497.00
	43.08	0.1921	239639.10
	43.15	0.1678	209346.80
	43.31	1.1371	1418718.00
	43.47	0.2415	301277.00
89	43.60	0.7246	904031.70
	43.90	0.6477	808127.10
	44.06	0.5194	648093.90
	44.21	0.1627	203031.40
	44.31	0.5430	677550.20
	44.37	0.4373	545575.80
	44.46	0.1052	131197.80
	44.57	0.6155	767951.20
90	44.79	0.7668	956692.10
	44.86	0.4713	588012.80
	45.01	0.2321	289571.20
	45.12	0.5857	730804.10
	45.22	0.1854	231357.10
	45.33	0.2690	335586.50
	45.43	0.3895	485966.00

Peak Name	Ret. Time	Area %	Area
	45.64	0.4855	605804.90
	45.71	0.3211	400632.00
	45.80	0.4108	512535.30
	45.90	0.5740	716237.60
	46.13	0.6449	804648.80
	46.25	0.1508	188172.50
n-C12	46.50	4.0325	5031431.00
	46.61	0.5738	715896.60
	46.81	0.3492	435651.00
	46.92	0.4404	549551.10
i-C13	47.13	1.4979	1868964.00
	47.31	0.2362	294759.00
	47.44	0.3433	428291.70
	47.54	0.3291	410628.60
	47.65	0.8583	1070857.00
	47.82	0.4392	547965.10
	48.07	0.9729	1213938.00
	48.15	0.3904	487062.90
	48.30	0.3994	498294.10
	48.41	0.4389	547656.60
	48.56	0.8851	1104348.00
	48.63	0.5923	739009.80
	48.79	0.6097	760755.30
	48.96	0.9549	1191399.00
	49.03	0.6887	859306.40
	49.19	0.8068	1006656.00
i-C14	49.35	1.4129	1762887.00
	49.41	0.1898	236796.50
91	49.49	1.1019	1374864.00
	49.67	0.4163	519385.20
	49.73	0.5627	702029.30
	49.84	0.7927	989079.70
92	50.02	0.8413	1049704.00
n-C13	50.16	3.7575	4688255.00
	50.22	0.3792	473152.30
	50.32	0.1980	247044.00
	50.42	0.5210	650064.30
	50.53	0.8306	1036301.00
	50.62	0.2177	271628.50
	50.68	0.1938	241826.40
	50.73	0.6324	789049.50
	50.86	0.3317	413854.40
	50.97	0.2274	283731.60
	51.03	0.5702	711456.70
	51.18	0.8429	1051676.00
	51.40	0.2545	317572.00
	51.47	0.9153	1142061.00
	51.63	0.5631	702594.90
	51.72	0.4773	595481.10
	51.86	0.5531	690137.50
	51.99	1.2049	1503350.00
	52.18	0.6491	809938.00
	52.29	0.1795	223941.50
i-C15	52.41	1.9095	2382562.00
	52.57	0.3856	481070.80
	52.77	0.9443	1178237.00
n-C14	52.93	3.4330	4283384.00
	53.06	0.3389	422795.30
	53.16	0.7355	917643.90
	53.25	0.6131	765027.50
	53.33	0.2291	285802.10
	53.42	0.2325	290040.60
	53.50	0.1969	245668.20
	53.65	0.4555	568377.50
	53.74	0.3290	410474.00
	53.82	0.2679	334321.30
	53.92	0.3455	431080.60

Peak Name	Ret. Time	Area %	Area
	54.00	0.2196	273964.40
	54.06	0.1844	230016.00
	54.12	0.8015	1000063.00
	54.29	0.3801	474260.80
i-C16	54.44	1.3799	1721665.00
	54.57	0.2980	371864.50
	54.64	0.1849	230758.80
	54.84	0.3533	440877.30
	54.94	0.1160	144792.30
	55.01	0.1195	149085.70
n-C15	55.19	2.0392	2544359.00
	55.37	0.1701	212192.00
	55.51	0.1324	165210.40
	55.62	0.0488	60851.03
	55.74	0.0977	121893.70
	56.06	0.0624	77915.84
	56.15	0.1212	151224.00
	56.23	0.0494	61655.20
	56.32	0.2291	285880.50
	56.45	0.1477	184224.90
	56.59	0.1122	139957.90
	56.73	0.0406	50713.43
	56.88	0.0190	23651.30
	56.99	0.0450	56091.51
n-C16	57.11	0.5509	687342.00
	57.23	0.0461	57491.81
	57.39	0.0234	29205.96
	57.47	0.0344	42864.64
	57.66	0.0108	13532.38
	57.92	0.0428	53392.43
i-C18	58.03	0.1236	154272.60
	58.15	0.0300	37413.84
	58.22	0.0416	51861.30
	58.37	0.0222	27720.58
	58.69	0.0125	15547.54
n-C17	58.82	0.1695	211545.70
Pristane	59.00	0.1521	189767.20
	59.84	0.0117	14585.41
n-C18	60.38	0.0551	68735.91
Phytane	60.61	0.0250	31213.29
n-C19	61.82	0.0263	32872.22
n-C20	63.17	0.0096	11926.55
IS #3	64.09	0.3197	398932.70

Total Area = 1.24771E+08 Total Height = 3.561661E+07 Total Amount = 0

ZymaX FORENSICS

3/30/2010

ZymaX ID	41782-2
Sample ID	GEI-1-PROD-100318

Evaporation

n-Pentane / n-Heptane	0.00
2-Methylpentane / 2-Methylheptane	0.00

Waterwashing

Benzene / Cyclohexane	0.00
Toluene / Methylcyclohexane	0.00
Aromatics / Total Paraffins (n+iso+cyc)	3.05
Aromatics / Naphthenes	46.34

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	0.00
3-Methylhexane / n-Heptane	0.00
Methylcyclohexane / n-Heptane	0.00
Isoparaffins + Naphthenes / Paraffins	0.84

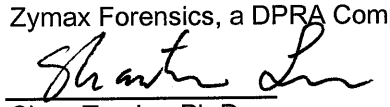
Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	0.00

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	12.98
% Isoparaffinic	9.31
% Aromatic	72.79
% Naphthenic	1.57
% Olefinic	3.35

Submitted by,
Zymax Forensics, a DPRA Company



Shan-Tan Lu, Ph.D.
Director of Forensic Geochemistry

ZymaX FORENSICS

3/30/2010

ZymaX ID	41782-2
Sample ID	GEI-1-PROD-100318

1	Propane	0.00
2	Isobutane	0.00
3	Isobutene	0.00
4	Butane/Methanol	0.00
5	trans-2-Butene	0.00
6	cis-2-Butene	0.00
7	3-Methyl-1-butene	0.00
8	Isopentane	0.00
9	1-Pentene	0.00
10	2-Methyl-1-butene	0.00
11	Pentane	0.00
12	trans-2-Pentene	0.00
13	cis-2-Pentene/t-Butanol	0.00
14	2-Methyl-2-butene	0.00
15	2,2-Dimethylbutane	0.00
16	Cyclopentane	0.00
17	2,3-Dimethylbutane/MTBE	0.00
18	2-Methylpentane	0.00
19	3-Methylpentane	0.00
20	Hexane	0.00
21	trans-2-Hexene	0.00
22	3-Methylcyclopentene	0.00
23	3-Methyl-2-pentene	0.00
24	cis-2-Hexene	0.00
25	3-Methyl-trans-2-pentene	0.00
26	Methylcyclopentane	0.00
27	2,4-Dimethylpentane	0.00
28	Benzene	0.00
29	5-Methyl-1-hexene	0.00
30	Cyclohexane	0.00
31	2-Methylhexane/TAME	0.00
32	2,3-Dimethylpentane	0.00
33	3-Methylhexane	0.00
34A	1-trans-3-Dimethylcyclopentane	0.00
34B	1-cis-3-Dimethylcyclopentane	0.00
35	2,2,4-Trimethylpentane	0.00
I.S. #1	à,à,à-Trifluorotoluene	0.00

ZymaX FORENSICS

3/30/2010

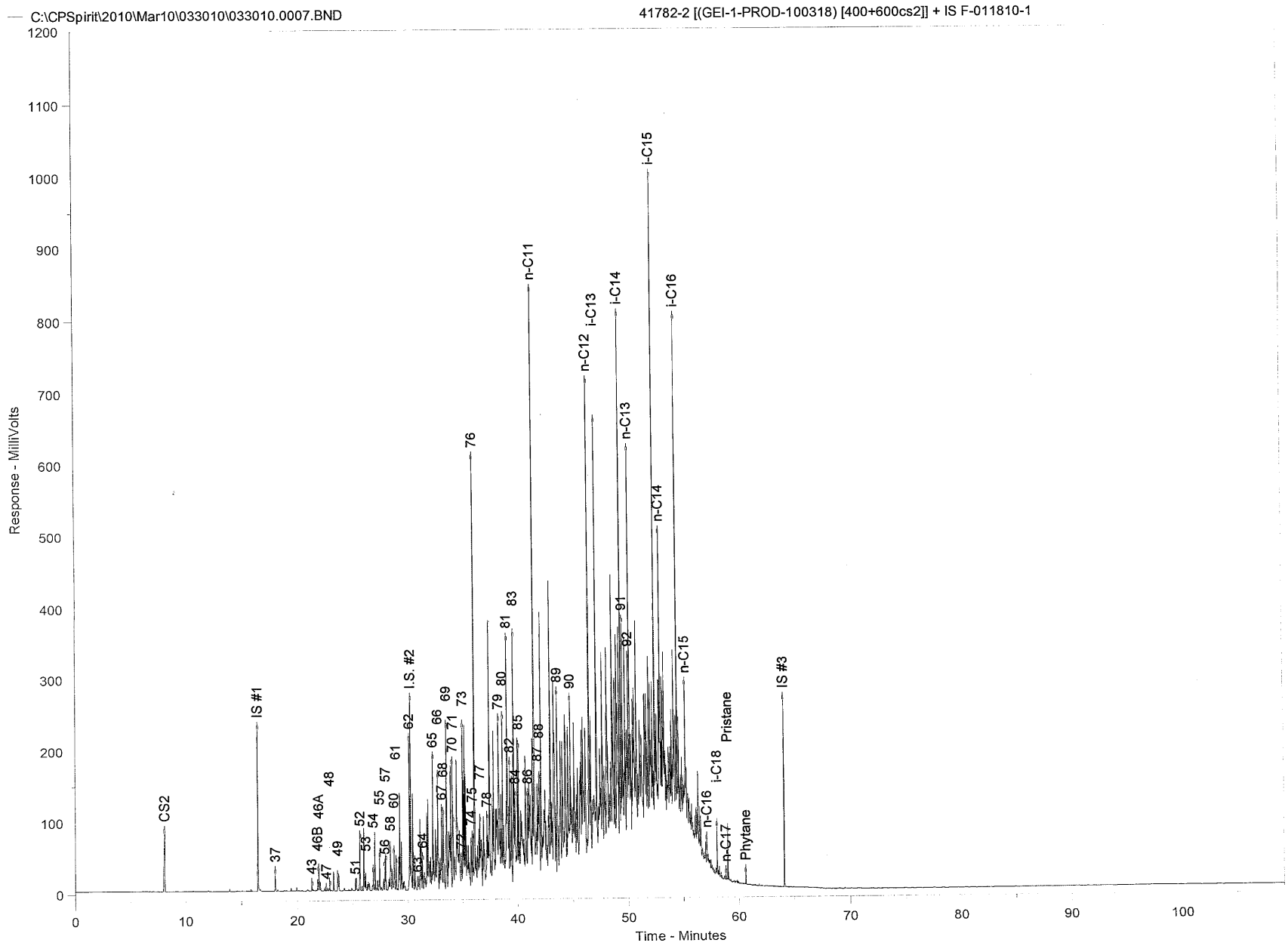
ZymaX ID		41782-2
Sample ID		GEI-1-PROD-100318
36	n-Heptane	0.00
37	Methylcyclohexane	0.33
38	2,5-Dimethylhexane	0.00
39	2,4-Dimethylhexane	0.00
40	2,3,4-Trimethylpentane	0.00
41	Toluene/2,3,3-Trimethylpentane	0.00
42	2,3-Dimethylhexane	0.00
43	2-Methylheptane	0.09
44	4-Methylheptane	0.00
45	3,4-Dimethylhexane	0.00
46A	3-Ethyl-3-methylpentane	0.44
46B	1,4-Dimethylcyclohexane	0.07
47	3-Methylheptane	0.00
48	2,2,5-Trimethylhexane	0.10
49	n-Octane	0.34
50	2,2-Dimethylheptane	0.00
51	2,4-Dimethylheptane	0.09
52	Ethylcyclohexane	1.17
53	2,6-Dimethylheptane	0.21
54	Ethylbenzene	0.39
55	m+p Xylenes	0.77
56	4-Methyloctane	0.51
57	2-Methyloctane	0.54
58	3-Ethylheptane	1.22
59	3-Methyloctane	0.00
60	o-Xylene	0.98
61	1-Nonene	0.72
62	n-Nonane	3.00
I.S.#2	p-Bromofluorobenzene	0.00
63	Isopropylbenzene	0.22
64	3,3,5-Trimethylheptane	0.77
65	2,4,5-Trimethylheptane	2.51
66	n-Propylbenzene	2.62
67	1-Methyl-3-ethylbenzene	1.96
68	1-Methyl-4-ethylbenzene	2.10
69	1,3,5-Trimethylbenzene	4.43
70	3,3,4-Trimethylheptane	2.33

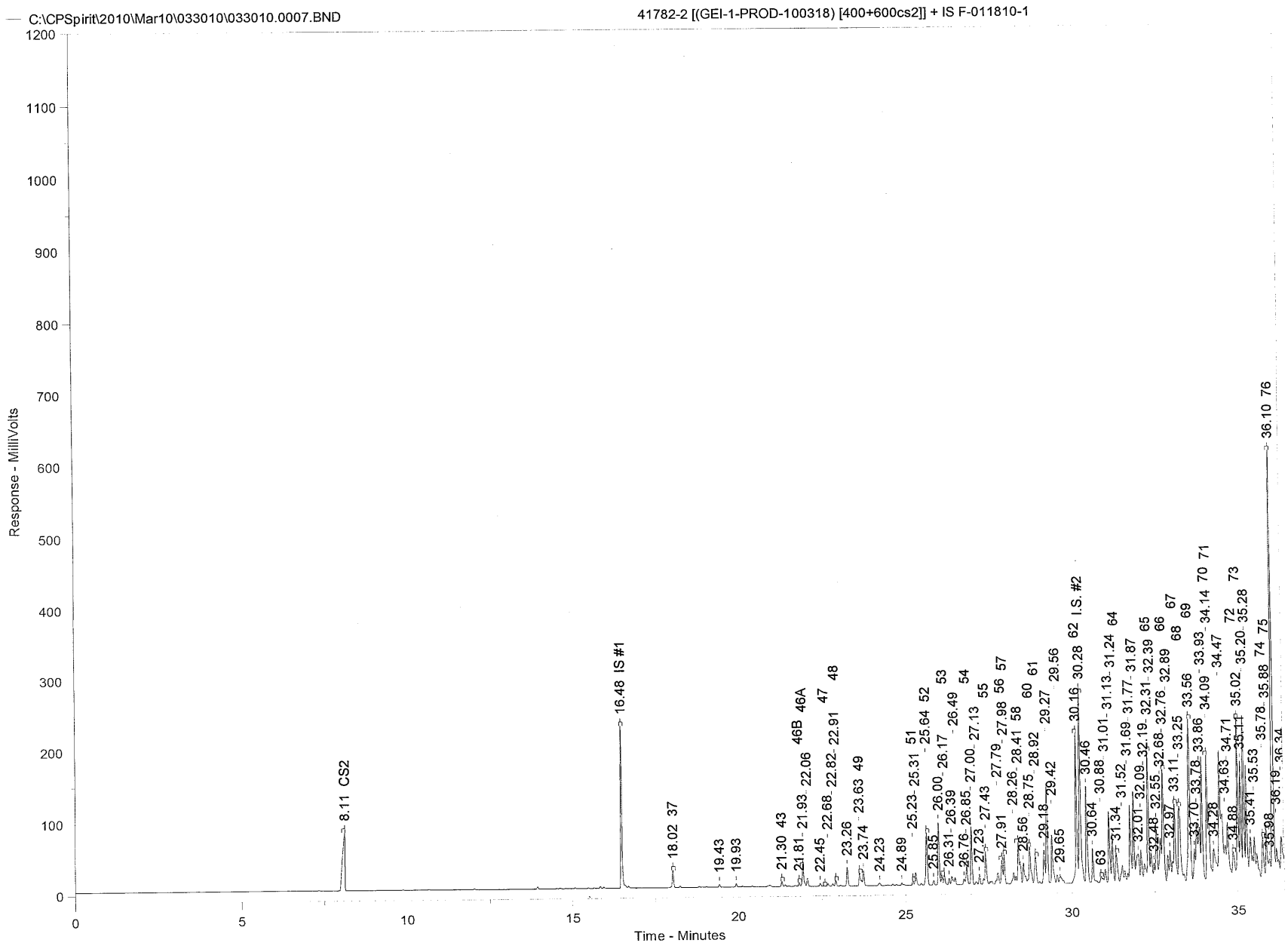
ZymaX FORENSICS

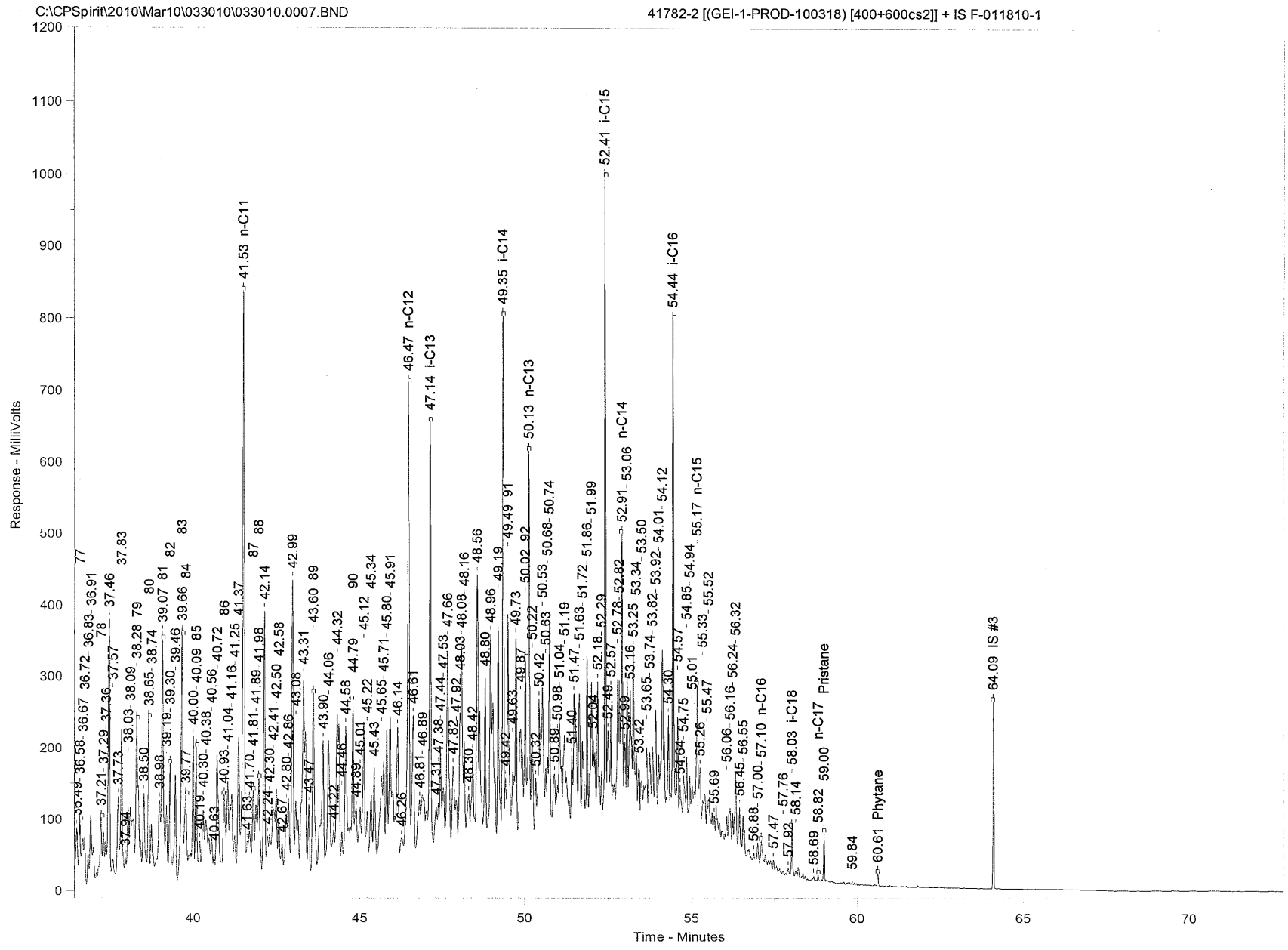
3/30/2010

ZymaX ID	41782-2
Sample ID	GEI-1-PROD-100318

71	1-Methyl-2-ethylbenzene	1.39
72	3-Methylnonane	0.50
73	1,2,4-Trimethylbenzene	2.87
74	Isobutylbenzene	0.99
75	sec-Butylbenzene	1.02
76	n-Decane	9.65
77	1,2,3-Trimethylbenzene	1.44
78	Indan	1.66
79	1,3-Diethylbenzene	4.27
80	1,4-Diethylbenzene	2.69
81	n-Butylbenzene	5.79
82	1,3-Dimethyl-5-ethylbenzene	2.55
83	1,4-Dimethyl-2-ethylbenzene	6.36
84	1,3-Dimethyl-4-ethylbenzene	2.73
85	1,2-Dimethyl-4-ethylbenzene	2.91
86	Undecene	2.63
87	1,2,4,5-Tetramethylbenzene	1.99
88	1,2,3,5-Tetramethylbenzene	2.81
89	1,2,3,4-Tetramethylbenzene	5.00
90	Naphthalene	3.45
91	2-Methyl-naphthalene	5.45
92	1-Methyl-naphthalene	3.97


C:\CPSpirit\2010\Mar10\033010\033010.0007.BND
41782-2 [(GEI-1-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
CS2
IS #1
I.S. #2
IS #3
Pristane
Phytane
n-C11
n-C12
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
i-C13
i-C14
i-C15
i-C16


C:\CPSpirit\2010\Mar10\033010\033010.0007.BND
41782-2 [(GEI-1-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
8.11 CS2
16.48 IS #1
18.02 37
19.43
19.93
21.30 43
21.81
21.93
22.06 46B
46A
22.45
22.68
22.82
22.91 47
48
23.26
23.63 49
23.74
24.23
24.89
25.23
25.31 51
25.64 52
25.85
26.00
26.17
26.31
26.39
26.49 53
26.76
26.85
27.00
27.13 54
27.23
27.43
27.79
27.91
27.98 56
57
28.26
28.41 58
28.56
28.75
28.92
29.18
29.27 60
61
29.42
29.56
29.65
30.16
30.28 62
I.S. #2
30.46
30.64
30.88
31.01
31.13
31.24 64
63
31.34
31.52
31.69
31.77
31.87
32.01
32.09
32.19
32.31
32.39 65
32.48
32.55
32.68
32.76
32.89 66
68
32.97
33.11
33.25
33.56
67
69
33.70
33.78
33.86
33.93
34.09
34.14 70
71
34.28
34.47
34.63
34.71
34.88
35.02
35.11
35.20
35.28 72
73
35.41
35.53
35.78
35.88
74
75
35.98
36.19
36.34
36.10 76


C:\CPSpirit\2010\Mar10\033010\033010.0007.BND
41782-2 [(GEI-1-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
n-C11
i-C13
n-C12
i-C14
n-C13
i-C15
n-C14
i-C16
n-C15
n-C16
i-C18
n-C17
Pristane
Phytane
IS #3

Sample Name = **41782-2 [(GEI-1-PROD-100318) [400+600cs2]] + IS F-011810-1**

Instrument = Instrument 1
Heading 1 =
Heading 2 =

Acquisition Port = DP#

Raw File Name = **C:\CPSpirit\2010\Mar10\033010\033010.0007.RAW**
Method File Name = C:\CPSpirit\C344.met
Calibration File Name = C:\CPSpirit\010510.cal

Date Taken (end) = 3/31/2010 8:15:17 AM
Method Version = 44
Calibration Version = 7

Peak Name	Ret. Time	Area %	Area
CS2	8.11	0.3531	420045.30
IS #1	16.48	0.4930	586419.60
37	18.02	0.0564	67111.65
	19.43	0.0089	10538.90
	19.93	0.0109	12949.15
43	21.30	0.0159	18933.91
46B	21.81	0.0119	14188.47
46A	21.93	0.0763	90743.18
	22.06	0.0267	31737.36
	22.45	0.0089	10617.71
	22.68	0.0083	9839.22
	22.82	0.0078	9288.23
48	22.91	0.0179	21324.46
	23.26	0.0592	70365.91
49	23.63	0.0578	68804.33
	23.74	0.0507	60254.53
	24.23	0.0125	14874.50
	24.89	0.0116	13846.17
51	25.23	0.0146	17359.90
	25.31	0.0472	56105.74
52	25.64	0.2011	239247.50
	25.85	0.0145	17256.05
	26.00	0.1979	235477.30
53	26.17	0.0355	42251.67
	26.31	0.0213	25370.36
	26.39	0.0373	44394.03
	26.49	0.0234	27868.98
	26.76	0.0212	25213.61
54	26.85	0.0664	79034.72
	27.00	0.1838	218649.80
	27.13	0.0129	15336.17
	27.23	0.0323	38423.80
55	27.43	0.1321	157089.30
	27.79	0.0571	67982.15
56	27.91	0.0869	103431.70
57	27.98	0.0931	110735.40
	28.26	0.0508	60485.01
58	28.41	0.2093	249042.10
	28.56	0.0995	118311.00
60	28.75	0.1676	199405.40
61	28.92	0.1233	146641.80
	29.18	0.1351	160764.40
	29.27	0.3141	373660.30
	29.42	0.1865	221893.50
	29.56	0.0298	35423.91
	29.65	0.0563	67001.59
62	30.16	0.5143	611766.30
I.S. #2	30.28	0.7521	894658.90
	30.46	0.3526	419477.70
	30.64	0.1236	147030.50
63	30.88	0.0381	45321.60
	31.01	0.0498	59221.66
	31.13	0.2474	294271.30
	31.24	0.1754	208684.50
64	31.34	0.1319	156938.80

Peak Name	Ret. Time	Area %	Area
	31.52	0.0829	98599.76
	31.69	0.0318	37863.73
	31.77	0.2651	315340.50
	31.87	0.3066	364676.60
	32.01	0.2025	240953.40
	32.09	0.1132	134688.70
	32.19	0.0972	115680.10
65	32.31	0.4303	511832.50
	32.39	0.1204	143224.60
	32.48	0.0607	72209.04
	32.55	0.2222	264305.00
	32.68	0.2076	246988.10
66	32.76	0.4500	535363.40
	32.89	0.0846	100655.70
	32.97	0.0999	118804.90
67	33.11	0.3360	399657.10
68	33.25	0.3599	428149.90
69	33.56	0.7594	903395.10
	33.70	0.1170	139232.90
	33.78	0.2399	285337.10
	33.86	0.2389	284163.70
	33.93	0.4104	488208.60
70	34.09	0.3993	475026.60
71	34.14	0.2391	284392.70
	34.28	0.1941	230849.70
	34.47	0.5143	611760.70
	34.63	0.1262	150092.70
	34.71	0.2164	257439.20
72	34.88	0.0853	101427.70
73	35.02	0.4919	585211.00
	35.11	0.3330	396123.00
	35.20	0.4700	559079.40
	35.28	0.3191	379607.40
	35.41	0.1420	168939.00
	35.53	0.0707	84144.75
74	35.78	0.1702	202466.40
75	35.88	0.1752	208377.20
	35.98	0.0798	94972.88
76	36.10	1.6550	1968767.00
	36.19	0.1651	196435.90
	36.34	0.2440	290242.90
	36.49	0.2751	327310.20
77	36.58	0.2464	293166.20
	36.67	0.2020	240339.50
	36.72	0.1513	179958.90
	36.83	0.1012	120346.40
	36.91	0.4043	480995.20
78	37.21	0.2855	339650.60
	37.29	0.1762	209572.00
	37.36	0.1318	156747.40
	37.46	0.9901	1177888.00
	37.57	0.0654	77821.87
	37.73	0.3044	362150.20
	37.83	0.5160	613818.50
	37.94	0.0210	25029.61
	38.03	0.1297	154332.80
	38.09	0.0603	71742.34
79	38.28	0.7318	870573.30
	38.50	0.2719	323404.80
80	38.65	0.4607	548026.80
	38.74	0.1673	199013.50
	38.98	0.3884	462001.50
81	39.07	0.9924	1180539.00
	39.19	0.2660	316466.20
82	39.30	0.4375	520461.80
	39.46	0.4234	503718.10
83	39.66	1.0913	1298226.00

Peak Name	Ret. Time	Area %	Area
84	39.77	0.4691	558065.50
	40.00	0.5979	711255.80
85	40.09	0.4986	593106.10
	40.19	0.1625	193273.20
	40.30	0.3366	400458.40
	40.38	0.3522	419028.40
	40.56	0.1622	192925.80
	40.63	0.0884	105102.80
	40.72	0.7305	868977.90
86	40.93	0.4518	537454.40
	41.04	0.4335	515729.10
	41.16	0.5643	671314.60
	41.25	0.1865	221886.10
	41.37	0.6403	761722.40
n-C11	41.53	2.4056	2861783.00
	41.63	0.1349	160503.50
	41.70	0.2440	290215.00
87	41.81	0.3407	405325.50
	41.89	0.3288	391087.30
88	41.98	0.4815	572771.00
	42.14	0.9682	1151819.00
	42.24	0.1483	176454.20
	42.30	0.1735	206439.90
	42.41	0.4490	534115.90
	42.50	0.3194	379908.70
	42.58	0.2074	246673.40
	42.67	0.1263	150225.30
	42.80	0.2750	327123.20
	42.86	0.3061	364085.00
	42.99	1.1293	1343425.00
	43.08	0.4685	557355.50
	43.31	1.5074	1793202.00
	43.47	0.2438	290042.80
89	43.60	0.8570	1019519.00
	43.90	0.8438	1003813.00
	44.06	0.7103	844965.60
	44.22	0.1970	234373.50
	44.32	1.1259	1339437.00
	44.46	0.1096	130394.40
	44.58	0.8655	1029551.00
90	44.79	0.5918	704000.40
	44.89	0.2904	345408.80
	45.01	0.2565	305140.90
	45.12	0.5855	696498.60
	45.22	0.1852	220297.80
	45.34	0.2662	316677.60
	45.43	0.3507	417220.70
	45.65	0.3721	442651.80
	45.71	0.2498	297156.30
	45.80	0.3058	363798.80
	45.91	0.3043	361979.20
	46.14	0.4336	515828.10
	46.26	0.0808	96126.86
n-C12	46.47	1.9728	2346818.00
	46.61	0.6540	778020.90
	46.81	0.3112	370248.40
	46.89	0.4775	568097.60
i-C13	47.14	1.6471	1959439.00
	47.31	0.2263	269233.20
	47.38	0.1499	178300.20
	47.44	0.3515	418092.00
	47.53	0.3089	367418.70
	47.66	0.9883	1175649.00
	47.82	0.4397	523022.70
	47.92	0.1951	232091.30
	48.03	0.4432	527218.40
	48.08	0.7727	919264.80

Peak Name	Ret. Time	Area %	Area
	48.16	0.3549	422207.50
	48.30	0.3215	382494.30
	48.42	0.4909	583987.80
	48.56	1.7122	2036831.00
	48.80	0.6054	720141.90
	48.96	1.6847	2004166.00
	49.19	0.8062	959058.40
i-C14	49.35	1.5848	1885270.00
	49.42	0.2036	242179.40
91	49.49	0.9348	1112011.00
	49.63	0.4088	486278.80
	49.73	0.6511	774569.30
	49.87	0.8459	1006346.00
92	50.02	0.6807	809780.40
n-C13	50.13	1.2713	1512301.00
	50.22	0.4533	539234.70
	50.32	0.1929	229485.10
	50.42	0.5850	695907.90
	50.53	0.9146	1088062.00
	50.63	0.2318	275710.50
	50.68	0.2191	260585.50
	50.74	0.6934	824893.30
	50.89	0.3391	403454.80
	50.98	0.2081	247590.90
	51.04	0.6484	771362.70
	51.19	0.8527	1014427.00
	51.40	0.2828	336373.60
	51.47	0.9271	1102933.00
	51.63	0.5912	703263.70
	51.72	0.4610	548381.90
	51.86	0.5570	662617.60
	51.99	0.6598	784877.90
	52.04	0.5181	616375.40
	52.18	0.6484	771313.90
	52.29	0.1774	211017.30
i-C15	52.41	1.7834	2121557.00
	52.49	0.4634	551271.20
	52.57	0.6355	756008.90
	52.78	0.5167	614690.80
	52.82	0.6273	746208.90
n-C14	52.91	0.8127	966813.80
	52.99	0.3371	400975.10
	53.06	0.4217	501642.10
	53.16	0.7474	889087.30
	53.25	0.6240	742278.60
	53.34	0.2619	311534.20
	53.42	0.2544	302608.70
	53.50	0.2015	239760.50
	53.65	0.4560	542521.20
	53.74	0.3659	435244.60
	53.82	0.2990	355670.10
	53.92	0.4282	509419.20
	54.01	0.2310	274781.40
	54.12	1.0622	1263622.00
	54.30	0.3577	425487.30
i-C16	54.44	1.5831	1883330.00
	54.57	0.3506	417021.50
	54.64	0.1581	188120.20
	54.75	0.1991	236807.20
	54.85	0.1541	183313.50
	54.94	0.1480	176044.70
	55.01	0.1310	155844.50
n-C15	55.17	0.5300	630512.40
	55.26	0.1774	211020.20
	55.33	0.0189	22483.70
	55.47	0.0512	60873.04
	55.52	0.1492	177541.60

Peak Name	Ret. Time	Area %	Area
	55.69	0.0320	38024.77
	56.06	0.0792	94169.17
	56.16	0.1781	211887.20
	56.24	0.1365	162358.30
	56.32	0.2427	288756.60
	56.45	0.1550	184359.70
	56.55	0.1519	180702.30
	56.88	0.0250	29682.76
	57.00	0.0650	77382.07
n-C16	57.10	0.0862	102572.30
	57.47	0.0224	26630.21
	57.76	0.0103	12235.06
	57.92	0.0266	31592.83
i-C18	58.03	0.1289	153367.20
	58.14	0.0132	15739.55
	58.69	0.0185	22020.04
n-C17	58.82	0.0231	27449.15
Pristane	59.00	0.1306	155372.20
	59.84	0.0069	8168.55
Phytane	60.61	0.0300	35722.64
IS #3	64.09	0.3879	461489.20

Total Area = 1.18961E+08 Total Height = 3.326751E+07 Total Amount = 0

ZymaX FORENSICS

3/30/2010

ZymaX ID	41782-3
Sample ID	GEI-3-PROD-100318

Evaporation

n-Pentane / n-Heptane	0.00
2-Methylpentane / 2-Methylheptane	0.00

Waterwashing

Benzene / Cyclohexane	0.00
Toluene / Methylcyclohexane	1.30
Aromatics / Total Paraffins (n+iso+cyc)	3.87
Aromatics / Naphthenes	36.89

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	0.00
3-Methylhexane / n-Heptane	0.72
Methylcyclohexane / n-Heptane	1.69
Isoparaffins + Naphthenes / Paraffins	2.83

Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	1.90

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	5.33
% Isoparaffinic	12.95
% Aromatic	79.00
% Naphthenic	2.14
% Olefinic	0.58

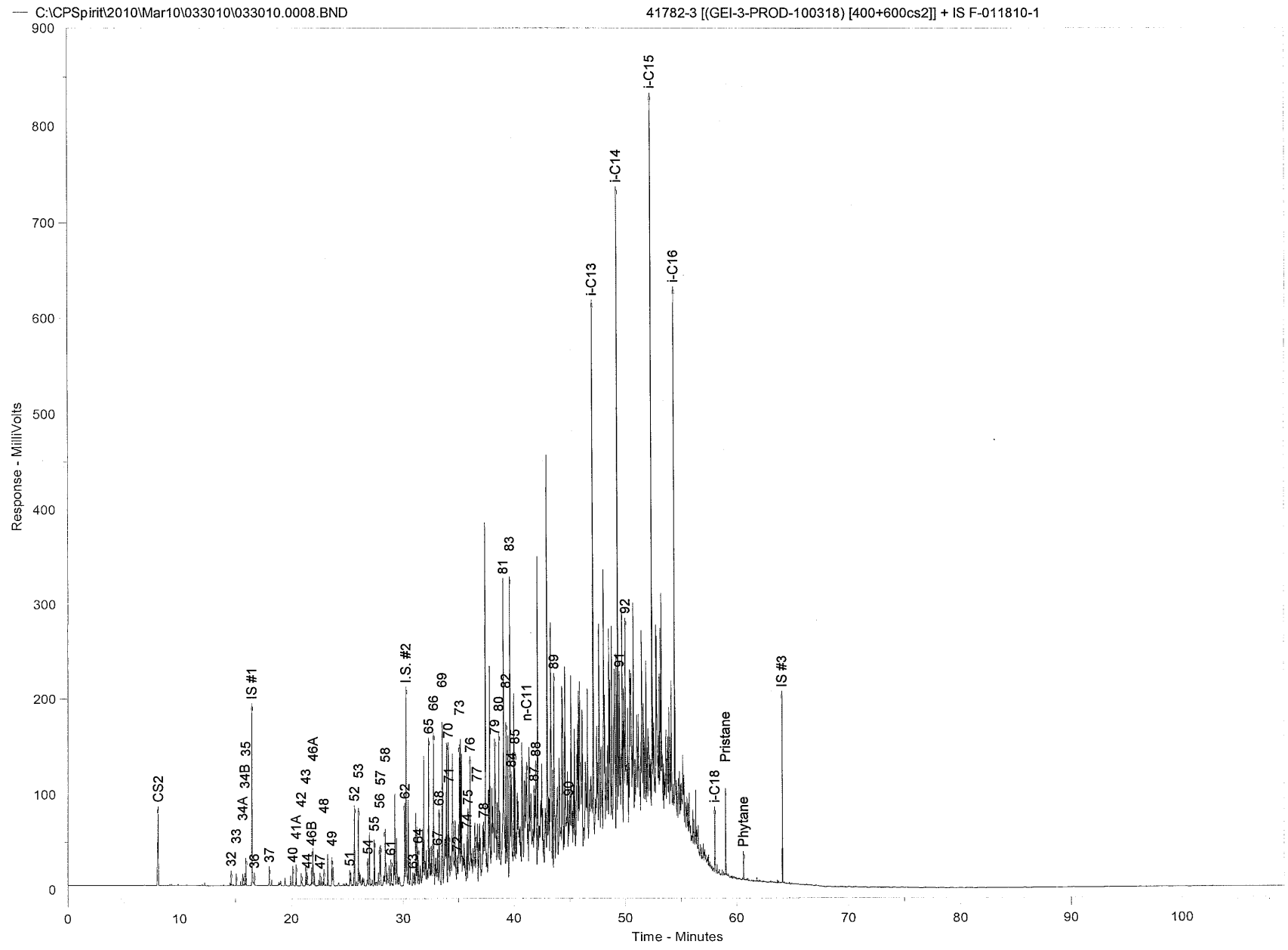
Submitted by,
Zymax Forensics, a DPRA Company

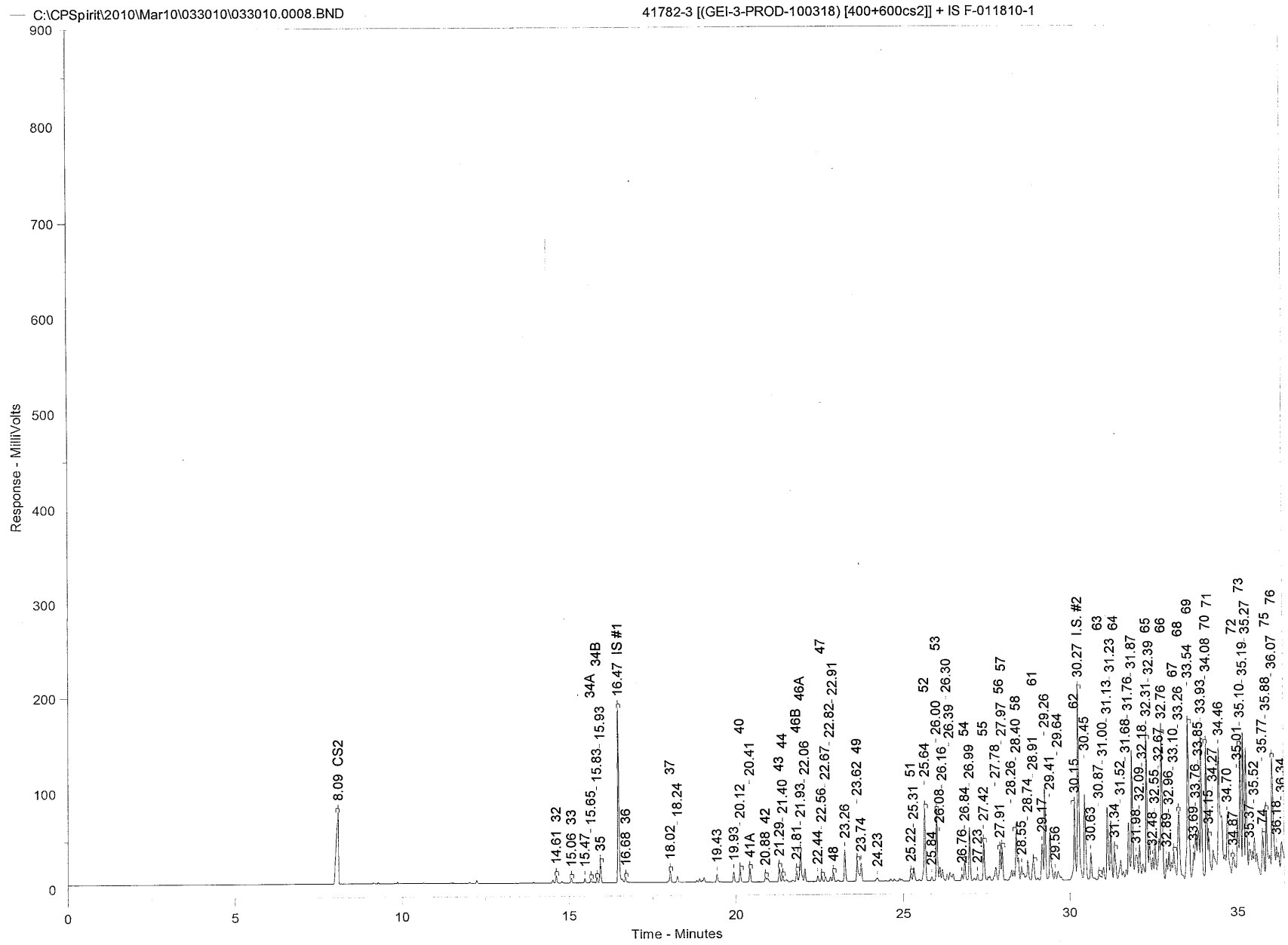
Shan-Tan Lu, Ph.D.
Director of Forensic Geochemistry

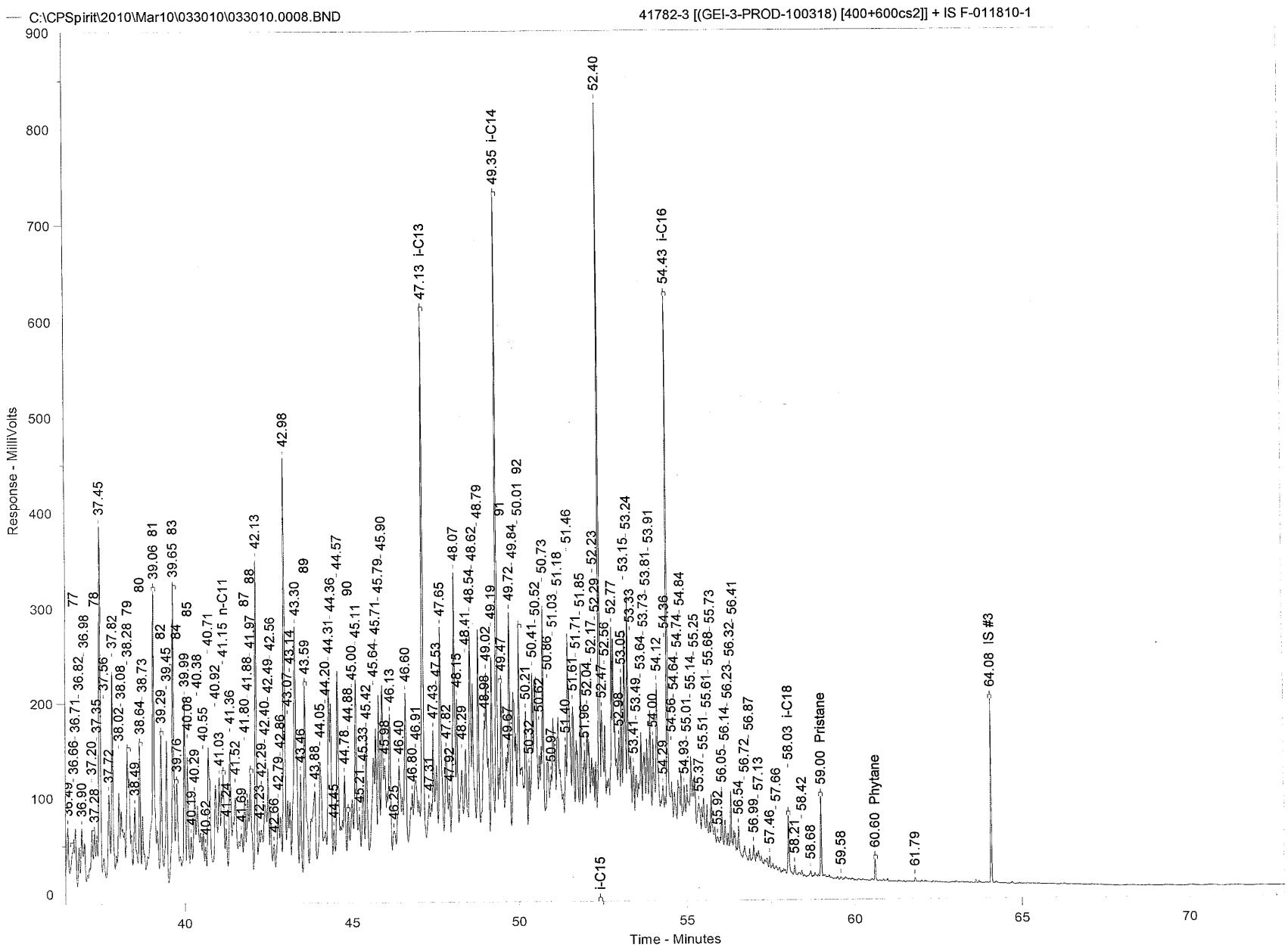
3/30/2010

ZymaX ID	41782-3
Sample ID	GEI-3-PROD-100318

71	1-Methyl-2-ethylbenzene	0.96
72	3-Methylnonane	0.50
73	1,2,4-Trimethylbenzene	2.32
74	Isobutylbenzene	0.98
75	sec-Butylbenzene	1.53
76	n-Decane	3.05
77	1,2,3-Trimethylbenzene	1.66
78	Indan	1.21
79	1,3-Diethylbenzene	6.25
80	1,4-Diethylbenzene	2.89
81	n-Butylbenzene	10.19
82	1,3-Dimethyl-5-ethylbenzene	3.41
83	1,4-Dimethyl-2-ethylbenzene	7.25
84	1,3-Dimethyl-4-ethylbenzene	3.09
85	1,2-Dimethyl-4-ethylbenzene	2.61
86	Undecene	0.00
87	1,2,4,5-Tetramethylbenzene	1.89
88	1,2,3,5-Tetramethylbenzene	3.08
89	1,2,3,4-Tetramethylbenzene	5.41
90	Naphthalene	1.26
91	2-Methyl-naphthalene	4.16
92	1-Methyl-naphthalene	6.84


C:\CPSpirit\2010\Mar10\033010\033010.0008.BND
41782-3 [(GEI-3-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
CS2
IS #1
I.S. #2
IS #3
i-C13
i-C14
i-C15
i-C16
n-C11
i-C18
Pristane
Phytane


C:\CPSpirit\2010\Mar10\033010\033010.0008.BND
41782-3 [(GEI-3-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
8.09 CS2
14.61 32
15.06 33
15.47 15.65 35
15.83 15.93 34A 34B
16.47 IS #1
16.68 36
18.02 18.24 37
19.43
19.93 20.12 20.41 40
20.88 41A
21.29 21.40 42 43 44
21.81 21.93 22.06 46B 46A
22.44 22.56 22.67 22.82 22.91 47
23.26 23.62 23.74 48 49
24.23
25.22 25.31 51
25.64 25.84 26.08 26.16 52
26.00 26.30 26.39 53
26.76 26.84 26.99 54
27.23 27.42 55
27.78 27.91 27.97 56 57
28.26 28.40 28.55 28.74 28.91 58 61
29.17 29.26 29.41 29.56 29.64
30.15 30.27 I.S. #2 30.45 62
30.63 30.87 31.00 31.13 31.23 63 64
31.34 31.52 31.68 31.76 31.87
31.98 32.09 32.18 32.31 32.39 65
32.48 32.55 32.67 32.76 66
32.89 32.96 33.10 33.26 67 68
33.54 69
33.69 33.76 33.85 33.93 34.08 70 71
34.15 34.27 34.46
34.87 34.70 35.01 35.10 35.19 72
35.27 73
35.37 35.52 35.77 35.88 36.07 75 76
74
36.18 36.34


C:\CPSpirit\2010\Mar10\033010\033010.0008.BND
41782-3 [(GEI-3-PROD-100318) [400+600cs2]] + IS F-011810-1
Response - MilliVolts
Time - Minutes
i-C15
n-C11
i-C13
i-C14
i-C16
i-C18
Pristane
Phytane
IS #3

Sample Name = **41782-3 [(GEI-3-PROD-100318) [400+600cs2]] + IS F-011810-1**

Instrument = Instrument 1
Heading 1 =
Heading 2 =

Acquisition Port = DP#

Raw File Name = **C:\CPSpirit\2010\Mar10\033010\033010.0008.RAW**
Method File Name = C:\CPSpirit\C344.met
Calibration File Name = C:\CPSpirit\2010\Mar10\033010\033010.0008.BND

Date Taken (end) = 3/31/2010 10:23:54 AM
Method Version = 44
Calibration Version = 7

Peak Name	Ret. Time	Area %	Area
CS2	8.09	0.3938	352181.60
32	14.61	0.0215	19207.25
33	15.06	0.0142	12676.37
	15.47	0.0134	12015.89
34A	15.65	0.0129	11578.71
34B	15.83	0.0158	14099.29
35	15.93	0.0629	56276.77
IS #1	16.47	0.5276	471828.30
36	16.68	0.0196	17560.47
37	18.02	0.0331	29596.85
	18.24	0.0193	17265.05
	19.43	0.0237	21165.00
	19.93	0.0317	28324.41
40	20.12	0.0384	34366.87
41A	20.41	0.0430	38426.49
42	20.88	0.0316	28256.43
43	21.29	0.0442	39497.11
44	21.40	0.0158	14101.46
46B	21.81	0.0324	29004.86
46A	21.93	0.1193	106721.80
	22.06	0.0404	36086.27
	22.44	0.0178	15878.86
47	22.56	0.0166	14873.46
	22.67	0.0149	13326.77
	22.82	0.0137	12228.78
48	22.91	0.0274	24525.53
	23.26	0.0998	89248.54
49	23.62	0.0915	81828.77
	23.74	0.0614	54948.59
	24.23	0.0154	13812.51
51	25.22	0.0247	22066.43
	25.31	0.0519	46388.01
52	25.64	0.2715	242796.80
	25.84	0.0129	11552.92
53	26.00	0.2235	199870.90
	26.08	0.0436	38960.50
	26.16	0.0401	35841.46
	26.30	0.0168	14980.21
	26.39	0.0210	18769.61
	26.76	0.0199	17771.71
54	26.84	0.0684	61169.32
	26.99	0.1714	153267.80
	27.23	0.0196	17564.23
55	27.42	0.1287	115071.50
	27.78	0.0631	56461.38
56	27.91	0.1072	95898.44
57	27.97	0.1027	91828.93
	28.26	0.0453	40553.54
58	28.40	0.2645	236554.10
	28.55	0.0730	65260.90
	28.74	0.0799	71426.24
61	28.91	0.0984	88029.68
	29.17	0.1443	129065.40
	29.26	0.2968	265445.80
	29.41	0.1950	174427.00

Peak Name	Ret. Time	Area %	Area
	29.56	0.0287	25667.84
	29.64	0.0527	47133.17
62	30.15	0.2781	248696.30
I.S. #2	30.27	0.7311	653777.40
	30.45	0.3230	288893.20
	30.63	0.0939	83940.38
63	30.87	0.0306	27372.99
	31.00	0.0462	41320.28
	31.13	0.2546	227722.50
	31.23	0.2070	185135.90
64	31.34	0.1320	118027.10
	31.52	0.1242	111068.10
	31.68	0.0351	31373.28
	31.76	0.1987	177658.50
	31.87	0.4322	386528.20
	31.98	0.1605	143543.70
	32.09	0.1237	110585.40
	32.18	0.0767	68617.49
65	32.31	0.4578	409396.10
	32.39	0.1518	135771.80
	32.48	0.0728	65119.39
	32.55	0.1497	133843.80
	32.67	0.1926	172209.00
66	32.76	0.5489	490837.30
	32.89	0.0672	60098.26
	32.96	0.0966	86429.69
67	33.10	0.1801	161017.30
68	33.26	0.3475	310801.10
69	33.54	0.7058	631141.30
	33.69	0.0932	83302.96
	33.76	0.1797	160668.30
	33.85	0.2374	212327.70
	33.93	0.4529	405054.80
70	34.08	0.4218	377192.60
71	34.15	0.1637	146350.70
	34.27	0.1784	159525.40
	34.46	0.8073	721938.90
	34.70	0.2548	227854.30
72	34.87	0.0860	76921.80
	35.01	0.1932	172740.70
73	35.10	0.3970	354992.80
	35.19	0.4227	377989.50
	35.27	0.3768	336968.60
	35.37	0.0769	68770.87
	35.52	0.0641	57316.41
74	35.77	0.1672	149517.20
75	35.88	0.2612	233621.00
76	36.07	0.5207	465612.00
	36.18	0.1815	162354.90
	36.34	0.2221	198616.70
	36.49	0.2864	256095.50
77	36.66	0.2837	253684.20
	36.71	0.1909	170745.50
	36.82	0.1323	118281.20
	36.90	0.2427	217002.60
	36.98	0.1660	148492.00
	37.20	0.3178	284244.70
78	37.28	0.2065	184627.80
	37.35	0.1858	166122.50
	37.45	1.4172	1267408.00
	37.56	0.1421	127032.90
	37.72	0.4209	376420.10
	37.82	0.8381	749496.00
	38.02	0.3664	327703.60
	38.08	0.6006	537076.90
79	38.28	1.0666	953877.40
	38.49	0.4549	406792.80

Peak Name	Ret. Time	Area %	Area
80	38.64	0.4930	440912.80
	38.73	0.3294	294593.80
81	39.06	1.7397	1555806.00
82	39.29	0.5815	520025.40
	39.45	0.5639	504306.00
83	39.65	1.2389	1107964.00
84	39.76	0.5270	471310.60
	39.99	0.6992	625245.50
85	40.08	0.4464	399197.40
	40.19	0.1838	164377.00
	40.29	0.4144	370620.10
	40.38	0.4207	376224.40
	40.55	0.1919	171586.40
	40.62	0.1141	102054.50
	40.71	0.8130	727072.40
	40.92	0.5471	489241.00
	41.03	0.4661	416841.60
n-C11	41.15	0.6914	618326.70
	41.24	0.2036	182114.30
	41.36	0.6114	546764.70
	41.52	0.6720	600984.40
	41.69	0.2535	226687.40
87	41.80	0.3222	288142.00
	41.88	0.3671	328270.50
88	41.97	0.5264	470779.80
	42.13	1.1379	1017569.00
	42.23	0.1753	156756.10
	42.29	0.2285	204319.80
	42.40	0.4557	407526.50
	42.49	0.3902	348912.90
	42.56	0.2305	206174.40
	42.66	0.1336	119452.60
	42.79	0.3181	284434.50
	42.86	0.2203	197021.00
	42.98	1.5529	1388697.00
	43.07	0.3018	269889.60
	43.14	0.2529	226162.50
	43.30	1.6192	1447981.00
	43.46	0.3461	309545.50
89	43.59	0.9234	825769.30
	43.88	0.7525	672964.40
	44.05	0.6937	620399.70
	44.20	0.2154	192653.60
	44.31	0.7634	682685.30
	44.36	0.5527	494310.80
	44.45	0.1383	123673.70
	44.57	1.0128	905720.70
	44.78	0.3545	317058.30
90	44.88	0.2150	192266.60
	45.00	0.3262	291697.80
	45.11	0.7976	713256.10
	45.21	0.2170	194095.90
	45.33	0.3500	313012.50
	45.42	0.5326	476260.50
	45.64	0.6129	548122.40
	45.71	0.4764	426048.50
	45.79	0.6300	563380.40
	45.90	0.7684	687185.70
	45.98	0.4004	358052.30
	46.13	0.8574	766784.30
	46.25	0.1354	121085.90
	46.40	0.7472	668197.30
	46.60	0.7483	669158.90
	46.80	0.3677	328814.80
	46.91	0.7456	666766.90
i-C13	47.13	2.0361	1820800.00
	47.31	0.2371	212049.70

Peak Name	Ret. Time	Area %	Area
	55.14	0.4550	406921.70
	55.25	0.2252	201361.40
	55.37	0.3391	303238.70
	55.51	0.1741	155698.20
	55.61	0.1059	94688.48
	55.68	0.0581	51980.27
	55.73	0.1751	156571.30
	55.92	0.0513	45845.90
	56.05	0.1196	106964.90
	56.14	0.1111	99346.55
	56.23	0.0519	46456.76
	56.32	0.1900	169905.30
	56.41	0.1213	108494.30
	56.54	0.1037	92726.21
	56.72	0.0625	55858.97
	56.87	0.0269	24075.80
	56.99	0.0539	48231.77
	57.13	0.0167	14974.17
	57.46	0.0249	22311.76
	57.66	0.0140	12557.03
i-C18	58.03	0.1739	155503.10
	58.21	0.0279	24967.08
	58.42	0.0146	13066.01
	58.68	0.0234	20929.32
Pristane	59.00	0.2031	181652.90
	59.58	0.0102	9150.96
Phytane	60.60	0.0526	47000.81
	61.79	0.0129	11520.22
IS #3	64.08	0.3822	341802.10

Total Area = 8.942793E+07 Total Height = 2.436399E+07 Total Amount = 0

PTS Laboratories, Inc.

8100 Secura Way • Santa Fe Springs, CA 90670
Telephone (562) 347-2500 • Fax (562) 907-3610

May 16, 2011

Greg Montgomery
ARCADIS
2300 Eastlake Avenue East, Suite 200
Seattle, WA 98102

Re: PTS File No: 41252 and 41299
Fluid Properties Data
FAIR Unocal

Dear Mr. Montgomery:

Please find enclosed report for Fluid Properties analyses conducted upon samples received from your FAIR Unocal project. All analyses were performed by applicable ASTM, EPA, or API methodologies. An electronic version of the report has previously been sent to your attention via the internet. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please give Rachel Spitz a call at (562) 347-2504.

Sincerely,
PTS Laboratories

for Rachel Spitz

Michael Mark Brady, P.G.
District Manager

Encl.

PTS Laboratories

Project Name: FAIR Unocal
Project Number: B0045506

PTS File No: 41252
Client: ARCADIS

TEST PROGRAM

FLUID ID	Date	Time	Fluid Type	OILPRINT™ FSCOT	Fluid Cleaning			
Method:				IP 318/75M	Proprietary			
Date Received: 20110418								
MW-15	4/14/11	0930	Product	X	X			
TOTALS:				1	1			

Laboratory Test Program Notes

PTS Laboratories

Project Name: FAIR Unocal
Project Number: 306456

PTS File No: 41299
Client: ARCADIS

TEST PROGRAM

FLUID ID	Date	Time	Fluid Type	OILPRINT™ FSCOT	Fluid Cleaning			Notes
Method:				IP 318/75M	Proprietary			
Date Received: 20110510								
GEI 7	20110505	1220	Product	X	X			
GEI 8	20110505	1235	Product	X	X			
TOTALS:				2	2			2

Laboratory Test Program Notes
Analyze samples for OILPRINT only per A. Ohrt/ARCADIS.

PTS File No: 41252 and 41299
Client: ARCADIS
Project Name: FAIR Unocal
Project No: B0045506 and 306456
Date: May 14, 2011

Hydrocarbon Characterization

Introduction

A suite of three fluids were received for hydrocarbon characterization. The samples are identified as MW-15, GEI 7, and GEI 8. Additional samples may be submitted in the near future for further analysis and correlation.

Conclusions

All three fluids can be categorized as diesels with somewhat higher gasoline content ($C_5 - C_9$) than normal. Such characteristic is common in what are termed "Alaskan" diesels. While the overall hydrocarbon profiles are similar, there are some differences in composition. GEI 7 and GEI 8 are very similar and are probably from the same source, but the GEI 8 has suffered more weathering which has decreased the gasoline fraction significantly. These two samples are from a different source than the MW-15, based on the detailed hydrocarbon fingerprints.

Analyses and Discussion

The samples were analyzed by OIL PRINT™ to obtain information on the specific hydrocarbon composition of the $C_2 - C_{34}$ fractions. The data are presented in Figures 1 thru 4 and Table 1.

Figures 1 thru 3 are reduced scale copies of the chromatograms with the addition of some peak identifications. Visual comparison of the figures illustrates the lower concentration of the gasoline fraction in the GEI 8 and also illustrates the general, similar, chromatographic profiles for all three fluids. Table 1 contains values of some specific hydrocarbon ratios. This data is derived from the chromatograms where peak height is directly proportional to concentration. Peak numbers are assigned sequentially with $C_2 = 2$, $C_8 = 30$, $C_{10} = 78$ out to $C_{34} = 448$. Figure 4 is a polar plot (often termed a "star" diagram) and is based on some of the data in the table. The data, plus the diagram, show clearly the very similar composition of GEI 7 and GEI 8 and the significant difference of MW-15. Such differences between the GEI samples and MW-15 indicate they were derived from different sources. The small differences between GEI 7 and GEI 8 are related to changes imposed by their history in the subsurface environment, not different sources.

L.W. Slentz

PTS File No: 41252 and 41299
Client: ARCADIS
Project Name: FAIR Unocal
Project No: B0045506 and 306456
Date: May 14, 2011

Table 1
NAPL Characterization by Hydrocarbon Ratios

		Hydrocarbon Ratios by Peak Numbers												
Run #	Sample ID	44/42	50/58	66/67	78/69	83/79	86/91	96/99	116/119	131/132	142/140	170/168	221/223	248/250
405	MW-15	3.62	2.92	1.23	1.25	0.87	0.86	1.10	1.23	0.83	1.43	1.78	1.18	1.30
410	GEI 7	0.77	2.38	1.00	2.29	1.16	1.16	1.38	0.74	1.09	0.98	2.16	1.49	1.57
411	GEI 8	1.15	2.44	0.96	2.49	1.19	1.12	1.43	0.97	1.07	1.02	2.10	1.58	1.56

FIGURE 1
Sample ID: MW-15_405

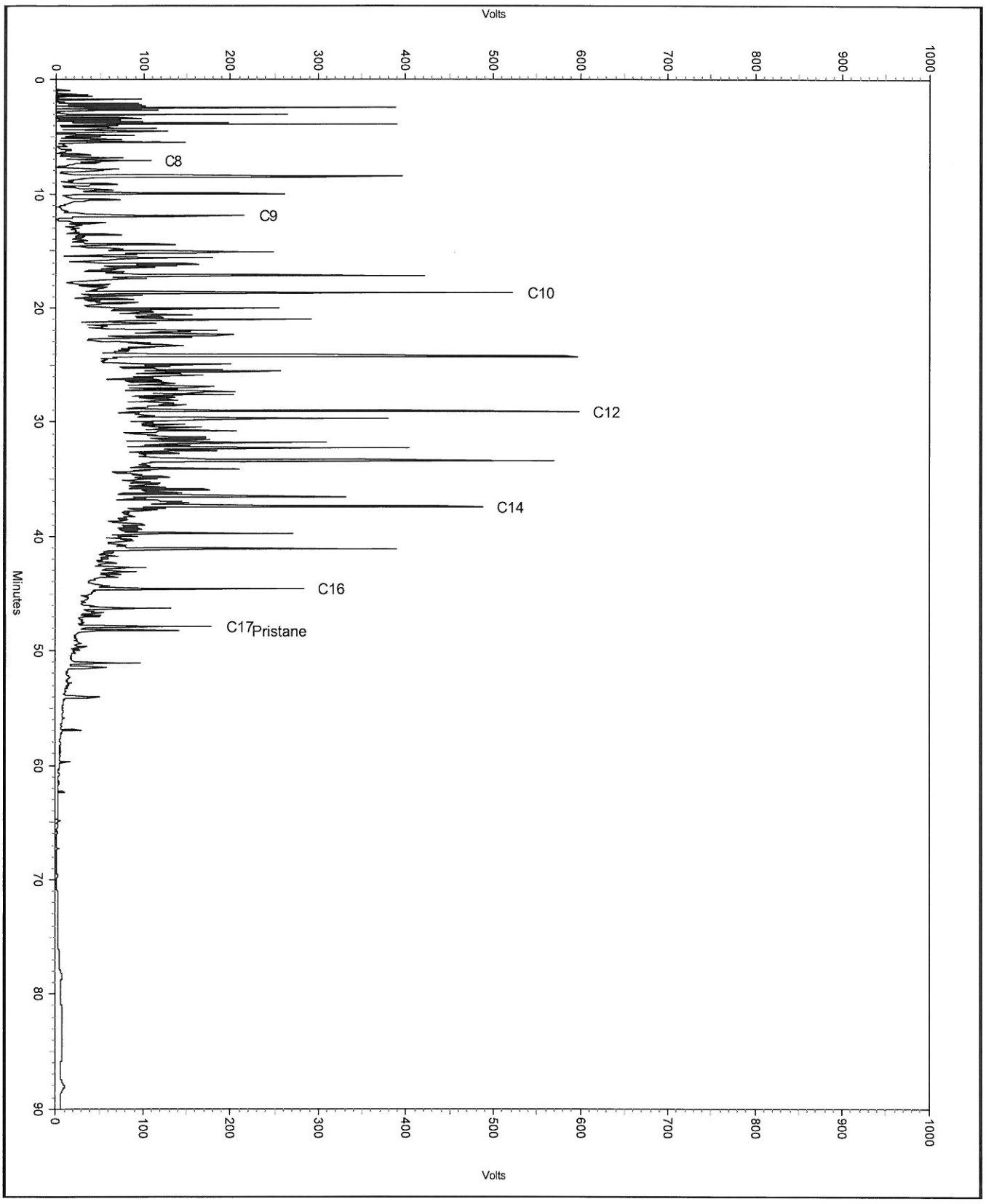


FIGURE 2
Sample ID: GEI 7_410

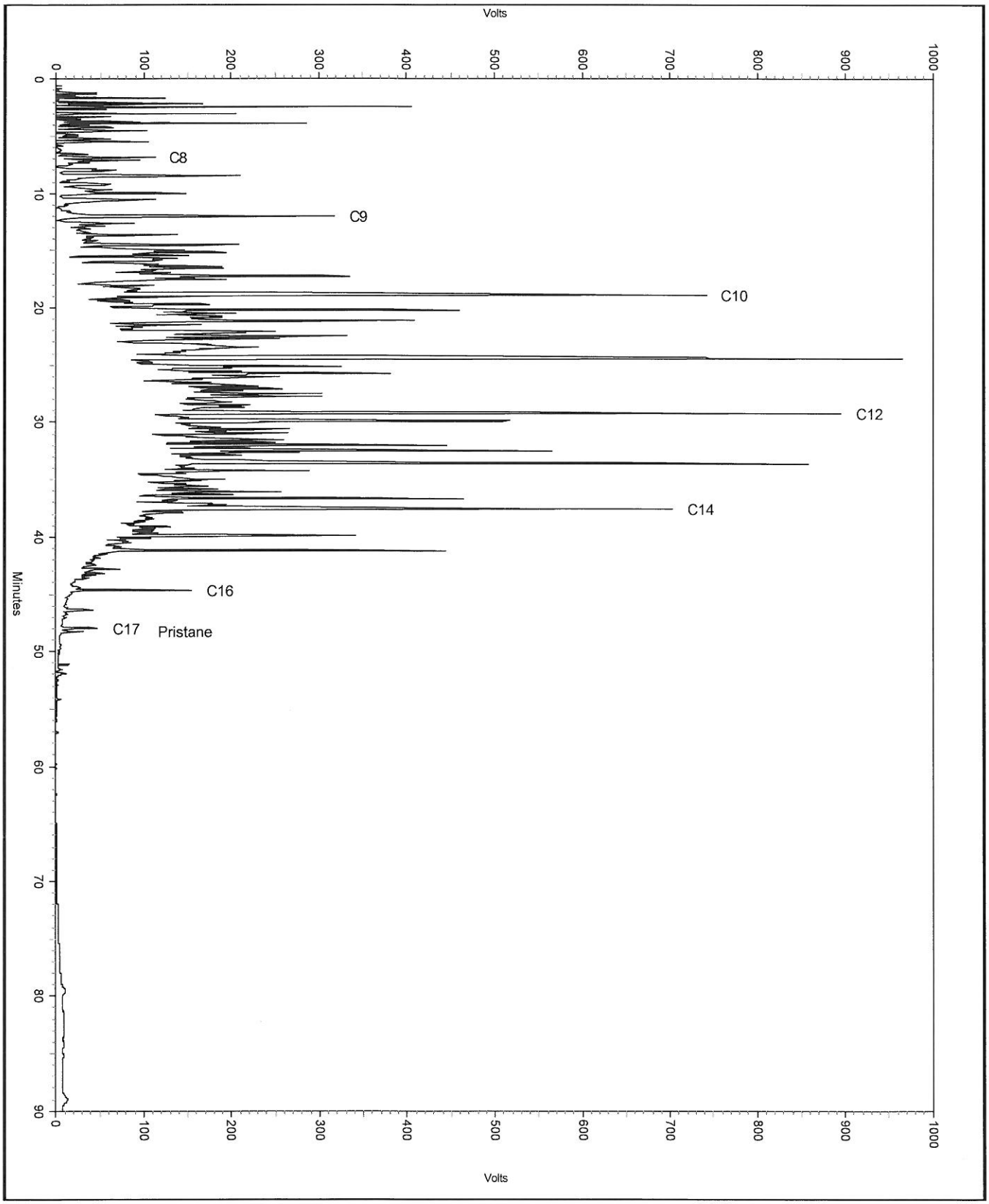


FIGURE 3
Sample ID: GEI 8_411

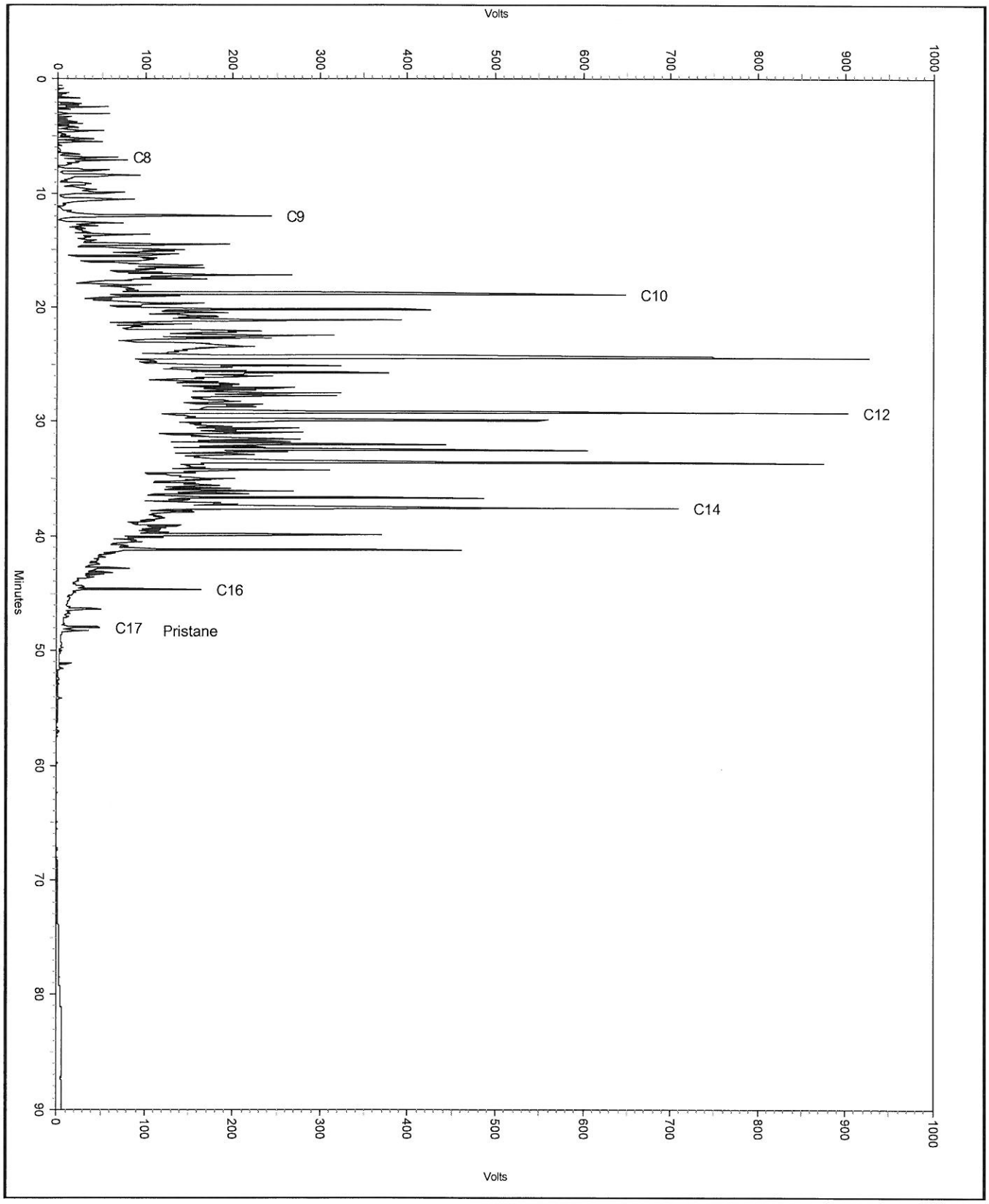
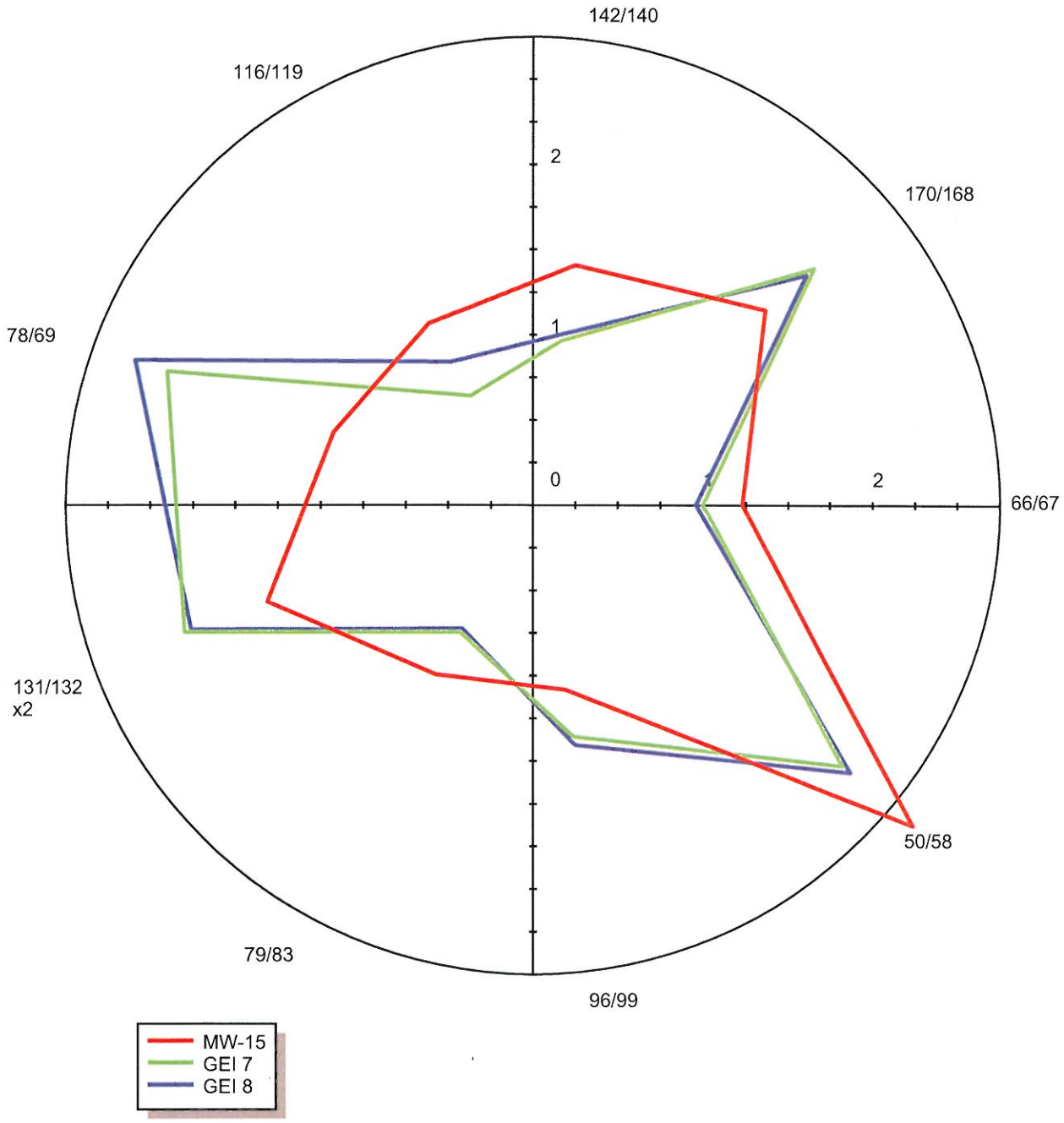


Figure 4


142/140
116/119
170/168
78/69
66/67
131/132
x2
50/58
79/83
96/99
0
1
2
2
MW-15
GEI 7
GEI 8

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY	ARCADIS ~~Se~~ NKA
ADDRESS	2300 Eastlake Ave
CITY	Seattle, WA
ZIP CODE	98102
PROJECT MANAGER	Greg Montgomery
PROJECT NAME	FAIR Unocal
PHONE NUMBER	206-726-4741
PROJECT NUMBER	B0045506
FAX NUMBER	
SITE LOCATION	328 ½ Illinois St, Fairbanks, AK
SAMPLER SIGNATURE	(signature)
PO#	
TURNAROUND TIME	24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ NORMAL ☒ OTHER:
SAMPLE INTEGRITY (CHECK):	INTACT ✓ ON ICE ___
PTS QUOTE NO.	
PTS FILE:	41252

ANALYSIS REQUEST

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5084	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	Fuel ID	C3-C44 GC/FID	EPA (1625m) GC/MS (Gas spectrometer analysis)	EDB, mmt and organic lead	COMMENTS
✓ MW-15 Product	4-14-11	9:30	~~ft.~~ NKA 16.93	1																		X	X	X	X	Sampling method bail, no purge. Sample matrix = Product

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
Nelson Alger	(signature)		
COMPANY: ARCADIS	COMPANY: PTS Labs Inc	COMPANY:	COMPANY:
DATE: 4-14-2011 TIME: 12:55	DATE: 4-18-11 TIME: 1244	DATE: TIME:	DATE: TIME:

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Gas spectrometer Analysis

PAGE 1 OF 1

COMPANY: Arcadis

ADDRESS: 2300 Eastlake Ave E #200 | CITY: Seattle, WA | ZIP CODE: 98102

PROJECT MANAGER: Greg ~~Montgomery~~ Montgomery | PHONE NUMBER: 206.726.4742

PROJECT NAME: FAIR Unocal

PROJECT NUMBER: ~~306456~~ .306456 DGB | FAX NUMBER:

SITE LOCATION: 328.5 Illinois St. Fairbanks, AK

SAMPLER SIGNATURE: MMD

PO#:

TURNAROUND TIME: 24 HOURS ☐ 48 HOURS ☐ 72 HOURS ☐ 5 DAYS ☐ NORMAL ☒ OTHER: _____

SAMPLE INTEGRITY (CHECK): INTACT ✓ ON ICE ____

PTS QUOTE NO.:

PTS FILE: 41299

SAMPLE ID NUMBER	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG: CORE PHOTOGRAPHY	MOISTURE CONTENT, ASTM D2216	POROSITY: TOTAL, API RP40	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100, API RP40, D5004	GRAIN SIZE DISTRIBUTION, ASTM D422/4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	Fuel ID	C3-C44 GC\FID	EPA (1625M) GC\MS	EDB, MMT and organic lead	COMMENTS
GEI 7 DGB 5/5/11	~~4/5/11~~	12:20	16.04	1																	X	X	X	X	*Sampling method:
GEI 8 DGB 5/5/11	~~4/5/11~~	12:35	16.40	1																	X	X	X	X	no purge
																									*Sample matrix = product

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
Michael MacDaniel MM MD	[signature]		
COMPANY: Arcadis	COMPANY: PTS Labs Inc	COMPANY:	COMPANY:
DATE: ~~4/5/11~~ 5/5/11 DGB	TIME: ~~5:10~~ 17:16	DATE: 5/10/11	TIME: 1303