Confirmation Assessment Report

US Travel Systems/Former Texaco Service Station 211083
230 Old Steese Highway
Fairbanks, Alaska
ADEC File ID: 102.26.046
Hazard ID: 24310

Chevron Environmental Management Company

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| 2018 | 04.05 | Report No 38 | April 3 2018

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List of Acronyms and Abbreviations

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AS	air sparge
BTEX	benzene, toluene, ethylbenzene, xylene
COPCs	constituents of potential concern
CSM	conceptual site model
DOT	Department of Transportation
DRO	diesel range organics
fbg	feet below grade
ft	feet
ft btoc	feet below top of casing
GRO	gasoline range organics
mg/kg	milligrams per kilogram
mg/L	milligram per liter
mL	milliliter
No	number
PAHs	polynuclear aromatic hydrocarbons
P.G.	Professional Geologist
PID	photoionization detector
QEP	qualified environmental professionals
®	registered
SVE	soil vapor extraction
™	trademark
UST	underground storage tank
VOCs	volatile organic compounds

1. Introduction

GHD is submitting this *Confirmation Assessment Report* to the Alaska Department of Environmental Conservation (ADEC) on behalf of Chevron Environmental Management Company (Chevron) for the US Travel Systems / former Texaco service station 211083 in Fairbanks, Alaska. GHD advanced six borings to assess post-remediation soil quality.

All fieldwork and reporting were completed in accordance with:

- ADEC's March 7, 2017 *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites*
- ADEC's March 2016 and August 2017 *Field Sampling Guidance*
- Applicable regulations: 18 Alaska Administrative Code (AAC) 78, Article 2, 6, and 9
- Field work and reporting were supervised and/or performed by Qualified Environmental Professionals (QEP) in accordance with 18 AAC 75.333
- GHD's June 13, 2017 *Confirmation Assessment Work Plan*, approved by ADEC on July 6, 2017

The site background, subsurface investigation, analytical methods and results, and conclusions are outlined in the following sections.

2. Site Background

2.1 Site Description

The site is a former Texaco service station located at 230 Old Steese Highway in Fairbanks, Alaska (Figure 1). The property's legal description is TRACT B BLOCK 9 GRAEHL. The latitude and longitude are 64.848620°north and 147.703320°west. The station was active from 1959 to 1983 and included a building, two dispenser islands, five 4,000-gallon gasoline underground storage tanks (USTs), and one 500-gallon used oil UST. The USTs, piping and dispenser islands were removed without documentation or sampling and the excavation was reportedly backfilled with clean gravel. Petroleum hydrocarbons were identified in the subsurface during an Alaska Department of Transportation (DOT) investigation in 1991. Petroleum hydrocarbons detected at the site are likely a result of leaking USTs, piping and/or dispenser islands. An air sparge (AS)/soil vapor extraction (SVE) remediation system operated from 1995 to 2003. The system shutdown when air constituent concentration significantly dropped and it was determined the system was no longer effective. In 2008 the wells were abandoned and new AS/SVE system installed. The new AS/SVE system operated from 2008 to 2010, was shutdown from 2010 to 2013 to evaluate rebound, restarted in 2013 and ran until 2014 when it was decommissioned. The new AS/SVE system removed 1,053.3 pounds of gasoline range organics (GRO).

Land use surrounding the site is primarily commercial and residential. The site is currently owned by David Mongold and operates as an Allstate Insurance Company. Chevron is the responsible party for the active environmental case related to activities prior to 1993. The site is bordered by a

strip mall to the north across Minnie Street, a Holiday service station to the east across Old Steese Highway, a Taco King Restaurant to the south, and a flower shop to the west. The Holiday service station is listed in the ADEC Contaminated Sites Database (File ID: 102.26.003). Noyes Slough is located approximately 200 feet (ft) west of the site. Site photographs documenting drilling are included in Appendix A. Site environmental history is included in Appendix B.

2.2 Site Geology

The site is located in central Alaska between the northern Brooks Range and the southern Alaska Range. Fairbanks area bedrock consists of Paleozoic metasedimentary and metaigneous rocks overlain by glaciofluvial sediments. During the last glacial period the maximum extent of glaciers reached within approximately 50 miles of the Fairbanks area. Glaciofluvial sediments produced by the retreating glaciers dominate the local subsurface.

Site subsurface sediments consist primarily of sandy gravel fill to 8 feet below grade (fbg) underlain by sand with silt and gravel, including an intermittent silt layer 2 to 3 ft thick at 8 to 13 fbg, to the total explored depth of 22 fbg.

2.3 Site Hydrology

The site is located in central Alaska immediately north of the Chena River and east of Noyes Slough in the Tanana River Valley. Six onsite and four offsite flush mount groundwater monitoring wells are gauged and sampled annually. Historical static groundwater depths have ranged between 7.57 to 15.96 feet below top of casing (ft btoc) according to groundwater data from 1993 to present. Groundwater flow has ranged from south to north, with the dominant flow to the west or northwest.

2.4 Constituents of Potential Concern

Site constituents of potential concern (COPCs) are:

Table 2.1 Constituents of Potential Concern

COPCs	ADEC Cleanup Levels	
	Groundwater (mg/L)	Soil (mg/kg)
DRO	1.5	250
GRO	2.2	300
Benzene	0.0046	0.022
Naphthalene	1.46	43

mg/L milligrams per liter
mg/kg milligrams per kilogram
DRO diesel range organics

ADEC Table C Groundwater Cleanup Levels (*Title 18 AAC 75.345*) and ADEC Method Two Soil Cleanup Levels, Tables B1 and B2, under 40-inch zone, migration to groundwater (*Title 18 AAC 75.341*) are the default site cleanup levels for groundwater and soil.

2.5 Conceptual Site Model

GHD updated the conceptual site model (CSM) which includes information on sources, affected media and exposure pathways. Potentially complete pathways include incidental soil ingestion, dermal absorption of constituents from soil, and ingestion of groundwater. CSM scoping and graphic forms are included in Appendix C.

3. Subsurface Investigation

3.1 Confirmation Boring Rationale

GHD advanced six soil borings to evaluate post-remediation soil quality following the operation of AS/SVE systems operated onsite from 1995 to 2003, from 2008 to 2010, and in 2013 and part of 2014.

Soil samples collected before site remediation contained diesel range organics (DRO), gasoline range organics (GRO), benzene, toluene, ethylbenzene, and xylenes (BTEX) above ADEC cleanup levels at depths between 10 and 22 fbg. The confirmation soil borings were advanced downgradient of previous soil exceedances and samples for analyses were collected approximately 1 to 2 ft below historical hydrocarbon exceedances. Historical soil analytical data is presented in Appendix D.

- SB17-1 advanced downgradient from MW-2 (1993) contained GRO (410 milligrams per kilogram (mg/kg) and 1,100 mg/kg) and benzene (3.8 mg/kg and 0.05 mg/kg). SB17-1 was moved 30 ft northwest of the proposed location due to the proximity of overhead electric lines. ADEC representative, Shawn Tisdell, was onsite and approved the relocation on August 11, 2017.
- SB17-2 advanced downgradient from MW-3 (1993) was adjusted 1 ft east of the proposed location due to proximity of a water line. In 1993, MW-3 contained GRO at 2,000 mg/kg and 350 mg/kg, DRO at 670 mg/kg, and benzene at 6.3 mg/kg and 0.13 mg/kg.
- SB17-3 was advanced downgradient from SB-1. In 2006, SB-1 contained 770 mg/kg GRO and 3.3 mg/kg benzene at 16 to 19 fbg.
- SB17-4 was advanced downgradient of 1993 soil boring B-3. Soil sample B-3 collected from 20 to 21.5 fbg contained 780 mg/kg GRO and 12 mg/kg benzene. SB17-4 was moved approximately 1 ft northwest of the proposed location due to an obstruction encountered at 6 fbg.
- SB17-5 was advanced downgradient from MW-5, installed in 1991, to evaluate BTEX exceedances.

- SB17-6 was advanced downgradient from SB-3. Soil boring SB-3 was advanced in 2006 and contained: GRO at 380 mg/kg (13 to 15 fbg) and 1,000 mg/kg (15 to 18 fbg), and benzene at 1 mg/kg (13 to 15 fbg), and 2.0 mg/kg (15 to 18 fbg).

3.2 Pre-Field Coordination

GHD prepared a site specific health and safety plan to inform all site workers of known hazards and provide health and safety guidance. GHD coordinated site activities with laboratories, contractors, stakeholders, ADEC, and Chevron in advance. GHD conducted a pre field safety meeting with Chevron and all appropriate parties prior to the start of fieldwork. GHD observed a private utility locate on August 11, 2017 to determine any potential underground obstructions. Alaska Digline was notified on August 11, 2017 to clear the proposed boring locations for utilities. Chevron and GHD safety protocols were reviewed at daily tailgate meetings. A journey management plan was prepared to address safety concerns associated with traffic routes and onsite parking.

3.3 Drilling and Sampling

NRC Alaska advanced borings SB17-1 through SB17-6 to 8 fbg using a Vactor 2100 vacuum truck to clear boring locations for potential utilities on August 23, 2017. Discovery Drilling, Inc. advanced soil borings using a Geoprobe® 7822DT direct-push drill rig equipped with eight-inch outer diameter hollow-stem augers to approximately 22 fbg on August 24, 2017. Soils were logged using the Unified Soil Classification System. Oliver Yan, a trained geologist and QEP, oversaw all drilling activities. Fieldwork and reporting were supervised by QEP, Siobhan Pritchard. QEP resumes are included in Appendix E.

GHD field-screened the soil for volatile organic compounds (VOCs) with a photoionization detector (PID) in five foot intervals starting at 10 fbg. A clean plastic bag was partially filled (one-third to one-half) with soil and set aside for ten to fifteen minutes to allow VOCs to volatilize; the bags were agitated at the beginning and end of the headspace development. A calibrated PID was used to measure headspace VOC concentrations through a slit in the bag.

Soil samples for laboratory analysis were collected from 15 and 22 fbg from each boring, as well as from locations with the highest PID reading. Samples were collected using Geoprobe's dual tube sampling system, where a continuous Macro-Core acetate sampler was driven through the inner rod at five foot intervals. Soil samples were collected directly from the acetate sampler using a Terra Core™ sampler. Approximately 25 grams of soil were weighed and collected into methanol preserved laboratory supplied containers for high level VOC and GRO analysis. Low level VOC samples were collected by placing one Terra Core sampler of soil into a vial pre-preserved with sodium bisulfate. DRO samples were collected into 120 milliliter (mL) amber glass jars and a 125 mL clear jar was filled with soil for moisture analysis. Soil boring logs are included in Appendix F. Field notes are presented in Appendix G. GHD's drilling and soil sampling SOPs are included in Appendix H.

3.4 Data Quality

All field instruments were calibrated prior to mobilization according to the manufacturer's specifications. All field staff are trained in routine maintenance and operation of instrumentation.

The PID was calibrated prior to the start of field work however daily calibration was not conducted. Calibration forms are included in Appendix G.

Samples analyzed for VOCs (approximately 25 grams of soil preserved with methanol) were collected before samples for non-volatile compounds. All soil samples, including one duplicate per ten samples collected and/or per day of sampling were collected into clean containers supplied by the analytical laboratory, placed on ice in an insulated cooler, and chilled to a temperature of approximately 4°C (+/- 2ºC). The coolers were sealed for transport and shipped to Eurofins Lancaster Laboratories of Lancaster, Pennsylvania under chain of custody. Laboratory data were qualified by a GHD chemist and an ADEC Laboratory Data Review Checklist completed.

3.5 Investigation Derived Waste

Soil cuttings and decontamination water produced during the site assessment were combined and collected in four United States DOT approved Super Sacks® and one 55 gallon drum and stored onsite. The ADEC approved the transportation and disposal of approximately 4.3 cubic yards of soil on March 9, 2018 (Appendix I). The final disposal manifest will be submitted to the ADEC following disposal.

4. Analytical Methods and Results

4.1 Soil Analytical Methods

Select soil samples, duplicates, trip blanks, and equipment blanks were analyzed for the following constituents:

Table 4.1 Soil Analytical Methods

Analyte	Method	Method Detection Limits	Sample Hold Time
DRO	Alaska Series Method AK102	4.0 mg/kg	14 days
GRO	Alaska Series Method AK101	0.5 mg/kg	14 days
VOCs	Method SW-846 8260B	0.0005-0.015 mg/kg	14 days
PAHs	Method SW-846 8270M SIM	0.00035 – 0.00075 mg/kg	14 days

PAHs polynuclear aromatic hydrocarbons

4.2 Soil Analytical Results

No DRO, GRO, or benzene were detected above cleanup levels in any collected sample at 20 or 22 fbg. No DRO, GRO, benzene or PAHs were detected above cleanup levels in SB17-1. The highest DRO concentration detected was 6,000 mg/kg (SB17-6 Dup at 15.5 fbg). SB17-4 at 15 fbg contained the highest GRO (5,500 mg/kg) and naphthalene (20 mg/kg). The highest benzene concentration detected was 1.0 mg/kg (SB17-6 at 15 fbg).

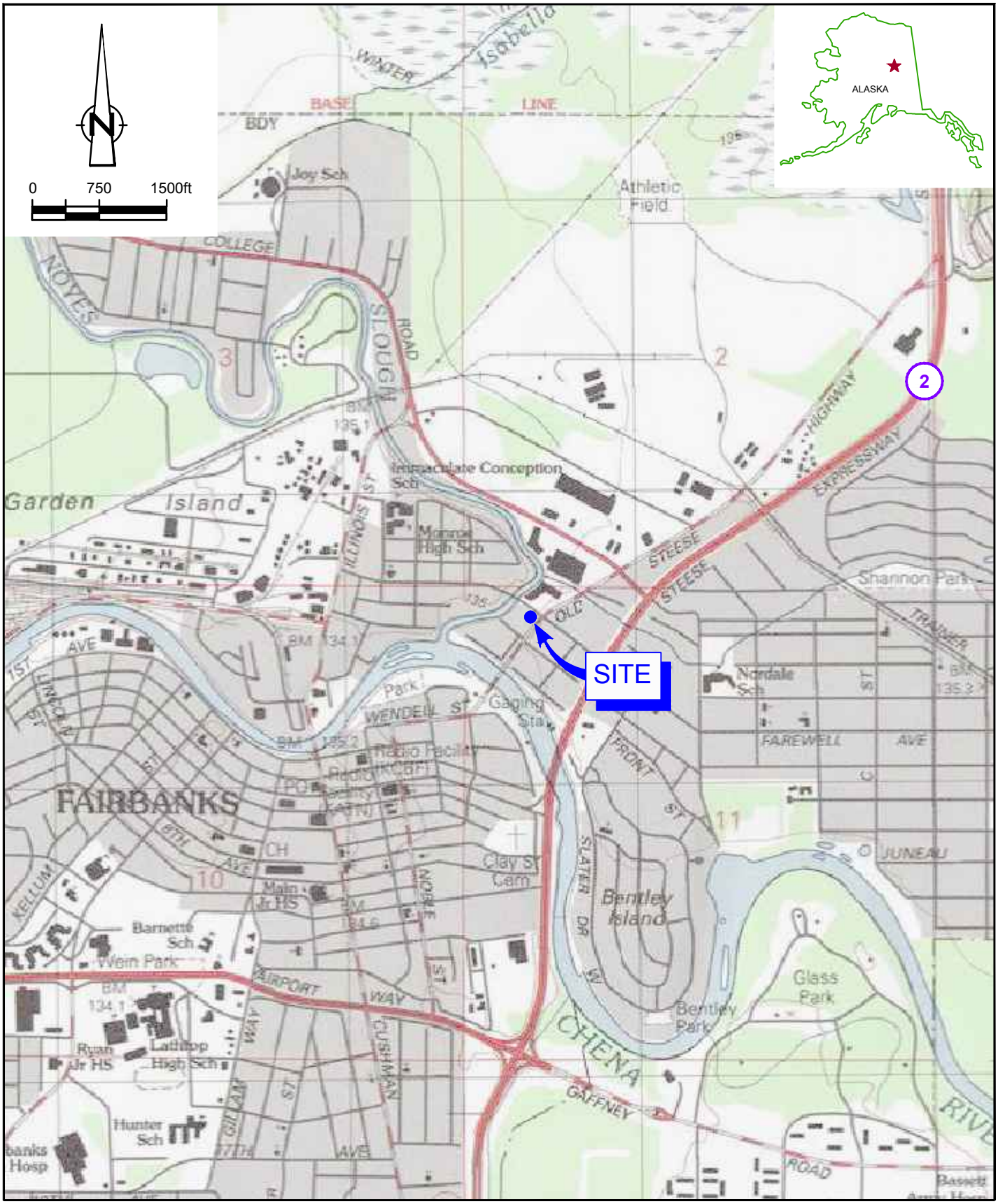
Method detection limits for high level VOC analysis did not meet ADEC data quality objectives. Therefore, low-level VOC analysis, using sodium bisulfate as a preservative, were reported.

Petroleum hydrocarbon concentrations in soil are presented in Table 1 and PAH results in soil are presented in Table 2. A summary of the results are presented on Figure 2. The laboratory analytical reports are presented in Appendix J. Based on the quality assurance/quality control review, the data submitted were judged to be acceptable for use with the specific qualifications noted. The ADEC Laboratory Data Review Checklist and memorandum are presented in Appendix K.

5. Conclusions

GHD advanced six soil borings to evaluate post-remediation soil quality. Residual petroleum hydrocarbons in soil are primarily located at the capillary fringe near the former USTs. Petroleum hydrocarbons have been vertically delineated and do not extend below 22 fbg. Results indicate attenuation near 2006 boring SB-1; however, petroleum hydrocarbons at SB17-2 have remained stable since 1993 (MW-3) and at SB17-6 have remained stable since 2006 (SB-3). Based on the data from the confirmation assessment borings and previous investigations, GHD concludes that subsurface petroleum hydrocarbon and naphthalene concentrations are below human health risk levels, stable, and not migrating offsite. Dissolved-phase petroleum hydrocarbons in groundwater have been below ADEC cleanup levels for three consecutive sampling events. Pending 2018 groundwater sampling results GHD will evaluate a cleanup complete with institutional controls designation with all stakeholders.

Figures



Source: TOPO! MAPS

US TRAVEL SYSTEMS / FORMER TEXACO SERVICE STATION
211083 230 OLD STEESE HIGHWAY
FAIRBANKS, ALASKA

65004-2018

Sep 15, 2017

VICINITY MAP

FIGURE 1

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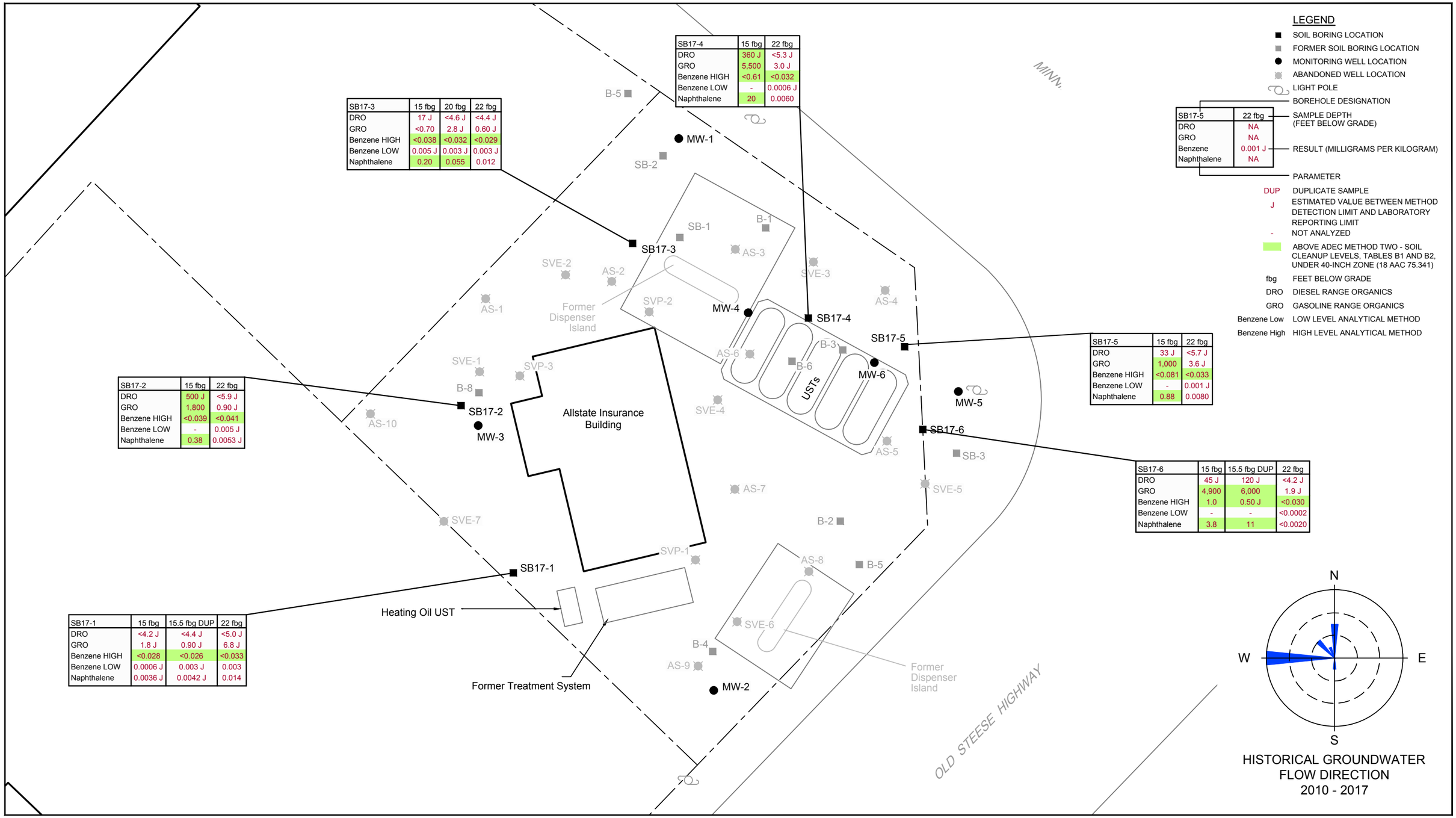

Source: Basemap modified from a July 29, 2014 survey performed by McLane Consulting Inc. BBL an Arcadis Company 2006 Soil Investigation Results. Shannon & Wilson, Inc. Monitoring well and Soil Boring Locations Dated May 1993.

US TRAVEL SYSTEMS / FORMER TEXACO SERVICE STATION 211083
230 OLD STEESE HIGHWAY
FAIRBANKS, ALASKA

PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL AUGUST 24, 2017

65004-2018
Mar 6, 2018

FIGURE 2

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Tables

Table 1

Soil Analytical Results
US Travel Systems/Former Texaco Service Station 211083
230 Old Steese Highway
Fairbanks, Alaska

Location	Date	Depth	HYDROCARBONS		PRIMARY VOCS								PCE		Naphthalene	Moisture	
	Units		DRO	GRO	Benzene		Toluene		Ethylbenzene		Total Xylenes						
			mg/kg	mg/kg	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	%	
					HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW			
ADEC Soil Cleanup Levels January 2017[a]		fbg	**250**	**1,400**	**0.022**	**0.022**	**6.7**	**6.7**	**0.13**	**0.13**	**1.5**	**1.5**	**0.19**	**0.19**	**0.038**		
SB17-1	08/24/2017	15 / 15.5	<4.2 J / <4.4 J	1.8 J / 0.9 J	**<0.028 / <0.026**	0.00060 J / 0.0030 J	<0.057 / <0.053	0.0050 / 0.012	<0.057 / <0.053	:0.00090 / 0.0020	<0.057 / <0.053	0.0020 J / 0.014	<0.057 / <0.053	<0.00090 / <0.00090	0.0036 J / 0.0042 J	5.4 / 3.6	5.4 / 3.6
SB17-1	08/24/2017	22	<5.0 J	6.8 J	**<0.033**	0.0030	0.25 J	0.14	0.12 J	0.092	0.69	0.45 E	<0.066	<0.00050	0.014	12.0	12.0
SB17-2	8/24/2017	15	**500 J**	**1,800**	**<0.039**	-	<0.077	-	0.11 J	-	**1.8**	-	<0.077	-	**0.38**	20.0	-
SB17-2	8/24/2017	22	<5.9 J	0.90 J	**<0.041**	0.0050 J	<0.082	0.012	<0.082	0.0050	<0.082	0.017	<0.082	<0.0010	0.0053 J	20.3	20.3
SB17-3	8/24/2017	15	17.0 J	<0.7	**<0.038**	0.005 J	<0.075	0.009	<0.075	0.002 J	<0.075	0.012	<0.075	<0.001	**0.20**	17.0	17.0
SB17-3	8/24/2017	20	<4.6 J	2.8 J	**<0.032**	0.003 J	<0.065	0.007	<0.065	0.047	0.067 J	0.05	<0.065	<0.0007	**0.055**	6.7	6.7
SB17-3	8/24/2017	22	<4.4 J	0.6 J	**<0.029**	0.003 J	<0.058	0.004 J	<0.058	<0.0009	<0.058	0.005	<0.058	<0.0009	0.012	6.4	6.4
SB17-4	8/24/2017	15	**360 J**	**5,500**	**<0.61**	-	**9.3**	-	**3.1 J**	-	**160**	-	**<1.2**	-	**20**	10.7	-
SB17-4	8/24/2017	22	<5.3 J	3.0 J	**<0.032**	0.0006J	<0.064	0.002 J	<0.064	0.0009 J	<0.064	0.012	<0.064	<0.0006	0.0060	11.7	11.7
SB17-5	8/24/2017	15	33 J	1,000	**<0.081**	-	0.66 J	-	**2.3**	-	**18**	-	<0.16	-	**0.88**	17.9	-
SB17-5	8/24/2017	22	<5.7 J	3.6 J	**<0.033**	0.001 J	<0.066	0.01	<0.066	0.01	0.074 J	0.035	<0.066	<0.0007	0.0080	13.8	13.8
SB17-6	8/24/2017	15 / 15.5	45 J / 120 J	**4,900 / 6,000**	**1.0 / 0.50 J**	-	**35 / 37**	-	**44 / 53**	-	**510 / 450**	-	<0.17 / <0.13	-	**3.8 / 11**	18.9 / 10.2	
SB17-6	8/24/2017	22	<4.2 J	1.9 J	**<0.030**	<0.0002	<0.060	0.003	<0.060	0.001 J	0.078 J	0.011	<0.060	<0.0005	<0.0020	6.1	6.1

Abbreviations and Notes:

VOC = Voloatile Organic Compounds by method SW846 8260B

DRO = Diesel Range Organics by Alaska Series Method AK102

GRO = Gasoline Range Organics by Alaska Series Method AK101

PCE = Tetrachloroethylene by method SW846 8260B

fbg = feet below grade

mg/kg = milligrams per kilogram

ADEC = Alaska Department of Environmental Conservation

LOW = Low level analytical method

HIGH = High level analytical method

a = ADEC Method Two - Soil Cleanup Levels, Tables B1 and B2, Under 40-inch zone (18 AAC 75.341)

x / y = sample results / blind duplicate results

<x = Constituent not detected above x milligrams per kilogram

J = Estimated value

BOLD = Indicates concentration above the ADEC Soil Cleanup Level

- = not analyzed

E = concentration exceeds the calibration range

Table 2

PAHs Soil Analytical Results
US Travel Systems / Former Texaco Service Station 211083
230 Old Steese Highway
Fairbanks, Alaska

Location	Date	Depth	PAHs																
	Units	fbg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Anthracene mg/kg	Benzo(a)anthracene mg/kg	Benzo(a)pyrene mg/kg	Benzo(b)fluoranthene mg/kg	Benzo(g,h,i)perylene mg/kg	Benzo(k)fluoranthene mg/kg	Chrysene mg/kg	Dibenz(a,h)anthracene mg/kg	Fluoranthene mg/kg	Fluorene mg/kg	Indeno(1,2,3-cd)pyrene mg/kg	Naphthalene mg/kg	Phenanthrene mg/kg	Pyrene mg/kg
ADEC Soil Cleanup Levels January 2017[a]			**18**	**37**	**390**	**0.28**	**0.27**	**2.7**	**15,000**	**27**	**82**	**0.87**	**590**	**36**	**8.8**	**0.038**	**39**	**87**
SB17-1	8/24/2017	15 / 15.5	<0.0010 / <0.0010	<0.0021 / 0.0020	<0.0010 / <0.0010	<0.0021 / <0.0020	<0.0021 J / <0.0020	<0.0021 / <0.0020	<0.0021 / <0.0020	<0.0021 / <0.0020	<0.001 / <0.001	<0.0021 / <0.0020	<0.0021 / <0.0020	<0.0021 / <0.0020	<0.0021 / <0.0020	0.0036 J / 0.0042 J	<0.0021 / <0.0020	<0.0021 / <0.0020
SB17-1	8/24/2017	22	<0.0011	<0.0022	<0.0011	<0.0022	<0.0022 J	<0.0022	<0.0022	<0.0022	<0.0011	<0.0022	<0.0022	<0.0022	<0.0022	0.014	<0.0022	<0.0022
SB17-2	8/24/2017	15	0.0085	0.029	0.0090	0.0069	0.0035 J	0.0039 J	0.0034 J	<0.0024	0.0077	<0.0024	0.014	0.051	<0.0024	0.38	0.043	0.024
SB17-2	8/24/2017	22	<0.0012	<0.0024	<0.0012	<0.0024	<0.0024 J	<0.0024	<0.0024	<0.0024	<0.0012	<0.0024	<0.0024	<0.0024	<0.0024	0.0053 J	<0.0024	<0.0024
SB17-3	8/24/2017	15	0.0023 J	<0.0023	0.0043 J	0.0042 J	0.0043 J	0.0047 J	0.0055 J	<0.0023	0.0037 J	<0.0023	0.0060	0.0028 J	0.0024 J	**0.20**	0.016	0.0098
SB17-3	8/24/2017	20	<0.0010	<0.0021	<0.0010	<0.0021	<0.0021 J	<0.0021	<0.0021	<0.0021	<0.0010	<0.0021	<0.0021	<0.0021	<0.0021	**0.055**	<0.0021	<0.0021
SB17-3	8/24/2017	22	<0.0010	<0.0020	<0.0010	<0.0020	<0.0020 J	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020	<0.0020	<0.0020	<0.0020	0.012	<0.0020	<0.0020
SB17-4	8/24/2017	15	0.012	0.024	0.015	0.0053 J	<0.0022 J	<0.0022	<0.0022	<0.0022	0.0039 J	<0.0022	0.018	0.058	<0.0022	**20**	0.077	0.016
SB17-4	8/24/2017	22	<0.0011	<0.0022	<0.0011	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0011	<0.0022	<0.0022	<0.0022	<0.0022	0.0060	<0.0022	<0.0022
SB17-5	8/24/2017	15	0.0013 J	0.0026 J	<0.0012	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0012	<0.0023	<0.0023	0.0055 J	<0.0023	**0.88**	0.0054 J	<0.0023
SB17-5	8/24/2017	22	<0.0011	<0.0023	<0.0011	<0.0023	<0.0023	<0.0023	<0.0023	<0.0023	<0.0011	<0.0023	<0.0023	<0.0023	<0.0023	0.0080	<0.0023	<0.0023
SB17-6	8/24/2017	15 / 15.5	0.0014 J / 0.0031 J	0.0042 J / 0.064 J	<0.0012 J / 0.020 J	<0.0024 / 0.0032 J	<0.0024 / <0.0022	<0.0024 / <0.0022	<0.0024 / <0.0022	<0.0024 / <0.0022	<0.0012 / 0.0029 J	<0.0024 / <0.0022	<0.0024 / 0.015	0.0066 J / 0.046 J	<0.0024 / <0.0022	**3.8 / 11**	0.0082 J / 0.067 J	<0.0024 / 0.013
SB17-6	8/24/2017	22	<0.0010	<0.0020	<0.0010	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0010	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.002	<0.0020

Notes and Abbreviations

PAH = Polynuclear Aromatic Hydrocarbons by method SW-846 8270C SIM (Selected Ion Monitoring)
fbg = feet below grade
mg/kg = milligrams per kilogram
ADEC = Alaska Department of Environmental Conservation
a = ADEC Method Two - Soil Cleanup Levels, Tables B1 and B2, Under 40-inch zone (18 AAC 75.341)
x / y = sample results / blind duplicate results
<x = Constituent not detected above x milligrams per kilogram
J = Estimated value
BOLD = Indicates concentration above the ADEC Soil Cleanup Level

Appendices

Appendix A
Site Photographs

PHOTO 1: SB17-2 FACING SOUTHWEST

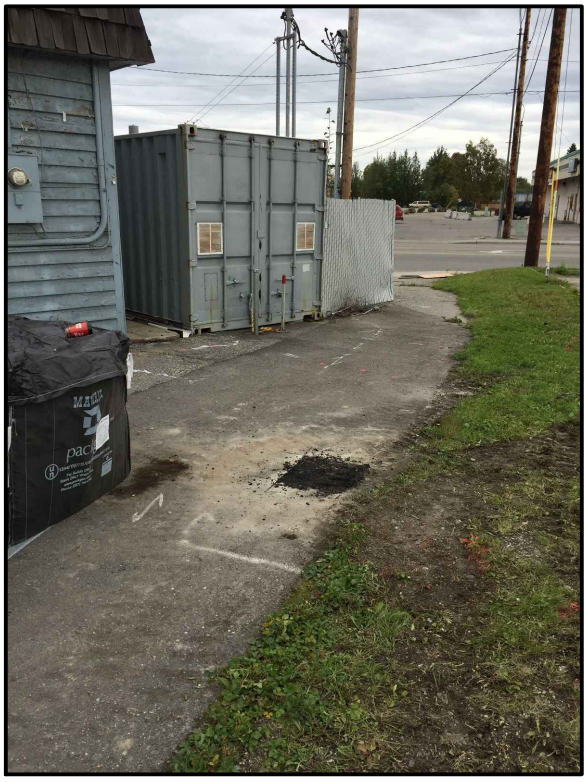


PHOTO 2: SB17-1 FACING SOUTH

PHOTO 3: SB17-3 FACING SOUTH

PHOTO 4: VACUUM TRUCK AT SB17-1 FACING SOUTHEAST

PHOTO 5: SB17-4 FACING NORTHWEST

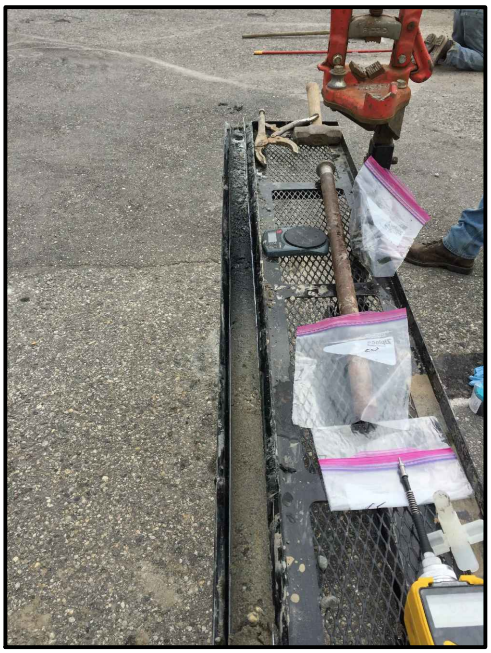


PHOTO 6: SOIL CORE FROM SB17-5 (10 – 15 FBG)

PHOTO 7: SB17-5 AND SB17-6 FACING NORTH

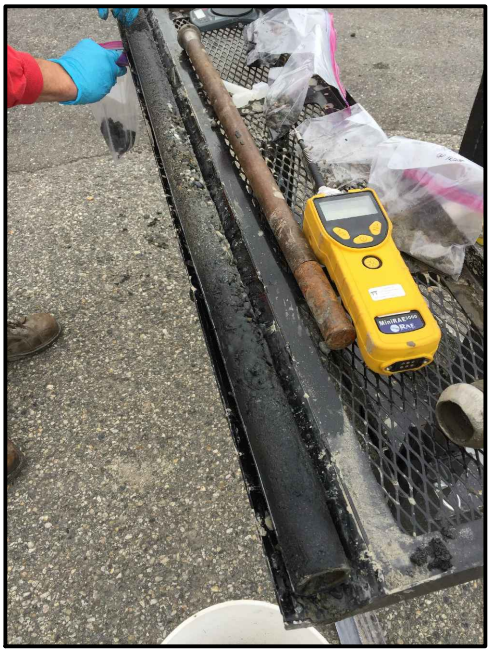


PHOTO 8: SOIL CORE FROM SB17-6 (10 – 15 FBG)

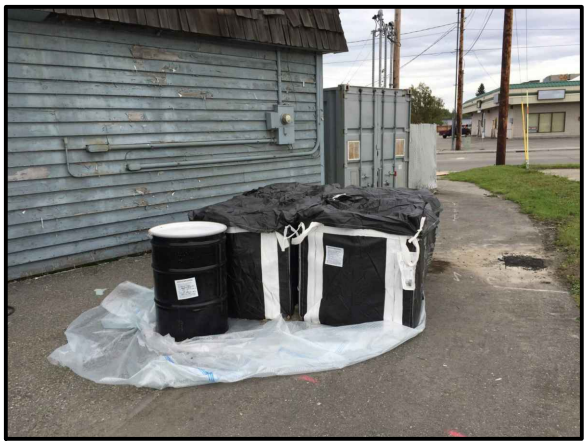


PHOTO 9: WASTE STORAGE NEAR SB17-1 FACING SOUTH

US TRAVEL SYSTEMS / FORMER TEXACO SERVICE STATION 211083
230 OLD STEESE HIGHWAY
FAIRBANKS, ALASKA

65004-2018

Mar 12, 2018

SITE PHOTOGRAPHS

Appendix B
Site Environmental History

Appendix B Environmental History
US Travel Systems / Former Texaco 211083

1993 Well Installation
Shannon and Wilson, Inc. installed wells MW-1 through MW-4 and advanced soil borings B-1 through B-3. Details are presented in the Shannon and Wilson report: *Results of Initial Site Assessment and Release Investigation,* dated May 4, 1993.

1994 Well Installation
Shannon and Wilson installed wells MW-7 and MW-8. Details are presented in the Shannon and Wilson report: *Results of Off-Site Well Installation and Initial Sampling,* dated August 5, 1994.

1995 Remediation System Installation
Shannon and Wilson installed a vapor extraction and air injection remediation system which operated from January 1995 until December 2003. Details are presented in the Shannon and Wilson report: *Corrective Action Activities*, dated October 1996.

2002 Well Point Installation
Well points WP-1 through WP-8 were installed. Two well points were converted to monitoring wells MW-9 and MW-10. Details are presented in the Shannon and Wilson report: *Results of Monitoring Well and Temporary Well Point Sampling*, dated January 18, 2002.

2006 Soil Characterization
Arcadis advanced sixteen membrane interface probe (MIP) borings. Details are presented in the Arcadis report: *Additional Soil Characterization Report*, dated December 28, 2006.

2008 Remediation System Installation
Arcadis installed soil vapor extraction (SVE) wells SVE-1 through SVE-7 and air sparge (AS) wells AS-1 through AS-10. Previous remediation wells were abandoned. The remediation system was installed and operation began in 2008. The system was shut down in July 2008 to evaluate rebound. Details are presented in the Arcadis report: *Remediation System Installation Report*, dated January 14, 2008.

2014 Soil Vapor Assessment
GHD installed three soil vapor probes to evaluate inhalation exposure pathways. Details are presented in the GHD report: *Revised Soil Vapor Assessment Report*, dated March 2015.

2014 Remediation System Decommissioning
GHD decommissioned the AS/SVE well network and remediation system. Details are presented in the GHD report: *Revised Remediation System Decommissioning Report*, dated March 2015.

Appendix C
CSM Graphic and Scoping Forms

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Chevron 211083

File Number: 102.26.046

Completed by: Travis Weaver

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☒ USTs
- ☐ ASTs
- ☒ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☐ Other:

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☐ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☐ Sediment
- ☐ Groundwater
- ☐ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☐

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☐

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Soil gas data collected confirmed that volatile contaminants are not migrating to the surface and the inhalation pathway is incomplete.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Soil gas data collected confirmed that volatile contaminants are not migrating to the surface and the inhalation pathway is incomplete.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: US Travel Systems/Chevron 211083
ADEC File ID: 102.26.046

Completed By: Travis Weaver
Date Completed: 2/26/18

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☐ Surface Soil (0-2 ft bgs)	☐ Direct release to surface soil — check soil	☑ soil	☑ Incidental Soil Ingestion	F	C/F	C/F	C/F			
	☐ Migration to subsurface — check soil		☑ Dermal Absorption of Contaminants from Soil	F	C/F	C/F	C/F			
	☐ Migration to groundwater — check groundwater		☐ Inhalation of Fugitive Dust							
	☐ Volatilization — check air									
	☐ Runoff or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — check soil	☑ groundwater	☑ Ingestion of Groundwater	F	C/F	C/F	C/F			
	☑ Migration to groundwater — check groundwater		☐ Dermal Absorption of Contaminants in Groundwater							
	☑ Volatilization — check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Ground-water	☐ Direct release to groundwater — check groundwater	☐ air	☐ Inhalation of Outdoor Air							
	☐ Volatilization — check air		☐ Inhalation of Indoor Air							
	☐ Flow to surface water body — check surface water		☐ Inhalation of Fugitive Dust							
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Surface Water	☐ Direct release to surface water — check surface water	☐ surface water	☐ Ingestion of Surface Water							
	☐ Volatilization — check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Sedimentation — check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Sediment	☐ Direct release to sediment — check sediment	☐ sediment	☐ Direct Contact with Sediment							
	☐ Resuspension, runoff, or erosion — check surface water									
	☐ Uptake by plants or animals — check biota	☐ biota	☐ Ingestion of Wild or Farmed Foods							
	☐ Other (list):									

Revised, 10/01/2010

Appendix D
Historical Soil Analytical Data

Table 1

Historical Soil Analytical Data: GRO and BTEX
US Travel Systems/Former Texaco 211083
230 Old Steese Highway
Fairbanks, Alaska

Sample Location	Depth (feet bgs)	Date Sampled	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes
ADEC Soil Cleanup Level			**300**	**250**	**11,000**	**0.02**	**5.4**	**5.5**	**78**
SB1	16-19	10/20/06	**<890**	**6.5**	**<4.6**	**1.2**	**16**	**11**	**61**
	16-19[D]	10/20/06	**770**	**40[1]**	**14[1]**	**3.3**	**42**	**17**	**92**
SB2	17-20	10/20/06	**19**	<4.5	<4.5	<0.01	<0.05	<0.06	<0.1
SB3	13-15	10/20/06	**380**	**27**	**11**	**1**	**13**	**2.1**	**32**
	15-18	10/20/06	**1,000**	**31**	**9.2**	**2.0**	**34**	**13**	**60**
MW-8	15.0	07/01/94	ND	6.0	--	ND	ND	ND	ND
	20.0	07/01/94	ND	7.6	--	ND	ND	ND	ND
MW-7	10.0	06/30/94	ND	9.9	--	ND	ND	ND	ND
	15.0	06/30/94	ND	13.0	--	ND	ND	ND	ND
MW-1	12.5-14	03/29/93	<0.05	15	--	<0.05	<0.05	<0.05	<0.1
	15-16.5	03/29/93	2500	480	--	3.5	110	71	370
	15-16.5[D]	03/29/93	1800	--	--	--	--	--	--
	20-21.5	03/29/93	2	20	--	<0.05	<0.05	<0.05	<0.1
MW-2	10-11.5	03/29/93	410	100	--	<0.05	<0.05	4.7	36
	10-11.5[D]	03/29/93	--	49	--	--	--	--	--
	12.5-14	03/29/93	1100	45	--	3.8	19	23	120
	20-21.5	03/29/93	15	15	--	0.05	0.1	0.09	0.24
MW-3	12.5-14	03/29/93	2000	670	--	<0.05	43	59	320
	12.5-14[D]	03/29/93	--	25	--	--	--	--	--
	15-16.5	03/29/93	350	48	--	6.3	20	7.4	37
	20-21.5	03/29/93	3.2	6.2	--	0.13	0.22	<0.05	0.26
MW-4	7.5-9	03/29/93	5.8	34	--	<0.05	<0.05	<0.05	<0.1
	10-11.5	03/29/93	33	34	--	<0.05	<0.05	<0.05	1.1
	10-11.5[D]	03/29/93	--	--	--	<0.05	3	8.5	50
	20-21.5	03/29/93	43	27	--	0.15	0.29	<0.05	0.27
B-1	2.5-4	03/29/93	3.3	6.2	--	--	--	--	--
	2.5-4[D]	03/29/93	--	--	--	<0.05	<0.05	<0.05	<0.1
	5-6.5	03/29/93	--	--	--	<0.05	<0.05	<0.05	<0.1
B-2	7.5-9	03/29/93	3.3	15	--	<0.05	<0.05	0.15	0.35
B-3	2.5-4	03/29/93	5.9	60	--	--	--	--	--
	2.5-4[D]	03/29/93	29	--	--	--	--	--	--
	20-21.5	03/29/93	780	19	--	12	41	14	62
DOT MW-2 (MW-5)	10-12	08/01/91	d	--	--	illegible, but greater than standards			
	12-14	08/01/91	d	--	--				

Notes

All results are reported in milligrams per kilogram (mg/kg)
Cleanup Levels: ADEC soil cleanup level for migration to groundwater, under 40-inch zone.

ND	Not detected and detection limit not available
--	not analyzed
D	Field duplicate
GRO	Gasoline range organics, analyzed by AK Method 101.
BTEX	Benzene, toluene, ethylbenzene, and total xylenes, analyzed by EPA Method 8021
2.0	Concentration greater than the applicable ADEC soil cleanup level
40[1]	[1]Sample analyzed after holding time was exceeded.
< 0.05	not detected greater than the laboratory reporting limit

Table 2
Historical Soil Analytical Data: Polynuclear Aromatic Hydrocarbons
US Travel Systems/Former Texaco 211083
230 Old Steese Highway
Fairbanks, Alaska

			Acenaphthene	Pyrene	Naphthalene	Acenaphthylene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene
ADEC Soil Cleanup Level			**210**	**1,500**	**21**	**6,100**	**270**	**30,000**	**4,300**	**2,100**	**6**	**620**	**20**	**200**	**3**	**54**	**6**	**3,000**
	16-19	10/20/06	<0.039	<0.039	0.24	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039
SB1	16-19[D]	10/20/06	<0.038	<0.038	0.32	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038
SB2	17-20	10/20/06	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038
SB3	13-15	10/20/06	<0.038	<0.038	4.1	<0.038	0.058	0.11	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038	<0.038
SB3	15-18	10/20/06	<0.036	<0.036	0.66	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036

Notes
Sample results compared with the ADEC soil cleanup level for migration to groundwater, under 40-inch zone.
Polynuclear aromatic hydrocarbons (PAHs) were analyzed by EPA Method 8270 C.
mg/kg = milligram per kilogram
Highlighted concentrations are greater than the ADEC soil cleanup level for migration to groundwater, under 40-inch zone.
< = not detected greater than the laboratory reporting limit
D = Duplicate sample

Appendix E
QEP Resumes

Siobhan Pritchard

Qualified: MA (Structural Geology), 2006, BS, Geology, 2000

Connected: Registered Professional Geologist: Wyoming, Member, Geological Society of America, Member, Colorado Groundwater Association, Member

Professional Summary: Siobhan is an effective and articulate communicator who quickly gains the trust and confidence of clients, stakeholders, on-site staff, senior management, and key decision makers. In her 10 years of experience, Siobhan continues to identify opportunities for improvement, make recommendations, and helps implement innovative processes to meet an ever-changing regulatory environment's and client's needs.

Oil and Gas – Remediation and Environmental Risk Evaluation

Senior Project Manager

Mid Way | Baker Hughes | Casper, Wyoming | 2015 - ongoing

Siobhan provides senior oversight for field work and project establishment for a Baker Hughes storage facility formerly an asphalt manufacturer facility. She has provided oversight for site investigations to determine the most effective remediation strategy for property divestment.

Senior Project Manager

Various Projects | Chevron Environmental Management Company | Alaska | 2011 - ongoing

Siobhan is responsible for senior management of the Chevron EMC Alaska portfolio including multiple retail remediation sites. Siobhan negotiates remediation strategies based on client interest and state regulations and requirements. Sites are currently at various stages of remediation. Several sites are located in remote areas necessitating additional logistical challenges. Siobhan routinely evaluates and presents remedial alternatives to remediation system teams that satisfy both client expectations and regulatory requirements.

Technical Reviewer

Various Projects | Various Clients | Alaska, Colorado, New Mexico, Utah, Wyoming | Ongoing

Siobhan is the senior reviewer for assessment and remediation reports in several states for legacy pipeline releases, natural gas well sites, production facilities, storage facilities, retail stations, and bulk fuel terminals.

Remediation Activities

Senior Project Manager

Various Projects | Chevron EMC | Anchorage, Alaska | 2011 - ongoing

Siobhan manages several active remediation sites that utilize technology such as air sparge/soil vapor extraction, passive groundwater collection, and in-situ bioremediation. Siobhan has worked closely with engineers, clients and regulators to develop active remediation strategies that satisfy regulatory requirements as well as cost efficient strategies. She has recently become involved in identifying sustainable remediation strategies, including active remediation, waste disposal and sampling methods.

Field Geologist

Various Remediation Projects | Various Clients | Colorado and Alaska | 2007 - 2012

Siobhan was responsible for field oversight and knowledge of soil sampling procedures and techniques; groundwater sampling procedures and techniques; subsurface and hydrogeological investigations. Siobhan conducted routine inspections of nitrogen, ozone and oxygen injection remediation systems.

Oil and Gas Upstream/Pipeline Facilities – Site Assessments

Project Manager

Due Diligence Investigations | Various Clients | Colorado, Wyoming, Utah | 2011 - 2015

Siobhan was the Project Manager for multiple sites as part of due diligence evaluations and liability divestments. Responsible for financial management, site documentation, file review, stakeholder engagement, field activities, site assessments, risk evaluation, and reporting for sites.

Project Manager

Stormwater Permitting | Various Clients | Colorado | 2010 - 2012

Siobhan was the Project Manager for multiple sites requiring Stormwater Management Plans as well as updating permits and conducting training for compliance with new regulations. Responsible for financial management, site documentation, file review, stakeholder engagement, field activities, site assessments, risk evaluation, and reporting for sites.

Safety Officer

Office Safety Officer

Various Clients | Denver, Colorado | 2007 - 2012

Siobhan was responsible for preparing health and safety plans, journey management plans, and job safety analyses. Other duties included running office safety meetings, pre field health and safety meetings, and tailgate safety meetings. She provided quality control oversight during groundwater and soil sampling events. She also provided oversight during hot work/high hazard activities.

Geologist and Hydrogeologist

Field Geologist

Site Assessments | Chevron EMC, Delta Western | Alaska | 2007 - 2012

Siobhan was responsible for coordination and preparation, development, and submittal of proposals to complete site assessment activities within the Alaska Contaminated Sites Program. Siobhan was responsible for the scheduling, planning, field work activities, and reporting of assigned sites.

Field Geologist

Phase I Environmental Site Assessments | Various Clients | Colorado and Alaska | 2008 - 2012

Siobhan was responsible for Phase I Environmental Site Assessments in Colorado and Alaska in accordance with ASTM Standards.

Field Hydrogeologist

Dutch Harbor | Delta Western | Alaska | 2011

Siobhan was responsible for oversight for subsurface investigations related to a legacy pipeline release which led to agency closure.

Field Geologist

Various Remediation Projects | Various Clients | Colorado and Alaska | 2007 - 2012

Siobhan was responsible for field oversight and knowledge of soil sampling procedures and techniques; groundwater sampling procedures and techniques; subsurface and hydrogeological investigations. Siobhan conducted routine inspections of nitrogen, ozone and oxygen injection remediation systems.

Other Geologic Research

Field Geologist

Various Projects | Colorado, New Mexico, Washington, Ireland, Costa Rica, Argentina, Chile | 1997 - 2000

- Analyzed and mapped shatter cones from the Santa Fe impact structure.
- Experience with shatter cone petrography to identify impact glass and microscopic shock structures, such as planar deformation features.
- Analyzed Andean Cordilleran and Precordilleran, Costa Rican, Southeastern United States, Wisconsin, and Rocky Mountain geology through mapping formation contacts, fault movement and orientation, rock analysis, grain analysis, and aerial photography analysis.
- Analyzed various lava flows from Volcan Arenal using rock and grain analysis and geochemistry analysis.
- Experience analyzing cores and with log interpretation.
- Conducted 2D and 3D seismic mapping for several large potential oil fields.
- Conducted ground penetrating radar surveys.
- Conducted species diversity research in western Ireland.
- Research assistant on a NASA Space Grant studying near shore shoaling waves and depth to sea floor.
- Experience with Fortran 90, Matlab, Unix, Microsoft Office, Adobe Photoshop and Illustrator, Autocad, and 3D Quickmove.

Work history

2007 – present	GHD (formerly Conestoga-Rovers & Associates), Golden, CO

Other related areas of interest

Recognized (Certifications/Trainings)

- Loss Preventions Systems
- Federal Regulatory Commission Training
- Alaska Qualified Person
- OSHA 40-hour HAZWOPER, 2007
- OSHA 8-hour HAZWOPER refresher, 2008-present

Published Refereed Papers

- "Shatter Cone Occurrences Indicate a Possible Impact Structure near Santa Fe, New Mexico, GSA Abstracts with Programs" Vol. 38 n. 7 pp. 298.(with Fackelman, S.P., McElvain, T.H., Morrow, J.R., Koeberl, C., 2006)
- "Shatter cone and microscopic shock alteration for a post Paleoproterozoic terrestrial impact structure near Santa Fe, New Mexico, USA", Earth and Planetary Science Letters v. 207 pp. 209 299.(with
  - Fackelman, S.P., Morrow, J.R., Koeberl, C., McElvain, T.H., 2008)

Papers Presented and Published in Conference Proceedings

- "Shatter Cone Exposures Indicate a New Bolide Impact Structure Near Santa Fe, New Mexico", Lunar and Planetary Science Conference XXXVIII.2007

Presentations

- Colorado Oil and Gas Association "Environmental Remediation" luncheon presentation

Oliver Yan
Project Coordinator/Geologist

Qualified: B.Sc., Geology and minor in Anthropology, University of California, Davis

Professional Summary: Oliver has worked in the field of environmental and geologic field consulting since 2008. Oliver has a diverse background in managing and performing environmental site assessments for a variety of petroleum, industrial, and commercial properties throughout California, Alaska, and Washington. Oliver has coordinated and conducted numerous soil and groundwater investigations involving various sampling techniques and field procedures. Oliver exhibits good proposal development and reporting, effective communication, good organization, and excellent interpersonal skills.

Project Coordinator/Geologist
Retail and Bulk Storage Petroleum Sites | Various Clients | Alaska

Oliver acts as project coordinator for various retail and bulk storage petroleum facilities. He performs various site assessment activities, including borehole advancement, soil and groundwater sample collection, soil gas sampling, and well installation and destruction. He develops and prepares various site assessment reports, including work plans, site investigation summary reports, and cleanup complete (Site Closure) reports.

Project Coordinator/Geologist
Phase I Environmental Site Assessments | Various Clients | Alaska, Washington, and Idaho

Oliver performed Phase I Environmental Site Assessments and Property Transaction Screens to determine the presence of potential Recognized Environmental Conditions prior to sale of various agricultural, commercial, and industrial properties. Assessments included historical records review, property walk-throughs, and document preparation.

Staff Geologist
Retail and Bulk Storage Petroleum Sites | Various Clients | California

Oliver coordinates and implements all logistical aspects of site investigation work including: health and safety, access agreements, notification letters, property relations, local permits, subcontractor coordination (drilling, traffic control, and laboratory), sampling supplies/equipment coordination, and waste handling/manifesting/disposal. Experience with multiple field techniques including: hollow-stem auger, direct push/cone penetrometer, and sonic drilling technologies. Oversight of well installation, soil boring advancement, soil vapor probe installation, subslab vapor probe installation, and remedial activities (site excavation/UST removal and remedial system demolition). Proficient in soil logging (USCS Classification), surface soil sampling, subsurface soil sampling, grab-groundwater sampling, monitoring well sampling, soil vapor sampling, ambient air sampling, and sensitive receptor/door-to-door surveys. Prepared reports including: Low-Threat Closure reports, Feasibility Studies, Corrective Action Plans, Conceptual Site Models, Subsurface Investigation Reports, Groundwater Monitoring Reports, and Work Plans.

Field Equipment and Fleet Manager
CRA | California and Washington Offices | October 2011 through May 2013

Oliver managed fleet vehicles for the CRA West Coast offices and managed the field equipment for the Emeryville, California office. Tasks include, but are not limited to: coordination of fleet maintenance, GPS tracking, obtaining all field equipment/sampling supplies, and managed all equipment certifications.

Other related areas of interest

Recognized (Certifications/Trainings

- OSHA 40-hour Hazardous Waste Operation and Emergency Response (HAZWOPER) Worker Training (per 29 CFR 1910.20), June 2008
- OSHA 8-hour HAZWOPER Worker, Refresher, September 2016
- CPR, AED, and Standard First Aid Certified, April 2017
- Loss Prevention Safety Training, July 2008
- Excavation Competent Person Training, December 2008
- Department of Transportation Hazardous Materials Transportation (49 CFR 172.704) Training, December 2016
- RCRA Hazardous Waste Management (RCRA 40 CFR Part 265.16) Training, Marc 2017 (annual refresher)
- Groundwater Pollution & Hydrology Course, Princeton Groundwater, Inc., March 2013
- 10-hour Occupational Safety & Health Training (Construction Safety & Health), January 2014
- Defensive Driving Training, October 2016

Work history

August 2015 – present	GHD Services, Inc., Anchorage, Alaska
October 2011 – August 2015	GHD Services, Inc. (formerly Conestoga-Rovers & Associates), Emeryville, California
June 2008 – October 2011	Conestoga-Rovers & Associates, Rancho Cordova, California

Appendix F
Soil Boring Logs

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: US Travel Systems / Former Texaco 211083
PROJECT NUMBER: 065004
CLIENT: Chevron EMC
LOCATION: 230 Old Steese Highway, Fairbanks, Alaska

HOLE DESIGNATION: SB17-1
DATE COMPLETED: August 24, 2017
DRILLING METHOD: Direct Push/Vacuum Truck
FIELD PERSONNEL: O. Yan/T. Weaver

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	ASPHALT	0.42					
	GP-SANDY GRAVEL (FILL), brown to grayish brown, dry						
7.00	SP-SAND, fine grained, poorly graded, gray, moist	7.00					
10			1				0.1
12	- fine to coarse grained, well graded, wet at 13.0ft BGS		2				1.0
14	- fine gravel up to 1/2", grayish tan at 15.0ft BGS - brown at 15.5ft BGS - grayish brown at 16.0ft BGS		SB17-1-15 3				3.1
18							
20	- fine to medium gravel up to 1" at 20.0ft BGS		4				33.0
22	END OF BOREHOLE @ 22.0ft BGS	22.00	5 SB17-1-22				45.1
24							
26							
28							
30							
32							
34							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS ⬭

OVERBURDEN LOG 065004-WI.GPJ GHD_Corp 3/5/18

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: US Travel Systems / Former Texaco 211083
PROJECT NUMBER: 065004
CLIENT: Chevron EMC
LOCATION: 230 Old Steese Highway, Fairbanks, Alaska

HOLE DESIGNATION: SB17-2
DATE COMPLETED: August 24, 2017
DRILLING METHOD: Direct Push/Vacuum Truck
FIELD PERSONNEL: O. Yan/T. Weaver

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	ASPHALT	0.25					
	GP-SANDY GRAVEL (FILL), with fine to medium sand, brown, dry						
	GP-SANDY GRAVEL, with fine to medium sand, fine to medium grained, grayish brown, dry	4.00					
	SP-SAND, fine to medium grained, poorly graded, tan/brown, dry	8.00					
			1				0.3
	GP-GRAVEL, fine gravel, poorly graded, brown, wet	13.00 ▽	2				0.0
	SP-SAND, with fine gravel, fine to medium grained, poorly graded, gray, wet	14.00	SB17-2-15 3				64.7
	SP-GRAVELLY SAND, fine to medium rounded to subangular gravel up to 1", fine to coarse grained, well graded, gray, wet	17.00					
	SP-SAND, fine grained, poorly graded, gray, wet	20.00	4				3.0
	END OF BOREHOLE @ 22.0ft BGS	22.00	5 SB17-2-22				0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS ⬭

OVERBURDEN LOG 065004-WI.GPJ GHD_Corp 3/5/18

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: US Travel Systems / Former Texaco 211083
PROJECT NUMBER: 065004
CLIENT: Chevron EMC
LOCATION: 230 Old Steese Highway, Fairbanks, Alaska

HOLE DESIGNATION: SB17-3
DATE COMPLETED: August 24, 2017
DRILLING METHOD: Direct Push/Vacuum Truck
FIELD PERSONNEL: O. Yan/T. Weaver

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	ASPHALT	0.25					
	GP-ANDY GRAVEL (FILL), brown to gray, dry						
8	ML-SILT, with fine sand, trace medium gravel, light brown, dry	8.00					
10			1				0.1
11	SP-SAND, with fine gravel up to 0.5", fine to medium grained, poorly graded, grayish brown, moist to wet	11.00					
12				▽			
13			2				0.4
15			SB17-3-15 3				1.5
16	- fine to coarse grained, well graded at 17.0ft BGS						
18			SB17-3-19				
19	GP-GRAVEL, with fine to coarse sand, fine to medium grained up to 1", grayish brown, dry	19.50	4				10.8
22	END OF BOREHOLE @ 22.0ft BGS	22.00	5 SB17-3-22				2.8

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS ⬭

OVERBURDEN LOG 065004-WI.GPJ GHD_Corp 3/5/18

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: US Travel Systems / Former Texaco 211083
PROJECT NUMBER: 065004
CLIENT: Chevron EMC
LOCATION: 230 Old Steese Highway, Fairbanks, Alaska

HOLE DESIGNATION: SB17-4
DATE COMPLETED: August 24, 2017
DRILLING METHOD: Direct Push/Vacuum Truck
FIELD PERSONNEL: O. Yan/T. Weaver

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	PID (ppm)
	ASPHALT	0.25					
	GP/SP-GRAVEL/SAND (FILL), grayish brown, dry						
10	SP-GRAVELLY SAND, fine to coarse grained, grayish brown, dry	9.75	1				1.5
	ML-SILT, fine sand, grayish brown, wet	11.00 ▽					
	SP-GRAVELLY SAND, with fine gravel up to 3/4", fine to coarse grained, gray, wet	13.00	2				
			SB17-4-15 3				931
18	- fine to medium gravel, black at 18.0ft BGS						536
20	- fine to coarse grained at 20.0ft BGS		4				60.2
22	END OF BOREHOLE @ 22.0ft BGS	22.00	5 SB17-4-22				35.6

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: US Travel Systems / Former Texaco 211083
PROJECT NUMBER: 065004
CLIENT: Chevron EMC
LOCATION: 230 Old Steese Highway, Fairbanks, Alaska

HOLE DESIGNATION: SB17-5
DATE COMPLETED: August 24, 2017
DRILLING METHOD: Direct Push/Vacuum Truck
FIELD PERSONNEL: O. Yan/T. Weaver

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	ASPHALT	0.25					
	SP-GRAVELLY SAND (FILL), brown, dry						
6	SM-SILTY SAND, fine grained, brownish gray, dry	6.00					
	- gray, greenish discoloration, moist at 9.0ft BGS						
10	- fine gravel, fine to coarse grained, black, wet at 11.0ft BGS		1				387
12	SP-SAND, fine to medium gravel to 3/4", fine to coarse grained, grayish brown, wet	12.00					
			SB17-5-15-2				1026
18	SP-GRAVELLY SAND, fine to medium gravel up to 1", fine to coarse grained, gray, wet	18.00					
20			3				266.8
22	END OF BOREHOLE @ 22.0ft BGS	22.00	4 SB17-5-22				25.4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS ⬭

OVERBURDEN LOG 065004-WI.GPJ GHD_Corp 3/5/18

STRATIGRAPHIC LOG
(OVERBURDEN)

PROJECT NAME: US Travel Systems / Former Texaco 211083
PROJECT NUMBER: 065004
CLIENT: Chevron EMC
LOCATION: 230 Old Steese Highway, Fairbanks, Alaska

HOLE DESIGNATION: SB17-6
DATE COMPLETED: August 24, 2017
DRILLING METHOD: Direct Push/Vacuum Truck
FIELD PERSONNEL: O. Yan/T. Weaver

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE	PID (ppm)
	ASPHALT	0.25					
	FILL, grayish brown						
4	SP-SILTY SAND, fine grained, brown, dry	4.00					
7	SP-SAND, fine gravel up to 1/2", fine to coarse grained, brown, moist to wet	7.00					
8	- wet at 9.0ft BGS						23.1
10			1				431.3
14	- fine to medium grained, gray to black, wet		SB17-6-15 2				966.0
16	GP-SANDY GRAVEL, fine to medium sand, fine to medium grained, gray, wet	16.00					
18	SP-SAND, fine to medium gravel up to 1-1/4", fine to coarse grained, well graded, gray, wet	18.00					
20			3				787.4
22	END OF BOREHOLE @ 22.0ft BGS	22.00	4 SB17-6-22				118.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS ⬭

OVERBURDEN LOG 065004-WI.GPJ GHD_Corp 3/5/18

Appendix G
GHD Field Notes

DAILY FIELD REPORT

Project Name: 211083	GHD Proj. Mgr: S. PRITCHARD	Field Rep: O. SAW
Project Number: 065004	Date: 8/11/17	Site Address: 230 OLD STAGE HWY FAIRBANKS, AK
Scope of Work: GEOPHYSICAL/UTILITY SURVEY		
Equipment: GEOPHYSICAL EQUIPMENT		Weather:

Time	Activity/Comments	SWA
0740	Arrive onsite from airport → conduct tailgate → notify PM	
0808	Finish discussion w/ PM after site walk for marking; looks like one boring will ~~be~~ have to be moved → next to shed due to overhead powerlines; UST; ad access issues. Boring moved to downgradient area @ edge of site building, downgradient of shed.	
0810	CONTINUE W/ CLEARANCE.	
0815	Call w/ Shawn (DEC regulator) → will be onsite to discuss location	
0850	S. TIDWELL ONSITE → DISCUSSION OVER GENERAL SITE	
	→ DISCUSSION OF NEW PROPOSED LOCATION → WHY WE CAN'T DO IT IN PROPOSED AREA.	
	→ OKAY'D NEW LOCATION → STATED MIGHT BE BETTER LOCATION SINCE IT WILL BE DOWNGRADIENT AND TENANTS PROPERTY BOUNDARY → TRYING TO SEE WHAT WELL WOULD MAKE SENSE W/ EXISTING UTILITIES.	
	S. TIDWELL OKAY'D GENERAL AREA OF NEW BORING.	
1040	J. TIDWELL OFFSITE → OKAY'D LOCATION PENDING UTILITY ISSUES → CHECK W/ JANU (OTHER DEC REG) IF THERE ARE ANY ISSUES ON 8/23 – 8/25.	
1200	FINISH W/ UTILITY LOCATE; GHD LOCATED ALL BORING LOCATIONS; NO CONFLICTS W/ PROPOSED BORING LOCATIONS; ASPHALT ~4-INCHES THICK.	

SWA Key:	A: Person or People	B: Equipment	C: Environmental
	D: Procedures/Processes/JSA-review/revise	E: Visitors	

Operational Mileage: Start _____ End _____ Total _____

DAILY FIELD REPORT

Project Name: CEMC 21083	GHD Proj. Mgr: S. PRITCHARD	Field Rep: T. WEAVER / O. SAN
Project Number: 065004	Date: 8/21/17	Site Address: 230 OLD STEESE HWY, FAIRBANKS, AK
Scope of Work: SAW BLADE; ASPHALT CUTTING		
Equipment: SAW BLADE (INDEPENDENT RENTAL)		Weather:

Time	Activity/Comments	SWA
1525	ARRIVE ONSITE; NOTIFY PM; CONDUCT TAILGATE SAFETY MEETING	
1540	HEAD TO HOME DEPOT TO PICK UP FACE SHIELDS	
1557	BACK ONSITE, WILL GET STARTED W/ THE SAW CUT.	
1605	START SAW CUTTING	
1710	FINISH SAW CUTTING 3 LOCATIONS AT FRONT OF PROPERTY	
17:25	BACK @ HOTEL → CHECK-IN.	

SWA Key:	A: Person or People	B: Equipment	C: Environmental
	D: Procedures/Processes/JSA-review/revise	E: Visitors	

Operational Mileage: Start _____ End _____ Total _____

TTT Environmental

The peferred source for instrument Rentals, Sales, Service, and Supplies!

CALIBRATION/INSPECTION REPORT

Calibration Date: 8/21/2017
Report Date (check-out): 8/23/2017

Company Name: GHD
Rental Discription: Rae Systems MiniRae 3000 PID

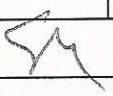
Sales Order#: SF170421
Serial #: 4805

CALIBRATION*					
Sensor	Fresh air value	Calibration*		Alarm Level	
		Desired reading	Instrument reading	Low	High
PID - 10.6 eV	0.0	100 ppm	100 ppm	50ppm	100ppm

* Calibrated per manufacturer specifications

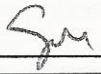
CALIBRATION GAS INFORMATION						
Components	**Conc.**	**Lot #**	**Manuf.**	**Accuracy**	**Fill Date**	**Exp. Date**
Isobutylene (PID)	100 ppm	16-5612	ISG	+/-2%	9/14/2016	9/14/2018

Calibrated by: Shandra Miller

Signature: 

INSTRUMENT INSPECTION		
Item	**Pre-rental Check-out** *(Do not rent inst. if any "No's")*	**Post-rental Check-in** *("No's" may indicate customer damage)*
Calibrated within the last 10 days?:	Yes No	Check for cracks or any damage to housing and LCD display.
Water trap filter installed on meter?:	Yes No	
Instrument powers on properly ("Test Passed" is indicated) & w/o "Low Bat", "LAMP", etc displayed?:	Yes No	Yes No
Display contrast is legable and no black streaks or cracks in LCD screen exist?:	Yes No	Yes No
PID reads no greater than 2.0 ppm?:	Yes No	
Battery icon in upper right corner is at least 1/2?:	Yes No	
Remove filter; reading increases no more than 3.0 ppm when a long heavy breath is blown into inlet?:	Yes No	
Pump stops & alarms when inlet filter is plugged with finger?:	Yes No	
Visual & audio alarms work correctly?:	Yes No	
Press "Y" key; pump starts, alarm clears, & reading is as before?:	Yes No	
Hold "MODE" button down and meter turns off w/5 second count down?:	Yes No	Yes No
Rental checklist completed?:	Yes No	Yes No

Comments:

Signiture (Check-out): 

Signiture (Check-in):

Golden Heart
UTILITIES
AN ALASKAN CORPORATION

ACKNOWLEDGEMENT OF MAIN LINE LOCATE

230 OLD STEESE — 8-22-17

Location — Date

I, [illegible], or an appointed representative acknowledge that Golden Heart Utilities, Inc. (GHU) has provided the approximate location of the utility's buried primary main lines and equipment in the area to be excavated. I was also informed that ONLY hand digging is allowed within 5 feet of the main line. I have read and understand the Policy and Guidelines of GHU regarding underground line locates (attached). I understand that GHU will provide the best information available to it regarding the location of its facilities, but it is not always possible to provide an exact location or depth of bury for main lines. All costs incurred in the excavation project are my responsibility. GHU assumes no responsibility by providing this line locate.

[illegible] — 8/22/17

Customer or Representative Name (Please Print) — Date

Customer or Representative Signature

Scott [illegible]

GHU Locator Signature

Distribution: Original copy attached to the work order initiating the locate
Copy to the customer/contractor requesting locate

DAILY FIELD REPORT

Project Name: CEMC 211083	GHD Proj. Mgr: S. PRITCHARD	Field Rep: O.YAN / T. WEAVER
Project Number: 065004	Date: 8/23/17	Site Address: 230 OLD STEESE HWY FAIRBANKS, AK
Scope of Work: VAC-RIG ; BOREHOLE CLEARANCE TO 8'BG (6 HOLES)		
Equipment: VAC-RIG ; COMPRESSOR ;		Weather: 60s → OVERCAST; SUNNY

Time	Activity/Comments	SWA
0635	ARRIVE @ NRC LOCATION -	
0830	FINISH W/ NRC SAFETY MEETING	
0840	MOB TO SITE ; NRC WILL ARRIVE @ AROUND 9:30-10	
0900	PREP FOR WORK ; REVIEW BOREHOLE LOCATIONS	
0915	PREP PAPERWORK	
0950	NRC ONSITE ; CONDUCT TAILGATE	
1020	SET UP @ SB17-1 ; NRC SET-UP @ LOCATIONS; PREP WORK	
1028	START W/ VAC WORK @ SB17-1	
1034	START COMPRESSOR TO USE AIR KNIFE, PID reading 0 ppm	
1056	FINISH SB17-1 @ 8 FT	
1102	BEGIN BACKFILLING OF	
1109	NRC CONTACTS OFFICE TO GET MORE BACKFILL (PEA GRAVEL)	
1120	FINISH BACKFILL	
1125	START SETUP @ SB17-2 ; BEGIN AIR-KNIFE CLEARANCE @ 1127	
	1135 → take PID reading → 0.0 ppm	
1150	FINISH CLEARANCE @ SB17-2 ; DO SITEWALK FOR THE REST OF	
	THE BOREHOLES → DECIDE TO DO THE OTHER SIDE NEXT SB17-6.	
1155	BEGIN BACKFILL @ SB17-2	
1200	FINISH W/ BACKFILL.	
1225	BACK FROM LUNCH → PU SAFETY REFOCUS	
1235	SET UP @ SB17-6 LOCATION	
1239	START W/ VAC OF SB17-6	
1248	FINISH @ SB17-6	
1251	START CLEARING OF SB17-5	
1300	CALL W/ SHAWN TISDALE → UPDATING W/ PROGRESS TO WORK TODAY,	
	LIKELY IF THERE WERE ANY ISSUES → DISCUSSED WORK FOR TOMORROW,	
	WILL CONTINUE W/ WORK AND CC/ JAMES	
1302	NRC ARRIVED W/ PEA GRAVEL	

SWA Key:	A: Person or People	B: Equipment	C: Environmental
	D: Procedures/Processes/JSA-review/revise	E: Visitors	

Operational Mileage: Start _____ End _____ Total _____

Project Number: 065004 Date: 8/23/17

Time	Activity/Comments	SWA
1307	FINISH CLEARING SB17-5	
1309	BEGIN BACKFILL OF SB17-6	
1325	FINISH W/ BACKFILL AT BOTH SB17-6/SB17-5	
1330	TAILGATE BOARD	
1311	BEGIN AIR KNIFE @ SB17-4	
1350	STOP WORK → REACHED 6 FT; DID NOT GO THROUGH; OBSTRUCTION	
1410	STOPPED UNTIL BREAK → ASPHALT BEING DIFFICULT	
1420	START W/ SB17-3	
1500	FINISH CLEARING @ SB17-2	
1518	FINISH SAW CUTTING NEW LOCATION @ SB17-11	
1525	MOB TO NEW LOCATION & START VAC TRUCK	
1529	SQUA, PEDESTRIAN ENTERS EXCLUSION ZONE, AFTER BEING ASKED TO STAY BACK	A
1532	RESUME WORK AFTER PEDESTRIAN LEAVES & ADDITIONAL CONES & TAPE PUT UP	
1550	FINISH W/ AIR KNIFE WILL BEGIN W/ BACKFILL.	
1607	BEGIN BACKFILL; SITE CLEANUP → WILL GO @ THE END TO OFFLOAD WASTE	
1710	FINISH UP	

SWA Key:	A: Person or People	B: Equipment	C: Environmental
	D: Procedures/Processes/JSA-review/revise	E: Visitors	

DAILY FIELD REPORT

Project Name: CEMC 211073	GHD Proj. Mgr: S. PRITCHARD	Field Rep: T. WEAVER / O. YATES
Project Number: 065004	Date: 8/24/17	Site Address: 230 OLD STEESE HWY FAIRBANKS, AK
Scope of Work: ADVANCE SOIL BORINGS BY GEOPROBE; COLLECT SAMPLES		
Equipment: GEOPROBE; PID		Weather: Cloudy / 55° F

Time	Activity/Comments	SWA
0700	LOAD TRUCK / MOB TO SITE	
0717	ARRIVE ONSITE; MEET MATT; JEREMY FROM DISCOVERY DRILLING	
0723	D. CARRIER W/ CEMC ARRIVES ONSITE; CONDUCT SITE WALK	
0738	CONDUCT TAILGATE SAFETY MEETING	
0842	BATHROOM BREAK, DAN LEAVES, UNLOAD; INSPECT EQUIPMENT, PREP SAMPLE SUPPLIES	
0917	SET UP ON SB-17-2 → START DIRECT PUSH; SOIL SAMPLE COLLECTION; PID=0.0	
1031	FINISH COLLECTING SAMPLES FROM SB-17-2; REPAVED W/ ASPHALT (COLD PATCH)	
1035	STOP WORK → DRILL RIG STOPPED WORKING; CREW TROUBLESHOOTING RIG; DOES NOT SEEM TO START; NOTIFY S. PRITCHARD OF ISSUE	B
1103	DISCOVERY CREW CALLS THEIR OFFICE; CONTINUE W/ TROUBLESHOOTING	
1114	CREW FIXES DRILL RIG → NOTIFY PM; DAN CARRIER BACK ONSITE	
1120	MOB and SET UP @ SB17-1 → DIRECT PUSH DRILLING; COLLECT SAMPLES ↳ COLLECT DUPLICATE SAMPLE.	
1157	FINISH W/ BACKFILL OF SB17-1; 1200 → BREAK FOR LUNCH	
1235	GHD/DISCOVERY BACK FROM LUNCH; SET UP @ SB17-3; COLLECT SAMPLES	
1250	D. CARRIER BACK ONSITE.	
1315	STOP WORK → HOLE @ SB17-3 KEEPS COLLAPSING; SO CAN'T BACKFILL W/ BENTONITE; CONTACT S. PRITCHARD; DECIDE TO LEAVE AS IS; PAVE OVER.	C
1320	MOBED TO SB17-6; BEGIN DIRECT PUSH. COLLECT SAMPLES; SET UP BIG EXCLUSION ZONE	
1405	FINISH W/ BACKFILL @ SB17-6 →	
1410	MOBBED TO SB17-5 → DIRECT PUSH → THROUGH ASPHALT → DIRECT PUSH → COLLECT SAMPLES.; BACKFILL BORING @ 1500	
1505	MOB to SB17-4 → BEGIN DIRECT PUSH → COLLECT SAMPLES	
1590	BACKFILL SB17-4 → BEGIN SITE CLEANUP → PACK SAMPLES; PAVED ALL DISTURBED AREAS W/ ASPHALT (COLD PATCH); EMPTY SOIL SLEEVE INTO DRUM. FIXED OLD PATCH THAT CAME UNDONE.	
1620	FINALIZE SITE CLEAN UP → 4 SUPER SACKS; 1 DRUM OF SOIL.	
1640	GHD/DISCOVERY OFFSITE; DROP OFF PID.	
1705	ARRIVE @ HOTEL.	

SWA Key:			
	A: Person or People	B: Equipment	C: Environmental
	D: Procedures/Processes/JSA-review/revise	E: Visitors	

Operational Mileage: Start _____ End _____ Total _____

Chevron Generic Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only
Acct. # _____ Group # _____ Sample # _____
Instructions on reverse side correspond with circled numbers

SCR #: 210728

(1) Client Information

Facility # CEMC 211083 WBS
Site Address 230 OLD STEESE HWY, FAIRBANKS AK
Chevron PM DANIEL CARRIZ
Lead Consultant GHD SERVICES, INC
Consultant/Office SIOBHAN PRITCHARD
Consultant Project Mgr. 645 G STREET, STE 401, ANCHORAGE, AK
Consultant Phone # (720) 974-0985
Sampler O YAN / T. WERNER

(4) Matrix

Soil ☒ | Sediment ☐ | Potable Water ☐ | Ground Water ☐ | NPDES ☐ | Surface Water ☐ | Oil ☐ | Air ☐

(3) Grab / Composite

(2) Sample Identification | Collected Date | Time | Total Number of Containers

(5) Analyses Requested

BTEX + MTBE 8021 ☐ 8260 ☐ Naphth ☐ | 8260 full scan | Oxygenates ____ | TPH-GRO AK101 | 8015 ☐ 8260 ☐ | TPH-DRO without Silica Gel Cleanup AK102 ☐ | TPH-DRO with Silica Gel Cleanup ☐ | VPH ☐ Method ____ | EPH ☐ Method ____ | Lead Total ☐ Diss. ☐ Method ____ | PAHs by 8270 SIM | Moisture

Sample Identification	Collected Date	Time	Grab	Composite	Soil	Water	Oil	Total Containers	BTEX + MTBE 8021	8260	Naphth	8260 full scan	Oxygenates	TPH-GRO AK101	8015	8260	TPH-DRO without Silica Gel Cleanup AK102	TPH-DRO with Silica Gel Cleanup	VPH	Method	EPH	Method	Lead Total	Diss.	Method	PAHs by 8270 SIM	Moisture
SB17-1-S-15-170824	8/24/17	1130	X		X			9				X		X			X									X	X
SB17-1-S-22-170824		1145	X		X			9				X		X			X									X	X
SB17-2-S-15-170824		0955	X		X			9				X		X			X									X	X
SB17-2-S-22-170824		1011	X		X			9				X		X			X									X	X
SB17-3-S-15-170824		1300	X		X			9				X		X			X									X	X
SB17-3-S-20-170824		1312	X		X			9				X		X			X									X	X
SB17-3-S-22-170824		1315	X		X			9				X		X			X									X	X
SB17-4-S-15-170824		1511	X		X			9				X		X			X									X	X
SB17-4-S-22-170824		1522	X		X			9				X		X			X									X	X
DUP-1-S-170824		—	X		X			9				X		X			X									X	X

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run ____ oxy's on highest hit
- ☐ Run ____ oxy's on all hits

(6) Remarks

email results to:
siobhan.pritchard@ghd.com
and
oliver.yan@ghd.com

(7) Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

Relinquished by	Date	Time	Received by	Date	Time (9)
	8-16-17	1415		8/17/17	1600
	8/25/17	0800			

(8) Data Package (circle if required)

Type I - Full | Alaska/Type III | Type VI (Raw Data)

EDD (circle if required)

CVX-RTBU-FI_05 (default)
Other: _____

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Temperature Upon Receipt _____ °C

Received by | Date | Time

Custody Seals Intact? Yes No

Chevron Generic Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only
Acct. # _____ Group # _____ Sample # _____
Instructions on reverse side correspond with circled numbers

SCR #: 210728

(1) Client Information

Facility # CEMC 211083 WBS

Site Address 230 OLD STEESE HWY, FAIRBANKS, AK

Chevron PM: DANIEL CARRIER

Lead Consultant: GHD SERVICES, INC.

Consultant/Office: SIOBHAN PRITCHARD

Consultant Project Mgr.: 645 G STREET, STE 401, ANCHORAGE, AK

Consultant Phone #: (720) 974-0835

Sampler: O. YAN / T. WEAVER

(2) Sample Identification

Sample Identification	Collected Date	Collected Time	(3) Grab	Composite	(4) Matrix: Soil	Sediment	Water: Potable	Ground	NPDES	Surface	Oil	Air	Total Number of Containers	(5) Analyses Requested
SB17-5-S-25-170824	8/24/17	1440	X		X								9	BTEX + MTBE 8021 8260 Naphth; 8260 full scan; TPH-GRO 8015 8260 AK101; TPH-DRO without Silica Gel Cleanup AK102; PAHs by 8270 SIM; Moisture
SB17-5-S-22-170824		1455	X		X								9	
SB17-6-S-15-170824		1325	X		X								9	
SB17-6-S-22-170824		1400	X		X								9	
DUP-2-S-170824		—	X		X								9	

Analyses Requested (5): BTEX + MTBE 8021 8260 Naphth; 8260 full scan; Oxygenates ____; TPH-GRO 8015 8260 AK101; TPH-DRO without Silica Gel Cleanup AK102; TPH-DRO with Silica Gel Cleanup; VPH EPH Method ____; Lead Total Diss. Method ____; PAHs by 8270 SIM; Moisture

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

(6) Remarks

email results to siobhan.pritchard@ghd.com and oliver.yan@ghd.com

(7) Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

(8) Data Package (circle if required)

Type I - Full | Alaska/Type III | Type VI (Raw Data)

EDD (circle if required): CVX-RTBU-F1_05 (default) | Other: _____

(9)

Relinquished by	Date	Time	Received by	Date	Time
	8-16-17	1415		8/17/17	1600
	8/25/17	0800			

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Received by | Date | Time

Temperature Upon Receipt _____ °C

Custody Seals Intact? Yes No

Chevron Generic Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

For Eurofins Lancaster Laboratories Environmental use only
Acct. # _____ Group # _____ Sample # _____
Instructions on reverse side correspond with circled numbers.

SCR #: 211155

1 Client Information

Facility # CHEVRON 211083 WBS

Site Address 230 OLD STEESE HWY, FAIRBANKS, AK

Chevron PM DAN CARRIER Lead Consultant GHD SERVICES

Consultant/Office 645 G STREET, STE 401 / ANCHORAGE, AK

Consultant Project Mgr. SIOBHAN PRITCHARD

Consultant Phone # (907) 974-0235

Sampler D. YAN / T. WEAVER

4 Matrix

Soil ☒ Sediment ☐ Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☐ Oil ☐ Air ☐

3 Grab / Composite

2 Sample Identification / Collected Date / Time

5 Analyses Requested

Total Number of Containers

BTEX + MTBE ☐ 8021 ☐ 8260 ☐ Naphth

8260 full scan

Oxygenates ☐ 8260 ☐ ____

TPH-GRO ☐ 8015 ☐ 8260 AK101

TPH-DRO without Silica Gel Cleanup ☐ AK102

TPH-DRO with Silica Gel Cleanup ☐

VPH ☐ EPH ☐ Method ____

Lead ☐ Total ☐ Diss. ☐ Method ____

TCLP METALS + SVOCs

MOISTURE + PCBs

TCLP VOCs

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Water	Oil	Total Containers	BTEX + MTBE 8021 8260 Naphth	8260 full scan	Oxygenates	TPH-GRO AK101	TPH-DRO without Silica Gel Cleanup AK102	TPH-DRO with Silica Gel Cleanup	VPH	EPH	Lead Total Diss.	TCLP METALS + SVOCs	MOISTURE + PCBs	TCLP VOCs
WASTE-1-5-170825	8/23/17		X		X					X		X	X					X	X	X

6 Remarks

email results to:
siobhan.pritchard@ghd.com

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

7 Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

8 Data Package (circle if required)

Type I - Full | Alaska/Type III | Type VI (Raw Data)

EDD (circle if required)

CVX-RTBU-FI_05 (default) | Other: _____

Relinquished by	Date	Time	Received by	Date	Time
Edwin Hernandez	8/23/17	1535		8/24/17	1630
	8/15/17	835			

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Received by | Date | Time

Temperature Upon Receipt _____ °C

Custody Seals Intact? Yes No

9

Eurofins Lancaster Laboratories Environmental, LLC • 2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300

The white copy should accompany samples to Eurofins Lancaster Laboratories Environmental. The yellow copy should be retained by the client.

7047 0713

Boring/Well Name SB17-1 Page 1 of 1

PE/PG S. PRITCHARD

Utility Cleared to 8 FBG

Total Depth 22 FBG

Date Started 8/23/17

Date Completed 8/24/17

Screened Interval N/A

Depth to water (first encountered) 13 FBG

Depth to water (static) N/A

Located ONSITE → BEHIND BUILDING

Misc. Notes:

Client Name CHEVRON EAC

Job/Site Name CHEVRON 211083

Location 230 OLD STEESE HWY, FAIRBANKS, AK

Project Number 060004

Driller DISCOVERY DRILLING

Drilling Method DIRECT PUSH (GEOPROBE)

Boring Diameter 2.5 INCH

Logged by O. YAN

Depth/Sample Interval	Time	Sample ID	PID	Well Construction	U.S.C.S. Symbol	Geologic Descriptions and Comments	Color	Penetration Resistance/ Blow Counts	Moisture	Estimated Percentages: Clay	Silt	Sand	Gravel	Estimated Plasticity
0				BENTONITE	—	→ 5 INCH ASPHALT FILL → sandy gravel	brown	N/A	DRY					
5							grayish brown							
						FINE SAND; POORLY GRADED	gray			0	<10	85	<5	NON-PLASTIC
10			0.1						MOIST					
			1.0			fine to coarse sand; well graded			WET					
15	1130	SB17-1-15 (DUP-1)	3.1			Fine to coarse sand (WG); fine gravel; up to 0.5"	grayish brown			0	10	55	35	NP
							grayish brown			0	<5	60	35	NP
20			33.0			fine to mid gravel up to 1"					10	70	20	
	1145	SB17-1-21	45.1			BOTTOM OF BORING @ 22 FBG								
25														
30														

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Boring/Well Name SB17-2 Page 1 of 1

PE/PG S. PRITCHARD

Utility Cleared to 8 FBG

Total Depth 22 FBG

Date Started 8/23/17

Date Completed 8/24/17

Screened Interval N/A

Depth to water (first encountered) 13 FBG

Depth to water (static) N/A

Located ONSITE →

Misc. Notes:

Client Name CHEVRON EAC

Job/Site Name CHEVRON 211083

Location 230 OLD STEESE HWY, FAIRBANKS, AK

Project Number 065004

Driller DISCOVERY DRILLING

Drilling Method DIRECT PUSH (GEOPROBE)

Boring Diameter 2.5 INCH

Logged by O. YAN

Depth/Sample Interval	Time	Sample ID	PID	Well Construction	U.S.C.S. Symbol	Geologic Descriptions and Comments	Color	Penetration Resistance/ Blow Counts	Moisture	Estimated Percentages: Clay	Silt	Sand	Gravel	Estimated Plasticity
0						3" INCH ASPHALT								
						FILL → sandy gravel fine to med.-grained sand.	BROWN	N/A	DRY					
5						sandy gravel fine to coarse sand, fine to med gravel	grayish brown			0	10	35	55	NP
						fine sands → fine to med; poorly graded gravels up to				<5	15	50	30	NP
10			0.3				TAN/BROWN							
			0.0			GRAVEL → small gravels	BROWN		WET	—	—	10	90	NP
15	0955	SB17-2-15	69.7			SAND → fine, medium sand; poorly graded; few gravels	GRAY				10	80	10	
						gravelly sand → f to c grain sand; well graded; rounded to subangular fine to med.-gravels → up to 1"				0	5	60	35	
20			3.0			SAND fine; poorly graded								
	1011	SB17-2-22	0.0							Ø	<10	90	Ø	
						BOTTOM OF BORING @ 22 FBG								
25														
30														

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Boring/Well Name SB17-3 Page 1 of 1

PE/PG S. PRITCHARD

Utility Cleared to 8 FBG

Total Depth 22 FBG

Date Started 8/23/17

Date Completed 8/24/17

Screened Interval N/A

Depth to water (first encountered) 12.0

Depth to water (static) N/A

Located ONSITE → NORTHERN CORNER

Misc. Notes:

Client Name CHEVRON EAC

Job/Site Name CHEVRON 211083

Location 230 OLD STEESE HWY, FAIRBANKS, AK

Project Number 065004

Driller DISCOVERY DRILLING

Drilling Method DIRECT PUSH (GEO PROBE)

Boring Diameter 2.5 INCH

Logged by O. YAN

Depth/Sample Interval	Time	Sample ID	PID	Well Construction	U.S.C.S. Symbol	Geologic Descriptions and Comments	Color	Penetration Resistance/ Blow Counts	Moisture	Estimated Percentages: Clay	Silt	Sand	Gravel	Estimated Plasticity
0						3-INCH ASPHALT								
						FILL → gravelly gravel	Brown		DRY					
5						gravelly sand	grayish brown			0	10	65	25	NP
						SILT → fine grain sand; trace fine gravels	dark brown			10	60	25	<5	NP
10			0.1											
			0.4			sand w/ gravel → fine to med sand; poorly graded → fine gravels up to 0.5"	grayish brown		moist to wet	<5	10	55	30	NP
15	1302	SB17-3-15	1.5							0	5	70	25	
						fine to coarse sand; well graded								
20	1312	SB17-3-20	10.3			gravel w/ sand → fine to coarse sand; fine to med gravel up to 1"				0	<5	30	65	NP
	1315	SB17-3-22	2.0			BOTTOM OF BORING @ 22								
25														
30														

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Boring/Well Name SB17-4 Page 1 of 1

PE/PG S. PRITCHARD

Utility Cleared to 8 FBG

Total Depth 22 FBG

Date Started 8/23/17

Date Completed 8/24/17

Screened Interval N/A

Depth to water (first encountered) 11 FBG.

Depth to water (static) N/A

Located

Misc. Notes:

Client Name CHEVRON EMC

Job/Site Name CHEVRON 211083

Location 230 OLD STEESE HWY, FAIRBANKS, AK

Project Number 065004

Driller DISCOVERY DRILLING

Drilling Method DIRECT PUSH (GEO PROBE)

Boring Diameter 2.5 INCH

Logged by O. YAN

Depth/Sample Interval	Time	Sample ID	PID	Well Construction	U.S.C.S. Symbol	Geologic Descriptions and Comments	Color	Penetration Resistance/ Blow Counts	Moisture	Estimated Percentages: Clay	Silt	Sand	Gravel	Estimated Plasticity
0						3-INCH ASPHALT								
						FILL			DRY					NP
						gravel / SCRAP	Tan/Brown							
5														
						gravelly sand → fine to coarse	gray			Ø	10	60	30	
10			1.5			SILT → fine sands; minor odor	brown		wet	50	50	30	<10	LP
						gravelly sand → fine to coarse sands; fine gravels → up to ¾ inch; → strong hydrocarbon odor	gray			Ø	10	55	35	NP
15	1511	SB17-15	931								<10	50	40	NP
			530			fine to med. gravel	Black							
20			60.2			fine to coarse sand →	gray				5	75	25	NP
	1522	SB17-2235.6				BOTTOM OF BORING								
25														
30														

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Boring/Well Name SB17-5 Page 1 of 1

PE/PG S. PRITCHARD

Utility Cleared to 8 FBG

Total Depth 22 FBG

Date Started 8/23/17

Date Completed 8/24/17

Screened Interval N/A

Depth to water (first encountered) 10 FBG

Depth to water (static) N/A

Located

Misc. Notes:

Client Name CHEVRON EMC

Job/Site Name CHEVRON 211083

Location 230 OLD STEESE HWY, FAIRBANKS, AK

Project Number 065004

Driller DISCOVERY DRILLING

Drilling Method DIRECT PUSH (GEO PROBE)

Boring Diameter 2.5 INCH

Logged by O. YAN

Depth/Sample Interval	Time	Sample ID	PID	Well Construction	U.S.C.S. Symbol	Geologic Descriptions and Comments	Color	Penetration Resistance/ Blow Counts	Moisture	Estimated Percentages: Clay	Silt	Sand	Gravel	Estimated Plasticity
0						3-INCH ASPHALT								
						FILL → gravelly sand	Brown		DRY					
5						Fine sand → SILTY SAND	GREENISH GRAY			5	40	55		NP
10			387			→ greenish discoloration	GRAY		MOIST					
						Fine to coarse sand; fine gravels			WET	5	20	65	10	—
15	1444	SB17-S15	1,026			fine to coarse sand; fine to med gravels up to 0.75-inch	BLACK GRAY IN COLOR			0	15	60	25	NP
20			266.8			Gravelly sand → fine to coarse sand; fine to med. gravel up to 1"	GRAY			0	10	55	35	
	1455	SB17-S22	25.4			BOTTOM OF BORING @ 22								
25														
30														

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Boring/Well Name SB17-6 Page 1 of 1

PE/PG S. PRITCHARD

Utility Cleared to 8 FBG

Total Depth 22 FBG

Date Started 8/23/17

Date Completed 8/24/17

Screened Interval N/A

Depth to water (first encountered) 9 FBG

Depth to water (static) N/A

Located

Misc. Notes:

Client Name CHEVRON EAC

Job/Site Name CHEVRON 211083

Location 230 OLD STEESE HWY, FAIRBANKS, AK

Project Number 065004

Driller DISCOVERY DRILLING

Drilling Method DIRECT PUSH (GEO PROBE)

Boring Diameter 2.5 INCH

Logged by O. YAN

Depth/Sample Interval	Time	Sample ID	PID	Well Construction	U.S.C.S. Symbol	Geologic Descriptions and Comments	Color	Penetration Resistance/ Blow Counts	Moisture	Estimated Percentages: Clay	Silt	Sand	Gravel	Estimated Plasticity
0						@ 3" THICK ASPHALT								
						FILL	GRAVEL		DRY					
5						fine SAND → SILTY SAND;	GRAVEL			10	30	60		NP
							TO							
						fine to coarse SAND; fine GRAVEL up to 0.5 INCH	BROWN		MOIST	5	40	55	0	NP
			23.1							↓	↓	↓	↓	
10			43.7						WET	1	1	1	1	
										Ø	15	65	20	NP
							GRAY							
						fine to med SAND → STRONG TPH odor	↓							
15	1325	SB17-6-MW(15-20)					BLACK			-Ø	10	55	35	
						SANDY GRAVEL → fine to med SAND; fine to med GRAVEL								
							GRAY			-	05	35	60	NP
							↓				↓	↓	↓	
20			787.4			fine to coarse SAND; fine to med GRAVEL				Ø	10	70	20	
	MW	SB17-6	118.6			WELL GRADED LOOP to 1.25 INCH								
						BOTTOM OF BORE @ 22 FBG								
25														
30														

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Appendix H
GHD Drilling and Soil Sampling SOPs

GHD Field Training Manual

Section 4.0
Overview of Drilling Program Standard Operating Procedures

(T100)

200010 | Report No 2 | Revision 0 | July 1 2015

Please adhere to the following Quality System training requirements:

- Employees who are required to conduct a specific field activity must be properly certified to do the work.
- This involves reviewing the SOP and completing the online training course and exam.
- Employees must also conduct this field work under supervised conditions on at least three occasions, and must be certified by a qualified mentor. Only then can an employee conduct a specific field activity on their own. This is documented on a Field Method Training Record (**QSF-021**).
- A **QSF-021** is not required for this SOP.

Table of Contents

Quality System Forms Index

4. Overview of Drilling Program Standard Operating Procedures

4.1 Introduction

Drilling programs are conducted to characterize geologic and hydrogeologic conditions at a site. Standard Operating Procedures (SOPs) are presented herein for completing a variety of drilling activities.

This guideline is not intended to provide the basis for a drilling program, but instead assumes that a scope of work for the completion of a drilling program has been designed, a site-specific Work Plan has been established, and that a GHD representative is preparing to mobilize to the site.

Drilling programs vary from project to project due to different geologic and hydrogeological conditions, chemicals of concern, different guidance provided by the state/province where the site is located, and the specific objectives of the project (i.e., soil sampling, hydraulic monitoring, groundwater sampling, aquifer testing). It is essential that all drilling activities conform to local, provincial/state, and federal regulations. Therefore, it is essential that the GHD representative carefully review the Work Plan requirements. The primary goal of a drilling program is the advancement of boreholes in a variety of geologic and hydrogeologic conditions, to complete the specific objectives of the project. It is imperative that appropriate drilling techniques are chosen. There are advantages and disadvantages to each drilling method discussed herein.

The remainder of this section is organized as follows:

- Section 4.2 Background
- Section 4.3 Planning and Preparation
- Section 4.4 Safety and Health
- Section 4.5 Quality Assurance/Quality Control
- Section 4.6 Equipment Decontamination
- Section 4.7 Location and Marking of Well Sites/Final Visual Check
- Section 4.8 Drilling Methods
- Section 4.9 Drilling Program Follow-up Activities
- Section 4.10 References

4.2 Background

A significant portion of GHD's field activities relates to sampling and investigative activities that involve subsurface drilling. This typically requires GHD to contract or subcontract with a drilling firm to penetrate the ground for sample collection or well installation using a variety of drilling methods. Drilling methods selected are based on the geologic conditions at the site, scope of drilling program, and cost effectiveness of the drilling method.

All drilling programs require that geologic conditions be documented accurately at each site. Therefore, all GHD employees involved in drilling activities shall have specific training in the following Field Training SOPS:

1. Soil Sampling SOPs (Section 5.0).
2. Monitoring Well Design and Construction SOPs (Section 6.0).
3. Bedrock Drilling and Rock Description SOPs (Section 9.0) (required for bedrock drilling).

4.3 Planning and Preparation

Preparation for a drilling program requires that a number of setup and logistical activities be completed:

1. A fully approved drilling contractor from GHD's Approved Vendor List (QSL-004) should be used to complete all drilling program activities. If a drilling contractor is not listed or is only technically approved on QSL-004, then the Vendor must submit a completed QSF-030 (Canada) or QSF-031 (U.S.) to the Regional Safety and Health Manager for approval prior to mobilization to the site. A Vendor Evaluation Form (QSF-012) must be filled out and filed in the Project file for any Vendors that do not have full approval status or are not listed on QSL-004.
2. Initiate a Property Access Utility Clearance Sheet (QSF-019) to ensure utility clearance and property access have been granted.
3. Complete a Field Equipment Requisition Form (QSF-014) and assemble all equipment, materials, log books, and forms.
4. If necessary, contact GHD's Chemistry group to arrange/determine:
    - SSOW (Simplified Scope of Work)
    - glassware/sample jars
    - cooler
    - shipping details
    - start date
    - laboratory
    - expected sampling duration

4.4 Safety and Health

GHD is committed to conducting field activities in accordance with sound safety and health practices. GHD adheres to high safety standards to protect the safety and health of all employees, subcontractors, customers, and communities in which they work. The safety and health of our employees takes precedence over cost and schedule considerations.

Field personnel are required to implement the Safety Means Awareness Responsibility Teamwork (SMART) program as follows:

- Assure the Health and Safety Plan (HASP) is specific to the job and approved by a Regional Safety & Health Manager.
- Confirm that all HASP elements have been implemented for the job.
- A Job Safety Analysis (JSA) for each task has been reviewed, modified for the specific site conditions and communicated to all appropriate site personnel. The JSAs are a component of the HASP.
- Incorporate Stop Work Authority; Stop, Think, Act, Review (STAR) process; Safe Task Evaluation Process (STEP); Observations process; Near Loss and Incident Management process in the day-to-day operations of the job.
- Review and implement applicable sections of the GHD Safety & Health Policy Manual.
- Confirm that all site personnel have the required training and medical surveillance, as defined in the HASP.
- Be prepared for emergency situations, locating safety showers, fire protection equipment, evacuation route, rally point, and first aid equipment before you begin working, and make sure that the equipment is in good working order.
- Maintain all required Personal Protective Equipment (PPE), safety equipment, and instrumentation necessary to perform the work effectively, efficiently, and safely.
- Be prepared to call the GHD Incident Hotline at 1-866-529-4886 for all incidents involving injury/illness, property damage, and vehicle incident and/or significant Near Loss.

It is the responsibility of the Project Manager to:

- Ensure that all GHD field personnel have received the appropriate health and safety and field training and are qualified to complete the work.
- Provide subcontractors with a Job Hazard Analysis to enable them to develop their own HASP.
- Ensure that all subcontractors meet GHD's (and the Client's) safety requirements.

4.5 Quality Assurance/Quality Control

A well-designed Quality Assurance/Quality Control (QA/QC) program will:

- Ensure that data of sufficient quality are obtained in order to facilitate good site management.
- Allow for monitoring of staff and contractor performance.
- Verify the quality of the data for the regulatory agency.

The QA/QC program is developed on a site-specific basis. QA/QC requirements are discussed in detail in Section 3.9.

4.6 Equipment Decontamination

Prior to use and between each drilling location, drilling and sampling equipment must be decontaminated in accordance with the Work Plan, the Quality Assurance Project Plan (QAPP), or at a minimum, the methods presented in the following section.

The minimum wash procedures for decontamination of drilling or excavating equipment are:

1. High pressure hot water wash (brushing as necessary to remove particulate matter).
2. Potable, hot water, high pressure rinse.

Cover the clean augers with clean plastic sheeting to prevent contact with foreign materials. For geotechnical, geologic, or hydrogeologic studies where no contaminants are present, it is sufficient to clean the drilling or excavating equipment simply by removing the excess soils.

On environmental sites, soil sampling equipment (e.g., split spoons, trowel, spoons, shovels, bowls) is typically cleaned as follows:

1. Wash with clean potable water and laboratory detergent, using a brush as necessary to remove particulates.
2. Rinse with tap water.
3. Rinse with deionized water.
4. Air dry for as long as possible.

In addition, the following steps may be added when sampling for volatile organic compounds (VOCs) and metals:

1. Rinse with 10 percent nitric acid (only if samples are to be analyzed for metals).
2. Rinse with deionized water.
3. Rinse with appropriate solvent (e.g., pesticide grade isopropanol, methanol, acetone, hexane).
4. Rinse again with deionized water.
5. Air dry for as long as possible.
6. Wrap equipment in aluminum foil to prevent contamination.

Caution:	Confirm the cleaning protocol from the QAPP. The use of an incorrect cleaning protocol can invalidate chemical data.

4.7 Location and Marking of drilling locations/Final Visual Check

The proposed drilling locations marked on the site plan are located and staked in the field. On most sites, this should be completed several days prior to the drill rig arriving on site. Drilling locations are required for the completion of utility locates. Generally, drilling locations are strategically placed to assess site geologic and hydrogeologic conditions.

Once the final drilling location has been selected and utility clearances are complete, one last visual check of the immediate area should be performed before drilling proceeds to confirm the locations of adjacent utilities (subsurface or overhead) and verify adequate clearance. If gravity sewers or conduits exist in the area, access manholes or chambers should be opened and the conduit/sewer alignments confirmed. Do not enter manholes unless confined space procedures are followed.

When possible, it is prudent to use a hand auger or post-hole digging equipment to a sufficient depth to confirm that there are no buried utilities or pipelines. This is particularly important in limited space sites where wells are being installed close to buried utilities. Alternatively, a Hydrovac truck (air knife) can vacuum a large diameter hole to check for utilities, although soils collected this way may require containment on site. This procedure generally clears the area to the full diameter of the drilling equipment which will follow.

Caution: Do not assume that site plan details regarding pipe alignment/position are correct. Visually inspect pipe alignment when advancing boreholes near sewers. Be prepared to find additional piping if outdated plans are being used. If possible confirm pipe locations with on-site employees or a client representative.

Drilling locations are selected primarily to provide a good geographical distribution across the site. Most often, the drilling locations specified in the Work Plan are not pre-verified to confirm clearance from underground or overhead utilities, nor to consider the site's specific characteristics (e.g., traffic patterns, drainage patterns). Consequently, it is the Field Supervisor's responsibility to perform the following:

1. Select the exact location of each drilling location with the site and project requirements.
2. If drilling must be relocated, confirm the new location's suitability with the Project Coordinator.
3. Ensure all utilities have been cleared prior to initiating any drilling activities.

To the extent practical, drilling locations should be located adjacent to permanent structures (e.g., fences, buildings) that offer some form of protection and a reference point for future identification. Drilling in high traffic areas or road allowances or low-lying wet areas are undesirable, but may be unavoidable.

Note: Field tie-ins must be completed to accurately identify each drilling location. These will ensure that the drilling locations are properly identified on plans and for future identification in the field.

4.8 Drilling Methods

The following drilling methods are listed in order of preference. However, final selection will based on site geologic and hydrogeologic conditions. During drilling activities, it is required that detailed descriptions of the site geologic conditions be documented. Therefore, GHD personnel shall have completed all required SOPs related to drilling programs as indicated in Sections 4.2.

Hollow-Stem Augering

Continuous flight hollow-stem augering (HSA) is the most frequently used method of borehole advancement. Its primary advantages are:

1. Generally, no additional drilling fluids are introduced into the formation.
2. Representative geologic samples can be obtained easily using split-spoon samplers in conjunction with the standard penetration test (SPT) and HSA.
3. A monitoring well can be installed through the auger, eliminating the need for a temporary borehole casing.

Information regarding split-spoon sampling is discussed in Section 5.0.

HSAs are available with an inside diameter of 2.5, 3.25, 4.25, 6.25, 8.25, and 10.25 inches (6.4, 8.3, 10.8, 15.9, and 26.0 cm). Some drilling contractors have inside diameter HSAs as large as 16.25 inches (41.3 cm). The most commonly used inside diameter is 4.25 inch for the installation of a 2-inch (5 cm) diameter monitoring well. Larger diameter HSAs, including 6.25, 8.25, and 10.25 inch (10.8, 15.9, 26.0 cm), are used for large diameter monitoring or extraction wells ranging in size from 4 to 8 inches (10 to 20 cm). Boreholes can usually be advanced to depths of about 100 feet (30 m) with an HSA in unconsolidated clays, silts, and sands. However, HSAs cannot typically advance far into consolidated bedrock.

Installation of a well through a HSA is a simple process, but precautions need to be taken to ensure that well construction, particular sealing, is properly completed.

Removing a HSA from flowing sand may be difficult since the auger has to be removed without rotation, if at all possible. A bottom plug or pilot bit assembly should be used to keep out soils and water that have a tendency to fill the bottom of the HSA during drilling. If flowing sands are encountered, potable water (analyzed for contaminants of concern) may be added into the HSA to equalize the hydrostatic pressure, which will keep the formation materials and water from flowing into the HSA once the plug or pilot bit is removed. As well, all introduced water must be removed prior to groundwater sampling from a monitoring well, typically three times the introduced volume should be removed.

Direct-Push Drilling

Direct-push refers to the sampler being 'pushed' into the soil material without the use of drilling to remove the soil. This method relies on the drill unit static weight, combined with rapid hammer percussion, to advance the tool string. Discrete soil samples are continuously obtained. The direct-push method is popular due to the limited cuttings produced and the speed of the sampling process, which can be much faster than the sample description and sample preparation process.

Groundwater and vapor samples can also be collected utilizing this method and appropriate tooling. Subsurface investigations typically sample to depths of 30 feet (9.1 m) or more; however, depth will vary based on the site-specific geology.

This method is used extensively for initial site screening to establish site geology and delineate vertical and horizontal plume presence. Small diameter wells (3/4 inch or 1 inch [2 cm or

2.5 cm])can be installed using direct-push methods, however the installation of these wells may be regulated or disallowed by state, provincial, or local installation regulations.

SPT values cannot be obtained when sampling with a direct-push discrete soil sampler.

Discrete continuous soil samples are collected in tube samplers typically 4 or 5 feet long (1.2 to 1.5 m) affixed with a cutting shoe and internal liner (PVC, Teflon, or acetate are available). The soil sampler may be operated in "open-mode" (when borehole collapse is not a concern), or in "closed-mode" (when minimization of sample "slough" is desired). Closed-mode operation involves placement of a temporary drill-point in the cutting shoe and driving the assembled sampler to depth. At the required depth, the temporary drill–point is released (via internal threading) and the sampler is driven to the desired soil interval. The drill-point slides inside the sample liner, riding above the collected soil column. Once driven to depth, the sampler is retrieved to the ground surface and the sample liner, with soil, is removed for examination.

Dual-Wall Reverse Circulation Air Drilling

This method consists of two concentric strings of drill pipe (an outer casing and a slightly smaller inner casing). Compressed air is continually forced down the annulus between the casings carrying the drill cuttings and groundwater up the inside of the inner casing. At the surface, the inner casing is connected to a cyclone hopper where the drill cuttings and groundwater fall out from the bottom of the hopper, and air is disbursed from the top. The dual wall provides a fully cased borehole in which to install a well. The only soil or groundwater materials exposed at any time are those at the drill bit, so the potential for carrying contamination from one stratum to another is minimal. Depth-specific groundwater samples can be collected during drilling; however, since the groundwater is aerated, analysis for VOCs may not be valid.

Rotosonic Drilling

This method consists of a combination of rotation and high frequency vibration to advance a core barrel to the desired depth. Once the vibration is stopped, an outer casing is advanced to the same depth and the core barrel is retrieved and the sample is vibrated or hydraulically extracted into a plastic sleeve or sample tray. The well is installed through an outer casing. Rotosonic drilling generally requires less time than more traditional methods and continuous, relatively undisturbed samples can be obtained through virtually any formation. Conventional sampling tools can be employed as attachments (e.g., hydropunch, split spoon, Shelby tube). No mud, air, water, or other circulating medium is required, although limited amounts of water are usually introduced to lubricate the drill string. The main limitation of this method is the availability of equipment.

Rotary Method

This method consists of a drill rod attached to a drill bit (for soils, a tricone or drag bit; for rock, a button studded or diamond studded bit) that rotates and cuts through the soils and rock. The cuttings produced are forced to the surface between the borehole wall and the drill rod by drilling fluids that generally consist of water or drilling mud, or air. The drilling fluid or air not only forces the cuttings to the surface but also keeps the drilling bit cool. Using the rotary method can be difficult as it requires several steps to complete the installation. First, the borehole is drilled, then temporarily

cased, then the well is installed, and then the temporary casing is removed. In some cases, the borehole may remain open without installing a casing (e.g., cohesive soils or bedrock).

Water Rotary

When using the water rotary method, the potable water supply must be analyzed for contaminants of concern. Water rotary is the preferred rotary method since potable water is the only fluid introduced into the borehole during drilling. However, this method is generally only successful when drilling in cohesive soils. The use of potable water also reduces well development time.

Air Rotary (typically used in rock)

When using the air rotary method, the air compressor must have an in-line oil filter system assembly to filter the compressor oil mixed with the air coming from the compressor. This helps eliminate the introduction of contaminants into the formation. The oil filter system needs to be regularly inspected. An air compressor with no in-line oil filter system is not acceptable for air rotary drilling. A cyclone velocity dissipater or similar air containment system must also be used to funnel the cuttings to one location rather than allowing them to blow uncontrolled out of the borehole. Air rotary may not be an acceptable method for well installation where certain contaminants are present in the formation. Alternatively, it may be necessary to provide treatment for the air being exhausted from the borehole during the installation process.

Mud Rotary

Mud rotary is the least preferred rotary method because contamination can be introduced into the borehole from the metals constituents in the drilling mud. Drilling mud is generally non-toxic. However, it is possible for mud to commonly infiltrate and affect water quality by sorbing metals and polar organic compounds (Aller et al., 1991). Chemical composition and priority pollutants analysis can be obtained from the manufacturer. Mud rotary must utilize only potable water and pure (no additives) bentonite drilling mud. The viscosity of the drilling mud must be kept as low as possible. Proper well development is essential to ensure the removal of all the drilling mud and to return the formation to its previous undisturbed state. This can require the removal of large volumes of groundwater to reduce turbidity to acceptable levels.

Well Point

Occasionally, well points (sand points) are driven into place without using augers. This method provides no information on the geologic condition (other than the difficulty of driving which may be related to formation density). Well points are most often used simply to provide dewatering of a geologic unit prior to excavation in the area. Well points are also used in monitoring shallow hydrogeologic conditions such as in or adjacent to streambeds.

4.9 Drilling Program Follow-Up Activities

The following shall be completed once drilling program activities are completed:

1. Ensure the site is secured and clean and that the site and well keys are returned.

2. If applicable, notify the GHD Chemist as to the delivery of the samples. Enclose the chain-of-custody and cover letter, indicating the parameters and number of samples, in the sample cooler.

3. File all completed field notes and forms.

4.10 References

Numerous publications are available describing drilling methods. Four excellent references are:

1. Driscoll, F.G., 1986. Groundwater and Wells, 2nd Edition. Johnson Division.

2. Freeze, R.A. and Cherry, J.A., 1979. Groundwater. Prentice Hall, Inc.

3. ASTM D5092. Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifer.

4. Nielsen, David M., 1991. Practical Handbook of Ground-Water Monitoring.

GHD Field Training Manual

Section 5.0
Soil Sampling Standard Operating Procedures

Part 1 - Surficial Soil Sampling, Borehole Installation and Sample Collection, and Test Pit Excavation and Sampling

(T102A)

Part 2 - GHD Approach for Soil Materials Description and Classification

(T100)

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Please adhere to the following Quality System training requirements:

- Employees who are required to conduct a specific field activity must be properly certified to do the work.
- This involves reviewing the SOP and completing the online training course and exam.
- Employees must also conduct this field work under supervised conditions on at least three occasions, and must be certified by a qualified mentor. Only then can an employee conduct a specific field activity on their own. This is documented on a Field Method Training Record (QSF-021).
- Complete the QSF-021 and forward it to trainingrecords-northamerica@ghd.com.
- Please note that four topics are discussed in this SOP. A separate QSF-021 is required for each topic:
    - Surficial Soil Sampling
    - Borehole Installation and Sample Collection
    - Test Pit Excavation and Sampling
    - GHD Approach for Soil Materials Description and Classification

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5. Soil Sampling Standard Operating Procedures

5.1 Introduction

Soil sampling is conducted to characterize the physical and/or chemical conditions at a site. Standard Operating Procedures (SOPs) are presented herein for obtaining a variety of soil samples for physical and chemical analyses, including:

- Surficial soil samples (soil between ground surface and 6 to 12 inches (15 to 30 cm) below ground surface)
- Subsurface samples that require borehole installation
- Test pit excavations

This guideline is not intended to provide the basis for designing a soil sampling program, but instead assumes that a soil sampling program has been designed, a Work Plan has been established, and the sampling team is preparing to mobilize to the field.

Soil sampling procedures vary from project to project due to different parameters of concern, different guidance provided by the state/province where the site is located, or the specific objectives for the project. Therefore, it is essential that the sampling team members carefully review the Work Plan. The primary goal of surface soil sampling is to collect representative samples for examination and chemical analysis (if required).

The remainder of this section is organized as follows:

- Section 5.2 Sampling Methods
- Section 5.3 Planning and Preparation
- Section 5.4 Safety and Health
- Section 5.5 Quality Assurance/Quality Control
- Section 5.6 Equipment Decontamination
- Section 5.7 Procedures for Soil Classification
- Section 5.8 Procedures for Surficial Soil Sampling
- Section 5.9 Procedures for Borehole Installation and Sampling
- Section 5.10 Procedures for Test Pit Excavation and Sampling
- Section 5.11 Follow-up Activities
- Section 5.12 References

5.2 Sampling Methods

5.2.1 Surficial Soil Sampling

Surficial soil sampling is less frequently used than subsurface soil sampling (which involves borehole installation). Typically, surficial soil sampling is used when a large site is being assessed and the extent of contamination is unknown. In this case, surficial sampling is helpful in identifying the location of surface releases (e.g., historical spills of hydrocarbons) that may have contributed to subsurface contamination. A surficial soil sampling program is also recommended for sites with suspected atmospheric deposition of contaminants (e.g., stacks), areas of surface spills, or recent spills.

Surficial soil sampling is used when contamination is known to be restricted to the surficial region of the soil stratum. Thus, surficial sampling can be useful at brownfield sites, where it is necessary to determine if soils are contaminated with specific contaminants of concern (e.g., metals) as part of a purchaser's due diligence. Surficial soil sampling can also be required when obtaining data in order to perform a site-specific risk assessment.

For the purposes of this section, the surficial soil is considered to be the 0- to 6-inch (0 to 15 cm) soil horizon.

Samples are collected from areas where surficial soil contamination is known or suspected. Samples from a particular depth increment must not be mixed with soil from other depths. Soil horizons displaying different properties should be sampled separately, since they may behave very differently with respect to contaminant accumulation and movement.

5.2.2 Borehole Installation and Sampling

A significant portion of GHD's field activities involve borehole installation.

Several manual methods are available for the collection of shallow subsurface soil samples (e.g., hand augers, post-hole augers). However, the most common methods used by GHD to advance boreholes are a drill rig equipped with continuous flight hollow-stem augers (HSAs) and split-spoon samplers, or a direct-push drilling unit equipped with solid tube soil samplers.

5.2.3 Test Pit Excavation and Sampling

Test pits are typically excavated to explore and define geologic conditions (or buried waste/debris) and to allow the collection of subsurface soil samples for geotechnical or chemical analysis. Test pits give a more complete view of the subsurface soil conditions than soil borings. Test pits are excavated using either a rubber-tired backhoe or track-mounted excavator, and can extend 10 to 15 feet (3.0 to 4.6 m) below ground surface.

The use of test pits for investigation is determined on a site-specific basis. Experience from past projects has identified the following issues:

1. The nature and extent of contamination which may be encountered may be unknown. The Site-specific Health and Safety Plan (HASP) and Job Safety Analysis (JSA) must be specific to the level of Personal Protective Equipment (PPE); this may be Level A or B.

2. Waste materials, including drums, may be encountered. A plan must be in place specifying how this material will be handled.
3. Air emissions of some compounds may occur. A plan must be in place to ensure that employees and the public are adequately protected.
4. Community relations concerns may exist (e.g., workers in chemically protective "moon suits"). A notification plan may be required.
5. All underground utilities must be located utilizing documentation using the GHD Subsurface Clearance Protocol.

5.2.4 Grab Versus Composite Samples

A grab sample is collected to identify and quantify compounds at a specific location or interval. The sample is comprised of no more than the minimum amount of soil necessary to make up the volume of sample dictated by the required sample analyses. Composite samples are a mixture of a given number of sub-samples and are collected to characterize the average composition in a given surface area.

Samples to be analyzed for volatile organic compounds (VOCs) are always collected as grab samples. Mixing of soil samples to create a composite is not performed. Mixing of soil samples results in partial volatilization of VOCs from the soil, and thus compromises the integrity of the composite soil sample.

5.3 Planning and Preparation

The following activities are required prior to undertaking a soil sampling program:

1. Review the Work Plan, project documents, and health and safety requirements with the Project Coordinator.
2. Complete a Field Equipment Requisition Form (QSF-014) and assemble all equipment, materials, log books, and forms. Form SP-02 (Project Planning, Completion, and Follow-Up Checklist) should be used for guidance throughout the project. Borehole Installation/Soil Sampling Equipment and Supply Checklist (Form SP-12) provides a summary of the typical equipment/materials required for soil sampling. Drilling/Well Construction Checklist (Form SP-13) provides a listing of pre-planning and site activities that is designed as an aid to preparing and completing the project.
3. Obtain a site plan and any previous stratigraphic logs. Determine the exact number, location, and depths of samples to be collected.
4. Complete a Vendor Evaluation Form (QSF-012) and file in the project file for any vendors that do not have full approval status or are not listed on the Approved Vendor List (QSL-004). Completion of a Safety and Health Schedule (QSF-030 for Canadian work; QSF-031 for U.S. work) is necessary for all vendors who complete field services. Prior to mobilization on site, the vendor must submit the form to the Regional Safety and Health Manager for review and approval (if not already posted on QSL-004).

5. Contact GHD's Chemistry Group to arrange/determine:
    - SSOW (simplified Scope of Work)
    - Glassware/sample jars
    - Cooler
    - Shipping details
    - Start date
    - Laboratory
    - Expected sampling duration
6. Initiate a Property Access/Utility Clearance Data Sheet (QSF-019), if necessary. In most instances, surface sampling activities do not require utility clearances.
7. Determine notification needs with the Project Coordinator. Have the regulatory groups, client, landowner, GHD personnel, and laboratory been informed of the sampling event?
8. Determine the methods for handling and disposal of wash waters and spent decontamination fluids.

In addition to the above, the following may be required when conducting a borehole or test pit program:

1. Establish a water source for drilling and decontamination activities. Pre-plan the methods for handling and disposal of drill cuttings, wash waters, and spent decontamination fluids.
2. Arrange with driller to provide paraffin wax, melting pot, and heat source (if required).

5.4 Safety and Health

GHD is committed to conducting field activities in accordance with sound safety and health practices. GHD adheres to high safety standards to protect the safety and health of all employees, subcontractors, customers, and communities in which they work. The safety and health of our employees takes precedence over cost and schedule implications.

Field personnel are required to implement the Safety Means Awareness Responsibility Teamwork (SMART) program as follows:

- Assure the HASP is specific to the job and approved by a Regional Safety and Health Manager.
- Confirm that all HASP elements have been implemented for the job.
- A JSA for each task has been reviewed, modified for the specific site conditions and communicated to all appropriate site personnel. The JSAs are a component of the HASP.
- Incorporate Stop Work Authority; Stop, Think, Act, Review (STAR) process; Safe Task Evaluation Process (STEP); Observations process; Near Loss and Incident Management process in the day-to-day operations of the job.
- Review and implement applicable sections of the GHD Safety and Health Policy Manual.

- Confirm that all site personnel have the required training and medical surveillance, as defined in the HASP.
- Be prepared for emergency situations, locating safety showers, fire protection equipment, evacuation route, rally point, and first aid equipment before you begin working, and make sure the equipment is in good working order.
- Maintain all required PPE, safety equipment, and instrumentation necessary to perform the work effectively, efficiently, and safely.
- Be prepared to call the GHD Incident Hotline at 1-866-529-4886 for all incidents involving injury/illness, property damage, and vehicle incident and/or significant Near Loss.

It is the responsibility of the Project Manager to:

- Ensure that all GHD field personnel have received the appropriate health and safety and field training and are qualified to complete the work.
- Provide subcontractors with a Job Hazard Analysis to enable them to develop their own HASP.
- Ensure that all subcontractors meet GHD's (and the client's) safety requirements.

5.5 Quality Assurance/Quality Control

A well-designed Quality Assurance/Quality Control (QA/QC) program will:

- Ensure that data of sufficient quality are obtained in order to facilitate good site management.
- Allow for monitoring of staff and contractor performance.
- Verify the quality of the data for the regulatory agency.

The QA/QC program is developed on a site-specific basis. QA/QC requirements are discussed in detail in Section 3.9.

5.6 Equipment Decontamination

Borehole Installation and Sampling

Prior to use and between each borehole location at an environmental site, the drilling and sampling equipment must be decontaminated in accordance with the Work Plan or the methods presented in this section.

The minimum wash procedures for decontamination of drilling or excavating equipment are:

1. High pressure hot water detergent wash (brushing as necessary to remove particulate matter).
2. Potable, hot water, high pressure rinse.

Cover the clean augers with clean plastic sheeting to prevent contact with foreign materials. For geotechnical, geologic, or hydrogeologic studies where contaminants are not present, it is sufficient to clean the drilling or excavating equipment simply by removing the excess soils.

On environmental sites, the soil sampler equipment (split spoons, trowel, spoons, shovels, bowls) are typically cleaned as follows:

1. Wash with clean potable water and laboratory detergent, using a brush as necessary to remove particulates.
2. Rinse with tap water.
3. Rinse with deionized water.
4. Air dry for as long as possible.

In addition, the following steps may be added when sampling for VOCs and metals:

1. Rinse with 10 percent nitric acid (only if samples are to be analyzed for metals).
2. Rinse with deionized water.
3. Rinse with appropriate solvent (pesticide grade isopropanol, methanol, acetone, hexane, if required).
4. Rinse again with deionized water.
5. Air dry for as long as possible.
6. Wrap split-spoon samplers in aluminum foil to prevent contamination.

Caution:	Check the Quality Assurance Project Plan (QAPP) to confirm the cleaning protocol. Use of incorrect cleaning protocol could invalidate chemical data.

5.7 Procedures for Soil Classification

This SOP for Soil Classification is not intended to provide complete training in soil classification. Soil Classification will require additional training and experience.

Criteria and procedures for soil classification and description include:

1. A standard method of describing the soil by name and group symbol.
2. Standard field identification methods based on visual examination and manual tests on representative soil samples by a qualified GHD representative for interpretation of subsurface conditions at the site.
3. Verifying field description descriptions through the inspection.
4. Confirming descriptive information by laboratory determination of selected soil characteristics if required in the Work Plan.
5. Factual overburden stratigraphic logs completed by GHD personnel responsible for interpreting the subsurface conditions at the site and review/confirmation of soil descriptions by the Project Coordinator.

The overburden stratigraphic log is the factual description of the soil at each borehole location and will be relied on to interpret soil characteristics at the site. The overburden stratigraphic log will also be used to interpret the soil characteristics' influence and significance on the subsurface

environment. GHD personnel responsible for interpreting the subsurface conditions at the site will also verify overburden stratigraphic log accuracy. If practical, the Project Coordinator, Geologist, or Geotechnical Engineer should confirm the soil descriptions and examine representative soil samples.

Describing and classifying soils is a skill that is learned through experience and by systematic training using laboratory results of soil composition in comparison to field descriptions.

Note: Attendance at a soil identification course provided by GHD is mandatory.

Descriptions for natural undisturbed soils are recorded on a Stratigraphy Log (Overburden) (Form SP-14). An example of a completed Stratigraphy Log (Overburden) is presented on Figure 5.1.

Soil descriptions are completed in the following order:

1. Unified Soil Classification System (USCS) group symbol(s) (e.g., SM) of primary soil components or dual or borderline symbols.
2. Name and adjective description of primary, secondary, and minor grain size components.
3. Relative density for non-cohesive soils or consistency for cohesive soils.
4. Gradation and soil structure for non-cohesive soils or structure and plasticity for cohesive soils.
5. Color.
6. Moisture content.
7. Other physical observations including presence of staining and or odors.

Note: When describing observed odors, be as specific as possible to classify general odor category and strength of odor. Odors are generally chemical, petroleum, or septic related, varying from slight to moderate to strong. Identification of specific chemical compounds (i.e., benzene, gasoline) is not necessary and is often inaccurate as detailed chemistry commonly shows an array of chemicals present.

When describing vegetative matter presence in soils, do not use the term organic. The use of the term organic often leads to confusion regarding the presence of organic chemicals (i.e., VOCs, semi-volatile organic compounds [SVOCs]). Similarly, as noted above, use more specific terms for odors than organic.

The description of fill soils is similar to those used to describe native undisturbed soils. Fill soils will be identified as fill (i.e., SP/GP-Sand and Gravel [Fill]). To determine if soils are fill, look for evidence that the soil has been artificially placed (e.g., brick fragments, slag, glass, wood fragments). Relative or inconsistent soil density can also assist in determining if soils are fill, along with irregular soil structure.

Soils are identified and grouped consistently to determine subsurface pattern or changes and non-conformities in the soil stratigraphy. The stratigraphy of each soil boring or test pit is compared

to ensure that patterns or changes in soil stratigraphy are noted and that consistent terminology is used.

Visual examination, physical observation, and manual tests (based on ASTM D2488, Standard Practice for Description and Identification of Soils [Visual-Manual Procedure]) are used to aid in classifying and grouping soil samples in the field. These procedures are described in the following subsection. ASTM D2488 should be reviewed for detailed explanations of the procedures. (Note that the related ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes [Unified Soil Classification System] uses slightly different percentages of soil components.) Visual-manual procedures used to aid in soil identification and classification include:

1. Visual determination of grain size, soil gradation, and percentage of various soil components to the nearest 5 percent (i.e., gravel, sand, silt, and clay).
2. Dry strength, dilatancy, toughness, and plasticity tests (i.e., thread or ribbon test) for identification of inorganic fine-grained soils (e.g., CL or CH [clays], and ML or MH [silts]).
3. Soil compressive strength and consistency estimates based on thumb indent and or pocket penetrometer (preferred) methods.

The three main soil divisions are:

1. Coarse-grained soils (e.g., sand and gravel)
2. Fine-grained soils (e.g., silts and clays)
3. Soils with high natural organic and vegetative matter content (e.g., peat, marl)

These soil divisions are presented in the table of USCS classifications below.

Major Division			Group Symbol	Typical Description
Coarse grained soils more than 50% retained on No. 200 sieve	Gravel more than 50% of coarse fraction retained on No. 4 sieve	clean gravel <5% fines	GW	well graded gravel, gravel-sand mixtures
			GP	poorly graded gravel, gravel-sand mixtures
		gravel with >15% fines	GM	silty gravel, gravel-sand-silt mixtures
			GC	clayey gravel, gravel-sand-clay mixtures
	Sand more than 50% of coarse fraction passes No. 4 sieve	clean sand <5% fines	SW	well graded sand, fine to coarse sand, gravelly sand
			SP	poorly graded sand
		sand with >15% fines	SM	silty sand, sand-silt mixtures
			SC	clayey sand, sand-clay mixtures
Fine grained soils more than 50%	Silt and Clay liquid limit <50,	inorganic	ML	Inorganic silt
			CL	Inorganic clay

Major Division			Group Symbol	Typical Description
passes No. 200 sieve	low plasticity	organic	OL	organic silt, organic clay
				silt of high plasticity, elastic silt
	Silt and Clay liquid limit ≥50, high plasticity	inorganic	MH	clay of high plasticity, fat clay
			CH	organic clay, organic silt, low plasticity
		organic	OL	organic clay, organic silt, high plasticity
			OH	
Highly organic soils			Pt	peat

5.7.1 Coarse Grained Soils

The USCS symbols for coarse-grained soil are primarily based on grain size, grain size distribution (gradation), and percent of fines (silt and clay content).

Grain size classification used for describing soils is in terms of particle size and sieve size (e.g., gravelly sand, trace silt). Coarse-grained soil is composed of more than 50 percent by weight, sand size, or larger (75 μm diameter, No. 200 sieve size). Note that there are other definitions for coarse-grained or coarse textured soil and for sand and for sand size as soil having greater than 70 percent particles equal to or greater than 50 μm diameter (after "Guidelines for Contaminated Sites in Ontario") or 60 μm diameter ("Canadian Foundation Manual").

The percentage descriptors for soil components are different for coarse-grained versus fine-grained soils. The following are the percentage component descriptors for coarse-grained soils:

Noun (e.g., sand, gravel)	Major Component
Adjective (e.g., silty, clayey, sandy, gravelly)	Greater than 15%
With (e.g., with silt, with clay, with sand, with gravel)	5% to 15%
Trace (e.g., trace silt, trace clay, trace sand, trace gravel)	<5%

Grain size distribution of coarse-grained soils includes:

- Poorly graded (i.e., soil having a uniform or predominantly one grain size, SP and GP)
- Well graded (i.e., poorly sorted soils with a wide range of particle sizes with substantial percentage of intermediate sizes, SW and GW)
- Dirty (i.e., soil having greater than 15 percent fines, SM, SC, GM, and GC)

Coarse-grained soils are further classified based on the percentage of fine-grained soils (e.g., silts and clays) they contain. Coarse-grained soils containing greater than 15 percent fine-grained soils are described with an adjective (e.g., silty [SM, GM], clayey [SC, GC]). This description is attributed to soil particles that adhere when the soil sample is rubbed between the hands or adhere to the sides of sample jars after shaking, or rolling in the jar. The jar shake test will also result in the segregation of sand and gravel particles and can be used as a visual aid in determining sand and gravel content percentages.

Examples of the group symbol, name, and adjectives used to describe the primary, secondary, and minor components of soil are:

- GW - Sandy Gravel (e.g., 70 percent gravel and 30 percent sand, well graded)
- GW - Sandy Gravel-trace silt (less than 5 percent silt, well graded)
- SP - Sand (a uniform sand, predominantly one sand grain size)
- SM - Silty Sand, with clay (sand with greater than 15 percent silt, and 5 to 15 percent clay)

Relative density is important in establishing the engineering properties and behavior of coarse-grained soils. Relative density of non-cohesive (coarse-grained) soils is determined using the standard penetration test (SPT) blow counts (N-values) in accordance with ASTM D1586. A detailed discussion of the SPT and N values can be found in Section 5.9.2.1.

The SPT provides reliable indications of the relative density of sand and fine gravel. N-values in coarse-grained soil are influenced by a number of factors that result in overestimated relative densities. For example, in coarse-grained gravel, dilatent silty fine sands, sand below the water table and uniform coarse sand, N-values tend to be conservative and under estimate the relative density. The Project Geotechnical Engineer will assess these effects, if required.

Other methods, such as modified SPT and cone penetration tests, are used on occasion to supplement or replace the SPT method for certain site-specific conditions. All modifications to the SPT or substitute methods must be recorded as required to interpret test results and correlate relative density.

5.7.2 Fine-Grained Soil

A fine-grained soil is made up of more than 50 percent silt and clay (i.e., fines greater than 50 percent by weight passing the 75 μm (No. 200) sieve size). Description of visual-manual field methods and criteria to further characterize and group fine-grained soil (e.g., CL, CH, ML, and MH) are discussed in ASTM D2488.

The percentage descriptors for components is different for fine-grained versus coarse-grained soils. The following are the percentage component descriptors for fine-grained soils:

Noun (e.g., silt, clay)	Major Component
Adjective (e.g., sandy, gravelly, silty, clayey)	Greater than 30%
With (e.g., with sand, with gravel, with silt, with clay)	15% to 30%
Few (e.g., few sand, few gravel, few silt, few clay)	5% to 15%
Trace (e.g., trace silt, trace clay, trace sand, trace gravel)	<5%

Further soil characterization tests include dry strength, dilatency, toughness, and plasticity (thread or ribbon test).

Criteria for Describing Dry Strength

Description	Criteria
None	The dry specimen crumbles into powder with mere pressure of handling.
Low	The dry specimen crumbles into powder with some finger pressure.

Description	Criteria
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure.
High	The dry specimen crumbles into powder with finger pressure; specimen will break into pieces between thumb and a hard surface.
Very High	The dry specimen cannot be broken between the thumb and a hard surface.

Criteria for Describing Dilatancy

Description	Criteria
None	No visible change in small wetted specimen when rapidly shaken in palm of hand.
Slow	Water appears slowly on the surface of the specimen during shaking and does not disappear or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking and disappears quickly upon squeezing or stretching.

Criteria for Describing Toughness

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit; the thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit; the thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread to near the plastic limit; the thread and the lump have very high stiffness.

Criteria for Describing Plasticity

Description	Criteria
Nonplastic	1/8-inch (3 mm) thread cannot be rolled at any water content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit; the thread cannot be re-rolled after reaching the plastic limit; the lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit; the thread can be re-rolled several times after reaching the plastic limit; the lump can be formed without crumbling when drier than the plastic limit.

Examples of group symbol identification based on visual-manual procedures and criteria for describing fine grained soil are:

Group Symbol	Dry Strength	Dilatancy	Toughness	Plasticity
ML	None to low	Slow to rapid	Low or thread cannot be formed	Slight
CL	Medium to high	None to slow	Medium	Low
MH	Low to medium	None to slow	Low to medium	Low
CH	High to very high	None	High	High

Positive classification by USCS group symbols as described in ASTM D2487, is through laboratory determination of particle size characteristics, liquid limit, and plasticity index. The need for laboratory testing will be determined by the Project Hydrogeologist, Geologist, or Geotechnical Engineer and will be detailed in the Work Plan. If no laboratory testing is performed to confirm soil classification, a statement of qualification (method used) is required for group symbols.

Examples of terminology that accompany the group symbols are:

- ML - Sandy Silt (e.g., 30 percent sand)
- CL - Clay (lean) with sand (e.g., 15 to 29 percent sand)

The USCS group symbols require the use of lean clay (CL) and fat clay (CH). The use of these symbols is dependent on the plasticity of the soil. Classification such as silty clay can only be used for a very narrow set of conditions, and will only be used if Atterberg Limit results are available. The lean and fat clay designations are not universally used, but adherence to the USCS requires that these symbols be used.

Correlation of N-values and consistency for clays is unreliable. Consistency determinations will be performed using more appropriate static test methods, especially for very soft to stiff clays. N-values are more reliable in hard clays.

Estimates of unconfined compressive strength (Su) can be obtained by a pocket penetrometer test. To estimate consistency and compressive strength with a pocket penetrometer, cut a minimum 4-inch (10 cm) soil core perpendicular to the soil core length. Hold the core with moderate confining pressure so as not to deform the soil core. Slowly insert the pocket penetrometer tip into the perpendicular face of the soil core until the pocket penetrometer indents the soil core to the mark indicated on the piston of the penetrometer. The pocket penetrometer estimate of the soil compressive strength (Su) is the direct reading of the value mark on the graduated shaft indicated by the shaft ring marker, or by the graduated piston reading at the shaft body. For average estimates, complete this procedure several times on the ends and middle of the soil core. For Shelby tube samples (or thin wall samplers), perform the pocket penetrometer test at several locations on the exposed ends of the sample.

In situ shear vane tests or other test methods provide better compressive strength estimates for very soft to stiff consistency clay soil.

Describing soil consistency is an important component in evaluating the engineering properties and strength characteristics of fine-grained cohesive soil. Consistency terms like soft and hard are based on the unconfined compressive strength (Su) and shear strength or cohesion (cu) of the soil.

Patterns of soil gas and groundwater movement in fine-grained soil are influenced by natural soil structure. Soil structure is dependent on the depositional method and to a lesser extent climate. The identification of fill soil is equally important in determining soil characteristics in fine-grained soils.

5.8 Procedures for Surficial Soil Sampling

This section provides a limited discussion on considerations for the design of a soil sampling program in order to provide the sampling team members with a basic understanding of those considerations.

5.8.1 Background

Soil sampling locations are selected in order to obtain representative soils with the minimum number of samples. Prior to conducting an investigation, a site inspection may eliminate many uncertainties with respect to site characteristics and result in a more complete soil sampling study. The site inspection should identify pertinent features (e.g., rock outcrops, drainage patterns, surface runoff, surface cover characteristics (e.g., grass, gravel, concrete), wet areas, and fill areas) and evaluate the relationship between those features and potential sources of contaminants. An understanding of these relationships and conditions is important in developing a sampling plan.

5.8.2 Random, Biased, and Grid-Based Sampling

Unless there is a strong indication of contaminant presence, such as staining, soil sample locations may be randomly selected from several areas within the site, such as near obvious potential sources of current or historic contamination. Potential sources include large transformers, aboveground storage tanks (ASTs), mandoors, outdoor storage racks, and drainage swales.

If an area shows evidence of contamination, such as staining or vegetative stress, biased samples are collected from the area to characterize the contamination. Background and control samples are also biased, since they are collected in locations typical of non-site-impacted conditions.

When a soil sampling investigation involves a large area, grid-based soil sampling is performed. There is no single grid size that is appropriate for all sites. Common grid sizes are developed on 50- and 100-foot (15 to 30 m) centers. It is acceptable to integrate several different grid sizes in a single investigation.

For a surficial soil sampling program, it is also important to consider the presence of structures and drainage pathways that might affect contaminant migration. It is sometimes desirable to select sampling locations in low-lying areas which are capable of retaining some surface water flow since these areas could provide samples which are representative of historic site conditions (worst-case scenario if surface water flow is a concern).

5.8.3 Sample Interval

Surficial soil is generally considered to be soil between ground surface and 6 to 12 inches (15 to 30 cm) below ground surface. However, for risk assessment purposes, regulatory authorities often consider soil from ground surface to 2 feet (0.6 m) below ground surface to be surficial soil.

Note: Ontario regulations state that surficial soils are 0 to 6 inches (0 to 15 cm) below ground surface.

The exact interval to be considered as surficial soil is often a matter of discussion with the regulatory authorities that review the Work Plan. The sample interval is important to the sample collection method and to the manner in which the data are ultimately interpreted. Another important factor is the type of soil. If there are different types of soil present at the site, this may have a bearing on the sample interval. For example, it may be important to separately sample a layer of material with high organic carbon content which overlies a layer of fine-grained soil.

5.8.4 Procedures for Surficial Sampling

Soil sampling methods are dependent upon the sample interval of interest, the type of soil material to be sampled, and the requirements for handling the sample after retrieval. The most common method for collection of surficial soil samples is the use of a stainless steel trowel. Soil samples may also be collected with spoons and push tubes. Often a shovel is required to open a trench such that sampling can be conducted. Soil that has come in contact with the shovel cannot be used as sample material.

In all cases, the sampling device must be constructed of an inert material with smooth surfaces which can be easily decontaminated. The decontamination protocol employs a sequence of cleaning agents and water designed to remove surface contaminants (refer to Section 5.6). All sampling equipment is cleaned between sample locations. A typical surficial soil sampling protocol is outlined below:

1. Collect surficial soil samples using a precleaned stainless steel trowel or other appropriate tool. Each sample consists of soil from the surface (or other starting depth) to the depth specified in the Work Plan. Sample in ditches only when there is no water present.
2. Use a new pair of disposable gloves at each sample location.
3. Prior to use, at each sample location, decontaminate all sampling tools as specified in the Work Plan or as described in Section 5.5.
4. Use a precleaned sampling tool to remove the sample from the layer of exposed soil. Place the collected soil directly into a clean, prelabeled sample jar and seal with a Teflon-lined cap. If a sample is to be split for duplicate analyses, first homogenize the soil in a precleaned stainless steel bowl.
5. After collection, place the samples on ice or cooler packs in a laboratory-supplied cooler.

Surficial debris (e.g., grass cover) should be removed from the area where the sample is to be collected using a separate precleaned device.

In the event that soil conditions are not as described in the Work Plan, or if there are unexpected distinct layers of soil present (e.g., a layer of high organic carbon content overlying a layer of fine-grained soil), sampling personnel should immediately report the conditions to the Project Coordinator for direction. Similarly, if a sampling location is in a gravel or paved area, sampling personnel should confirm with the Project Coordinator whether the surface samples are to be collected from the gravel/pavement subbase material or from the first layer of soil beneath these layers.

Also, sampling team members should immediately report any conditions to the Project Coordinator that they believe may have a negative effect on the quality of the results.

It is generally inadvisable to collect samples containing excessive amounts of large particles such as gravel. Gravel presents difficulties for the laboratory in terms of sample preparation and the results may not be truly representative of contaminant concentrations in nearby soil.

All conditions at the time of sample collection are properly documented in a field log book. This includes a thorough description of the sample characteristics including grain size, color, and general appearance; date/time of sampling; and labeling information. The location of the sampling point is described in words, and three measurements are taken from adjacent permanent structures so that, if necessary, the sample location can be readily identified in the field at a future date. It is often advisable to have a licensed land surveyor accurately survey the locations.

Soil samples are homogenized in a stainless steel bowl prior to filling sample containers. This step can be bypassed if only one sample container is required to be filled, as long as the laboratory will homogenize the sample upon receipt. It is important that soil samples be mixed thoroughly to ensure that the sample is as representative as possible of the sample interval. When using a round bowl, mixing is achieved by stirring the material in a circular motion and occasionally turning the material over. Fill the sample container completely, leaving no headspace.

Do not mix soil for samples for VOC analyses as this promotes the partial volatilization of compounds from the soil.

In 1997, EPA adopted new methods for sampling soils for VOC analysis. Method 5035 calls for collecting soil using a coring device (EnCore). For analysis of low level VOCs (typically 1 to 200 μg/kg), soil is sealed in a specially prepared vial with a solution of sodium bisulfate. For higher levels of VOCs, the soil is placed in a vial with a volume of methanol. This method increases the complexity of collecting soils and makes it imperative that the sampler and laboratory work closely together. For some soil sampling programs, multiple EnCores are required for each sample interval. The number of EnCores required per sample interval should be ascertained during the prior planning and preparation stage.

Discrete Grab Sampling Methodology for Surficial Soils

Discrete grab sampling is employed when the sampling location is considered to be a small area (approximately 1 square foot [0.1 square meter]) that has both a consistent soil type and a consistent level of contaminant impact.

When collecting a discrete grab surficial soil sample, use the following procedure:

1. Using the sampling device (e.g., trowel, spoon, Oakfield sampler) scoop soil from the top 2 inches (5 cm) into the sample container. If the sample is being collected for VOC analyses, perform this step as quickly as possible in order to minimize the loss of volatile compounds from the soil.
2. Collect a field screening sample from the same sampling location as the discrete grab sample and at the same time. Scoop soil into a zip-loc bag until it is no more than one quarter full.

3. Do not mix the soil for samples collected for VOC analyses (for sample homogenization purposes) as this will promote the loss of volatile compounds from the soil. The laboratory will obtain a representative sample from the container by using coring techniques before the laboratory analysis is performed.

Composite Sampling Methodology for Surficial Soils

A composite sample can be obtained directly from the soil surface by combining a number of discrete grab samples from a number of sampling locations on the soil surface. For preparation of a meaningful composite sample, the soils from the sub-samples taken from the different sampling locations should have (by visual observation) similar contaminant concentrations.

When collecting a composite surface soil sample, use the following procedure:

1. Choose a number of discrete sampling locations that will give a representative sample of the defined composite area at each sampling location.
2. Using the sampling device (e.g., trowel, spoon), scoop the soil from the top 2 inches (5 cm) into the sample container. As much as practical, try to put approximately the same volume of soil from each sampling location into the container.
3. Move to the next sampling location and repeat steps 1 and 2.
4. Collect a maximum of five surface samples (to avoid the complete dilution of any hot spots).
5. When the last location has been sampled, ensure the sample container is filled with soil, leaving no headspace.
6. Since composite samples are used for semi-volatile organic compounds (SVOCs) and inorganic parameters, minimizing the sample collection time is not as important as when discrete samples for VOC analyses are being collected. However, the preferred practice is that the sampler take no longer than necessary to obtain the sample.
7. Collect a field screening sample from the same sampling location as the composite sample and at the same time. As much as practical, try to put approximately the same volume of soil from each discrete grab sampling location into a zip-loc bag. The zip-loc bag should be no more than one quarter full after all the sub-samples have been added.

Since composite samples are not analyzed for VOCs, there is no reason to avoid mixing the sub-samples from the various sampling locations in the sample container (homogenization). However, since the laboratory will use coring techniques to ensure that a sample is representative of the entire container, there is no need to perform field homogenization of the soil within the sample container.

During the sampling program, the sampling team leader will stay in contact with the GHD chemist assigned to the project such that the GHD chemist can properly inform the contract laboratory of the progress of the work. This includes submitting sample summaries and/or copies of completed chain-of-custody forms to the GHD chemist.

Finally, some GHD QAPPs require a designation of a QA/QC officer for field activities. The sampling team leader may be required to conduct certain field audit activities and, at minimum, should be familiar with and responsible for completion of all QA/QC sample activities.

5.9 Procedures for Borehole Installation and Sampling

Once the prior planning and preparation activities are completed, the drilling program can proceed. The typical series of events that takes place is:

1. Locating and marking boring locations.
2. Initiation of a Property Access/Utility Clearance Data Sheet (QSF-019), including obtaining appropriate signoffs by the client representative and drilling subcontractor representative.
3. Contractor mobilization; equipment and material check.
4. Site selection of decontamination pad and drum staging area (if applicable); final visual examination of proposed drilling area for utility conflicts.
5. Decontamination of sampling and drilling equipment prior to use in accordance with the Work Plan or as described in Section 5.6.
6. Borehole advancement utilizing the approved method as outlined in the Work Plan.
7. Soil sample collection; descriptions of the soil samples in accordance with GHD protocol.
8. Monitoring well installation (if applicable).
9. Sample preparation and packaging.
10. Abandonment of boreholes or installation of monitoring wells.
11. Collection of groundwater samples (if monitoring wells are installed).
12. Surveying of borehole location and elevations.
13. Field note completion and review.

5.9.1 Location and Marking of Drill Sites/Final Visual Check

The proposed borehole locations marked on the site plan are located in the field and staked. On most sites, this will likely be done several days in advance of the drill rig arriving on site. Unless boreholes are to be installed on a fixed grid, the proposed locations are usually strategically placed to assess site conditions.

> Note: Any borehole (and all the records thereof) which is completed with casing as a temporary or permanent monitoring well, will be designated by the monitoring well number only (i.e., MW1-yy). Boreholes drilled strictly as soil test borings in which no casing is set (even if an open-hole groundwater sample is collected) will be designated by the boring number only (i.e., BH1-yy).

Once the final location for the proposed boring has been selected and utility clearances are complete, one last visual check of the immediate area should be performed before drilling proceeds. This should confirm the locations of any adjacent utilities (subsurface or overhead) and verification

of adequate clearance. If gravity sewers or conduits exist in the area, any access manholes or chambers should be opened and the conduit/sewer alignments confirmed. Do not enter manholes unless confined space procedures are followed.

If possible, it is prudent to use a hand auger or post-hole digging equipment to a sufficient depth to confirm that there are no buried utilities or pipelines. Alternatively, a Hydrovac truck can vacuum a large diameter hole to check for utilities, although soils collected this way may require containment on site. This procedure generally clears the area to the full diameter of the drilling equipment which will follow.

Caution:	Do not assume site plan details regarding pipe alignments/position are correct. Visually check pipe position when drilling near sewers. Personnel should also be alert to additional piping presence if the plans are outdated.

If it is necessary to relocate a proposed borehole due to terrain, utilities, access, etc., the Project Coordinator must be notified and an alternate location will be selected.

5.9.2 Sample Collection

A boring is advanced incrementally to permit intermittent or continuous sampling. Test intervals and locations are normally stipulated by the Project Coordinator or Work Plan. Typically, the depth interval for sampling is 2.5 to 5 feet (0.75 to 1.5 m), or less in homogeneous strata, with at least one test and sampling location at every change of stratum. In some cases samples are taken continuously (i.e., 2-foot (0.6 m) long samples at 2-foot (0.6 m) intervals).

Collected soil samples are described in the field using the USCS (visual-manual procedure). The soil description is recorded on a Stratigraphic Log (Overburden) (Form SP-14) or field book in the following order:

1. USCS Soil Symbol of major component
2. Native or fill
3. Secondary and minor soil components
4. Relative densities/consistency
5. Grain-size/plasticity
6. Gradation/structure
7. Color
8. Moisture content
9. Observations of odor or visual chemical presence (i.e., non-aqueous phase liquid [NAPL])
10. Additional descriptions

For environmental sampling, always change gloves between collecting subsequent soil samples to prevent cross-contamination. Decontaminate all tools (e.g., samplers, spatulas) prior to use on each sample to prevent cross-contamination in accordance with the Work Plan or as described in Section 5.6.

Any drilling procedure that provides a suitably clean and stable hole before insertion of the sampler, and assures that the standard penetration test (SPT) or other sampling technique is performed on essentially undisturbed soil, is acceptable. The drilling method is selected based on the subsurface conditions. Each of the following methods has proven to be acceptable for specific subsurface conditions:

- HSA with inside diameter between 2.5 and 6.25 inches (5.7 to 15.9 cm)
- Solid stem auger (SSA) with auger diameter between 2.5 and 6.25 inches (5.7 to 15.9 cm)
- Direct-push (dual tube systems, discrete soil sample systems)
- Open-hole rotary drilling
- Wash boring

Several drilling methods are not acceptable. These include:

- Jetting through an open tube sampler and then sampling when the desired depth is reached.
- SSA use below the groundwater table in non-cohesive soils.
- Casing driven below the sampling depth prior to sampling.
- Advancing a borehole with bottom discharge bits.
- Advancing a boring for subsequent insertion of the sampler solely by means of previous sampling when performing SPT (the open hole must be larger in diameter than the split-spoon sampler).

Discrete Grab Sampling Methodology for Boreholes

When borehole drilling, the split-spoon sample retrieved from the borehole is considered a discrete grab sample that has been taken from one sampling location, as long as both the stratigraphy of the entire sample and the level of contamination are consistent over the length of the split-spoon sample. If a single split-spoon sample contains soils from two different stratigraphic units, the soils from each of these stratigraphic units are considered separate discrete grab samples.

If a single split-spoon sample contains soils from a single stratigraphic unit, but visual observation indicated that some of the soil was heavily impacted with contaminants, while the rest of the soil was only lightly impacted, then the soils representing each of the two levels of contamination are considered two separate discrete grab samples.

Composite Sampling Methodology for Boreholes

A composite sample is obtained by combining a number of discrete grab samples from the same borehole. For preparation of a meaningful composite sample, the soils from the sub-samples taken from the different split-spoon samples should be from a single stratigraphic unit and have (by visual observation) similar contaminant concentrations (or be physically similar for geotechnical testing purposes).

Use the following methodology for preparing a composite sample from these discrete grab split-spoon samples:

1. Prior to collecting a sample of the soil for field vapor screening or chemical analysis, if smearing of soil is apparent on the outside of the soil core, scrape away the outer layer of the soil using a decontaminated putty knife, stainless steel spoon, or similar implement. This should only be performed if the soil core sample is consolidated. Do not use this procedure for unconsolidated soil samples.
2. Split the sample longitudinally along the length of the split-spoon sampler. Use one half of the core sample to prepare a composite sample to be used in soil headspace vapor screening measurements, and the other half to prepare a composite sample to be submitted to the laboratory for chemical analysis or geotechnical testing.
3. Place sub-samples from various sampling locations (i.e., split-spoon samples) into a zip-loc bag for field screening. As much as practical, attempt to place approximately the same volume of soil from each sampling location into the zip-loc bag.
4. For samples where labo , ratory analysis is also desired, place sub-samples from various sampling locations into the appropriate soil sample containers. As much as practical, attempt to place approximately the same volume of soil from each sampling location into the sample container.

The following subsections describe specific protocols for split-spoon sampling, Shelby tube sampling, and methods for collecting soil samples using a direct-push rig.

5.9.2.1 Split-Spoon Samplers

This method is used to obtain representative samples of subsurface soil materials and to determine a measure of the in situ relative density of the subsurface soils. The test methods described below must be followed to obtain representative samples.

SPT involves the use of split-barrel samplers (also known as split spoons). Split-spoon sampling is performed in accordance with ASTM D1586. The split-spoon sampler consists of an 18- or 24-inch (45 or 60 cm) long, 2-inch (5 cm) outside diameter tube, which comes apart lengthwise into two halves. An example of a split-spoon sampler is presented on Figure 5.2.

Note: A typical 2-inch (5 cm) outside diameter split-spoon is 1 3/8-inch (3.5 cm) diameter at the drive shoe and 1 1/2-inch (3.8 cm)diameter within the barrel of the split spoon. The volume of the soil in a completely filled 24-inch (61 cm) long split-spoon is approximately 19.8 oz (586 mL), thus the sample volume requirements are important if multiple types of parameters requiring differing analytical techniques are required (i.e., VOCs, SVOCs, metals, petroleum hydrocarbon compounds [PHC]). Soil recovery in a split spoon is often less than 24 inches (61 cm), resulting in less available volume.

Once the borehole is advanced to the target depth and cleared of cuttings, representative soil samples are collected in the following manner:

1. The split-spoon sampler is inspected to ensure it is properly cleaned and decontaminated. The driving shoe (tip) should be relatively sharp and free of severe dents and distortions.
2. The cleaned split-spoon sampler is attached to the drill rods and lowered into the borehole. Do not allow the sampler to drop onto the soil in the bottom of the borehole.
3. After the sampler has been lowered to the bottom of the hole, it is given a single blow to seat it and make sure that it is in undisturbed soil. If there still appears to be excessive cuttings in the bottom of the borehole, remove the sampler from the borehole and remove the cuttings.
4. Mark the drill rods in three or four successive 6-inch (15 cm) increments, depending on sampler length, so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-inch (15 cm) increment.

The sampler is then driven continuously for either 18 or 24 inches (45 or 60 cm) by use of a 140-pound (63.5 kg) hammer. The hammer may be lifted and dropped by either the cathead and rope method, or by using a trip, automatic, or semi-automatic drop system. The hammer should free-fall a distance of 30 inches (±1 inch) (75 cm, ±25 mm) per blow. Measure the drop at least daily to ensure that the drop is correct. To ensure a free-falling hammer, no more than 2 1/4 turns of the rope may be wound around the cathead (see ASTM D1586). The number of blows applied in each 6-inch (15 cm) increment is counted until one of the following occurs:

1. A total of 50 blows have been applied during any one of the 6-inch (15 cm) increments described above.
2. A total of 100 blows have been applied.
3. There is no advancement of the sampler during the application of ten successive blows of the hammer (i.e., the spoon is 'bouncing' on a stone or bedrock).
4. The sampler has advanced the complete 18 or 24 inches (45 or 60 cm) without the limiting blow counts occurring as described above.

In some cases where the limiting number of blow counts has been exceeded, GHD may direct the driller to attempt to drive the sampler more if collection of a greater sample length is essential, as long as the sampler is still being advanced.

On the field form, record the number of blows required to drive each 6-inch (15 cm) increment of penetration. The first 6 inches (15 cm) is considered to be a seating drive. The sum of the number of blows required for the second and third 6 inches (15 cm) of penetration is termed the "standard penetration resistance" or the "N-value".

Note: If the borehole has sloughed and there is caved material in the bottom, the split spoon may push through this under its own weight, but now the spoon is partially 'pre-filled'. When the spoon is driven the 18 or 24 inches (45 or 60 cm) representing its supposedly empty length, the spoon fills completely before the end of the drive interval. Three problems arise:

1. The top part of the sample is not representative of the in-place soil at that depth.
2. The SPT value will be artificially higher toward the bottom of the drive interval since the spoon was packed full. These conditions should be noted on the field log.
3. The available sample volume is significantly reduced.

The sampler is then removed from the borehole and unthreaded from the drill rods. The open shoe (cutting end) and head of the sampler are partially unthreaded by the drill crew and the sampler is transferred to the geologist/engineer work surface.

Note: A table made out of two sawhorses and a piece of plywood is appropriate, or a drum, both covered with plastic sheeting.

The open shoe and head are removed by hand by the drill crew or GHD representative, and the sampler is tapped so that the tube separates.

Note: Handle each split spoon with clean disposable gloves if environmental samples are being collected from that split-spoon sample.

Measure and record the length of sample recovered making sure to discount any sloughed material that is present on top of the sample core.

Caution must be used when conducting split-spoon sampling below the groundwater table, particularly in sand or silt. These soils tend to heave or "blow back" into the HSA due to the difference in hydraulic pressures between the inside of the HSA and the undisturbed soil. To equalize the hydraulic pressure, it may be necessary to fill the inside of the HSA with potable water from a reliable and pre-tested source. Drilling mud is uncommonly used and presents problems for sample collection and well development. The water level within the boring or HSA needs to be maintained at or above the in situ groundwater level at all times during drilling, removal of drill rods, and sampling. Since heave or blow back is not always obvious to the driller, it is essential that the water level in the borehole always be maintained at or above the groundwater level. Split-spoon sampling below the water table in sands and silt occasionally results in non-representative samples being collected due to the heaving effect disturbing the soil. This is particularly important if the water level in the hole has not been maintained at the in situ water level.

Heaving conditions and the volume of potable water used should be noted on a Stratigraphic Log (Overburden) (Form SP-14). The volume of water added must be removed during well development prior to groundwater sampling. This practice may not be acceptable if environmental samples are to be collected.

Suspected low N-values should be noted on the field logs. If it is critical to have accurate N-values below the water table, other methods can be employed, such as conducting a dynamic cone

penetration test. This quick and easy test involves attaching a cone shaped tip to the end of the drill rods, and driving the tip into the ground similar to the split-spoon method, except that the borehole is not pre-augered. Cones may be driven 20 to 40 feet (6.1 to 12.2 m) through a formation without augering. Blow counts are recorded for each 1 foot (0.3 m) of advancement. Consult the Project Manager if such conditions are unexpectedly encountered.

> Note: A 3-inch (7.5 cm) outside diameter split spoon is available in order to obtain larger sample volumes. However, the SPT values from driving this sampler are typically much higher than those for the 2-inch (5 cm) split spoon.

Larger-Diameter Barrels

A variation of split-barrel sampling involves the use of a longer, larger diameter barrel in conjunction with a HSA. The sampling barrel is installed inside the auger with a swivel attachment to limit rotation of the barrel. After completion of a 5-foot (1.5 m) auger penetration, the auger is left in place and the barrel retrieved from the borehole. This method provides a larger diameter core, which may be desirable for bench-scale testing or where a large volume of soil is required for sample analyses. The sampler should be handled and the sample retrieved in the same way as described above for split-spoon sampling.

5.9.2.2 Shelby Tube Samplers

Thin-walled samplers such as Shelby tubes are used to collect relatively undisturbed samples (as compared to split-spoon samples) of soft to stiff clayey soils. The Shelby tube has an outside diameter of 2 or 3 inches (5 to 7.5 cm) and is 3 feet (0.9 m) long. These undisturbed samples are used for certain laboratory tests of structural properties (consolidation, hydraulic conductivity, shear strength) or other tests that might be influenced by sample disturbance. Procedures for conducting thin-walled tube sampling are provided in ASTM D1587, and are briefly described below:

1. The soil deposit being sampled must be cohesive in nature, and relatively free of gravel and cobble materials, as contact with these materials will damage or collapse the sampler.
2. Clean out the borehole to the sampling elevation using whatever method that will ensure the material to be sampled is not disturbed. If groundwater is encountered, maintain the liquid level in the borehole at or above groundwater level during the sampling operation.
3. Bottom discharge bits are not permitted. Side discharge bits may be used, with caution. Jetting through an open-tube sampler to clean out the borehole to sampling elevation is not permitted.
4. Remove loose material from the center of the casing or HSA as carefully as possible to avoid disturbance of the material to be sampled.
5. Place the sample tube so that its bottom rests on the bottom of the hole. Advance the sampler into the formation without rotation by a continuous and relatively rapid motion. Usually hydraulic pressure is applied to the top of the drill rods.
6. Determine the length of advance by the resistance and condition of the formation, but the length shall never exceed 5 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clays.

7. In no case should the length of advance be greater than the sample-tube length minus an allowance for the sampler head and a minimum of 3 inches (7.5 cm) for cuttings.

8. The tube may be rotated to shear the bottom of the sample 2 to 3 minutes after pressing in, and prior to retrieval to ensure the sample does not slide out of the tube. Lift the weight of the rods off of the tube prior to rotating.

9. Withdraw the sampler from the formation as carefully as possible in order to minimize disturbance of the sample.

10. Package and transport the sample in accordance with project-specific requirements.

Occasionally, the Project Manager/Coordinator may require extraction of the sample from the tube in the field. Use the following procedure:

1. A sample extruder, which consists of a clamp arrangement to hold the tube and a hydraulic ram to push the sample through the tube, is usually provided by the driller. To prevent cross-contamination, ensure the extruder is field cleaned between each sample.

2. The sample is then extruded into a carrying tray; these are often made from a piece of 4-inch (10 cm) or 6-inch (12.5 cm) diameter polyvinyl chloride (PVC) pipe cut lengthwise. Ensure the carrying tray is field cleaned between each sample. The sample is carried to the work station for geologic description. Trim the potentially cross-contaminated exterior and place it in the appropriate container.

3. The Shelby tube sampler is then thoroughly field cleaned and decontaminated for reuse. Since they are thin-walled, the tubes are easily damaged, crimped, or otherwise distorted during handling or pushing. The Shelby tube should be inspected before use and, if significantly damaged, rejected.

5.9.2.3 Direct-Push Sampling Systems

Direct-push refers to the sampler being 'pushed' into the soil material without the use of rotation to remove the soil. This method relies on the drill unit static weight combined with rapid hammer percussion for advancement of the tool string. Soil samples are continuously obtained. Groundwater and vapor samples can also be collected utilizing this method and appropriate tooling. Subsurface investigations typically sample to depths of 30 feet (9.1 m) or more; however, depth will vary based on the site-specific geology.

Direct-push methods are widely used for underground storage tank (UST) investigations and property investigations. This method is used extensively for initial site screening activities to establish site geology and to delineate vertical and horizontal plume presence. Small diameter wells (3/4 or 1 inch [2 or 2.5 cm]) diameter can be installed using direct-push methods, often using a pre-packed screen. SPT values cannot be obtained when sampling with a direct–push discrete soil sampler.

This method is also popular due to the limited cuttings produced during the drilling and sampling process and the increased sampling process speed, which can be much quicker than the sample description and sample preparation process. (It is often helpful to have two people, depending on the nature of the work program.)

Continuous soil samples are collected in tube samplers (various lengths), affixed with a cutting shoe and internal liner (PVC, Teflon, or acetate are available). The soil sampler may be operated in open-mode (when borehole collapse is not a concern), or closed-mode (when minimization of sample slough is desired). Closed-mode operation involves the placement of a temporary drill-point in the cutting shoe and driving the assembled sampler to depth. Once at the required depth, the temporary drill–point is released (via internal threading) and the sampler is driven to the desired soil interval. The drill-point slides inside the sample liner, riding above the collected soil column. Once driven to depth, the sampler is retrieved to the ground surface and the sample liner with soil, is removed for examination.

Caution: Be careful when opening interval liners with knives, as severe cuts may result from the knife slipping. A special two-blade hooked knife is available for opening the liners. Generally the driller/helper will open the liner for you.

5.9.3 Field Sample Screening

When soil sampling at sites with known or suspected VOC impact, it is often required to measure the soil for the presence of undifferentiated organic vapors. This field screening can be performed using a photoionization detector (PID). Immediately upon the opening of the split-spoon or discrete soil sampler, the soil is screened with a PID (HNu, Microtip, or equivalent) for the presence of undifferentiated organic vapors. This is accomplished by running the PID along the length of the soil sample. Record the highest reading.

Note: The PID measurement must be taken upwind of the drill rig or any running motors so that exhaust fumes will not affect the measurements.

Another method of field screening is head space measurement. This consists of placing a portion of the soil sample in a sealable glass jar, placing aluminum foil over the jar top, and tightening the lid. The jar is only partially filled. The jar is shaken and set aside for at least 30 minutes. After the sample has equilibrated, the lid of the jar is opened, the foil is punctured with the PID probe, and the air (headspace) above the soil sample is monitored. Record this headspace reading on the field form or in the field book. As an alternative, the soil can be placed in a sealable zip-loc bag.

Note: Perform headspace readings in an area that is not subject to wind. Also, in the winter, it is necessary to allow the samples to equilibrate in a warm area to ±70°F (20°C) (e.g., site trailer or van, but not direct heat or sunshine). The portion of the sample used for headspace analysis cannot be used for VOCs analysis.

Representative portions of the soil sample must be retained for geologic record following description. Place the soil portions into labeled, sealable sample containers (usually mason jars or zip-loc bags) without destroying any apparent stratification. If a stratigraphic change is observed within the split-spoon sampler, a separate geologic record sample is kept.

All geologic record samples are to be retained by the client. Geologic record samples must not return to or be placed in storage at a GHD office. An example of a properly completed Stratigraphy Log (Overburden) is presented on Figure 5.2.

5.9.4 Chemical Description

During soil examination and logging, carefully check for the presence of light or dense NAPL. NAPL may be present in gross amounts or present in small/minute quantities. The adjectives and corresponding quantities used when describing NAPL within a soil matrix are as follows:

Visual Description	Fraction of Soil Pore Volume Containing NAPL
Saturated	>0.5
Some	0.5 - 0.25
Trace	<0.25

A complete description of NAPL must describe the following:

- Color
- Quantity
- Density (compared to water) (i.e., light/floats or heavy/sinks)
- Odor (if observed)
- Viscosity (i.e., mobile/flowable, non-mobile/highly viscous-tar like)

The presence of an "iridescent sheen" by itself does not constitute "NAPL presence", but may be an indicator that NAPL is close to the area.

NAPL presence within a soil matrix may be confirmed by placing a small soil sample within water, shaking, and observing for NAPL separation (i.e., light or dense) from the soil matrix.

Trace amounts of NAPL are identified/confirmed by a close visual examination of the soil matrix, (i.e., separate soil by hand, wearing disposable gloves) and performing a careful inspection of the soil separation planes/soil grains for NAPL presence.

Often during sample examination with a knife, an iridescent sheen will be noted on the soil surface (i.e., clay/silts) if the knife has passed through an area of NAPL.

There are a number of more complicated tests available to confirm/identify NAPL presence, these are:

- Ultraviolet (UV) fluorescent analysis
- Hydrophobic dyes (use with care, consult the health and safety SOPs as some hydrophobic dyes are potential human carcinogens)
- Centrifugation
- Chemical analysis

GHD typically utilizes organic vapor detection results, visual examination, soil/water shake testing, and chemical analysis, to confirm NAPL presence. The more complex techniques described may be incorporated on sites where clear colorless NAPL is present and its field identification is critical to the program.

5.9.5 Chemical Sample Preparation and Packaging

Subsurface soil samples are usually grab samples, used to characterize the soil at a specific depth or depth interval (e.g., 2 to 4 feet [0.6 to 1.2 m]). On occasion, composite samples are collected from a borehole over a greater depth interval (e.g., 5 to 15 feet [1.5 to 4.1 m]).

The following describes the collection of grab samples for chemical analysis (all soil from one split spoon). Figure 5.2 shows the split-spoon sample selection details.

Clayey Soils

1. Discard upper and lower ends of sample core (3 inches [7.5 cm]).
2. Use a precleaned stainless steel knife.
3. Cut the remaining core longitudinally.
4. With a sample spoon, remove soil from the center portion of the core and place in a precleaned stainless steel bowl.
5. Remove large stones and natural vegetative debris.
6. Homogenize the soil and place directly into sample jars.

Note: Samples for VOC analysis must not be homogenized. Collect soil from the length of the center portion of the core and place in the sample container. Completely fill the container. No air space (headspace) should remain in the sample container.

Sandy Soils

As sandy soils have less cohesion than clayey soils, it is not easy to cut the core longitudinally to remove the center of the sample. Therefore, with a stainless steel spoon, scrape away surface soils which have likely contacted the sampler and then sample the center portion of the soil core.

Note: Place all soil samples collected for chemical analysis immediately into a cooler with ice.

Record all soil samples in the sample log book. Label samples as specified in Section 3.9.1.2.

In 1997, EPA adopted new methods for sampling soils for VOC analysis. Method 5035 calls for collecting soil using a coring device (EnCore). For analysis of low-level VOCs (typically 1 to 200 μg/kg) soil is commonly sealed in a specially prepared vial with a solution of sodium bisulfate. For higher levels of VOCs, the soil is placed in a vial with a volume of methanol. This method increases the complexity of collecting soils and makes it imperative that the sampler and laboratory work closely together. For some soil sampling programs, multiple EnCores are required for each sample interval. Holding times for samples in EnCores may be 24 to 48 hours if not field preserved; therefore, the GHD sampler, laboratory, and GHD chemist should discuss sampling and shipping procedures prior to beginning the work program.

5.9.6 Physical Sample Preparation and Packaging

When a sample is collected for geotechnical or hydrogeologic properties, the sample needs to be prepared and packaged in a manner to maintain its physical properties. Soil samples are usually

grab samples, collected from a specific depth or depth interval (e.g., 2 to 4 feet [0.6 to 1.2 m]). On occasion, composite samples are collected from the borehole over a greater depth interval (e.g., 5 to 15 feet [1.5 to 4.6 m]).

The following describes the collection of grab samples for geotechnical or hydrogeologic purposes for common samplers, the split-spoon, thin-wall, and direct-push discrete soil sampler. For soil samples collected for geotechnical purposes, the samples must not be allowed to freeze.

5.9.6.1 Split-Spoon Samples

1. Following completion of PID screening of the split spoon, remove and dispose of soil at the top of the sample that is obviously sloughed material not representative of the soil at the sampled depth.
2. Measure the length of the sample and record as the recovered length.
3. If cohesive, perform a pocket penetrometer reading and describe the soil.
4. Carefully transfer the sample onto a sheet of aluminum or tin foil, taking care to maintain structure and bedding of the soil sample as much as possible. This may not be possible with non-cohesive soils with low silt or clay contents. The sample may need to be packaged in three 6- to 8-inch (15 to 20 cm) segments.
5. Roll the sample in the tin foil and fold over the ends to seal. Wrap in a second layer of tin foil.
6. Identify the top, middle, and bottom segments with a T, M, and B using an indelible marker.
7. For each segment record the "up" direction with an arrow.
8. Place the foil wrapped sample in a plastic bag and write the sample identification on the bag using an indelible marker. Storing the sample in foil, as opposed to a jar, has the advantage of retaining the soil's in-place structure and preventing loss of moisture.
9. If the soils are sandy and it is not possible to retain the soils structure by rolling it in tin foil, packaging the sample in a jar or zip-loc bag is also acceptable, provided the jar or zip-loc bag is filled to eliminate air space which could result in the soil sample drying out.

A split-barrel sample is approximately 4 inches (10 cm) in diameter and requires different handling than a split-spoon or Shelby tube sample. For a cohesive core sample, the section of drill core is wrapped in several layers of cheesecloth, coated with paraffin wax, and the process repeated until the entire sample is sealed adequately. These samples are usually utilized for specific bench-scale tests.

5.9.6.2 Shelby Tube Samples

1. Remove any sloughed material from the top of the sample using a knife or similar long bladed instrument. If it is not possible to distinguish sloughed soil from intact soil, do not remove.
2. Following removal of sloughed material, measure the tube length and the air space in the tube above the sample and record the difference as the sample recovery. In the unusual circumstance that there is also air space at the bottom of the sample, subtract this as well and record this latter measurement as a separate entry.

3. Seal the top and bottom of the sample with wax (wax is normally provided and prepared by the driller) and first pour the liquefied wax into the top of the sample to a thickness of about 1 inch (2.5 cm). Once this is cooled, remove approximately 1/2 inch (1.3 cm) of soil from bottom of sample (unless there is already a cavity at bottom of sample) and seal similarly.
4. Fill the remaining air space above the sample with loose soil to prevent the sample from shifting in the tube, and then cap both ends of the sample with plastic caps. Tape the caps on using duct tape.
5. Write the sample identification number on the cap using an indelible marker.

Shelby tubes containing soft clays and wet silts need to be handled with care to avoid damage to the sample. Keep samples in an upright position at all times and transport either in a specifically designed cushioned box or position in your vehicle with cushioning under and around the individual tubes. Do not allow geotechnical soil samples to freeze.

5.9.6.3 Direct–Push Soil Samples

1. Once removed to the ground surface, open the discrete soil sampler by removing the cutting shoe, and extract the soil liner (with recovered soil) from the sampler body.
2. Place the soil liner into a holder and cut lengthwise (using a liner knife) to expose the collected soil core.
3. Perform PID screening for organic vapors and record readings.
4. Measure length of sample and record as the recovered length.
5. If cohesive, perform pocket penetrometer reading and describe soil.
6. Carefully transfer the sample onto a sheet of aluminum or tin foil taking care to maintain structure and bedding of the soil sample as much as possible. This may not be possible with non-cohesive soils with low silt or clay contents. The sample may need to be packaged in multiple 6- to 8-inch (15 to 20 cm) segments.
7. Roll the sample in the tin foil and fold over the ends to seal. Wrap in a second layer of tin foil.
8. Identify the depth interval of each segment using an indelible marker.
9. For each segment record the "up" direction with an arrow.
10. Place the foil-wrapped sample in a plastic bag and write the sample identification on the bag using an indelible marker. Storing the sample in foil, as opposed to a jar, has the advantage of retaining the soil's in-place structure and preventing loss of moisture. If the soils are sandy and it is not possible to retain the soils structure by rolling it in tin foil, packaging the sample in one or more jars or zip-loc bags is also acceptable, provided each jar or bag is filled to eliminate air space which could result in the soil sample drying out.

The soil core is split lengthwise to allow inspection. Chemical samples can be removed from the soil core (if required), or soil record samples can be retained (if a component of the project scope). Soil record samples are often retained to allow sample collection for analysis later (depending upon analyte sensitivity/holding times), or for later inspection/geotechnical testing if required.

5.9.7 Communication of Field Findings

Field findings should be communicated frequently with the office technical staff responsible for the program. This communication allows the office staff to: confirm that the investigation meets the intent of the Work Plan; alter procedures and sampling protocol if soil conditions are markedly different from those assumed; and assist in determining screening intervals for piezometers or monitoring wells.

Call office staff no later than the completion of the first borehole, and sooner if possible. Be prepared to discuss the results by faxing the field logs beforehand (wherever possible) and by having a copy of the field log in hand when on the telephone. Call after each borehole and call before leaving the site.

5.9.8 Borehole Abandonment

Following completion of the borehole it must be properly abandoned in accordance with the project documents. Some jurisdictions have requirements or standards of practice that require filling the borehole with bentonite or cement grout.

Note: The integrity of any underlying confining layer must be restored to prevent chemical cross-contamination or hydraulic cross-connection. This is true for all sites, regardless of the known presence or absence of contaminants. This normally requires grouting of the borehole within the zone of the confining layer.

Whenever possible, the cuttings are returned to the borehole to within 1 foot (0.3 m) of the ground surface. The remainder of the borehole is topped off with material consistent with the surrounding ground surface. Excess cuttings are usually collected in drums or a lugger box or spread on the surrounding ground surface consistent with the protocols specified in the Work Plan and as required by federal, state, provincial, and local regulations.

Check with the Project Coordinator to determine the method for handling drill cuttings.

Note: Always include the method of abandonment in the field log book or on a Stratigraphic Log (Overburden) (Form SP-14)

5.9.9 Borehole Tie-In/Surveying

Recording the locations of boreholes on the site plan is extremely important, and may be accomplished by manual measurement (i.e., swing ties) and surveying. Manual measurements for each borehole must be tied into three permanent features (e.g., buildings, utility poles, hydrants). Include diagrams with measurements in the field book.

In addition to manual measurements, surveying with respect to a geodetic benchmark and a site coordinate system is often completed at larger sites for horizontal and vertical control.

Note: Manual field measurements are always necessary regardless of whether a survey is completed.
Manual measurements in field notes allow future identification of the sample/drill site without the need for a survey crew to locate positions using a grid system. This becomes important when trying to locate flushmount wells buried by snow or soils.

5.9.10 Field Notes

Field notes must document all the events, equipment used, calibration activities, and measurements collected during the sampling activities. The field notes must be legible and concise such that the entire borehole installation and soil sampling event can be reconstructed for future reference.

Field notes documenting events, equipment used, and related items are typically recorded in a standard GHD field book, while soil descriptions and PID readings are recorded on a Stratigraphic Log (Overburden) (Form SP-14). Standard GHD field books are available from all GHD equipment administrators. Form SP-14 is available as a printable linked document in this file or as a bound pad from each office.

Note: Use a Stratigraphic Log (Overburden) for recording all soil descriptions and related notes unless otherwise approved by the Project Coordinator/Manager.

Field book/form entries are made in black ink and any changes/corrections are stroked out with a single line, initialed, and dated to indicate when and by whom the correction was made.

The field notes should document the following for each borehole completed:

1. Identification of borehole
2. Depth
3. Static water level depth and measurement technique
4. Time started and completed
5. Measured field parameters
6. Sample appearance
7. Sample odors (if respiratory protection is not required)
8. Types of sample containers and sample identification numbers
9. Parameters requested for analysis
10. Field analysis data and method(s)
11. Sample distribution and transporter
12. Laboratory shipped to
13. Chain-of-custody number for shipment to laboratory
14. Field observations on sampling event
15. Name of collector(s)

16. Climatic conditions including air temperature

17. Problems encountered and any deviations made from the established sampling protocol

5.10 Procedures for Test Pit Excavation and Sampling

Once the prior planning and preparation activities are completed, the test pit excavation and subsurface soil sampling program can proceed. The typical series of events which takes place is:

1. Location and marking of test pit locations
2. Final visual examination of proposed excavation area for utility conflicts
3. Excavation of test pits and collection of the soil samples
4. Field screening of soil sample with specific air monitoring equipment (e.g., PID, LEL meter)
5. Description of soil sample and test pit
6. Completion of Test Pit Stratigraphy Log (Form SP-03)
7. Documentation, including photographs and/or videotape, as required
8. Chemical sample preparation and packaging
9. Backfilling of test pit excavation
10. Surveying of test pit locations
11. Field note completion and review.

5.10.1 Location and Marking of Test Pits/Final Visual Check

Proposed test pit locations marked on the site plan are located in the field and staked. The proposed test pit locations are usually strategically placed to assess site conditions, former facilities, waste areas, etc.

Once the final location for the proposed test pit has been selected and utility clearances are complete, one last check of the immediate area is performed before excavation proceeds to confirm the locations of any adjacent utilities (subsurface or overhead) and verify adequate clearance. If gravity sewers or conduits exist in the area, any access manholes or chambers are opened and the conduit/sewer alignments confirmed.

Caution:	Do not assume site plan details regarding pipe alignments/position are correct. Visually check pipe position when excavating near sewers. Personnel should also be alert to the presence of additional piping, especially if the plans are outdated.

If it is necessary to relocate a proposed test pit due to terrain, utilities, access etc., the Project Coordinator must be notified and an alternate location will be selected.

5.10.2 Test Pit Location Setup

The test pit location is set up as follows:

1. The excavator is positioned such that the excavation spoils are deposited by the excavator downwind of all staff.
2. A sheet of polyethylene is placed downwind of the test pit location to accept spoils, if required by the Work Plan.
3. To the extent practicable, the investigation area is set up such that water or liquids that may be excavated, freely drain back into the excavation.
4. The excavation begins at one location with the excavator backing up (as required) to extend the pit.

5.10.3 Sample Collection

Soil samples can be collected from the backhoe/excavator bucket or from the test pit excavation face. Samples which require a discrete depth interval are collected from the excavator bucket following excavation of all or a portion of the test pit. Samples are collected using a cleaned steel trowel, shovel, or stainless steel spoon. Samples are placed in a stainless steel bowl and mixed (except VOCs). **Do not enter the test pit**. (Confined Space Entry requirements apply and proper shoring of the excavation walls may be necessary.)

Caution:	Personnel observing or sampling test pit operations must never stand within the "turning radius" or "reach-zone" of the excavation equipment. Operator error or equipment failure could result in severe injury or death if struck by the backhoe bucket or the backhoe itself. Stand opposite the backhoe well beyond the far end of the trench for communication. Personnel should also be alert to test pit side wall conditions which typically undermine the ground surface and create unstable soils surrounding the test pit area.

Discrete Grab Sampling From Test Pits

When taking discrete grab samples from a test pit using an excavator bucket, the sampling location is considered a volume of soil in the bucket that has both a consistent soil type and a consistent level of contaminant impact. When sampling using an excavator bucket, the operator will dig to the desired depth and then provide a small volume of soil from a discrete position and depth in the test pit.

When collecting a discrete grab sample from the excavator bucket, use the following procedure:

1. Scrape off the top 2 inches (5 cm) of soil at the sampling location in the excavator bucket.
2. Using the sampling device (e.g., trowel, spoon) scoop the freshly exposed soil into the sample container. Ensure that the samples taken were not in contact with the excavator bucket to avoid the potential for cross-contamination.

3. Pushing the sample container into the soil in order to fill the container is not recommended. This could result in breaking the sample container and potential injury to field personnel (e.g., cutting hands on broken glass).
4. If the sample is being collected for VOC analyses, perform this step as quickly as possible in order to minimize the loss of volatile compounds from the soil.
5. Collect a field screening sample from the same sampling location as the discrete grab sample and at the same time. Scoop soil into a zip-loc bag until it is no more than one quarter full.
6. Do not mix the soil for samples collected for VOC analyses (for sample homogenization purposes) as this will promote the loss of volatile compounds from the soil. The laboratory will obtain a representative sample from the container by using coring techniques before the laboratory analysis is performed.

Composite Sampling

A composite sample can be obtained by combining a number of discrete grab samples from a test pit sampling location (i.e., excavator bucket). For preparation of a meaningful composite sample, the soils from the sub-samples taken from the different sampling locations should be from a single stratigraphic unit and have (by visual observation) similar contaminant concentrations.

When taking composite samples from multiple excavator buckets, consider each excavator bucket of soil to be a sampling location. When taking a composite sample using the excavator, use the following procedure:

1. Pick a number of discrete sampling locations that will give a representative sample of the horizon of interest in the test pit.
2. From each of these sampling locations, obtain a soil sample from the excavator bucket using the same methodology described in the previous subsection for a discrete grab sample.
3. The sample container should be partially filled with soil from each discrete grab sampling location. As much as practical, try to put approximately the same volume of soil from each sampling location into the container.
4. Move to the next sampling location and obtain another discrete grab soil sample.
5. Collect a maximum of five surface samples (to avoid the complete dilution of any hot spots).
6. When the last location has been sampled, ensure the sample container is filled with soil, leaving no headspace.
7. Since composite samples are used for SVOCs and inorganic parameters, minimizing the sample collection time is not as important as when discrete samples for VOC analyses are being collected. However, the preferred practice is that the sampler take no longer than necessary to obtain the sample.
8. Collect a field screening sample from the same sampling location as the composite sample and at the same time. As much as practical, try to put approximately the same volume of soil from each discrete grab sampling location into a zip-loc bag. The zip-loc bag should be no more than one quarter full after all the sub-samples have been added.

5.10.4 Field Sample Screening

Upon collection of a soil sample, the soil is screened with a PID (HNu, Microtip, or equivalent) for the presence of undifferentiated organic vapors. This is accomplished by running the PID across the soil sample. Record the highest reading and sustained readings.

> Note: The PID measurement must be taken upwind of the excavating equipment or running motors so that exhaust fumes will not affect the measurements.

Another method of field screening is head space measurement. This consists of placing a portion of the soil sample in a sealable glass jar, placing aluminum foil over the jar top, and tightening the lid. The jar should only be partially filled. Shake the jar and set aside for at least 30 minutes. After the sample has equilibrated, open the lid of the jar, puncture the foil with the PID probe, and monitor the air (headspace) above the soil sample. Record this headspace reading on a Test Pit Stratigraphy Log (Form SP-03) or in the field book.

> Note: Perform all headspace readings in an area that is not subject to wind. Also, in winter it is necessary to allow the samples to equilibrate in a warm area (e.g., site trailer or van). This requirement is usually dictated by the Work Plan.

5.10.5 Sample Description and Logging of Test Pits

During the excavation of a test pit, samples may be collected to provide a geologic record, to assist the geologist/engineer in completing or characterizing the stratigraphic units, and to allow for physical or chemical testing.

Soil samples collected are described in the field using the USCS. The soil descriptions are recorded on the field form or field book in the following order:

1. USCS Soil Symbol of major component
2. Native or fill
3. Secondary and minor soil components
4. Relative densities/consistency
5. Grain size/plasticity
6. Gradation/structure
7. Color
8. Moisture content
9. Observations of odor or visual chemical presence (i.e., NAPL)

In addition to describing the soil properties, enter the following information into a Test Pit Stratigraphy Log (Form SP-03):

1. Presence of groundwater and the rate of seepage (if groundwater is encountered).
2. Thickness of each stratigraphic unit.

3. Description of bedding plane features (e.g., continuous, discontinuous, graded, wavy bedding).
4. Description of joints, fractures and faults, if bedrock is encountered (number and orientation).
5. Any appearance of weathering.
6. Description of fill and waste materials.

Note: When describing observed odors, be specific in terms of general odor category and strength of odor noted. Odors may typically be chemical, petroleum, or septic related, varying from slight, to moderate, to strong. Identification of specific chemical compounds (i.e., TCE or C-56 odor) is usually unnecessary and often inaccurate as a detailed analysis commonly shows an array of chemistry present.
When describing the presence of vegetative matter in the soil sample, do not use the term "organic" as this often leads to confusion with regards to the presence of organic chemicals (i.e., NAPL).

When describing the soil samples and the stratigraphy observed in the test pit, it is imperative that the sampler use consistent terms from one test pit to the next. As test pits are installed, compare the stratigraphy of completed test pits to the stratigraphy of the test pit you are currently excavating. Be aware of patterns and confirm all inconsistencies at the time the test pit is being excavated. Since soil stratigraphy is so important to understanding site conditions, soil samples are collected from each stratigraphic unit, and described in full.

5.10.6 Chemical Description

Representative portions of the soil sample should be retained as a geologic record along with a description. Place the soil portions into labeled, sealable, sample containers (usually mason jars) without destroying any apparent stratification.

All geologic record samples are to be retained by the client. Geologic record samples must not return to or be placed in storage at a GHD office.

An example of a properly completed Test Pit Stratigraphy Log is presented on Figure 3.12 and described in Section 3.4.1.5.

During soil examination and logging, carefully check for the presence of light or dense NAPL. NAPL may be present in gross amounts or present in small/minute quantities. The adjectives and corresponding quantities used when describing NAPL within a soil matrix are as follows:

Visual Description	Fraction of Soil Pore Volume Containing NAPL
Saturated	>0.5
Some	0.5 - 0.25
Trace	<0.25

A complete description of NAPL includes the following:

- Color
- Quantity

- Density (compared to water) (i.e., light/floats or heavy/sinks)
- Odor (if observed)
- Viscosity (i.e., mobile/flowable, non-mobile/highly viscous-tar like)

The presence of an iridescent sheen by itself does not constitute NAPL presence, but may be an indicator that NAPL is close to the area.

NAPL presence within a soil matrix may be confirmed by placing a small soil sample within water, shaking, and observing for NAPL separation (i.e., light or dense) from the soil matrix.

Trace amounts of NAPL are identified/confirmed by a close visual examination of the soil matrix, (i.e., separate soil by hand [wearing disposable gloves]) and perform a careful inspection of the soil separation planes/soil grains for NAPL presence.

Often during the sample examination with a knife, an iridescent sheen will be noted on the soil surface (i.e., clay/silts) if the knife has passed through an area of NAPL.

There are a number of more complicated tests available to confirm/identify NAPL presence, these are:

- UV fluorescent analysis
- Hydrophobic dyes
- Centrifugation
- Chemical analysis

GHD typically utilizes organic vapor detection results, visual examination, soil/water shake testing, and chemical analysis, to confirm NAPL presence. The more complex techniques described may be incorporated on sites where clear colorless NAPL is present and its field identification is critical to the program.

5.10.7 Chemical Sample Preparation and Packaging

Subsurface soil samples are usually grab samples, used to characterize the soil at a specific depth or depth interval (e.g., 2 to 4 feet [0.6 to 1.2 m]). On occasion, composite samples are collected from a test pit over a greater depth interval (e.g., 5 to 15 feet [1.5 to 4.6 m]).

The following describes the collection of grab samples for chemical analysis.

Clayey Soils

Scrape away the surface soils and collect the sample. Remove large stones and natural vegetative debris and homogenize the soil and place it directly into the sample jars.

> Note: Samples for VOC analysis must not be homogenized. Remove the outer layer of soil from the excavation face then collect the sample and place it in the sample container. Completely fill the container. No air space (headspace) should remain.

Sandy Soils

As sandy soils have less cohesion than clayey soils, with a stainless steel spoon or other device scrape away surface soils which have likely contacted the backhoe/excavator bucket, then collect the sample.

> Note: All soil samples collected for chemical analysis must be placed immediately into a cooler with ice.

Record all soil samples recorded in the sample log book as described in Section 3.4.1. Labeling of samples shall be consistent with Section 3.9.1.2.

5.10.8 Documentation

In addition to completing all field logs and books, it will generally be necessary for test pits to be documented with photographs and/or video tape. This requirement should be fully ascertained and coordinated in advance of field activities.

5.10.9 Test Pit Abandonment

Following completion of the test pit, backfill the excavation using the soil excavated from the pit. To the extent practicable, replace materials in the test pit in the same intervals from which they were extracted.

It should be noted that the material will tend to "bulk" after excavation. As a result, the excavator operator must be informed to compact the materials as they are replaced within the excavation.

5.10.10 Restoration

The test pit location must be fully restored. Ensure that restoration activities are properly designed and incorporated within the scope of services for the test pit contractor.

Restoration could include:

- Landscaping
- Paving
- Concrete

5.11 Follow-up Activities

Complete the following activities at the conclusion of the field work:

1. Double check the Work Plan to ensure all samples have been collected and confirm this with the Project Coordinator.
2. Ensure that all sample locations are surveyed such that the sample location could be readily re-established.

3. Clean equipment and return to the equipment administrator with the appropriate form dated and signed. Complete water disposal (if required), and cleaning fluid disposal requirements as specified in the Work Plan.

4. Notify the contract laboratory as to when to expect the samples. Enclose the chain-of-custody and covering letter, indicating the parameters and number of samples, in the sample cooler. Ensure that the GHD chemist has all relevant information required to track the progress of the sample analysis.

5. Submit a memo to the Project Coordinator indicating sampling procedures and observations (such as surface staining), grid layout, and all QA/QC documentation.

6. Prepare and distribute a Project Planning, Completion, and Follow-Up Checklist (Form SP-02).

5.12 References

For additional information pertaining to this topic, the user of this manual may reference the following:

Surficial Soil Sampling

ASTM D4547 Practice for Sampling Waste and Soils for Volatile Organics

ASTM D6044 Guide for Representative Sampling for Management of Waste and Contaminated Media

ASTM D6051 Guide for Composite Sampling and Field Subsampling for Environmental Waste Management Activities

Subsurface Soil Sampling

ASTM D420 Guide for Site Characterization for Engineering, Design, and Construction Purposes

ASTM PS 89 Guide for Expedited Site Characterization of Hazardous Waste Contaminated Sites

ASTM D5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock

ASTM D2487 Classification of Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)

ASTM D5781 Guide for Use of Dual-Wall Reverse-Circulation Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices

ASTM D5782 Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices

ASTM D5783 Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices

ASTM D5784	Guide for Use of Hollow-Stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices
ASTM D5872	Guide for Use of Casing Advancement Drilling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
ASTM D5875	Guide for Use of Cable-Tool Drilling and Sampling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
ASTM D5876	Guide for Use of Direct Rotary Wireline Casing Advancement Drilling Methods for Geoenvironmental Exploration and Installation of Subsurface Water-Quality Monitoring Devices
ASTM D4700	Guide for Soil Sampling from the Vadose Zone
ASTM D1586	Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils
ASTM D1587	Practice for Thin-Walled Tube Geotechnical Sampling of Soils
ASTM D4220	Practices for Preserving and Transporting Soil Samples
ASTM D6001	Guide for Direct-Push Water Sampling for Geoenvironmental Investigations

Appendix I
ADEC Soil Transport and Disposal Approval

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites and Prevention and Emergency Response Programs

Transport, Treatment, & Disposal Approval Form for Contaminated Media

DEC HAZARD/SPILL ID #	NAME OF SPILL OR CONTAMINATED SITE	
24310 / 100.26.046	US Travel Systems, Former (Former Texaco Site 211083)	
SITE OR SPILL LOCATION		
230 Old Steese Highway, Fairbanks, Alaska 99701		
CURRENT LOCATION AND TYPE OF CONTAMINATED MEDIA		**SOURCE OF THE CONTAMINATION**
Onsite - behind building (soil cuttings)		Former fuel USTs/dispensers
COMPOUNDS OF CONCERN	**ESTIMATED VOLUME**	**DATE(S) GENERATED**
DRO, GRO, BTEX	4.3 cubic yards	8/23/17 and 8/24/17
POST TREATMENT ANALYSIS REQUIRED *(such as GRO, DRO, RRO, BTEX, and/or Chlorinated Solvents)*		
DRO, GRO, VOCs, TCLP (VOCs + SVOCs + Metals), PCBs		
COMMENTS		
Soil cuttings generated from borehole clearance/drilling - soil sampling of test boreholes (6 total). A total of 4 supersacks and 1 55-gallon DOT steel drum containing soil. GHD will observe/manifest the soil waste for transport to Alaska Soil Recycling (ASR) Spring 2018 when ASR opens.		

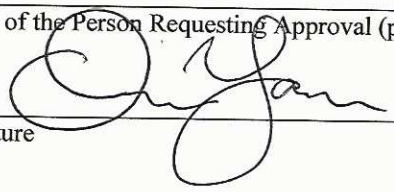
Facility Accepting the Contaminated Media

NAME OF THE FACILITY	PHYSICAL ADDRESS/PHONE NUMBER
Alaska Soil Recycling	2301 Spar Avenue, Anchorage, AK 99501

Responsible Party and Contractor Information

BUSINESS/NAME	ADDRESS/PHONE NUMBER
Chevron EMC - Daniel Carrier	145 S. State College Blvd, Room 5081, Brea, California 92821
GHD Services, Inc.	645 G Street, Suite 401, Anchorage, Alaska 99501

Oliver Yan on behalf of Chevron EMC
Name of the Person Requesting Approval (printed)


Signature

Geologist
Title/Association

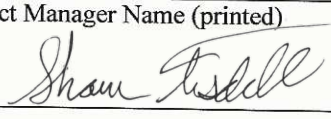
3/9/2018
Date

(907)244-8968
Phone Number

----------DEC USE ONLY----------

Based on the information provided, ADEC approves transport of the above-described media for treatment in accordance with the approved facility operations plan. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight/volume receipts of the loads transported to the facility and a post treatment analytical report. If the media is contaminated soil, it shall be transported as a covered load in compliance with 18 AAC 60.015.

Shawn Tisdell
DEC Project Manager Name (printed)


Signature

Environmental Program Specialist
Project Manager Title

2018.03.09
Date

907-451-2752
Phone Number

Appendix J
Laboratory Analytical Report

ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

Report Date: September 18, 2017

Project: 211083

Account #: 10880
Group Number: 1843003
PO Number: 0015247544
Release Number: CARRIER
State of Sample Origin: AK

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To	GHD	Attn: Oliver Yan
Electronic Copy To	GHD	Attn: GHD EDF
Electronic Copy To	GHD	Attn: Siobhan Pritchard
Electronic Copy To	GHD	Attn: Sarah Gillette
Electronic Copy To	GHD	Attn: Jeffrey Cloud
Electronic Copy To	Chevron	Attn: GHD EDD

Respectfully Submitted,

Megan A. Moeller
Senior Specialist

(717) 556-7261

SAMPLE INFORMATION

Client Sample Description	Collection Information	ELLE#
SB17-1-S-15-170824 HIGH LEVEL Grab Soil	08/24/2017 11:30	9177528
SB17-1-S-15-170824 LOW LEVEL Grab Soil	08/24/2017 11:30	9177529
SB17-1-S-22-170824 HIGH LEVEL Grab Soil	08/24/2017 11:45	9177530
SB17-1-S-22-170824 LOW LEVEL Grab Soil	08/24/2017 11:45	9177531
SB17-2-S-15-170824 HIGH LEVEL Grab Soil	08/24/2017 09:55	9177532
SB17-2-S-22-170824 HIGH LEVEL Grab Soil	08/24/2017 10:11	9177534
SB17-2-S-22-170824 LOW LEVEL Grab Soil	08/24/2017 10:11	9177535
SB17-3-S-15-170824 HIGH LEVEL Grab Soil	08/24/2017 13:00	9177536
SB17-3-S-15-170824 LOW LEVEL Grab Soil	08/24/2017 13:00	9177537
SB17-3-S-20-170824 HIGH LEVEL Grab Soil	08/24/2017 13:12	9177538
SB17-3-S-20-170824 LOW LEVEL Grab Soil	08/24/2017 13:12	9177539
SB17-3-S-22-170824 HIGH LEVEL Grab Soil	08/24/2017 13:15	9177540
SB17-3-S-22-170824 LOW LEVEL Grab Soil	08/24/2017 13:15	9177541
SB17-4-S-15-170824 HIGH LEVEL Grab Soil	08/24/2017 15:11	9177542
SB17-4-S-22-170824 HIGH LEVEL Grab Soil	08/24/2017 15:22	9177544
SB17-4-S-22-170824 LOW LEVEL Grab Soil	08/24/2017 15:22	9177545
DUP-1-S-170824 HIGH LEVEL Grab Soil	08/24/2017	9177546
DUP-1-S-170824 LOW LEVEL Grab Soil	08/24/2017	9177547

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Project Name: 211083
LL Group #: 1843003

General Comments:

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below. Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

For dual column analyses, the surrogate (for multi-surrogate tests, at least one surrogate) must be within the acceptance limits on at least one of the two columns.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

Analysis Specific Comments:

SW-846 8260B, GC/MS Volatiles

Sample #s: 9177542

Reporting limits were raised due to interference from the sample matrix. The low level soil sample could not be analyzed for Benzene due to the levels of target and/or non-target compounds.

Sample #s: 9177531

The concentration reported for Xylene (total) is estimated since it exceeds the calibration range of the instrument.

SW-846 8270C SIM, GC/MS Semivolatiles

Sample #s: 9177544, 9177546

Reporting limits were raised due to limited sample volume.

Sample #s: 9177528, 9177530, 9177532, 9177534, 9177536, 9177538, 9177540, 9177542

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene

Reporting limits were raised due to limited sample volume.

Batch #: 17241SLA026 (Sample number(s): 9177528, 9177530, 9177532, 9177534, 9177536, 9177538, 9177540, 9177542 UNSPK: P166612)

The recovery(ies) for the following analyte(s) in the LCS were below the acceptance window: Benzo(a)pyrene

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(g,h,i)perylene

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: Naphthalene, Phenanthrene

Batch #: 17241SLB026 (Sample number(s): 9177544, 9177546 UNSPK: P166615)

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Naphthalene, Fluorene, Fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Phenanthrene, Chrysene, Benzo(g,h,i)perylene

AK 101, GC Volatiles

Batch #: 17243A34A (Sample number(s): 9177528, 9177530, 9177534, 9177536, 9177538, 9177540, 9177542, 9177544, 9177546)

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 9177542

Batch #: 17243A34B (Sample number(s): 9177532)

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 9177532

AK 102/AK 103 04/08/02, GC Petroleum Hydrocarbons

Sample #s: 9177528, 9177530, 9177532, 9177534, 9177536, 9177538, 9177540, 9177542, 9177544, 9177546

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Batch #: 172440004A (Sample number(s): 9177528, 9177530, 9177532, 9177534, 9177536, 9177538, 9177540, 9177542, 9177544, 9177546 UNSPK: P177908)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: TPH-DRO AK soil C10-C25

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: TPH-DRO AK soil C10-C25

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: TPH-DRO AK soil C10-C25

Sample Description: SB17-1-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177528
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:30 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-1-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.40	1.1	53.74
10237	Benzene	71-43-2	N.D.	0.028	0.28	53.74
10237	Bromodichloromethane	75-27-4	N.D.	0.057	0.28	53.74
10237	Bromoform	75-25-2	N.D.	0.057	0.28	53.74
10237	Bromomethane	74-83-9	N.D.	0.11	0.28	53.74
10237	2-Butanone	78-93-3	N.D.	0.23	0.57	53.74
10237	Carbon Disulfide	75-15-0	N.D.	0.057	0.28	53.74
10237	Carbon Tetrachloride	56-23-5	N.D.	0.057	0.28	53.74
10237	Chlorobenzene	108-90-7	N.D.	0.057	0.28	53.74
10237	Chloroethane	75-00-3	N.D.	0.11	0.28	53.74
10237	Chloroform	67-66-3	N.D.	0.057	0.28	53.74
10237	Chloromethane	74-87-3	N.D.	0.11	0.28	53.74
10237	Cyclohexane	110-82-7	N.D.	0.057	0.28	53.74
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.11	0.28	53.74
10237	Dibromochloromethane	124-48-1	N.D.	0.057	0.28	53.74
10237	1,2-Dibromoethane	106-93-4	N.D.	0.057	0.28	53.74
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.057	0.28	53.74
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.057	0.28	53.74
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.057	0.28	53.74
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.11	0.28	53.74
10237	1,1-Dichloroethane	75-34-3	N.D.	0.057	0.28	53.74
10237	1,2-Dichloroethane	107-06-2	N.D.	0.057	0.28	53.74
10237	1,1-Dichloroethene	75-35-4	N.D.	0.057	0.28	53.74
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.057	0.28	53.74
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.057	0.28	53.74
10237	1,2-Dichloropropane	78-87-5	N.D.	0.057	0.28	53.74
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.057	0.28	53.74
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.057	0.28	53.74
10237	Ethylbenzene	100-41-4	N.D.	0.057	0.28	53.74
10237	Freon 113	76-13-1	N.D.	0.11	0.57	53.74
10237	2-Hexanone	591-78-6	N.D.	0.17	0.57	53.74
10237	Isopropylbenzene	98-82-8	N.D.	0.057	0.28	53.74
10237	Methyl Acetate	79-20-9	N.D.	0.11	0.28	53.74
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.028	0.28	53.74
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.17	0.57	53.74
10237	Methylcyclohexane	108-87-2	N.D.	0.057	0.28	53.74
10237	Methylene Chloride	75-09-2	N.D.	0.11	0.28	53.74
10237	Styrene	100-42-5	N.D.	0.057	0.28	53.74
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.057	0.28	53.74
10237	Tetrachloroethene	127-18-4	N.D.	0.057	0.28	53.74
10237	Toluene	108-88-3	N.D.	0.057	0.28	53.74
10237	1,2,4-Trichlorobenzene	120-82-1	0.070 J	0.057	0.28	53.74
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.057	0.28	53.74
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.057	0.28	53.74
10237	Trichloroethene	79-01-6	N.D.	0.057	0.28	53.74
10237	Trichlorofluoromethane	75-69-4	N.D.	0.11	0.28	53.74
10237	Vinyl Chloride	75-01-4	N.D.	0.057	0.28	53.74
10237	Xylene (Total)	1330-20-7	N.D.	0.057	0.28	53.74

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177528
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:30 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-1-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0021	0.0052	1
10725	Acenaphthylene	208-96-8	N.D.	0.0010	0.0052	1
10725	Anthracene	120-12-7	N.D.	0.0010	0.0052	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0021	0.0052	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0021	0.0052	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0021	0.0052	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0021	0.0052	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0021	0.0052	1
10725	Chrysene	218-01-9	N.D.	0.0010	0.0052	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0021	0.0052	1
10725	Fluoranthene	206-44-0	N.D.	0.0021	0.0052	1
10725	Fluorene	86-73-7	N.D.	0.0021	0.0052	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0021	0.0052	1
10725	Naphthalene	91-20-3	0.0036 J	0.0021	0.0052	1
10725	Phenanthrene	85-01-8	N.D.	0.0021	0.0052	1
10725	Pyrene	129-00-0	N.D.	0.0021	0.0052	1

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene

Reporting limits were raised due to limited sample volume.

GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	1.8 J	0.6	6.0	28.54
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.	4.2	13	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	5.4	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177528
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:30 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-1-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 03:03	Jeremy C Giffin	53.74
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 11:30	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 20:10	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 14:37	Marie D Beamenderfer	28.54
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 11:30	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 11:30	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 04:35	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-15-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177529
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:30 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-1L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	0.024	0.007	0.019	0.9
10237	Benzene	71-43-2	0.0006 J	0.0005	0.005	0.9
10237	Bromodichloromethane	75-27-4	N.D.	0.0009	0.005	0.9
10237	Bromoform	75-25-2	N.D.	0.0009	0.005	0.9
10237	Bromomethane	74-83-9	N.D.	0.002	0.005	0.9
10237	2-Butanone	78-93-3	N.D.	0.004	0.009	0.9
10237	Carbon Disulfide	75-15-0	N.D.	0.0009	0.005	0.9
10237	Carbon Tetrachloride	56-23-5	N.D.	0.0009	0.005	0.9
10237	Chlorobenzene	108-90-7	N.D.	0.0009	0.005	0.9
10237	Chloroethane	75-00-3	N.D.	0.002	0.005	0.9
10237	Chloroform	67-66-3	N.D.	0.0009	0.005	0.9
10237	Chloromethane	74-87-3	N.D.	0.002	0.005	0.9
10237	Cyclohexane	110-82-7	N.D.	0.0009	0.005	0.9
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.002	0.005	0.9
10237	Dibromochloromethane	124-48-1	N.D.	0.0009	0.005	0.9
10237	1,2-Dibromoethane	106-93-4	N.D.	0.0009	0.005	0.9
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.0009	0.005	0.9
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.0009	0.005	0.9
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.0009	0.005	0.9
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.002	0.005	0.9
10237	1,1-Dichloroethane	75-34-3	N.D.	0.0009	0.005	0.9
10237	1,2-Dichloroethane	107-06-2	N.D.	0.0009	0.005	0.9
10237	1,1-Dichloroethene	75-35-4	N.D.	0.0009	0.005	0.9
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.0009	0.005	0.9
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.0009	0.005	0.9
10237	1,2-Dichloropropane	78-87-5	N.D.	0.0009	0.005	0.9
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.0009	0.005	0.9
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.0009	0.005	0.9
10237	Ethylbenzene	100-41-4	N.D.	0.0009	0.005	0.9
10237	Freon 113	76-13-1	N.D.	0.002	0.009	0.9
10237	2-Hexanone	591-78-6	N.D.	0.003	0.009	0.9
10237	Isopropylbenzene	98-82-8	N.D.	0.0009	0.005	0.9
10237	Methyl Acetate	79-20-9	N.D.	0.002	0.005	0.9
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.9
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.003	0.009	0.9
10237	Methylcyclohexane	108-87-2	N.D.	0.0009	0.005	0.9
10237	Methylene Chloride	75-09-2	0.010	0.002	0.005	0.9
10237	Styrene	100-42-5	N.D.	0.0009	0.005	0.9
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.0009	0.005	0.9
10237	Tetrachloroethene	127-18-4	N.D.	0.0009	0.005	0.9
10237	Toluene	108-88-3	0.005	0.0009	0.005	0.9
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.0009	0.005	0.9
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.0009	0.005	0.9
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.0009	0.005	0.9
10237	Trichloroethene	79-01-6	N.D.	0.0009	0.005	0.9
10237	Trichlorofluoromethane	75-69-4	N.D.	0.002	0.005	0.9
10237	Vinyl Chloride	75-01-4	N.D.	0.0009	0.005	0.9
10237	Xylene (Total)	1330-20-7	0.002 J	0.0009	0.005	0.9

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-15-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177529
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:30 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-1L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	5.4	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 20:58	Stephen C Nolte	0.9
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 11:30	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 11:30	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177530
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:45 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1712-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.		0.46	1.3	58.24
10237	Benzene	71-43-2	N.D.		0.033	0.33	58.24
10237	Bromodichloromethane	75-27-4	N.D.		0.066	0.33	58.24
10237	Bromoform	75-25-2	N.D.		0.066	0.33	58.24
10237	Bromomethane	74-83-9	N.D.		0.13	0.33	58.24
10237	2-Butanone	78-93-3	N.D.		0.26	0.66	58.24
10237	Carbon Disulfide	75-15-0	N.D.		0.066	0.33	58.24
10237	Carbon Tetrachloride	56-23-5	N.D.		0.066	0.33	58.24
10237	Chlorobenzene	108-90-7	N.D.		0.066	0.33	58.24
10237	Chloroethane	75-00-3	N.D.		0.13	0.33	58.24
10237	Chloroform	67-66-3	N.D.		0.066	0.33	58.24
10237	Chloromethane	74-87-3	N.D.		0.13	0.33	58.24
10237	Cyclohexane	110-82-7	N.D.		0.066	0.33	58.24
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.13	0.33	58.24
10237	Dibromochloromethane	124-48-1	N.D.		0.066	0.33	58.24
10237	1,2-Dibromoethane	106-93-4	N.D.		0.066	0.33	58.24
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.066	0.33	58.24
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.066	0.33	58.24
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.066	0.33	58.24
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.13	0.33	58.24
10237	1,1-Dichloroethane	75-34-3	N.D.		0.066	0.33	58.24
10237	1,2-Dichloroethane	107-06-2	N.D.		0.066	0.33	58.24
10237	1,1-Dichloroethene	75-35-4	N.D.		0.066	0.33	58.24
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.066	0.33	58.24
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.066	0.33	58.24
10237	1,2-Dichloropropane	78-87-5	N.D.		0.066	0.33	58.24
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.066	0.33	58.24
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.066	0.33	58.24
10237	Ethylbenzene	100-41-4	0.12	J	0.066	0.33	58.24
10237	Freon 113	76-13-1	N.D.		0.13	0.66	58.24
10237	2-Hexanone	591-78-6	N.D.		0.20	0.66	58.24
10237	Isopropylbenzene	98-82-8	N.D.		0.066	0.33	58.24
10237	Methyl Acetate	79-20-9	0.13	J	0.13	0.33	58.24
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.033	0.33	58.24
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.20	0.66	58.24
10237	Methylcyclohexane	108-87-2	N.D.		0.066	0.33	58.24
10237	Methylene Chloride	75-09-2	N.D.		0.13	0.33	58.24
10237	Styrene	100-42-5	N.D.		0.066	0.33	58.24
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.066	0.33	58.24
10237	Tetrachloroethene	127-18-4	N.D.		0.066	0.33	58.24
10237	Toluene	108-88-3	0.25	J	0.066	0.33	58.24
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.066	0.33	58.24
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.066	0.33	58.24
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.066	0.33	58.24
10237	Trichloroethene	79-01-6	N.D.		0.066	0.33	58.24
10237	Trichlorofluoromethane	75-69-4	N.D.		0.13	0.33	58.24
10237	Vinyl Chloride	75-01-4	N.D.		0.066	0.33	58.24
10237	Xylene (Total)	1330-20-7	0.69		0.066	0.33	58.24

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177530
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:45 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1712-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**		**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.		0.0022	0.0056	1
10725	Acenaphthylene	208-96-8	N.D.		0.0011	0.0056	1
10725	Anthracene	120-12-7	N.D.		0.0011	0.0056	1
10725	Benzo(a)anthracene	56-55-3	N.D.		0.0022	0.0056	1
10725	Benzo(a)pyrene	50-32-8	N.D.		0.0022	0.0056	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.		0.0022	0.0056	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.		0.0022	0.0056	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.		0.0022	0.0056	1
10725	Chrysene	218-01-9	N.D.		0.0011	0.0056	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.		0.0022	0.0056	1
10725	Fluoranthene	206-44-0	N.D.		0.0022	0.0056	1
10725	Fluorene	86-73-7	N.D.		0.0022	0.0056	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.0022	0.0056	1
10725	Naphthalene	91-20-3	0.014		0.0022	0.0056	1
10725	Phenanthrene	85-01-8	N.D.		0.0022	0.0056	1
10725	Pyrene	129-00-0	N.D.		0.0022	0.0056	1
	The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene						
	Reporting limits were raised due to limited sample volume.						
GC Volatiles	**AK 101**		**mg/kg**		**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	6.8	J	0.7	7.0	30.86
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**		**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.		5.0	15	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.						
Wet Chemistry	**SM 2540 G-1997**		**%**		**%**	**%**	
00111	Moisture	n.a.	12.0		0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.						

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177530
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:45 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1712-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 03:28	Jeremy C Giffin	58.24
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 11:45	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 20:39	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 16:33	Marie D Beamenderfer	30.86
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 11:45	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 11:45	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 05:03	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177531
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:45 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1712L

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**		**mg/kg**	**mg/kg**	
10237	Acetone	67-64-1	0.017		0.004	0.010	0.46
10237	Benzene	71-43-2	0.003		0.0003	0.003	0.46
10237	Bromodichloromethane	75-27-4	N.D.		0.0005	0.003	0.46
10237	Bromoform	75-25-2	N.D.		0.0005	0.003	0.46
10237	Bromomethane	74-83-9	N.D.		0.001	0.003	0.46
10237	2-Butanone	78-93-3	0.009		0.002	0.005	0.46
10237	Carbon Disulfide	75-15-0	0.002	J	0.0005	0.003	0.46
10237	Carbon Tetrachloride	56-23-5	N.D.		0.0005	0.003	0.46
10237	Chlorobenzene	108-90-7	N.D.		0.0005	0.003	0.46
10237	Chloroethane	75-00-3	N.D.		0.001	0.003	0.46
10237	Chloroform	67-66-3	N.D.		0.0005	0.003	0.46
10237	Chloromethane	74-87-3	N.D.		0.001	0.003	0.46
10237	Cyclohexane	110-82-7	0.053		0.0005	0.003	0.46
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.001	0.003	0.46
10237	Dibromochloromethane	124-48-1	N.D.		0.0005	0.003	0.46
10237	1,2-Dibromoethane	106-93-4	N.D.		0.0005	0.003	0.46
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.0005	0.003	0.46
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.0005	0.003	0.46
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.0005	0.003	0.46
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.001	0.003	0.46
10237	1,1-Dichloroethane	75-34-3	N.D.		0.0005	0.003	0.46
10237	1,2-Dichloroethane	107-06-2	N.D.		0.0005	0.003	0.46
10237	1,1-Dichloroethene	75-35-4	N.D.		0.0005	0.003	0.46
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.0005	0.003	0.46
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.0005	0.003	0.46
10237	1,2-Dichloropropane	78-87-5	N.D.		0.0005	0.003	0.46
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.0005	0.003	0.46
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.0005	0.003	0.46
10237	Ethylbenzene	100-41-4	0.092		0.0005	0.003	0.46
10237	Freon 113	76-13-1	N.D.		0.001	0.005	0.46
10237	2-Hexanone	591-78-6	N.D.		0.002	0.005	0.46
10237	Isopropylbenzene	98-82-8	0.002	J	0.0005	0.003	0.46
10237	Methyl Acetate	79-20-9	N.D.		0.001	0.003	0.46
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.0003	0.003	0.46
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.002	0.005	0.46
10237	Methylcyclohexane	108-87-2	0.027		0.0005	0.003	0.46
10237	Methylene Chloride	75-09-2	N.D.		0.001	0.003	0.46
10237	Styrene	100-42-5	N.D.		0.0005	0.003	0.46
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.0005	0.003	0.46
10237	Tetrachloroethene	127-18-4	N.D.		0.0005	0.003	0.46
10237	Toluene	108-88-3	0.14		0.0005	0.003	0.46
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.0005	0.003	0.46
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.0005	0.003	0.46
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.0005	0.003	0.46
10237	Trichloroethene	79-01-6	N.D.		0.0005	0.003	0.46
10237	Trichlorofluoromethane	75-69-4	N.D.		0.001	0.003	0.46
10237	Vinyl Chloride	75-01-4	N.D.		0.0005	0.003	0.46
10237	Xylene (Total)	1330-20-7	0.45	E	0.0005	0.003	0.46

*=This limit was used in the evaluation of the final result

Sample Description: SB17-1-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177531
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 11:45 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1712L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	The concentration reported for Xylene (total) is estimated since it exceeds the calibration range of the instrument.					
Wet Chemistry		**SM 2540 G-1997**	%	%	%	
00118	Moisture	n.a.	12.0	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 21:21	Stephen C Nolte	0.46
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 11:45	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 11:45	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177532
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 09:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-2-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.		0.54	1.5	61.74
10237	Benzene	71-43-2	N.D.		0.039	0.39	61.74
10237	Bromodichloromethane	75-27-4	N.D.		0.077	0.39	61.74
10237	Bromoform	75-25-2	N.D.		0.077	0.39	61.74
10237	Bromomethane	74-83-9	N.D.		0.15	0.39	61.74
10237	2-Butanone	78-93-3	N.D.		0.31	0.77	61.74
10237	Carbon Disulfide	75-15-0	N.D.		0.077	0.39	61.74
10237	Carbon Tetrachloride	56-23-5	N.D.		0.077	0.39	61.74
10237	Chlorobenzene	108-90-7	N.D.		0.077	0.39	61.74
10237	Chloroethane	75-00-3	N.D.		0.15	0.39	61.74
10237	Chloroform	67-66-3	N.D.		0.077	0.39	61.74
10237	Chloromethane	74-87-3	N.D.		0.15	0.39	61.74
10237	Cyclohexane	110-82-7	N.D.		0.077	0.39	61.74
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.15	0.39	61.74
10237	Dibromochloromethane	124-48-1	N.D.		0.077	0.39	61.74
10237	1,2-Dibromoethane	106-93-4	N.D.		0.077	0.39	61.74
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.077	0.39	61.74
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.077	0.39	61.74
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.077	0.39	61.74
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.15	0.39	61.74
10237	1,1-Dichloroethane	75-34-3	N.D.		0.077	0.39	61.74
10237	1,2-Dichloroethane	107-06-2	N.D.		0.077	0.39	61.74
10237	1,1-Dichloroethene	75-35-4	N.D.		0.077	0.39	61.74
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.077	0.39	61.74
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.077	0.39	61.74
10237	1,2-Dichloropropane	78-87-5	N.D.		0.077	0.39	61.74
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.077	0.39	61.74
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.077	0.39	61.74
10237	Ethylbenzene	100-41-4	0.11	J	0.077	0.39	61.74
10237	Freon 113	76-13-1	N.D.		0.15	0.77	61.74
10237	2-Hexanone	591-78-6	N.D.		0.23	0.77	61.74
10237	Isopropylbenzene	98-82-8	N.D.		0.077	0.39	61.74
10237	Methyl Acetate	79-20-9	0.40		0.15	0.39	61.74
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.039	0.39	61.74
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.23	0.77	61.74
10237	Methylcyclohexane	108-87-2	13		0.077	0.39	61.74
10237	Methylene Chloride	75-09-2	N.D.		0.15	0.39	61.74
10237	Styrene	100-42-5	N.D.		0.077	0.39	61.74
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.077	0.39	61.74
10237	Tetrachloroethene	127-18-4	N.D.		0.077	0.39	61.74
10237	Toluene	108-88-3	N.D.		0.077	0.39	61.74
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.077	0.39	61.74
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.077	0.39	61.74
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.077	0.39	61.74
10237	Trichloroethene	79-01-6	N.D.		0.077	0.39	61.74
10237	Trichlorofluoromethane	75-69-4	N.D.		0.15	0.39	61.74
10237	Vinyl Chloride	75-01-4	N.D.		0.077	0.39	61.74
10237	Xylene (Total)	1330-20-7	1.8		0.077	0.39	61.74

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177532
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 09:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-2-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	0.029	0.0024	0.0060	1
10725	Acenaphthylene	208-96-8	0.0085	0.0012	0.0060	1
10725	Anthracene	120-12-7	0.0090	0.0012	0.0060	1
10725	Benzo(a)anthracene	56-55-3	0.0069	0.0024	0.0060	1
10725	Benzo(a)pyrene	50-32-8	0.0035 J	0.0024	0.0060	1
10725	Benzo(b)fluoranthene	205-99-2	0.0039 J	0.0024	0.0060	1
10725	Benzo(g,h,i)perylene	191-24-2	0.0034 J	0.0024	0.0060	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0024	0.0060	1
10725	Chrysene	218-01-9	0.0077	0.0012	0.0060	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0024	0.0060	1
10725	Fluoranthene	206-44-0	0.014	0.0024	0.0060	1
10725	Fluorene	86-73-7	0.051	0.0024	0.0060	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0024	0.0060	1
10725	Naphthalene	91-20-3	0.38	0.0024	0.0060	1
10725	Phenanthrene	85-01-8	0.043	0.0024	0.0060	1
10725	Pyrene	129-00-0	0.024	0.0024	0.0060	1

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene

Reporting limits were raised due to limited sample volume.

GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	1,800	77	770	3087.14
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	500	55	160	10

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	20.0	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177532
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 09:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-2-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172501AA	09/07/2017 18:24	Jeremy C Giffin	61.74
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 21:09	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34B	09/06/2017 06:34	Marie D Beamenderfer	3087.14
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 09:55	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 09:55	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/07/2017 20:38	Nicholas R Rossi	10
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177534
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 10:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1722-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.58	1.6	65.66
10237	Benzene	71-43-2	N.D.	0.041	0.41	65.66
10237	Bromodichloromethane	75-27-4	N.D.	0.082	0.41	65.66
10237	Bromoform	75-25-2	N.D.	0.082	0.41	65.66
10237	Bromomethane	74-83-9	N.D.	0.16	0.41	65.66
10237	2-Butanone	78-93-3	N.D.	0.33	0.82	65.66
10237	Carbon Disulfide	75-15-0	N.D.	0.082	0.41	65.66
10237	Carbon Tetrachloride	56-23-5	N.D.	0.082	0.41	65.66
10237	Chlorobenzene	108-90-7	N.D.	0.082	0.41	65.66
10237	Chloroethane	75-00-3	N.D.	0.16	0.41	65.66
10237	Chloroform	67-66-3	N.D.	0.082	0.41	65.66
10237	Chloromethane	74-87-3	N.D.	0.16	0.41	65.66
10237	Cyclohexane	110-82-7	N.D.	0.082	0.41	65.66
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.16	0.41	65.66
10237	Dibromochloromethane	124-48-1	N.D.	0.082	0.41	65.66
10237	1,2-Dibromoethane	106-93-4	N.D.	0.082	0.41	65.66
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.082	0.41	65.66
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.082	0.41	65.66
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.082	0.41	65.66
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.16	0.41	65.66
10237	1,1-Dichloroethane	75-34-3	N.D.	0.082	0.41	65.66
10237	1,2-Dichloroethane	107-06-2	N.D.	0.082	0.41	65.66
10237	1,1-Dichloroethene	75-35-4	N.D.	0.082	0.41	65.66
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.082	0.41	65.66
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.082	0.41	65.66
10237	1,2-Dichloropropane	78-87-5	N.D.	0.082	0.41	65.66
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.082	0.41	65.66
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.082	0.41	65.66
10237	Ethylbenzene	100-41-4	N.D.	0.082	0.41	65.66
10237	Freon 113	76-13-1	N.D.	0.16	0.82	65.66
10237	2-Hexanone	591-78-6	N.D.	0.25	0.82	65.66
10237	Isopropylbenzene	98-82-8	N.D.	0.082	0.41	65.66
10237	Methyl Acetate	79-20-9	N.D.	0.16	0.41	65.66
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.041	0.41	65.66
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.25	0.82	65.66
10237	Methylcyclohexane	108-87-2	N.D.	0.082	0.41	65.66
10237	Methylene Chloride	75-09-2	N.D.	0.16	0.41	65.66
10237	Styrene	100-42-5	N.D.	0.082	0.41	65.66
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.082	0.41	65.66
10237	Tetrachloroethene	127-18-4	N.D.	0.082	0.41	65.66
10237	Toluene	108-88-3	N.D.	0.082	0.41	65.66
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.082	0.41	65.66
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.082	0.41	65.66
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.082	0.41	65.66
10237	Trichloroethene	79-01-6	N.D.	0.082	0.41	65.66
10237	Trichlorofluoromethane	75-69-4	N.D.	0.16	0.41	65.66
10237	Vinyl Chloride	75-01-4	N.D.	0.082	0.41	65.66
10237	Xylene (Total)	1330-20-7	N.D.	0.082	0.41	65.66

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177534
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 10:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1722-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0024	0.0060	1
10725	Acenaphthylene	208-96-8	N.D.	0.0012	0.0060	1
10725	Anthracene	120-12-7	N.D.	0.0012	0.0060	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0024	0.0060	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0024	0.0060	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0024	0.0060	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0024	0.0060	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0024	0.0060	1
10725	Chrysene	218-01-9	N.D.	0.0012	0.0060	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0024	0.0060	1
10725	Fluoranthene	206-44-0	N.D.	0.0024	0.0060	1
10725	Fluorene	86-73-7	N.D.	0.0024	0.0060	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0024	0.0060	1
10725	Naphthalene	91-20-3	0.0053 J	0.0024	0.0060	1
10725	Phenanthrene	85-01-8	N.D.	0.0024	0.0060	1
10725	Pyrene	129-00-0	N.D.	0.0024	0.0060	1

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene

Reporting limits were raised due to limited sample volume.

GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	0.9 J	0.8	8.2	32.79
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.	5.9	18	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	20.3	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177534
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 10:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1722-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 03:51	Jeremy C Giffin	65.66
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 10:11	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 21:39	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 17:12	Marie D Beamenderfer	32.79
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 10:11	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 10:11	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 06:01	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177535
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 10:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1722L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	0.010 J	0.007	0.020	0.78
10237	Benzene	71-43-2	0.005 J	0.0005	0.005	0.78
10237	Bromodichloromethane	75-27-4	N.D.	0.001	0.005	0.78
10237	Bromoform	75-25-2	N.D.	0.001	0.005	0.78
10237	Bromomethane	74-83-9	N.D.	0.002	0.005	0.78
10237	2-Butanone	78-93-3	N.D.	0.004	0.01	0.78
10237	Carbon Disulfide	75-15-0	0.005	0.001	0.005	0.78
10237	Carbon Tetrachloride	56-23-5	N.D.	0.001	0.005	0.78
10237	Chlorobenzene	108-90-7	N.D.	0.001	0.005	0.78
10237	Chloroethane	75-00-3	N.D.	0.002	0.005	0.78
10237	Chloroform	67-66-3	N.D.	0.001	0.005	0.78
10237	Chloromethane	74-87-3	N.D.	0.002	0.005	0.78
10237	Cyclohexane	110-82-7	0.014	0.001	0.005	0.78
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.002	0.005	0.78
10237	Dibromochloromethane	124-48-1	N.D.	0.001	0.005	0.78
10237	1,2-Dibromoethane	106-93-4	N.D.	0.001	0.005	0.78
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.001	0.005	0.78
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.001	0.005	0.78
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.001	0.005	0.78
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.002	0.005	0.78
10237	1,1-Dichloroethane	75-34-3	N.D.	0.001	0.005	0.78
10237	1,2-Dichloroethane	107-06-2	N.D.	0.001	0.005	0.78
10237	1,1-Dichloroethene	75-35-4	N.D.	0.001	0.005	0.78
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.001	0.005	0.78
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.001	0.005	0.78
10237	1,2-Dichloropropane	78-87-5	N.D.	0.001	0.005	0.78
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.001	0.005	0.78
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.001	0.005	0.78
10237	Ethylbenzene	100-41-4	0.005	0.001	0.005	0.78
10237	Freon 113	76-13-1	N.D.	0.002	0.01	0.78
10237	2-Hexanone	591-78-6	N.D.	0.003	0.01	0.78
10237	Isopropylbenzene	98-82-8	0.001 J	0.001	0.005	0.78
10237	Methyl Acetate	79-20-9	N.D.	0.002	0.005	0.78
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.78
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.003	0.01	0.78
10237	Methylcyclohexane	108-87-2	0.01	0.001	0.005	0.78
10237	Methylene Chloride	75-09-2	N.D.	0.002	0.005	0.78
10237	Styrene	100-42-5	N.D.	0.001	0.005	0.78
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.001	0.005	0.78
10237	Tetrachloroethene	127-18-4	N.D.	0.001	0.005	0.78
10237	Toluene	108-88-3	0.012	0.001	0.005	0.78
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.001	0.005	0.78
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.001	0.005	0.78
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.001	0.005	0.78
10237	Trichloroethene	79-01-6	N.D.	0.001	0.005	0.78
10237	Trichlorofluoromethane	75-69-4	N.D.	0.002	0.005	0.78
10237	Vinyl Chloride	75-01-4	N.D.	0.001	0.005	0.78
10237	Xylene (Total)	1330-20-7	0.017	0.001	0.005	0.78

*=This limit was used in the evaluation of the final result

Sample Description: SB17-2-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177535
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 10:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1722L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	20.3	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 21:44	Stephen C Nolte	0.78
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 10:11	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 10:11	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177536
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-3-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**		**mg/kg**	**mg/kg**	
10237	Acetone	67-64-1	N.D.		0.53	1.5	62.35
10237	Benzene	71-43-2	N.D.		0.038	0.38	62.35
10237	Bromodichloromethane	75-27-4	N.D.		0.075	0.38	62.35
10237	Bromoform	75-25-2	N.D.		0.075	0.38	62.35
10237	Bromomethane	74-83-9	N.D.		0.15	0.38	62.35
10237	2-Butanone	78-93-3	N.D.		0.30	0.75	62.35
10237	Carbon Disulfide	75-15-0	N.D.		0.075	0.38	62.35
10237	Carbon Tetrachloride	56-23-5	N.D.		0.075	0.38	62.35
10237	Chlorobenzene	108-90-7	N.D.		0.075	0.38	62.35
10237	Chloroethane	75-00-3	N.D.		0.15	0.38	62.35
10237	Chloroform	67-66-3	N.D.		0.075	0.38	62.35
10237	Chloromethane	74-87-3	N.D.		0.15	0.38	62.35
10237	Cyclohexane	110-82-7	N.D.		0.075	0.38	62.35
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.15	0.38	62.35
10237	Dibromochloromethane	124-48-1	N.D.		0.075	0.38	62.35
10237	1,2-Dibromoethane	106-93-4	N.D.		0.075	0.38	62.35
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.075	0.38	62.35
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.075	0.38	62.35
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.075	0.38	62.35
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.15	0.38	62.35
10237	1,1-Dichloroethane	75-34-3	N.D.		0.075	0.38	62.35
10237	1,2-Dichloroethane	107-06-2	N.D.		0.075	0.38	62.35
10237	1,1-Dichloroethene	75-35-4	N.D.		0.075	0.38	62.35
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.075	0.38	62.35
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.075	0.38	62.35
10237	1,2-Dichloropropane	78-87-5	N.D.		0.075	0.38	62.35
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.075	0.38	62.35
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.075	0.38	62.35
10237	Ethylbenzene	100-41-4	N.D.		0.075	0.38	62.35
10237	Freon 113	76-13-1	N.D.		0.15	0.75	62.35
10237	2-Hexanone	591-78-6	N.D.		0.23	0.75	62.35
10237	Isopropylbenzene	98-82-8	N.D.		0.075	0.38	62.35
10237	Methyl Acetate	79-20-9	0.17	J	0.15	0.38	62.35
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.038	0.38	62.35
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.23	0.75	62.35
10237	Methylcyclohexane	108-87-2	N.D.		0.075	0.38	62.35
10237	Methylene Chloride	75-09-2	N.D.		0.15	0.38	62.35
10237	Styrene	100-42-5	N.D.		0.075	0.38	62.35
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.075	0.38	62.35
10237	Tetrachloroethene	127-18-4	N.D.		0.075	0.38	62.35
10237	Toluene	108-88-3	N.D.		0.075	0.38	62.35
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.075	0.38	62.35
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.075	0.38	62.35
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.075	0.38	62.35
10237	Trichloroethene	79-01-6	N.D.		0.075	0.38	62.35
10237	Trichlorofluoromethane	75-69-4	N.D.		0.15	0.38	62.35
10237	Vinyl Chloride	75-01-4	N.D.		0.075	0.38	62.35
10237	Xylene (Total)	1330-20-7	N.D.		0.075	0.38	62.35

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177536
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-3-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0023	0.0058	1
10725	Acenaphthylene	208-96-8	0.0023 J	0.0012	0.0058	1
10725	Anthracene	120-12-7	0.0043 J	0.0012	0.0058	1
10725	Benzo(a)anthracene	56-55-3	0.0042 J	0.0023	0.0058	1
10725	Benzo(a)pyrene	50-32-8	0.0043 J	0.0023	0.0058	1
10725	Benzo(b)fluoranthene	205-99-2	0.0047 J	0.0023	0.0058	1
10725	Benzo(g,h,i)perylene	191-24-2	0.0055 J	0.0023	0.0058	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0023	0.0058	1
10725	Chrysene	218-01-9	0.0037 J	0.0012	0.0058	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0023	0.0058	1
10725	Fluoranthene	206-44-0	0.0060	0.0023	0.0058	1
10725	Fluorene	86-73-7	0.0028 J	0.0023	0.0058	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	0.0024 J	0.0023	0.0058	1
10725	Naphthalene	91-20-3	0.20	0.0023	0.0058	1
10725	Phenanthrene	85-01-8	0.016	0.0023	0.0058	1
10725	Pyrene	129-00-0	0.0098	0.0023	0.0058	1

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene

Reporting limits were raised due to limited sample volume.

GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	N.D.	0.7	7.1	29.42
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	17 J	5.8	17	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	17.0	0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177536
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-3-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 04:15	Jeremy C Giffin	62.35
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 13:00	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 22:08	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 17:52	Marie D Beamenderfer	29.42
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 13:00	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 13:00	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 06:30	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-15-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177537
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-3L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	0.011 J	0.007	0.020	0.83
10237	Benzene	71-43-2	0.005 J	0.0005	0.005	0.83
10237	Bromodichloromethane	75-27-4	N.D.	0.001	0.005	0.83
10237	Bromoform	75-25-2	N.D.	0.001	0.005	0.83
10237	Bromomethane	74-83-9	N.D.	0.002	0.005	0.83
10237	2-Butanone	78-93-3	N.D.	0.004	0.010	0.83
10237	Carbon Disulfide	75-15-0	N.D.	0.001	0.005	0.83
10237	Carbon Tetrachloride	56-23-5	N.D.	0.001	0.005	0.83
10237	Chlorobenzene	108-90-7	N.D.	0.001	0.005	0.83
10237	Chloroethane	75-00-3	N.D.	0.002	0.005	0.83
10237	Chloroform	67-66-3	N.D.	0.001	0.005	0.83
10237	Chloromethane	74-87-3	N.D.	0.002	0.005	0.83
10237	Cyclohexane	110-82-7	N.D.	0.001	0.005	0.83
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.002	0.005	0.83
10237	Dibromochloromethane	124-48-1	N.D.	0.001	0.005	0.83
10237	1,2-Dibromoethane	106-93-4	N.D.	0.001	0.005	0.83
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.001	0.005	0.83
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.001	0.005	0.83
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.001	0.005	0.83
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.002	0.005	0.83
10237	1,1-Dichloroethane	75-34-3	N.D.	0.001	0.005	0.83
10237	1,2-Dichloroethane	107-06-2	N.D.	0.001	0.005	0.83
10237	1,1-Dichloroethene	75-35-4	N.D.	0.001	0.005	0.83
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.001	0.005	0.83
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.001	0.005	0.83
10237	1,2-Dichloropropane	78-87-5	N.D.	0.001	0.005	0.83
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.001	0.005	0.83
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.001	0.005	0.83
10237	Ethylbenzene	100-41-4	0.002 J	0.001	0.005	0.83
10237	Freon 113	76-13-1	N.D.	0.002	0.010	0.83
10237	2-Hexanone	591-78-6	N.D.	0.003	0.010	0.83
10237	Isopropylbenzene	98-82-8	N.D.	0.001	0.005	0.83
10237	Methyl Acetate	79-20-9	N.D.	0.002	0.005	0.83
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.83
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.003	0.010	0.83
10237	Methylcyclohexane	108-87-2	0.001 J	0.001	0.005	0.83
10237	Methylene Chloride	75-09-2	N.D.	0.002	0.005	0.83
10237	Styrene	100-42-5	N.D.	0.001	0.005	0.83
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.001	0.005	0.83
10237	Tetrachloroethene	127-18-4	N.D.	0.001	0.005	0.83
10237	Toluene	108-88-3	0.009	0.001	0.005	0.83
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.001	0.005	0.83
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.001	0.005	0.83
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.001	0.005	0.83
10237	Trichloroethene	79-01-6	N.D.	0.001	0.005	0.83
10237	Trichlorofluoromethane	75-69-4	N.D.	0.002	0.005	0.83
10237	Vinyl Chloride	75-01-4	N.D.	0.001	0.005	0.83
10237	Xylene (Total)	1330-20-7	0.012	0.001	0.005	0.83

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-15-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177537
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-3L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	17.0	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 22:08	Stephen C Nolte	0.83
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 13:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 13:00	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-20-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177538
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:12 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1732-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.		0.45	1.3	60.5
10237	Benzene	71-43-2	N.D.		0.032	0.32	60.5
10237	Bromodichloromethane	75-27-4	N.D.		0.065	0.32	60.5
10237	Bromoform	75-25-2	N.D.		0.065	0.32	60.5
10237	Bromomethane	74-83-9	N.D.		0.13	0.32	60.5
10237	2-Butanone	78-93-3	N.D.		0.26	0.65	60.5
10237	Carbon Disulfide	75-15-0	N.D.		0.065	0.32	60.5
10237	Carbon Tetrachloride	56-23-5	N.D.		0.065	0.32	60.5
10237	Chlorobenzene	108-90-7	N.D.		0.065	0.32	60.5
10237	Chloroethane	75-00-3	N.D.		0.13	0.32	60.5
10237	Chloroform	67-66-3	N.D.		0.065	0.32	60.5
10237	Chloromethane	74-87-3	N.D.		0.13	0.32	60.5
10237	Cyclohexane	110-82-7	N.D.		0.065	0.32	60.5
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.13	0.32	60.5
10237	Dibromochloromethane	124-48-1	N.D.		0.065	0.32	60.5
10237	1,2-Dibromoethane	106-93-4	N.D.		0.065	0.32	60.5
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.065	0.32	60.5
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.065	0.32	60.5
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.065	0.32	60.5
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.13	0.32	60.5
10237	1,1-Dichloroethane	75-34-3	N.D.		0.065	0.32	60.5
10237	1,2-Dichloroethane	107-06-2	N.D.		0.065	0.32	60.5
10237	1,1-Dichloroethene	75-35-4	N.D.		0.065	0.32	60.5
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.065	0.32	60.5
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.065	0.32	60.5
10237	1,2-Dichloropropane	78-87-5	N.D.		0.065	0.32	60.5
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.065	0.32	60.5
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.065	0.32	60.5
10237	Ethylbenzene	100-41-4	N.D.		0.065	0.32	60.5
10237	Freon 113	76-13-1	N.D.		0.13	0.65	60.5
10237	2-Hexanone	591-78-6	N.D.		0.19	0.65	60.5
10237	Isopropylbenzene	98-82-8	N.D.		0.065	0.32	60.5
10237	Methyl Acetate	79-20-9	0.17	J	0.13	0.32	60.5
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.032	0.32	60.5
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.19	0.65	60.5
10237	Methylcyclohexane	108-87-2	N.D.		0.065	0.32	60.5
10237	Methylene Chloride	75-09-2	N.D.		0.13	0.32	60.5
10237	Styrene	100-42-5	N.D.		0.065	0.32	60.5
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.065	0.32	60.5
10237	Tetrachloroethene	127-18-4	N.D.		0.065	0.32	60.5
10237	Toluene	108-88-3	N.D.		0.065	0.32	60.5
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.065	0.32	60.5
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.065	0.32	60.5
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.065	0.32	60.5
10237	Trichloroethene	79-01-6	N.D.		0.065	0.32	60.5
10237	Trichlorofluoromethane	75-69-4	N.D.		0.13	0.32	60.5
10237	Vinyl Chloride	75-01-4	N.D.		0.065	0.32	60.5
10237	Xylene (Total)	1330-20-7	0.067	J	0.065	0.32	60.5

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-20-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177538
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:12 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1732-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**		**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.		0.0021	0.0052	1
10725	Acenaphthylene	208-96-8	N.D.		0.0010	0.0052	1
10725	Anthracene	120-12-7	N.D.		0.0010	0.0052	1
10725	Benzo(a)anthracene	56-55-3	N.D.		0.0021	0.0052	1
10725	Benzo(a)pyrene	50-32-8	N.D.		0.0021	0.0052	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.		0.0021	0.0052	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.		0.0021	0.0052	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.		0.0021	0.0052	1
10725	Chrysene	218-01-9	N.D.		0.0010	0.0052	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.		0.0021	0.0052	1
10725	Fluoranthene	206-44-0	N.D.		0.0021	0.0052	1
10725	Fluorene	86-73-7	N.D.		0.0021	0.0052	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.0021	0.0052	1
10725	Naphthalene	91-20-3	0.055		0.0021	0.0052	1
10725	Phenanthrene	85-01-8	N.D.		0.0021	0.0052	1
10725	Pyrene	129-00-0	N.D.		0.0021	0.0052	1
	The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene						
	Reporting limits were raised due to limited sample volume.						
GC Volatiles	**AK 101**		**mg/kg**		**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	2.8	J	0.6	5.6	26
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**		**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.		4.6	14	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.						
Wet Chemistry	**SM 2540 G-1997**		**%**		**%**	**%**	
00111	Moisture	n.a.	6.7		0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.						

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-20-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177538
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:12 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1732-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 04:39	Jeremy C Giffin	60.5
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 13:12	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 22:38	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 18:31	Marie D Beamenderfer	26
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 13:12	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 13:12	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 06:59	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-20-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177539
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:12 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1732L

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	0.015		0.005	0.015	0.68
10237	Benzene	71-43-2	0.003	J	0.0004	0.004	0.68
10237	Bromodichloromethane	75-27-4	N.D.		0.0007	0.004	0.68
10237	Bromoform	75-25-2	N.D.		0.0007	0.004	0.68
10237	Bromomethane	74-83-9	N.D.		0.001	0.004	0.68
10237	2-Butanone	78-93-3	0.004	J	0.003	0.007	0.68
10237	Carbon Disulfide	75-15-0	N.D.		0.0007	0.004	0.68
10237	Carbon Tetrachloride	56-23-5	N.D.		0.0007	0.004	0.68
10237	Chlorobenzene	108-90-7	N.D.		0.0007	0.004	0.68
10237	Chloroethane	75-00-3	N.D.		0.001	0.004	0.68
10237	Chloroform	67-66-3	N.D.		0.0007	0.004	0.68
10237	Chloromethane	74-87-3	N.D.		0.001	0.004	0.68
10237	Cyclohexane	110-82-7	0.085		0.0007	0.004	0.68
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.001	0.004	0.68
10237	Dibromochloromethane	124-48-1	N.D.		0.0007	0.004	0.68
10237	1,2-Dibromoethane	106-93-4	N.D.		0.0007	0.004	0.68
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.0007	0.004	0.68
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.0007	0.004	0.68
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.0007	0.004	0.68
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.001	0.004	0.68
10237	1,1-Dichloroethane	75-34-3	N.D.		0.0007	0.004	0.68
10237	1,2-Dichloroethane	107-06-2	N.D.		0.0007	0.004	0.68
10237	1,1-Dichloroethene	75-35-4	N.D.		0.0007	0.004	0.68
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.0007	0.004	0.68
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.0007	0.004	0.68
10237	1,2-Dichloropropane	78-87-5	N.D.		0.0007	0.004	0.68
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.0007	0.004	0.68
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.0007	0.004	0.68
10237	Ethylbenzene	100-41-4	0.047		0.0007	0.004	0.68
10237	Freon 113	76-13-1	N.D.		0.001	0.007	0.68
10237	2-Hexanone	591-78-6	N.D.		0.002	0.007	0.68
10237	Isopropylbenzene	98-82-8	0.004	J	0.0007	0.004	0.68
10237	Methyl Acetate	79-20-9	N.D.		0.001	0.004	0.68
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.0004	0.004	0.68
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.002	0.007	0.68
10237	Methylcyclohexane	108-87-2	0.042		0.0007	0.004	0.68
10237	Methylene Chloride	75-09-2	N.D.		0.001	0.004	0.68
10237	Styrene	100-42-5	N.D.		0.0007	0.004	0.68
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.0007	0.004	0.68
10237	Tetrachloroethene	127-18-4	N.D.		0.0007	0.004	0.68
10237	Toluene	108-88-3	0.007		0.0007	0.004	0.68
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.0007	0.004	0.68
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.0007	0.004	0.68
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.0007	0.004	0.68
10237	Trichloroethene	79-01-6	N.D.		0.0007	0.004	0.68
10237	Trichlorofluoromethane	75-69-4	N.D.		0.001	0.004	0.68
10237	Vinyl Chloride	75-01-4	N.D.		0.0007	0.004	0.68
10237	Xylene (Total)	1330-20-7	0.050		0.0007	0.004	0.68

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-20-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177539
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:12 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1732L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	6.7	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 22:31	Stephen C Nolte	0.68
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 13:12	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 13:12	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177540
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:15 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1733-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.41	1.2	54.67
10237	Benzene	71-43-2	N.D.	0.029	0.29	54.67
10237	Bromodichloromethane	75-27-4	N.D.	0.058	0.29	54.67
10237	Bromoform	75-25-2	N.D.	0.058	0.29	54.67
10237	Bromomethane	74-83-9	N.D.	0.12	0.29	54.67
10237	2-Butanone	78-93-3	N.D.	0.23	0.58	54.67
10237	Carbon Disulfide	75-15-0	N.D.	0.058	0.29	54.67
10237	Carbon Tetrachloride	56-23-5	N.D.	0.058	0.29	54.67
10237	Chlorobenzene	108-90-7	N.D.	0.058	0.29	54.67
10237	Chloroethane	75-00-3	N.D.	0.12	0.29	54.67
10237	Chloroform	67-66-3	N.D.	0.058	0.29	54.67
10237	Chloromethane	74-87-3	N.D.	0.12	0.29	54.67
10237	Cyclohexane	110-82-7	N.D.	0.058	0.29	54.67
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.12	0.29	54.67
10237	Dibromochloromethane	124-48-1	N.D.	0.058	0.29	54.67
10237	1,2-Dibromoethane	106-93-4	N.D.	0.058	0.29	54.67
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.058	0.29	54.67
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.058	0.29	54.67
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.058	0.29	54.67
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.12	0.29	54.67
10237	1,1-Dichloroethane	75-34-3	N.D.	0.058	0.29	54.67
10237	1,2-Dichloroethane	107-06-2	N.D.	0.058	0.29	54.67
10237	1,1-Dichloroethene	75-35-4	N.D.	0.058	0.29	54.67
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.058	0.29	54.67
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.058	0.29	54.67
10237	1,2-Dichloropropane	78-87-5	N.D.	0.058	0.29	54.67
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.058	0.29	54.67
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.058	0.29	54.67
10237	Ethylbenzene	100-41-4	N.D.	0.058	0.29	54.67
10237	Freon 113	76-13-1	N.D.	0.12	0.58	54.67
10237	2-Hexanone	591-78-6	N.D.	0.18	0.58	54.67
10237	Isopropylbenzene	98-82-8	N.D.	0.058	0.29	54.67
10237	Methyl Acetate	79-20-9	N.D.	0.12	0.29	54.67
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.029	0.29	54.67
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.18	0.58	54.67
10237	Methylcyclohexane	108-87-2	N.D.	0.058	0.29	54.67
10237	Methylene Chloride	75-09-2	N.D.	0.12	0.29	54.67
10237	Styrene	100-42-5	N.D.	0.058	0.29	54.67
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.058	0.29	54.67
10237	Tetrachloroethene	127-18-4	N.D.	0.058	0.29	54.67
10237	Toluene	108-88-3	N.D.	0.058	0.29	54.67
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.058	0.29	54.67
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.058	0.29	54.67
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.058	0.29	54.67
10237	Trichloroethene	79-01-6	N.D.	0.058	0.29	54.67
10237	Trichlorofluoromethane	75-69-4	N.D.	0.12	0.29	54.67
10237	Vinyl Chloride	75-01-4	N.D.	0.058	0.29	54.67
10237	Xylene (Total)	1330-20-7	N.D.	0.058	0.29	54.67

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177540
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:15 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1733-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**		**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.		0.0020	0.0051	1
10725	Acenaphthylene	208-96-8	N.D.		0.0010	0.0051	1
10725	Anthracene	120-12-7	N.D.		0.0010	0.0051	1
10725	Benzo(a)anthracene	56-55-3	N.D.		0.0020	0.0051	1
10725	Benzo(a)pyrene	50-32-8	N.D.		0.0020	0.0051	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.		0.0020	0.0051	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.		0.0020	0.0051	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.		0.0020	0.0051	1
10725	Chrysene	218-01-9	N.D.		0.0010	0.0051	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.		0.0020	0.0051	1
10725	Fluoranthene	206-44-0	N.D.		0.0020	0.0051	1
10725	Fluorene	86-73-7	N.D.		0.0020	0.0051	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		0.0020	0.0051	1
10725	Naphthalene	91-20-3	0.012		0.0020	0.0051	1
10725	Phenanthrene	85-01-8	N.D.		0.0020	0.0051	1
10725	Pyrene	129-00-0	N.D.		0.0020	0.0051	1

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene

Reporting limits were raised due to limited sample volume.

GC Volatiles	**AK 101**		**mg/kg**		**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	0.6	J	0.6	5.8	26.98
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**		**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.		4.4	13	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Wet Chemistry	**SM 2540 G-1997**		**%**		**%**	**%**	
00111	Moisture	n.a.	6.4		0.50	0.50	1

Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177540
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:15 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1733-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 05:03	Jeremy C Giffin	54.67
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 13:15	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 23:08	William H Saadeh	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 19:10	Marie D Beamenderfer	26.98
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 13:15	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 13:15	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 07:28	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177541
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:15 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1733L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	0.007 J	0.006	0.017	0.8
10237	Benzene	71-43-2	0.003 J	0.0004	0.004	0.8
10237	Bromodichloromethane	75-27-4	N.D.	0.0009	0.004	0.8
10237	Bromoform	75-25-2	N.D.	0.0009	0.004	0.8
10237	Bromomethane	74-83-9	N.D.	0.002	0.004	0.8
10237	2-Butanone	78-93-3	N.D.	0.003	0.009	0.8
10237	Carbon Disulfide	75-15-0	N.D.	0.0009	0.004	0.8
10237	Carbon Tetrachloride	56-23-5	N.D.	0.0009	0.004	0.8
10237	Chlorobenzene	108-90-7	N.D.	0.0009	0.004	0.8
10237	Chloroethane	75-00-3	N.D.	0.002	0.004	0.8
10237	Chloroform	67-66-3	N.D.	0.0009	0.004	0.8
10237	Chloromethane	74-87-3	N.D.	0.002	0.004	0.8
10237	Cyclohexane	110-82-7	0.019	0.0009	0.004	0.8
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.002	0.004	0.8
10237	Dibromochloromethane	124-48-1	N.D.	0.0009	0.004	0.8
10237	1,2-Dibromoethane	106-93-4	N.D.	0.0009	0.004	0.8
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.0009	0.004	0.8
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.0009	0.004	0.8
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.0009	0.004	0.8
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.002	0.004	0.8
10237	1,1-Dichloroethane	75-34-3	N.D.	0.0009	0.004	0.8
10237	1,2-Dichloroethane	107-06-2	N.D.	0.0009	0.004	0.8
10237	1,1-Dichloroethene	75-35-4	N.D.	0.0009	0.004	0.8
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.0009	0.004	0.8
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.0009	0.004	0.8
10237	1,2-Dichloropropane	78-87-5	N.D.	0.0009	0.004	0.8
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.0009	0.004	0.8
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.0009	0.004	0.8
10237	Ethylbenzene	100-41-4	N.D.	0.0009	0.004	0.8
10237	Freon 113	76-13-1	N.D.	0.002	0.009	0.8
10237	2-Hexanone	591-78-6	N.D.	0.003	0.009	0.8
10237	Isopropylbenzene	98-82-8	N.D.	0.0009	0.004	0.8
10237	Methyl Acetate	79-20-9	N.D.	0.002	0.004	0.8
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0004	0.004	0.8
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.003	0.009	0.8
10237	Methylcyclohexane	108-87-2	0.001 J	0.0009	0.004	0.8
10237	Methylene Chloride	75-09-2	N.D.	0.002	0.004	0.8
10237	Styrene	100-42-5	N.D.	0.0009	0.004	0.8
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.0009	0.004	0.8
10237	Tetrachloroethene	127-18-4	N.D.	0.0009	0.004	0.8
10237	Toluene	108-88-3	0.004 J	0.0009	0.004	0.8
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.0009	0.004	0.8
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.0009	0.004	0.8
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.0009	0.004	0.8
10237	Trichloroethene	79-01-6	N.D.	0.0009	0.004	0.8
10237	Trichlorofluoromethane	75-69-4	N.D.	0.002	0.004	0.8
10237	Vinyl Chloride	75-01-4	N.D.	0.0009	0.004	0.8
10237	Xylene (Total)	1330-20-7	0.005	0.0009	0.004	0.8

*=This limit was used in the evaluation of the final result

Sample Description: SB17-3-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177541
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:15 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1733L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	6.4	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 22:54	Stephen C Nolte	0.8
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 13:15	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 13:15	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177542
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-4-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.		8.5	24	1084.66
10237	Benzene	71-43-2	N.D.		0.61	6.1	1084.66
10237	Bromodichloromethane	75-27-4	N.D.		1.2	6.1	1084.66
10237	Bromoform	75-25-2	N.D.		1.2	6.1	1084.66
10237	Bromomethane	74-83-9	N.D.		2.4	6.1	1084.66
10237	2-Butanone	78-93-3	N.D.		4.9	12	1084.66
10237	Carbon Disulfide	75-15-0	N.D.		1.2	6.1	1084.66
10237	Carbon Tetrachloride	56-23-5	N.D.		1.2	6.1	1084.66
10237	Chlorobenzene	108-90-7	N.D.		1.2	6.1	1084.66
10237	Chloroethane	75-00-3	N.D.		2.4	6.1	1084.66
10237	Chloroform	67-66-3	N.D.		1.2	6.1	1084.66
10237	Chloromethane	74-87-3	N.D.		2.4	6.1	1084.66
10237	Cyclohexane	110-82-7	7.8		1.2	6.1	1084.66
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		2.4	6.1	1084.66
10237	Dibromochloromethane	124-48-1	N.D.		1.2	6.1	1084.66
10237	1,2-Dibromoethane	106-93-4	N.D.		1.2	6.1	1084.66
10237	1,2-Dichlorobenzene	95-50-1	N.D.		1.2	6.1	1084.66
10237	1,3-Dichlorobenzene	541-73-1	N.D.		1.2	6.1	1084.66
10237	1,4-Dichlorobenzene	106-46-7	N.D.		1.2	6.1	1084.66
10237	Dichlorodifluoromethane	75-71-8	N.D.		2.4	6.1	1084.66
10237	1,1-Dichloroethane	75-34-3	N.D.		1.2	6.1	1084.66
10237	1,2-Dichloroethane	107-06-2	N.D.		1.2	6.1	1084.66
10237	1,1-Dichloroethene	75-35-4	N.D.		1.2	6.1	1084.66
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		1.2	6.1	1084.66
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		1.2	6.1	1084.66
10237	1,2-Dichloropropane	78-87-5	N.D.		1.2	6.1	1084.66
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		1.2	6.1	1084.66
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		1.2	6.1	1084.66
10237	Ethylbenzene	100-41-4	3.1	J	1.2	6.1	1084.66
10237	Freon 113	76-13-1	N.D.		2.4	12	1084.66
10237	2-Hexanone	591-78-6	N.D.		3.6	12	1084.66
10237	Isopropylbenzene	98-82-8	15		1.2	6.1	1084.66
10237	Methyl Acetate	79-20-9	N.D.		2.4	6.1	1084.66
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.61	6.1	1084.66
10237	4-Methyl-2-pentanone	108-10-1	N.D.		3.6	12	1084.66
10237	Methylcyclohexane	108-87-2	100		1.2	6.1	1084.66
10237	Methylene Chloride	75-09-2	N.D.		2.4	6.1	1084.66
10237	Styrene	100-42-5	N.D.		1.2	6.1	1084.66
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		1.2	6.1	1084.66
10237	Tetrachloroethene	127-18-4	N.D.		1.2	6.1	1084.66
10237	Toluene	108-88-3	9.3		1.2	6.1	1084.66
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		1.2	6.1	1084.66
10237	1,1,1-Trichloroethane	71-55-6	N.D.		1.2	6.1	1084.66
10237	1,1,2-Trichloroethane	79-00-5	N.D.		1.2	6.1	1084.66
10237	Trichloroethene	79-01-6	N.D.		1.2	6.1	1084.66
10237	Trichlorofluoromethane	75-69-4	N.D.		2.4	6.1	1084.66
10237	Vinyl Chloride	75-01-4	N.D.		1.2	6.1	1084.66
10237	Xylene (Total)	1330-20-7	160		1.2	6.1	1084.66

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177542
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-4-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	Reporting limits were raised due to interference from the sample matrix. The low level soil sample could not be analyzed for Benzene due to the levels of target and/or non-target compounds.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	0.024	0.0022	0.0055	1
10725	Acenaphthylene	208-96-8	0.012	0.0011	0.0055	1
10725	Anthracene	120-12-7	0.015	0.0011	0.0055	1
10725	Benzo(a)anthracene	56-55-3	0.0053 J	0.0022	0.0055	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0022	0.0055	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0022	0.0055	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0022	0.0055	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0022	0.0055	1
10725	Chrysene	218-01-9	0.0039 J	0.0011	0.0055	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0022	0.0055	1
10725	Fluoranthene	206-44-0	0.018	0.0022	0.0055	1
10725	Fluorene	86-73-7	0.058	0.0022	0.0055	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0022	0.0055	1
10725	Naphthalene	91-20-3	20	0.11	0.27	50
10725	Phenanthrene	85-01-8	0.077	0.0022	0.0055	1
10725	Pyrene	129-00-0	0.016	0.0022	0.0055	1
	The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the TNI/DoD Standards. The following analytes are accepted based on this allowance: Benzo(a)pyrene					
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	5,500	270	2,700	12054.55
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	360	50	150	10
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	10.7	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177542
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:11 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-4-

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172434AA	09/01/2017 05:27	Jeremy C Giffin	1084.66
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 15:11	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/30/2017 23:37	William H Saadeh	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLA026	08/31/2017 00:07	William H Saadeh	50
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLA026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 22:26	Marie D Beamenderfer	12054.5 5
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 15:11	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 15:11	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/07/2017 21:02	Nicholas R Rossi	10
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177544
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:22 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-42

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.45	1.3	56.65
10237	Benzene	71-43-2	N.D.	0.032	0.32	56.65
10237	Bromodichloromethane	75-27-4	N.D.	0.064	0.32	56.65
10237	Bromoform	75-25-2	N.D.	0.064	0.32	56.65
10237	Bromomethane	74-83-9	N.D.	0.13	0.32	56.65
10237	2-Butanone	78-93-3	N.D.	0.26	0.64	56.65
10237	Carbon Disulfide	75-15-0	N.D.	0.064	0.32	56.65
10237	Carbon Tetrachloride	56-23-5	N.D.	0.064	0.32	56.65
10237	Chlorobenzene	108-90-7	N.D.	0.064	0.32	56.65
10237	Chloroethane	75-00-3	N.D.	0.13	0.32	56.65
10237	Chloroform	67-66-3	N.D.	0.064	0.32	56.65
10237	Chloromethane	74-87-3	N.D.	0.13	0.32	56.65
10237	Cyclohexane	110-82-7	N.D.	0.064	0.32	56.65
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.13	0.32	56.65
10237	Dibromochloromethane	124-48-1	N.D.	0.064	0.32	56.65
10237	1,2-Dibromoethane	106-93-4	N.D.	0.064	0.32	56.65
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.064	0.32	56.65
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.064	0.32	56.65
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.064	0.32	56.65
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.13	0.32	56.65
10237	1,1-Dichloroethane	75-34-3	N.D.	0.064	0.32	56.65
10237	1,2-Dichloroethane	107-06-2	N.D.	0.064	0.32	56.65
10237	1,1-Dichloroethene	75-35-4	N.D.	0.064	0.32	56.65
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.064	0.32	56.65
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.064	0.32	56.65
10237	1,2-Dichloropropane	78-87-5	N.D.	0.064	0.32	56.65
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.064	0.32	56.65
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.064	0.32	56.65
10237	Ethylbenzene	100-41-4	N.D.	0.064	0.32	56.65
10237	Freon 113	76-13-1	N.D.	0.13	0.64	56.65
10237	2-Hexanone	591-78-6	N.D.	0.19	0.64	56.65
10237	Isopropylbenzene	98-82-8	N.D.	0.064	0.32	56.65
10237	Methyl Acetate	79-20-9	N.D.	0.13	0.32	56.65
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.032	0.32	56.65
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.19	0.64	56.65
10237	Methylcyclohexane	108-87-2	N.D.	0.064	0.32	56.65
10237	Methylene Chloride	75-09-2	N.D.	0.13	0.32	56.65
10237	Styrene	100-42-5	N.D.	0.064	0.32	56.65
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.064	0.32	56.65
10237	Tetrachloroethene	127-18-4	N.D.	0.064	0.32	56.65
10237	Toluene	108-88-3	N.D.	0.064	0.32	56.65
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.064	0.32	56.65
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.064	0.32	56.65
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.064	0.32	56.65
10237	Trichloroethene	79-01-6	N.D.	0.064	0.32	56.65
10237	Trichlorofluoromethane	75-69-4	N.D.	0.13	0.32	56.65
10237	Vinyl Chloride	75-01-4	N.D.	0.064	0.32	56.65
10237	Xylene (Total)	1330-20-7	N.D.	0.064	0.32	56.65

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177544
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:22 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-42

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0022	0.0054	1
10725	Acenaphthylene	208-96-8	N.D.	0.0011	0.0054	1
10725	Anthracene	120-12-7	N.D.	0.0011	0.0054	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0022	0.0054	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0022	0.0054	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0022	0.0054	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0022	0.0054	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0022	0.0054	1
10725	Chrysene	218-01-9	N.D.	0.0011	0.0054	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0022	0.0054	1
10725	Fluoranthene	206-44-0	N.D.	0.0022	0.0054	1
10725	Fluorene	86-73-7	N.D.	0.0022	0.0054	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0022	0.0054	1
10725	Naphthalene	91-20-3	0.0060	0.0022	0.0054	1
10725	Phenanthrene	85-01-8	N.D.	0.0022	0.0054	1
10725	Pyrene	129-00-0	N.D.	0.0022	0.0054	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	3.0 J	0.6	6.5	28.66
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.	5.3	16	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	11.7	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177544
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:22 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-42

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 11:13	Jennifer K Howe	56.65
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 15:22	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 08:50	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 19:49	Marie D Beamenderfer	28.66
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 15:22	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 15:22	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 08:26	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177545
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:22 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1742L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.004	0.013	0.55
10237	Benzene	71-43-2	0.0006 J	0.0003	0.003	0.55
10237	Bromodichloromethane	75-27-4	N.D.	0.0006	0.003	0.55
10237	Bromoform	75-25-2	N.D.	0.0006	0.003	0.55
10237	Bromomethane	74-83-9	N.D.	0.001	0.003	0.55
10237	2-Butanone	78-93-3	N.D.	0.003	0.006	0.55
10237	Carbon Disulfide	75-15-0	0.001 J	0.0006	0.003	0.55
10237	Carbon Tetrachloride	56-23-5	N.D.	0.0006	0.003	0.55
10237	Chlorobenzene	108-90-7	N.D.	0.0006	0.003	0.55
10237	Chloroethane	75-00-3	N.D.	0.001	0.003	0.55
10237	Chloroform	67-66-3	N.D.	0.0006	0.003	0.55
10237	Chloromethane	74-87-3	N.D.	0.001	0.003	0.55
10237	Cyclohexane	110-82-7	N.D.	0.0006	0.003	0.55
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.001	0.003	0.55
10237	Dibromochloromethane	124-48-1	N.D.	0.0006	0.003	0.55
10237	1,2-Dibromoethane	106-93-4	N.D.	0.0006	0.003	0.55
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.0006	0.003	0.55
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.0006	0.003	0.55
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.0006	0.003	0.55
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.001	0.003	0.55
10237	1,1-Dichloroethane	75-34-3	N.D.	0.0006	0.003	0.55
10237	1,2-Dichloroethane	107-06-2	N.D.	0.0006	0.003	0.55
10237	1,1-Dichloroethene	75-35-4	N.D.	0.0006	0.003	0.55
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.0006	0.003	0.55
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.0006	0.003	0.55
10237	1,2-Dichloropropane	78-87-5	N.D.	0.0006	0.003	0.55
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.0006	0.003	0.55
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.0006	0.003	0.55
10237	Ethylbenzene	100-41-4	0.0009 J	0.0006	0.003	0.55
10237	Freon 113	76-13-1	N.D.	0.001	0.006	0.55
10237	2-Hexanone	591-78-6	N.D.	0.002	0.006	0.55
10237	Isopropylbenzene	98-82-8	N.D.	0.0006	0.003	0.55
10237	Methyl Acetate	79-20-9	N.D.	0.001	0.003	0.55
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0003	0.003	0.55
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.002	0.006	0.55
10237	Methylcyclohexane	108-87-2	0.007	0.0006	0.003	0.55
10237	Methylene Chloride	75-09-2	N.D.	0.001	0.003	0.55
10237	Styrene	100-42-5	N.D.	0.0006	0.003	0.55
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.0006	0.003	0.55
10237	Tetrachloroethene	127-18-4	N.D.	0.0006	0.003	0.55
10237	Toluene	108-88-3	0.002 J	0.0006	0.003	0.55
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.0006	0.003	0.55
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.0006	0.003	0.55
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.0006	0.003	0.55
10237	Trichloroethene	79-01-6	N.D.	0.0006	0.003	0.55
10237	Trichlorofluoromethane	75-69-4	N.D.	0.001	0.003	0.55
10237	Vinyl Chloride	75-01-4	N.D.	0.0006	0.003	0.55
10237	Xylene (Total)	1330-20-7	0.012	0.0006	0.003	0.55

*=This limit was used in the evaluation of the final result

Sample Description: SB17-4-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177545
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 15:22 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1742L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	11.7	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 23:17	Stephen C Nolte	0.55
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 15:22	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 15:22	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: DUP-1-S-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177546
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-D1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.37	1.1	50.77
10237	Benzene	71-43-2	N.D.	0.026	0.26	50.77
10237	Bromodichloromethane	75-27-4	N.D.	0.053	0.26	50.77
10237	Bromoform	75-25-2	N.D.	0.053	0.26	50.77
10237	Bromomethane	74-83-9	N.D.	0.11	0.26	50.77
10237	2-Butanone	78-93-3	N.D.	0.21	0.53	50.77
10237	Carbon Disulfide	75-15-0	N.D.	0.053	0.26	50.77
10237	Carbon Tetrachloride	56-23-5	N.D.	0.053	0.26	50.77
10237	Chlorobenzene	108-90-7	N.D.	0.053	0.26	50.77
10237	Chloroethane	75-00-3	N.D.	0.11	0.26	50.77
10237	Chloroform	67-66-3	N.D.	0.053	0.26	50.77
10237	Chloromethane	74-87-3	N.D.	0.11	0.26	50.77
10237	Cyclohexane	110-82-7	N.D.	0.053	0.26	50.77
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.11	0.26	50.77
10237	Dibromochloromethane	124-48-1	N.D.	0.053	0.26	50.77
10237	1,2-Dibromoethane	106-93-4	N.D.	0.053	0.26	50.77
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.053	0.26	50.77
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.053	0.26	50.77
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.053	0.26	50.77
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.11	0.26	50.77
10237	1,1-Dichloroethane	75-34-3	N.D.	0.053	0.26	50.77
10237	1,2-Dichloroethane	107-06-2	N.D.	0.053	0.26	50.77
10237	1,1-Dichloroethene	75-35-4	N.D.	0.053	0.26	50.77
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.053	0.26	50.77
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.053	0.26	50.77
10237	1,2-Dichloropropane	78-87-5	N.D.	0.053	0.26	50.77
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.053	0.26	50.77
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.053	0.26	50.77
10237	Ethylbenzene	100-41-4	N.D.	0.053	0.26	50.77
10237	Freon 113	76-13-1	N.D.	0.11	0.53	50.77
10237	2-Hexanone	591-78-6	N.D.	0.16	0.53	50.77
10237	Isopropylbenzene	98-82-8	N.D.	0.053	0.26	50.77
10237	Methyl Acetate	79-20-9	N.D.	0.11	0.26	50.77
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.026	0.26	50.77
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.16	0.53	50.77
10237	Methylcyclohexane	108-87-2	N.D.	0.053	0.26	50.77
10237	Methylene Chloride	75-09-2	N.D.	0.11	0.26	50.77
10237	Styrene	100-42-5	N.D.	0.053	0.26	50.77
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.053	0.26	50.77
10237	Tetrachloroethene	127-18-4	N.D.	0.053	0.26	50.77
10237	Toluene	108-88-3	N.D.	0.053	0.26	50.77
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.053	0.26	50.77
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.053	0.26	50.77
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.053	0.26	50.77
10237	Trichloroethene	79-01-6	N.D.	0.053	0.26	50.77
10237	Trichlorofluoromethane	75-69-4	N.D.	0.11	0.26	50.77
10237	Vinyl Chloride	75-01-4	N.D.	0.053	0.26	50.77
10237	Xylene (Total)	1330-20-7	N.D.	0.053	0.26	50.77

*=This limit was used in the evaluation of the final result

Sample Description: DUP-1-S-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177546
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-D1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0020	0.0050	1
10725	Acenaphthylene	208-96-8	N.D.	0.0010	0.0050	1
10725	Anthracene	120-12-7	N.D.	0.0010	0.0050	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0020	0.0050	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0020	0.0050	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0020	0.0050	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0020	0.0050	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0020	0.0050	1
10725	Chrysene	218-01-9	N.D.	0.0010	0.0050	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0020	0.0050	1
10725	Fluoranthene	206-44-0	N.D.	0.0020	0.0050	1
10725	Fluorene	86-73-7	N.D.	0.0020	0.0050	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0020	0.0050	1
10725	Naphthalene	91-20-3	0.0042 J	0.0020	0.0050	1
10725	Phenanthrene	85-01-8	N.D.	0.0020	0.0050	1
10725	Pyrene	129-00-0	N.D.	0.0020	0.0050	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	0.9 J	0.6	5.7	27.39
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.	4.4	13	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	3.6	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: DUP-1-S-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177546
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-D1

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 11:36	Jennifer K Howe	50.77
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146838	08/24/2017 00:00	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 09:20	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 15:13	Marie D Beamenderfer	27.39
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146838	08/24/2017 00:00	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146838	08/24/2017 00:00	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 08:54	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: DUP-1-S-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177547
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17D1L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	0.006 J	0.006	0.017	0.82
10237	Benzene	71-43-2	0.003 J	0.0004	0.004	0.82
10237	Bromodichloromethane	75-27-4	N.D.	0.0009	0.004	0.82
10237	Bromoform	75-25-2	N.D.	0.0009	0.004	0.82
10237	Bromomethane	74-83-9	N.D.	0.002	0.004	0.82
10237	2-Butanone	78-93-3	N.D.	0.003	0.009	0.82
10237	Carbon Disulfide	75-15-0	N.D.	0.0009	0.004	0.82
10237	Carbon Tetrachloride	56-23-5	N.D.	0.0009	0.004	0.82
10237	Chlorobenzene	108-90-7	N.D.	0.0009	0.004	0.82
10237	Chloroethane	75-00-3	N.D.	0.002	0.004	0.82
10237	Chloroform	67-66-3	N.D.	0.0009	0.004	0.82
10237	Chloromethane	74-87-3	N.D.	0.002	0.004	0.82
10237	Cyclohexane	110-82-7	0.002 J	0.0009	0.004	0.82
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.002	0.004	0.82
10237	Dibromochloromethane	124-48-1	N.D.	0.0009	0.004	0.82
10237	1,2-Dibromoethane	106-93-4	N.D.	0.0009	0.004	0.82
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.0009	0.004	0.82
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.0009	0.004	0.82
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.0009	0.004	0.82
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.002	0.004	0.82
10237	1,1-Dichloroethane	75-34-3	N.D.	0.0009	0.004	0.82
10237	1,2-Dichloroethane	107-06-2	N.D.	0.0009	0.004	0.82
10237	1,1-Dichloroethene	75-35-4	N.D.	0.0009	0.004	0.82
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.0009	0.004	0.82
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.0009	0.004	0.82
10237	1,2-Dichloropropane	78-87-5	N.D.	0.0009	0.004	0.82
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.0009	0.004	0.82
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.0009	0.004	0.82
10237	Ethylbenzene	100-41-4	0.002 J	0.0009	0.004	0.82
10237	Freon 113	76-13-1	N.D.	0.002	0.009	0.82
10237	2-Hexanone	591-78-6	N.D.	0.003	0.009	0.82
10237	Isopropylbenzene	98-82-8	N.D.	0.0009	0.004	0.82
10237	Methyl Acetate	79-20-9	N.D.	0.002	0.004	0.82
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0004	0.004	0.82
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.003	0.009	0.82
10237	Methylcyclohexane	108-87-2	0.001 J	0.0009	0.004	0.82
10237	Methylene Chloride	75-09-2	N.D.	0.002	0.004	0.82
10237	Styrene	100-42-5	N.D.	0.0009	0.004	0.82
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.0009	0.004	0.82
10237	Tetrachloroethene	127-18-4	N.D.	0.0009	0.004	0.82
10237	Toluene	108-88-3	0.012	0.0009	0.004	0.82
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.0009	0.004	0.82
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.0009	0.004	0.82
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.0009	0.004	0.82
10237	Trichloroethene	79-01-6	N.D.	0.0009	0.004	0.82
10237	Trichlorofluoromethane	75-69-4	N.D.	0.002	0.004	0.82
10237	Vinyl Chloride	75-01-4	N.D.	0.0009	0.004	0.82
10237	Xylene (Total)	1330-20-7	0.014	0.0009	0.004	0.82

*=This limit was used in the evaluation of the final result

Sample Description: DUP-1-S-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177547
ELLE Group # 1843003
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:44

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17D1L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	3.6	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/03/2017 23:41	Stephen C Nolte	0.82
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146843	08/24/2017 00:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146843	08/24/2017 00:00	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Batch number: R172434AA	Sample number(s): 9177528,9177530,9177534,9177536,9177538,9177540,9177542		
Acetone	N.D.	0.35	1.0
Benzene	N.D.	0.025	0.25
Bromodichloromethane	N.D.	0.050	0.25
Bromoform	N.D.	0.050	0.25
Bromomethane	N.D.	0.10	0.25
2-Butanone	N.D.	0.20	0.50
Carbon Disulfide	N.D.	0.050	0.25
Carbon Tetrachloride	N.D.	0.050	0.25
Chlorobenzene	N.D.	0.050	0.25
Chloroethane	N.D.	0.10	0.25
Chloroform	N.D.	0.050	0.25
Chloromethane	N.D.	0.10	0.25
Cyclohexane	N.D.	0.050	0.25
1,2-Dibromo-3-chloropropane	N.D.	0.10	0.25
Dibromochloromethane	N.D.	0.050	0.25
1,2-Dibromoethane	N.D.	0.050	0.25
1,2-Dichlorobenzene	N.D.	0.050	0.25
1,3-Dichlorobenzene	N.D.	0.050	0.25
1,4-Dichlorobenzene	N.D.	0.050	0.25
Dichlorodifluoromethane	N.D.	0.10	0.25
1,1-Dichloroethane	N.D.	0.050	0.25
1,2-Dichloroethane	N.D.	0.050	0.25
1,1-Dichloroethene	N.D.	0.050	0.25
cis-1,2-Dichloroethene	N.D.	0.050	0.25
trans-1,2-Dichloroethene	N.D.	0.050	0.25
1,2-Dichloropropane	N.D.	0.050	0.25
cis-1,3-Dichloropropene	N.D.	0.050	0.25
trans-1,3-Dichloropropene	N.D.	0.050	0.25
Ethylbenzene	N.D.	0.050	0.25
Freon 113	N.D.	0.10	0.50
2-Hexanone	N.D.	0.15	0.50
Isopropylbenzene	N.D.	0.050	0.25
Methyl Acetate	N.D.	0.10	0.25
Methyl Tertiary Butyl Ether	N.D.	0.025	0.25
4-Methyl-2-pentanone	N.D.	0.15	0.50
Methylcyclohexane	N.D.	0.050	0.25
Methylene Chloride	N.D.	0.10	0.25
Styrene	N.D.	0.050	0.25
1,1,2,2-Tetrachloroethane	N.D.	0.050	0.25
Tetrachloroethene	N.D.	0.050	0.25

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Toluene	N.D.	0.050	0.25
1,2,4-Trichlorobenzene	N.D.	0.050	0.25
1,1,1-Trichloroethane	N.D.	0.050	0.25
1,1,2-Trichloroethane	N.D.	0.050	0.25
Trichloroethene	N.D.	0.050	0.25
Trichlorofluoromethane	N.D.	0.10	0.25
Vinyl Chloride	N.D.	0.050	0.25
Xylene (Total)	N.D.	0.050	0.25
Batch number: R172441AA	Sample number(s): 9177544,9177546		
Acetone	N.D.	0.35	1.0
Benzene	N.D.	0.025	0.25
Bromodichloromethane	N.D.	0.050	0.25
Bromoform	N.D.	0.050	0.25
Bromomethane	N.D.	0.10	0.25
2-Butanone	N.D.	0.20	0.50
Carbon Disulfide	N.D.	0.050	0.25
Carbon Tetrachloride	N.D.	0.050	0.25
Chlorobenzene	N.D.	0.050	0.25
Chloroethane	N.D.	0.10	0.25
Chloroform	N.D.	0.050	0.25
Chloromethane	N.D.	0.10	0.25
Cyclohexane	N.D.	0.050	0.25
1,2-Dibromo-3-chloropropane	N.D.	0.10	0.25
Dibromochloromethane	N.D.	0.050	0.25
1,2-Dibromoethane	N.D.	0.050	0.25
1,2-Dichlorobenzene	N.D.	0.050	0.25
1,3-Dichlorobenzene	N.D.	0.050	0.25
1,4-Dichlorobenzene	N.D.	0.050	0.25
Dichlorodifluoromethane	N.D.	0.10	0.25
1,1-Dichloroethane	N.D.	0.050	0.25
1,2-Dichloroethane	N.D.	0.050	0.25
1,1-Dichloroethene	N.D.	0.050	0.25
cis-1,2-Dichloroethene	N.D.	0.050	0.25
trans-1,2-Dichloroethene	N.D.	0.050	0.25
1,2-Dichloropropane	N.D.	0.050	0.25
cis-1,3-Dichloropropene	N.D.	0.050	0.25
trans-1,3-Dichloropropene	N.D.	0.050	0.25
Ethylbenzene	N.D.	0.050	0.25
Freon 113	N.D.	0.10	0.50
2-Hexanone	N.D.	0.15	0.50
Isopropylbenzene	N.D.	0.050	0.25
Methyl Acetate	N.D.	0.10	0.25
Methyl Tertiary Butyl Ether	N.D.	0.025	0.25
4-Methyl-2-pentanone	N.D.	0.15	0.50
Methylcyclohexane	N.D.	0.050	0.25
Methylene Chloride	N.D.	0.10	0.25
Styrene	N.D.	0.050	0.25
1,1,2,2-Tetrachloroethane	N.D.	0.050	0.25

*- Outside of specification
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(2) The unspiked result was more than four times the spike added.
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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Tetrachloroethene	N.D.	0.050	0.25
Toluene	N.D.	0.050	0.25
1,2,4-Trichlorobenzene	N.D.	0.050	0.25
1,1,1-Trichloroethane	N.D.	0.050	0.25
1,1,2-Trichloroethane	N.D.	0.050	0.25
Trichloroethene	N.D.	0.050	0.25
Trichlorofluoromethane	N.D.	0.10	0.25
Vinyl Chloride	N.D.	0.050	0.25
Xylene (Total)	N.D.	0.050	0.25
Batch number: R172501AA	Sample number(s): 9177532		
Acetone	N.D.	0.35	1.0
Benzene	N.D.	0.025	0.25
Bromodichloromethane	N.D.	0.050	0.25
Bromoform	N.D.	0.050	0.25
Bromomethane	N.D.	0.10	0.25
2-Butanone	N.D.	0.20	0.50
Carbon Disulfide	N.D.	0.050	0.25
Carbon Tetrachloride	N.D.	0.050	0.25
Chlorobenzene	N.D.	0.050	0.25
Chloroethane	N.D.	0.10	0.25
Chloroform	N.D.	0.050	0.25
Chloromethane	N.D.	0.10	0.25
Cyclohexane	N.D.	0.050	0.25
1,2-Dibromo-3-chloropropane	N.D.	0.10	0.25
Dibromochloromethane	N.D.	0.050	0.25
1,2-Dibromoethane	N.D.	0.050	0.25
1,2-Dichlorobenzene	N.D.	0.050	0.25
1,3-Dichlorobenzene	N.D.	0.050	0.25
1,4-Dichlorobenzene	N.D.	0.050	0.25
Dichlorodifluoromethane	N.D.	0.10	0.25
1,1-Dichloroethane	N.D.	0.050	0.25
1,2-Dichloroethane	N.D.	0.050	0.25
1,1-Dichloroethene	N.D.	0.050	0.25
cis-1,2-Dichloroethene	N.D.	0.050	0.25
trans-1,2-Dichloroethene	N.D.	0.050	0.25
1,2-Dichloropropane	N.D.	0.050	0.25
cis-1,3-Dichloropropene	N.D.	0.050	0.25
trans-1,3-Dichloropropene	N.D.	0.050	0.25
Ethylbenzene	N.D.	0.050	0.25
Freon 113	N.D.	0.10	0.50
2-Hexanone	N.D.	0.15	0.50
Isopropylbenzene	N.D.	0.050	0.25
Methyl Acetate	N.D.	0.10	0.25
Methyl Tertiary Butyl Ether	N.D.	0.025	0.25
4-Methyl-2-pentanone	N.D.	0.15	0.50
Methylcyclohexane	N.D.	0.050	0.25
Methylene Chloride	N.D.	0.10	0.25
Styrene	N.D.	0.050	0.25

*- Outside of specification
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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
1,1,2,2-Tetrachloroethane	N.D.	0.050	0.25
Tetrachloroethene	N.D.	0.050	0.25
Toluene	N.D.	0.050	0.25
1,2,4-Trichlorobenzene	N.D.	0.050	0.25
1,1,1-Trichloroethane	N.D.	0.050	0.25
1,1,2-Trichloroethane	N.D.	0.050	0.25
Trichloroethene	N.D.	0.050	0.25
Trichlorofluoromethane	N.D.	0.10	0.25
Vinyl Chloride	N.D.	0.050	0.25
Xylene (Total)	N.D.	0.050	0.25
Batch number: X172461AA	Sample number(s): 9177529,9177531,9177535,9177537,9177539,9177541,9177545,9177547		
Acetone	N.D.	0.007	0.020
Benzene	N.D.	0.0005	0.005
Bromodichloromethane	N.D.	0.001	0.005
Bromoform	N.D.	0.001	0.005
Bromomethane	N.D.	0.002	0.005
2-Butanone	N.D.	0.004	0.010
Carbon Disulfide	N.D.	0.001	0.005
Carbon Tetrachloride	N.D.	0.001	0.005
Chlorobenzene	N.D.	0.001	0.005
Chloroethane	N.D.	0.002	0.005
Chloroform	N.D.	0.001	0.005
Chloromethane	N.D.	0.002	0.005
Cyclohexane	N.D.	0.001	0.005
1,2-Dibromo-3-chloropropane	N.D.	0.002	0.005
Dibromochloromethane	N.D.	0.001	0.005
1,2-Dibromoethane	N.D.	0.001	0.005
1,2-Dichlorobenzene	N.D.	0.001	0.005
1,3-Dichlorobenzene	N.D.	0.001	0.005
1,4-Dichlorobenzene	N.D.	0.001	0.005
Dichlorodifluoromethane	N.D.	0.002	0.005
1,1-Dichloroethane	N.D.	0.001	0.005
1,2-Dichloroethane	N.D.	0.001	0.005
1,1-Dichloroethene	N.D.	0.001	0.005
cis-1,2-Dichloroethene	N.D.	0.001	0.005
trans-1,2-Dichloroethene	N.D.	0.001	0.005
1,2-Dichloropropane	N.D.	0.001	0.005
cis-1,3-Dichloropropene	N.D.	0.001	0.005
trans-1,3-Dichloropropene	N.D.	0.001	0.005
Ethylbenzene	N.D.	0.001	0.005
Freon 113	N.D.	0.002	0.010
2-Hexanone	N.D.	0.003	0.010
Isopropylbenzene	N.D.	0.001	0.005
Methyl Acetate	N.D.	0.002	0.005
Methyl Tertiary Butyl Ether	N.D.	0.0005	0.005
4-Methyl-2-pentanone	N.D.	0.003	0.010
Methylcyclohexane	N.D.	0.001	0.005
Methylene Chloride	N.D.	0.002	0.005

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Styrene	N.D.	0.001	0.005
1,1,2,2-Tetrachloroethane	N.D.	0.001	0.005
Tetrachloroethene	N.D.	0.001	0.005
Toluene	N.D.	0.001	0.005
1,2,4-Trichlorobenzene	N.D.	0.001	0.005
1,1,1-Trichloroethane	N.D.	0.001	0.005
1,1,2-Trichloroethane	N.D.	0.001	0.005
Trichloroethene	N.D.	0.001	0.005
Trichlorofluoromethane	N.D.	0.002	0.005
Vinyl Chloride	N.D.	0.001	0.005
Xylene (Total)	N.D.	0.001	0.005
Batch number: 17241SLA026	Sample number(s): 9177528,9177530,9177532,9177534,9177536,9177538,9177540,9177542		
Acenaphthene	N.D.	0.00067	0.0017
Acenaphthylene	N.D.	0.00033	0.0017
Anthracene	N.D.	0.00033	0.0017
Benzo(a)anthracene	N.D.	0.00067	0.0017
Benzo(a)pyrene	N.D.	0.00067	0.0017
Benzo(b)fluoranthene	N.D.	0.00067	0.0017
Benzo(g,h,i)perylene	N.D.	0.00067	0.0017
Benzo(k)fluoranthene	N.D.	0.00067	0.0017
Chrysene	N.D.	0.00033	0.0017
Dibenz(a,h)anthracene	N.D.	0.00067	0.0017
Fluoranthene	N.D.	0.00067	0.0017
Fluorene	N.D.	0.00067	0.0017
Indeno(1,2,3-cd)pyrene	N.D.	0.00067	0.0017
Naphthalene	N.D.	0.00067	0.0017
Phenanthrene	N.D.	0.00067	0.0017
Pyrene	N.D.	0.00067	0.0017
Batch number: 17241SLB026	Sample number(s): 9177544,9177546		
Acenaphthene	N.D.	0.00067	0.0017
Acenaphthylene	N.D.	0.00033	0.0017
Anthracene	N.D.	0.00033	0.0017
Benzo(a)anthracene	N.D.	0.00067	0.0017
Benzo(a)pyrene	N.D.	0.00067	0.0017
Benzo(b)fluoranthene	N.D.	0.00067	0.0017
Benzo(g,h,i)perylene	N.D.	0.00067	0.0017
Benzo(k)fluoranthene	N.D.	0.00067	0.0017
Chrysene	N.D.	0.00033	0.0017
Dibenz(a,h)anthracene	N.D.	0.00067	0.0017
Fluoranthene	N.D.	0.00067	0.0017
Fluorene	N.D.	0.00067	0.0017
Indeno(1,2,3-cd)pyrene	N.D.	0.00067	0.0017
Naphthalene	N.D.	0.00067	0.0017
Phenanthrene	N.D.	0.00067	0.0017
Pyrene	N.D.	0.00067	0.0017
Batch number: 17243A34A	Sample number(s): 9177528,9177530,9177534,9177536,9177538,9177540,9177542,9177544,9177546		

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
TPH-GRO AK soil C6-C10	N.D.	0.5	5.0
Batch number: 17243A34B	Sample number(s): 9177532		
TPH-GRO AK soil C6-C10	N.D.	0.5	5.0
Batch number: 172440004A	Sample number(s): 9177528,9177530,9177532,9177534,9177536,9177538,9177540,9177542,9177544,9177546		
TPH-DRO AK soil C10-C25	N.D.	4.0	12

LCS/LCSD

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: R172434AA	Sample number(s): 9177528,9177530,9177534,9177536,9177538,9177540,9177542								
Acetone	7.50	7.57	7.50	8.00	101	107	32-144	6	30
Benzene	1.00	1.01	1.00	1.02	101	102	80-120	1	30
Bromodichloromethane	1.00	0.909	1.00	0.963	91	96	70-120	6	30
Bromoform	1.00	0.847	1.00	0.885	85	88	54-120	4	30
Bromomethane	1.00	1.09	1.00	1.04	109	104	31-160	5	30
2-Butanone	7.50	8.79	7.50	9.03	117	120	49-128	3	30
Carbon Disulfide	1.00	0.899	1.00	0.890	90	89	60-128	1	30
Carbon Tetrachloride	1.00	0.781	1.00	0.808	78	81	62-129	4	30
Chlorobenzene	1.00	0.958	1.00	0.980	96	98	80-120	2	30
Chloroethane	1.00	1.13	1.00	1.11	113	111	43-137	2	30
Chloroform	1.00	0.927	1.00	0.946	93	95	80-120	2	30
Chloromethane	1.00	1.04	1.00	1.03	104	103	56-120	1	30
Cyclohexane	1.00	0.853	1.00	0.895	85	89	58-126	5	30
1,2-Dibromo-3-chloropropane	1.00	0.777	1.00	0.880	78	88	47-126	12	30
Dibromochloromethane	1.00	0.864	1.00	0.910	86	91	65-120	5	30
1,2-Dibromoethane	1.00	0.953	1.00	1.00	95	100	74-120	5	30
1,2-Dichlorobenzene	1.00	0.972	1.00	1.07	97	107	80-120	10	30
1,3-Dichlorobenzene	1.00	0.985	1.00	1.06	99	106	80-120	8	30
1,4-Dichlorobenzene	1.00	0.999	1.00	1.07	100	107	80-120	7	30
Dichlorodifluoromethane	1.00	0.736	1.00	0.760	74	76	10-133	3	30
1,1-Dichloroethane	1.00	0.984	1.00	1.00	98	100	77-120	2	30
1,2-Dichloroethane	1.00	0.952	1.00	0.953	95	95	71-128	0	30
1,1-Dichloroethene	1.00	1.01	1.00	1.04	101	104	73-129	3	30
cis-1,2-Dichloroethene	1.00	1.03	1.00	1.05	103	105	80-120	2	30
trans-1,2-Dichloroethene	1.00	1.02	1.00	1.07	102	107	80-125	4	30
1,2-Dichloropropane	1.00	0.981	1.00	1.02	98	102	76-120	4	30
cis-1,3-Dichloropropene	1.00	0.877	1.00	0.915	88	91	66-120	4	30
trans-1,3-Dichloropropene	1.00	0.927	1.00	0.949	93	95	63-124	2	30
Ethylbenzene	1.00	0.928	1.00	0.954	93	95	80-120	3	30
Freon 113	1.00	0.912	1.00	0.957	91	96	59-139	5	30
2-Hexanone	5.00	5.59	5.00	5.79	112	116	51-131	3	30

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Isopropylbenzene	1.00	0.845	1.00	0.887	85	89	76-120	5	30
Methyl Acetate	1.00	1.07	1.00	1.06	107	106	54-146	0	30
Methyl Tertiary Butyl Ether	1.00	0.890	1.00	0.937	89	94	66-123	5	30
4-Methyl-2-pentanone	5.00	5.27	5.00	5.57	105	111	53-134	6	30
Methylcyclohexane	1.00	0.830	1.00	0.887	83	89	61-124	7	30
Methylene Chloride	1.00	1.02	1.00	1.03	102	103	76-122	2	30
Styrene	1.00	0.969	1.00	0.976	97	98	76-120	1	30
1,1,2,2-Tetrachloroethane	1.00	1.06	1.00	1.14	106	114	61-131	8	30
Tetrachloroethene	1.00	0.904	1.00	0.945	90	94	73-120	4	30
Toluene	1.00	0.983	1.00	1.02	98	102	80-120	3	30
1,2,4-Trichlorobenzene	1.00	0.818	1.00	0.968	82	97	62-127	17	30
1,1,1-Trichloroethane	1.00	0.805	1.00	0.841	80	84	61-125	4	30
1,1,2-Trichloroethane	1.00	1.04	1.00	1.06	104	106	80-120	1	30
Trichloroethene	1.00	0.918	1.00	0.948	92	95	80-120	3	30
Trichlorofluoromethane	1.00	0.906	1.00	0.913	91	91	47-132	1	30
Vinyl Chloride	1.00	0.998	1.00	0.994	100	99	59-120	0	30
Xylene (Total)	3.00	2.77	3.00	2.83	92	94	80-120	2	30
Batch number: R172441AA	Sample number(s): 9177544,9177546								
Acetone	7.50	6.36	7.50	6.69	85	89	32-144	5	30
Benzene	1.00	0.979	1.00	0.996	98	100	80-120	2	30
Bromodichloromethane	1.00	0.876	1.00	0.892	88	89	70-120	2	30
Bromoform	1.00	0.841	1.00	0.865	84	86	54-120	3	30
Bromomethane	1.00	0.982	1.00	0.922	98	92	31-160	6	30
2-Butanone	7.50	7.97	7.50	7.78	106	104	49-128	2	30
Carbon Disulfide	1.00	0.813	1.00	0.804	81	80	60-128	1	30
Carbon Tetrachloride	1.00	0.746	1.00	0.763	75	76	62-129	2	30
Chlorobenzene	1.00	0.937	1.00	0.957	94	96	80-120	2	30
Chloroethane	1.00	1.13	1.00	0.988	113	99	43-137	13	30
Chloroform	1.00	0.931	1.00	0.923	93	92	80-120	1	30
Chloromethane	1.00	0.968	1.00	0.962	97	96	56-120	1	30
Cyclohexane	1.00	0.815	1.00	0.813	81	81	58-126	0	30
1,2-Dibromo-3-chloropropane	1.00	0.784	1.00	0.818	78	82	47-126	4	30
Dibromochloromethane	1.00	0.855	1.00	0.879	85	88	65-120	3	30
1,2-Dibromoethane	1.00	0.927	1.00	0.946	93	95	74-120	2	30
1,2-Dichlorobenzene	1.00	1.00	1.00	1.03	100	103	80-120	3	30
1,3-Dichlorobenzene	1.00	0.983	1.00	1.02	98	102	80-120	4	30
1,4-Dichlorobenzene	1.00	1.02	1.00	1.04	102	104	80-120	2	30
Dichlorodifluoromethane	1.00	0.603	1.00	0.578	60	58	10-133	4	30
1,1-Dichloroethane	1.00	0.960	1.00	0.959	96	96	77-120	0	30
1,2-Dichloroethane	1.00	0.932	1.00	0.942	93	94	71-128	1	30
1,1-Dichloroethene	1.00	0.958	1.00	0.970	96	97	73-129	1	30
cis-1,2-Dichloroethene	1.00	1.01	1.00	1.02	101	102	80-120	1	30
trans-1,2-Dichloroethene	1.00	1.02	1.00	0.997	102	100	80-125	2	30
1,2-Dichloropropane	1.00	0.939	1.00	0.955	94	95	76-120	2	30
cis-1,3-Dichloropropene	1.00	0.867	1.00	0.880	87	88	66-120	1	30
trans-1,3-Dichloropropene	1.00	0.890	1.00	0.898	89	90	63-124	1	30
Ethylbenzene	1.00	0.898	1.00	0.917	90	92	80-120	2	30

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Freon 113	1.00	0.759	1.00	0.814	76	81	59-139	7	30
2-Hexanone	5.00	5.32	5.00	5.43	106	109	51-131	2	30
Isopropylbenzene	1.00	0.825	1.00	0.819	83	82	76-120	1	30
Methyl Acetate	1.00	1.05	1.00	1.02	105	102	54-146	3	30
Methyl Tertiary Butyl Ether	1.00	0.875	1.00	0.871	87	87	66-123	0	30
4-Methyl-2-pentanone	5.00	5.29	5.00	5.22	106	104	53-134	1	30
Methylcyclohexane	1.00	0.714	1.00	0.722	71	72	61-124	1	30
Methylene Chloride	1.00	1.01	1.00	0.997	101	100	76-122	2	30
Styrene	1.00	0.929	1.00	0.947	93	95	76-120	2	30
1,1,2,2-Tetrachloroethane	1.00	1.05	1.00	1.08	105	108	61-131	3	30
Tetrachloroethene	1.00	0.886	1.00	0.888	89	89	73-120	0	30
Toluene	1.00	0.940	1.00	0.961	94	96	80-120	2	30
1,2,4-Trichlorobenzene	1.00	0.804	1.00	0.880	80	88	62-127	9	30
1,1,1-Trichloroethane	1.00	0.800	1.00	0.788	80	79	61-125	2	30
1,1,2-Trichloroethane	1.00	1.01	1.00	1.01	101	101	80-120	0	30
Trichloroethene	1.00	0.899	1.00	0.913	90	91	80-120	2	30
Trichlorofluoromethane	1.00	0.816	1.00	0.816	82	82	47-132	0	30
Vinyl Chloride	1.00	0.925	1.00	0.900	92	90	59-120	3	30
Xylene (Total)	3.00	2.66	3.00	2.71	89	90	80-120	2	30
Batch number: R172501AA	Sample number(s): 9177532								
Acetone	7.50	7.94	7.50	7.72	106	103	32-144	3	30
Benzene	1.00	1.04	1.00	1.04	104	104	80-120	0	30
Bromodichloromethane	1.00	0.950	1.00	0.980	95	98	70-120	3	30
Bromoform	1.00	0.835	1.00	0.839	84	84	54-120	1	30
Bromomethane	1.00	0.854	1.00	0.921	85	92	31-160	7	30
2-Butanone	7.50	7.66	7.50	7.65	102	102	49-128	0	30
Carbon Disulfide	1.00	0.847	1.00	0.944	85	94	60-128	11	30
Carbon Tetrachloride	1.00	0.827	1.00	0.819	83	82	62-129	1	30
Chlorobenzene	1.00	0.898	1.00	0.901	90	90	80-120	0	30
Chloroethane	1.00	0.875	1.00	0.936	88	94	43-137	7	30
Chloroform	1.00	0.974	1.00	0.956	97	96	80-120	2	30
Chloromethane	1.00	1.04	1.00	1.01	104	101	56-120	3	30
Cyclohexane	1.00	0.877	1.00	0.869	88	87	58-126	1	30
1,2-Dibromo-3-chloropropane	1.00	0.762	1.00	0.786	76	79	47-126	3	30
Dibromochloromethane	1.00	0.829	1.00	0.864	83	86	65-120	4	30
1,2-Dibromoethane	1.00	0.876	1.00	0.914	88	91	74-120	4	30
1,2-Dichlorobenzene	1.00	0.930	1.00	0.941	93	94	80-120	1	30
1,3-Dichlorobenzene	1.00	0.944	1.00	0.934	94	93	80-120	1	30
1,4-Dichlorobenzene	1.00	0.944	1.00	0.943	94	94	80-120	0	30
Dichlorodifluoromethane	1.00	0.698	1.00	0.693	70	69	10-133	1	30
1,1-Dichloroethane	1.00	1.03	1.00	0.995	103	99	77-120	3	30
1,2-Dichloroethane	1.00	1.02	1.00	1.02	102	102	71-128	0	30
1,1-Dichloroethene	1.00	1.04	1.00	1.04	104	104	73-129	0	30
cis-1,2-Dichloroethene	1.00	1.05	1.00	1.05	105	105	80-120	0	30
trans-1,2-Dichloroethene	1.00	1.06	1.00	1.04	106	104	80-125	2	30
1,2-Dichloropropane	1.00	0.991	1.00	1.01	99	101	76-120	2	30
cis-1,3-Dichloropropene	1.00	0.892	1.00	0.913	89	91	66-120	2	30

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(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
trans-1,3-Dichloropropene	1.00	0.858	1.00	0.874	86	87	63-124	2	30
Ethylbenzene	1.00	0.867	1.00	0.869	87	87	80-120	0	30
Freon 113	1.00	0.953	1.00	0.947	95	95	59-139	1	30
2-Hexanone	5.00	5.20	5.00	5.23	104	105	51-131	1	30
Isopropylbenzene	1.00	0.773	1.00	0.793	77	79	76-120	3	30
Methyl Acetate	1.00	1.16	1.00	1.08	116	108	54-146	7	30
Methyl Tertiary Butyl Ether	1.00	0.942	1.00	0.912	94	91	66-123	3	30
4-Methyl-2-pentanone	5.00	5.49	5.00	5.49	110	110	53-134	0	30
Methylcyclohexane	1.00	0.800	1.00	0.852	80	85	61-124	6	30
Methylene Chloride	1.00	1.05	1.00	1.04	105	104	76-122	0	30
Styrene	1.00	0.891	1.00	0.882	89	88	76-120	1	30
1,1,2,2-Tetrachloroethane	1.00	1.05	1.00	1.02	105	102	61-131	3	30
Tetrachloroethene	1.00	0.850	1.00	0.856	85	86	73-120	1	30
Toluene	1.00	0.914	1.00	0.921	91	92	80-120	1	30
1,2,4-Trichlorobenzene	1.00	0.745	1.00	0.803	74	80	62-127	7	30
1,1,1-Trichloroethane	1.00	0.855	1.00	0.838	85	84	61-125	2	30
1,1,2-Trichloroethane	1.00	0.977	1.00	0.975	98	97	80-120	0	30
Trichloroethene	1.00	0.932	1.00	0.947	93	95	80-120	2	30
Trichlorofluoromethane	1.00	0.930	1.00	0.913	93	91	47-132	2	30
Vinyl Chloride	1.00	0.993	1.00	0.998	99	100	59-120	1	30
Xylene (Total)	3.00	2.55	3.00	2.58	85	86	80-120	1	30
Batch number: X172461AA	Sample number(s): 9177529,9177531,9177535,9177537,9177539,9177541,9177545,9177547								
Acetone	0.150	0.146	0.150	0.143	97	95	32-144	2	30
Benzene	0.0200	0.0206	0.0200	0.0204	103	102	80-120	1	30
Bromodichloromethane	0.0200	0.0184	0.0200	0.0182	92	91	70-120	1	30
Bromoform	0.0200	0.0165	0.0200	0.0159	82	80	54-120	3	30
Bromomethane	0.0200	0.0166	0.0200	0.0158	83	79	31-160	5	30
2-Butanone	0.150	0.137	0.150	0.136	92	91	49-128	1	30
Carbon Disulfide	0.0200	0.0199	0.0200	0.0194	100	97	60-128	3	30
Carbon Tetrachloride	0.0200	0.0178	0.0200	0.0175	89	87	62-129	2	30
Chlorobenzene	0.0200	0.0204	0.0200	0.0202	102	101	80-120	1	30
Chloroethane	0.0200	0.0171	0.0200	0.0163	86	81	43-137	5	30
Chloroform	0.0200	0.0195	0.0200	0.0194	98	97	80-120	0	30
Chloromethane	0.0200	0.0162	0.0200	0.0158	81	79	56-120	2	30
Cyclohexane	0.0200	0.0183	0.0200	0.0178	92	89	58-126	3	30
1,2-Dibromo-3-chloropropane	0.0200	0.0169	0.0200	0.0172	84	86	47-126	2	30
Dibromochloromethane	0.0200	0.0186	0.0200	0.0181	93	91	65-120	2	30
1,2-Dibromoethane	0.0200	0.0195	0.0200	0.0196	98	98	74-120	1	30
1,2-Dichlorobenzene	0.0200	0.0195	0.0200	0.0193	97	97	80-120	1	30
1,3-Dichlorobenzene	0.0200	0.0196	0.0200	0.0194	98	97	80-120	1	30
1,4-Dichlorobenzene	0.0200	0.0201	0.0200	0.0198	101	99	80-120	2	30
Dichlorodifluoromethane	0.0200	0.0134	0.0200	0.0129	67	64	10-133	4	30
1,1-Dichloroethane	0.0200	0.0202	0.0200	0.0198	101	99	77-120	2	30
1,2-Dichloroethane	0.0200	0.0194	0.0200	0.0194	97	97	71-128	0	30
1,1-Dichloroethene	0.0200	0.0208	0.0200	0.0204	104	102	73-129	2	30
cis-1,2-Dichloroethene	0.0200	0.0202	0.0200	0.0199	101	99	80-120	1	30
trans-1,2-Dichloroethene	0.0200	0.0206	0.0200	0.0201	103	100	80-125	3	30

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
1,2-Dichloropropane	0.0200	0.0206	0.0200	0.0204	103	102	76-120	1	30
cis-1,3-Dichloropropene	0.0200	0.0182	0.0200	0.0182	91	91	66-120	0	30
trans-1,3-Dichloropropene	0.0200	0.0186	0.0200	0.0186	93	93	63-124	0	30
Ethylbenzene	0.0200	0.0205	0.0200	0.0203	103	101	80-120	1	30
Freon 113	0.0200	0.0189	0.0200	0.0185	94	92	59-139	2	30
2-Hexanone	0.100	0.0981	0.100	0.0969	98	97	51-131	1	30
Isopropylbenzene	0.0200	0.0200	0.0200	0.0195	100	97	76-120	2	30
Methyl Acetate	0.0200	0.0197	0.0200	0.0191	98	95	54-146	3	30
Methyl Tertiary Butyl Ether	0.0200	0.0172	0.0200	0.0172	86	86	66-123	0	30
4-Methyl-2-pentanone	0.100	0.0941	0.100	0.0931	94	93	53-134	1	30
Methylcyclohexane	0.0200	0.0183	0.0200	0.0179	92	89	61-124	2	30
Methylene Chloride	0.0200	0.0205	0.0200	0.0203	102	102	76-122	1	30
Styrene	0.0200	0.0195	0.0200	0.0193	98	97	76-120	1	30
1,1,2,2-Tetrachloroethane	0.0200	0.0206	0.0200	0.0201	103	100	61-131	3	30
Tetrachloroethene	0.0200	0.0192	0.0200	0.0187	96	94	73-120	2	30
Toluene	0.0200	0.0207	0.0200	0.0204	104	102	80-120	2	30
1,2,4-Trichlorobenzene	0.0200	0.0171	0.0200	0.0173	86	87	62-127	1	30
1,1,1-Trichloroethane	0.0200	0.0173	0.0200	0.0169	87	85	61-125	2	30
1,1,2-Trichloroethane	0.0200	0.0207	0.0200	0.0203	104	101	80-120	2	30
Trichloroethene	0.0200	0.0193	0.0200	0.0189	96	95	80-120	2	30
Trichlorofluoromethane	0.0200	0.0179	0.0200	0.0172	89	86	47-132	4	30
Vinyl Chloride	0.0200	0.0163	0.0200	0.0159	82	79	59-120	3	30
Xylene (Total)	0.0600	0.0603	0.0600	0.0592	100	99	80-120	2	30
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 17241SLA026	Sample number(s): 9177528,9177530,9177532,9177534,9177536,9177538,9177540,9177542								
Acenaphthene	0.0333	0.0316			95		85-122		
Acenaphthylene	0.0333	0.0231			69		68-102		
Anthracene	0.0333	0.0268			80		75-111		
Benzo(a)anthracene	0.0333	0.0287			86		83-112		
Benzo(a)pyrene	0.0333	0.0258			77*		78-108		
Benzo(b)fluoranthene	0.0333	0.0277			83		75-120		
Benzo(g,h,i)perylene	0.0333	0.0237			71		71-109		
Benzo(k)fluoranthene	0.0333	0.0269			81		78-113		
Chrysene	0.0333	0.0265			80		79-111		
Dibenz(a,h)anthracene	0.0333	0.0248			74		66-119		
Fluoranthene	0.0333	0.0273			82		82-110		
Fluorene	0.0333	0.0280			84		81-115		
Indeno(1,2,3-cd)pyrene	0.0333	0.0242			73		65-114		
Naphthalene	0.0333	0.0270			81		71-114		
Phenanthrene	0.0333	0.0259			78		78-106		
Pyrene	0.0333	0.0275			82		73-109		
Batch number: 17241SLB026	Sample number(s): 9177544,9177546								
Acenaphthene	0.0333	0.0324			97		85-122		
Acenaphthylene	0.0333	0.0241			72		68-102		
Anthracene	0.0333	0.0282			85		75-111		
Benzo(a)anthracene	0.0333	0.0303			91		83-112		

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

LCS/LCSD (continued)

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	mg/kg	mg/kg	mg/kg	mg/kg					
Benzo(a)pyrene	0.0333	0.0273			82		78-108		
Benzo(b)fluoranthene	0.0333	0.0282			85		75-120		
Benzo(g,h,i)perylene	0.0333	0.0255			76		71-109		
Benzo(k)fluoranthene	0.0333	0.0291			87		78-113		
Chrysene	0.0333	0.0282			85		79-111		
Dibenz(a,h)anthracene	0.0333	0.0271			81		66-119		
Fluoranthene	0.0333	0.0277			83		82-110		
Fluorene	0.0333	0.0294			88		81-115		
Indeno(1,2,3-cd)pyrene	0.0333	0.0264			79		65-114		
Naphthalene	0.0333	0.0265			79		71-114		
Phenanthrene	0.0333	0.0277			83		78-106		
Pyrene	0.0333	0.0328			98		73-109		
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 17243A34A	Sample number(s): 9177528,9177530,9177534,9177536,9177538,9177540,9177542,9177544,9177546								
TPH-GRO AK soil C6-C10	11	10.22	11	9.98	93	91	60-120	2	20
Batch number: 17243A34B	Sample number(s): 9177532								
TPH-GRO AK soil C6-C10	11	10.22	11	9.98	93	91	60-120	2	20
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 172440004A	Sample number(s): 9177528,9177530,9177532,9177534,9177536,9177538,9177540,9177542,9177544,9177546								
TPH-DRO AK soil C10-C25	32	23.05	32	24.9	72*	78	75-125	8	50
	%	%	%	%					
Batch number: 17244820014A	Sample number(s): 9177528-9177532,9177534-9177542,9177544-9177547								
Moisture	89.5	89.43			100		99-101		
Moisture	89.5	89.43			100		99-101		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc	MS Spike Added	MS Conc	MSD Spike Added	MSD Conc	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 17241SLA026	Sample number(s): 9177528,9177530,9177532,9177534,9177536,9177538,9177540,9177542 UNSPK: P166612									
Acenaphthene	0.118	0.0332	0.0297	0.0328	0.0292	-264*	-268*	85-122	2	30
Acenaphthylene	0.0753	0.0332	0.0232	0.0328	0.0234	-156*	-157*	68-102	1	30
Anthracene	0.129	0.0332	0.0277	0.0328	0.0281	-304*	-306*	75-111	1	30

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc mg/kg	MS Spike Added mg/kg	MS Conc mg/kg	MSD Spike Added mg/kg	MSD Conc mg/kg	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Benzo(a)anthracene	0.465	0.0332	0.0304	0.0328	0.0365	-1308 (2)	-1305 (2)	83-112	18	30
Benzo(a)pyrene	0.455	0.0332	0.0282	0.0328	0.0351	-1285 (2)	-1279 (2)	78-108	22	30
Benzo(b)fluoranthene	0.668	0.0332	0.0373	0.0328	0.0457	-1901 (2)	-1897 (2)	75-120	20	30
Benzo(g,h,i)perylene	0.0917	0.0332	0.0107	0.0328	0.0122	-243*	-241*	71-109	13	30
Benzo(k)fluoranthene	0.279	0.0332	0.0350	0.0328	0.0402	-734 (2)	-727 (2)	78-113	14	30
Chrysene	0.412	0.0332	0.0285	0.0328	0.0351	-1156 (2)	-1149 (2)	79-111	21	30
Dibenz(a,h)anthracene	0.0376	0.0332	0.0141	0.0328	0.0142	-70*	-70*	66-119	1	30
Fluoranthene	1.22	0.0332	0.0311	0.0328	0.0412	-3577 (2)	-3588 (2)	82-110	28	30
Fluorene	0.215	0.0332	0.0278	0.0328	0.0264	-562 (2)	-573 (2)	81-115	5	30
Indeno(1,2,3-cd)pyrene	0.106	0.0332	0.0132	0.0328	0.0143	-279*	-279*	65-114	8	30
Naphthalene	0.206	0.0332	0.0301	0.0328	0.0450	-529 (2)	-490 (2)	71-114	40*	30
Phenanthrene	0.163	0.0332	0.0310	0.0328	0.0429	-396 (2)	-364 (2)	78-106	32*	30
Pyrene	1.12	0.0332	0.0313	0.0328	0.0413	-3279 (2)	-3287 (2)	73-109	27	30
Batch number: 17241SLB026	Sample number(s): 9177544,9177546 UNSPK: P166615									
Acenaphthene	N.D.	0.0331	0.0320	0.0331	0.0307	96	93	85-122	4	30
Acenaphthylene	N.D.	0.0331	0.0228	0.0331	0.0242	69	73	68-102	6	30
Anthracene	0.000432	0.0331	0.0263	0.0331	0.0270	78	80	75-111	2	30
Benzo(a)anthracene	0.00103	0.0331	0.0284	0.0331	0.0294	83	86	83-112	3	30
Benzo(a)pyrene	0.000757	0.0331	0.0254	0.0331	0.0259	74*	76*	78-108	2	30
Benzo(b)fluoranthene	0.00200	0.0331	0.0279	0.0331	0.0310	78	88	75-120	11	30
Benzo(g,h,i)perylene	0.000995	0.0331	0.0238	0.0331	0.0257	69*	75	71-109	8	30
Benzo(k)fluoranthene	N.D.	0.0331	0.0276	0.0331	0.0253	83	76*	78-113	9	30
Chrysene	0.00147	0.0331	0.0273	0.0331	0.0281	78*	81	79-111	3	30
Dibenz(a,h)anthracene	N.D.	0.0331	0.0263	0.0331	0.0266	79	80	66-119	1	30
Fluoranthene	0.00172	0.0331	0.0307	0.0331	0.0286	87	81*	82-110	7	30
Fluorene	N.D.	0.0331	0.0276	0.0331	0.0250	83	76*	81-115	10	30
Indeno(1,2,3-cd)pyrene	0.000716	0.0331	0.0260	0.0331	0.0260	76	76	65-114	0	30
Naphthalene	0.0110	0.0331	0.0266	0.0331	0.0279	47*	51*	71-114	5	30
Phenanthrene	0.00272	0.0331	0.0276	0.0331	0.0289	75*	79	78-106	5	30
Pyrene	0.00168	0.0331	0.0284	0.0331	0.0298	81	85	73-109	5	30
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 172440004A	Sample number(s): 9177528,9177530,9177532,9177534,9177536,9177538,9177540,9177542,9177544,9177546 UNSPK: P177908									

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc mg/kg	MS Spike Added mg/kg	MS Conc mg/kg	MSD Spike Added mg/kg	MSD Conc mg/kg	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
TPH-DRO AK soil C10-C25	67.3	31.8	614.26	31.8	88.43	1720*	66	60-140	150*	50

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 17244820014A	Sample number(s): 9177528-9177532,9177534-9177542,9177544-9177547 BKG: P182584			
Moisture	12.92	13.17	2	5
Moisture	12.92	13.17	2	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- Solid by 8260B
Batch number: R172434AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177528	86	94	84	80
9177530	87	93	86	83
9177534	83	90	82	78
9177536	81	86	80	74
9177538	77	84	74	73
9177540	84	88	82	79
9177542	76	79	132	111
Blank	88	97	85	80
LCS	92	100	94	89
LCSD	97	104	97	92
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: R172441AA

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- Solid by 8260B
Batch number: R172441AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177544	81	87	80	72
9177546	90	97	88	82
Blank	106	112	104	93
LCS	93	101	93	90
LCSD	93	99	94	90
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: R172501AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177532	92	102	108	114
Blank	102	112	88	79
LCS	98	105	88	87
LCSD	97	105	89	88
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: X172461AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177529	98	105	103	96
9177531	95	102	102	100
9177535	94	104	104	97
9177537	97	103	102	97
9177539	95	103	104	99
9177541	97	104	104	98
9177545	95	102	103	101
9177547	97	106	103	98
Blank	96	99	103	95
LCS	96	101	104	99
LCSD	96	99	104	99
Limits:	50-141	54-135	52-141	50-131

Analysis Name: PAH SIM 8270 Soil Microwave
Batch number: 17241SLA026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
9177528	94	99	95
9177530	85	90	87
9177532	69	99	101

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: PAH SIM 8270 Soil Microwave
Batch number: 17241SLA026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
9177534	88	94	89
9177536	85	90	92
9177538	63	93	90
9177540	112	95	93
9177542	86	92	91
Blank	86	101	97
LCS	86	94	87
MS	87	95	86
MSD	85	99	86
Limits:	47-120	51-117	53-116

Analysis Name: PAH SIM 8270 Soil Microwave
Batch number: 17241SLB026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
9177544	93	98	92
9177546	84	89	84
Blank	90	96	85
LCS	86	98	91
MS	96	92	65
MSD	86	92	89
Limits:	47-120	51-117	53-116

Analysis Name: TPH-GRO AK soil C6-C10
Batch number: 17243A34A

	Trifluorotoluene-F
9177528	93
9177530	103
9177534	83
9177536	85
9177538	92
9177540	93
9177542	1090*
9177544	87
9177546	99
Blank	101
LCS	102
LCSD	98
Limits:	60-120

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:44

Group Number: 1843003

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: TPH-GRO AK soil C6-C10
Batch number: 17243A34B

	Trifluorotoluene-F
9177532	533*
Blank	90
LCS	102
LCSD	98
Limits:	60-120

Analysis Name: TPH-DRO AK soil C10-C25
Batch number: 172440004A

	Orthoterphenyl
9177528	92
9177530	89
9177532	101
9177534	94
9177536	100
9177538	95
9177540	99
9177542	131
9177544	96
9177546	98
Blank	94
LCS	82
LCSD	82
MS	113
MSD	88
Limits:	50-150

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Chevron Generic Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

Acct. # 10880

For Eurofins Lancaster Laboratories Environmental use only
Group # 1843003 Sample # 9177528-47
Instructions on reverse side correspond with circled numbers.

SCR #: 210728

(1) Client Information

Facility # CEMC 211083 WBS

Site Address: 230 OLD STEESE HWY, FAIRBANKS, AK

Chevron PM: DANIEL CARRIER

Lead Consultant: GHD SERVICES, INC.

Consultant/Office: SIOBHAN PRITCHARD

Consultant Project Mgr.: 645 G STREET, STE 401, ANCHORAGE, AK

Consultant Phone #: (720) 974-0885

Sampler: O. YAN / T. WEAVER

(2) Sample Identification

Sample Identification	Collected Date	Collected Time	(3) Grab	(3) Composite	(4) Matrix: Soil	Water: Sediment	Water: Potable	Water: Ground	Water: NPDES	Water: Surface	Oil	Air	Total Number of Containers	(5) Analyses Requested
SB17-1-S-15-170824	8/24/17	1130	X		X								9	BTEX + MTBE 8021 8260 Naphth; 8260 full scan; Oxygenates; TPH-GRO AK101 8015 8260; TPH-DRO without Silica Gel Cleanup AK102; TPH-DRO with Silica Gel Cleanup; VPH EPH Method; Lead Total Diss. Method; PAHs by 8270 SIM; Moisture
SB17-1-S-22-170824		1145	X		X								9	
SB17-2-S-15-170824		0955	X		X								9	
SB17-2-S-22-170824		1011	X		X								9	
SB17-3-S-15-170824		1300	X		X								9	
SB17-3-S-20-170824		1312	X		X								9	
SB17-3-S-22-170824		1315	X		X								9	
SB17-4-S-15-170824		1511	X		X								9	
SB17-4-S-22-170824		1522	X		X								9	
DUP-1-S-170824		—	X		X								9	

(4) Matrix

Soil ☒ Sediment ☐ Water: Potable ☐ Ground ☐ NPDES ☐ Surface ☐ Oil ☐ Air ☐

(5) Analyses Requested

BTEX + MTBE 8021 ☐ 8260 ☐ Naphth ☐
8260 full scan
Oxygenates ____
TPH-GRO AK101 8015 ☐ 8260 ☐
TPH-DRO without Silica Gel Cleanup AK102 ☐
TPH-DRO with Silica Gel Cleanup ☐
VPH ☐ EPH ☐ Method ____
Lead Total ☐ Diss. ☐ Method ____
PAHs by 8270 SIM
Moisture

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

(6) Remarks

email results to:
siobhan.pritchard@ghd.com
and
oliver.yan@ghd.com

(7) Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

(8) Data Package (circle if required)

Type I - Full | (Alaska/Type III) | Type VI (Raw Data)

EDD (circle if required): CVX-RTBU-FI_05 (default) | Other: ____

	Relinquished by	Date	Time	Received by	Date	Time (9)
1	[signature]	8-16-17	1415	[signature]	8/17/17	1000
2	[signature]	8/25/17	0800			
3				[signature]	8/26/17	995

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Temperature Upon Receipt 0.8-3.2 °C

Custody Seals Intact? Yes No

eurofins | Lancaster Laboratories Environmental

Sample Administration Receipt Documentation Log

Doc Log ID: 192702

Group Number(s): 1843003

Client: Chevron

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	08/26/2017 9:45
Number of Packages:	4	Number of Projects:	1
State/Province of Origin:	AK		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Simon Nies (25112) at 14:52 on 08/26/2017

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	2.7	DT	Wet	Y	Bagged	N
2	DT146	1.3	DT	Wet	Y	Bagged	N
3	DT146	0.8	DT	Wet	Y	Bagged	N
4	DT146	3.2	DT	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	non-detect
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

Report Date: September 18, 2017

Project: 211083

Account #: 10880
Group Number: 1843005
PO Number: 0015247544
Release Number: CARRIER
State of Sample Origin: AK

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To	GHD	Attn: Oliver Yan
Electronic Copy To	GHD	Attn: GHD EDF
Electronic Copy To	GHD	Attn: Siobhan Pritchard
Electronic Copy To	GHD	Attn: Sarah Gillette
Electronic Copy To	GHD	Attn: Jeffrey Cloud
Electronic Copy To	Chevron	Attn: GHD EDD

Respectfully Submitted,

Megan A. Moeller
Senior Specialist

(717) 556-7261

SAMPLE INFORMATION

Client Sample Description	Collection Information	ELLE#
SB17-5-S-15-170824 HIGH LEVEL Grab Soil	08/24/2017 14:44	9177551
SB17-5-S-22-170824 HIGH LEVEL Grab Soil	08/24/2017 14:55	9177553
SB17-5-S-22-170824 LOW LEVEL Grab Soil	08/24/2017 14:55	9177554
SB17-6-S-15-170824 HIGH LEVEL Grab Soil	08/24/2017 13:25	9177555
SB17-6-S-22-170824 HIGH LEVEL Grab Soil	08/24/2017 14:00	9177557
SB17-6-S-22-170824 LOW LEVEL Grab Soil	08/24/2017 14:00	9177558
DUP-2-S-170824 HIGH LEVEL Grab Soil	08/24/2017	9177559

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Project Name: 211083
LL Group #: 1843005

General Comments:

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below. Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

For dual column analyses, the surrogate (for multi-surrogate tests, at least one surrogate) must be within the acceptance limits on at least one of the two columns.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

Analysis Specific Comments:

SW-846 8260B, GC/MS Volatiles

Sample #s: 9177551

Reporting limits were raised due to interference from the sample matrix. The low level soil sample could not be analyzed for Benzene due to the levels of target and/or non-target compounds.

Sample #s: 9177558

The secondary vial was analyzed and no valid data was collected during re-analysis. Therefore the matrix effects observed in the initial analysis could not be confirmed. The values reported here are from the initial analysis.

SW-846 8270C SIM, GC/MS Semivolatiles

Sample #s: 9177551, 9177553, 9177555, 9177557, 9177559

Reporting limits were raised due to limited sample volume.

Batch #: 17241SLB026 (Sample number(s): 9177551, 9177553, 9177555, 9177557, 9177559 UNSPK: P166615)

The recovery(ies) for the following analyte(s) in the MS and/or MSD were below the acceptance window: Naphthalene, Fluorene, Fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Phenanthrene, Chrysene, Benzo(g,h,i)perylene

AK 101, GC Volatiles

Batch #: 17243A34A (Sample number(s): 9177553, 9177555, 9177557, 9177559)

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 9177555, 9177559

Batch #: 17243A34B (Sample number(s): 9177551)

The recovery(ies) for one or more surrogates exceeded the acceptance window indicating a positive bias for sample(s) 9177551

AK 102/AK 103 04/08/02, GC Petroleum Hydrocarbons

Sample #s: 9177551, 9177553, 9177555, 9177557, 9177559

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.

Batch #: 172440004A (Sample number(s): 9177551, 9177553, 9177555, 9177557, 9177559 UNSPK: P177908)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: TPH-DRO AK soil C10-C25

The recovery(ies) for the following analyte(s) in the MS and/or MSD exceeded the acceptance window indicating a positive bias: TPH-DRO AK soil C10-C25

The relative percent difference(s) for the following analyte(s) in the MS/MSD were outside acceptance windows: TPH-DRO AK soil C10-C25

Sample Description: SB17-5-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177551
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:44 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-5-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.		1.1	3.2	132.49
10237	Benzene	71-43-2	N.D.		0.081	0.81	132.49
10237	Bromodichloromethane	75-27-4	N.D.		0.16	0.81	132.49
10237	Bromoform	75-25-2	N.D.		0.16	0.81	132.49
10237	Bromomethane	74-83-9	N.D.		0.32	0.81	132.49
10237	2-Butanone	78-93-3	N.D.		0.65	1.6	132.49
10237	Carbon Disulfide	75-15-0	N.D.		0.16	0.81	132.49
10237	Carbon Tetrachloride	56-23-5	N.D.		0.16	0.81	132.49
10237	Chlorobenzene	108-90-7	N.D.		0.16	0.81	132.49
10237	Chloroethane	75-00-3	N.D.		0.32	0.81	132.49
10237	Chloroform	67-66-3	N.D.		0.16	0.81	132.49
10237	Chloromethane	74-87-3	N.D.		0.32	0.81	132.49
10237	Cyclohexane	110-82-7	12		0.16	0.81	132.49
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.32	0.81	132.49
10237	Dibromochloromethane	124-48-1	N.D.		0.16	0.81	132.49
10237	1,2-Dibromoethane	106-93-4	N.D.		0.16	0.81	132.49
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.16	0.81	132.49
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.16	0.81	132.49
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.16	0.81	132.49
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.32	0.81	132.49
10237	1,1-Dichloroethane	75-34-3	N.D.		0.16	0.81	132.49
10237	1,2-Dichloroethane	107-06-2	N.D.		0.16	0.81	132.49
10237	1,1-Dichloroethene	75-35-4	N.D.		0.16	0.81	132.49
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.16	0.81	132.49
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.16	0.81	132.49
10237	1,2-Dichloropropane	78-87-5	N.D.		0.16	0.81	132.49
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.16	0.81	132.49
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.16	0.81	132.49
10237	Ethylbenzene	100-41-4	2.3		0.16	0.81	132.49
10237	Freon 113	76-13-1	N.D.		0.32	1.6	132.49
10237	2-Hexanone	591-78-6	N.D.		0.48	1.6	132.49
10237	Isopropylbenzene	98-82-8	1.3		0.16	0.81	132.49
10237	Methyl Acetate	79-20-9	N.D.		0.32	0.81	132.49
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.081	0.81	132.49
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.48	1.6	132.49
10237	Methylcyclohexane	108-87-2	12		0.16	0.81	132.49
10237	Methylene Chloride	75-09-2	N.D.		0.32	0.81	132.49
10237	Styrene	100-42-5	N.D.		0.16	0.81	132.49
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.16	0.81	132.49
10237	Tetrachloroethene	127-18-4	N.D.		0.16	0.81	132.49
10237	Toluene	108-88-3	0.66	J	0.16	0.81	132.49
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.16	0.81	132.49
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.16	0.81	132.49
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.16	0.81	132.49
10237	Trichloroethene	79-01-6	N.D.		0.16	0.81	132.49
10237	Trichlorofluoromethane	75-69-4	N.D.		0.32	0.81	132.49
10237	Vinyl Chloride	75-01-4	N.D.		0.16	0.81	132.49
10237	Xylene (Total)	1330-20-7	18		0.16	0.81	132.49

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177551
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:44 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-5-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	Reporting limits were raised due to interference from the sample matrix. The low level soil sample could not be analyzed for Benzene due to the levels of target and/or non-target compounds.					
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	0.0026 J	0.0023	0.0059	1
10725	Acenaphthylene	208-96-8	0.0013 J	0.0012	0.0059	1
10725	Anthracene	120-12-7	N.D.	0.0012	0.0059	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0023	0.0059	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0023	0.0059	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0023	0.0059	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0023	0.0059	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0023	0.0059	1
10725	Chrysene	218-01-9	N.D.	0.0012	0.0059	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0023	0.0059	1
10725	Fluoranthene	206-44-0	N.D.	0.0023	0.0059	1
10725	Fluorene	86-73-7	0.0055 J	0.0023	0.0059	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0023	0.0059	1
10725	Naphthalene	91-20-3	0.88	0.0023	0.0059	1
10725	Phenanthrene	85-01-8	0.0054 J	0.0023	0.0059	1
10725	Pyrene	129-00-0	N.D.	0.0023	0.0059	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	1,000	62	620	2546.47
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	33	5.2	16	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	17.9	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177551
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:44 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-5-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 12:49	Jennifer K Howe	132.49
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146839	08/24/2017 14:44	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 10:19	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34B	09/06/2017 07:13	Marie D Beamenderfer	2546.47
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146839	08/24/2017 14:44	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146839	08/24/2017 14:44	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 09:22	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177553
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1752-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	0.46	1.3	57.01
10237	Benzene	71-43-2	N.D.	0.033	0.33	57.01
10237	Bromodichloromethane	75-27-4	N.D.	0.066	0.33	57.01
10237	Bromoform	75-25-2	N.D.	0.066	0.33	57.01
10237	Bromomethane	74-83-9	N.D.	0.13	0.33	57.01
10237	2-Butanone	78-93-3	N.D.	0.26	0.66	57.01
10237	Carbon Disulfide	75-15-0	N.D.	0.066	0.33	57.01
10237	Carbon Tetrachloride	56-23-5	N.D.	0.066	0.33	57.01
10237	Chlorobenzene	108-90-7	N.D.	0.066	0.33	57.01
10237	Chloroethane	75-00-3	N.D.	0.13	0.33	57.01
10237	Chloroform	67-66-3	N.D.	0.066	0.33	57.01
10237	Chloromethane	74-87-3	N.D.	0.13	0.33	57.01
10237	Cyclohexane	110-82-7	N.D.	0.066	0.33	57.01
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.13	0.33	57.01
10237	Dibromochloromethane	124-48-1	N.D.	0.066	0.33	57.01
10237	1,2-Dibromoethane	106-93-4	N.D.	0.066	0.33	57.01
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.066	0.33	57.01
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.066	0.33	57.01
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.066	0.33	57.01
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.13	0.33	57.01
10237	1,1-Dichloroethane	75-34-3	N.D.	0.066	0.33	57.01
10237	1,2-Dichloroethane	107-06-2	N.D.	0.066	0.33	57.01
10237	1,1-Dichloroethene	75-35-4	N.D.	0.066	0.33	57.01
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.066	0.33	57.01
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.066	0.33	57.01
10237	1,2-Dichloropropane	78-87-5	N.D.	0.066	0.33	57.01
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.066	0.33	57.01
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.066	0.33	57.01
10237	Ethylbenzene	100-41-4	N.D.	0.066	0.33	57.01
10237	Freon 113	76-13-1	N.D.	0.13	0.66	57.01
10237	2-Hexanone	591-78-6	N.D.	0.20	0.66	57.01
10237	Isopropylbenzene	98-82-8	N.D.	0.066	0.33	57.01
10237	Methyl Acetate	79-20-9	N.D.	0.13	0.33	57.01
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.033	0.33	57.01
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.20	0.66	57.01
10237	Methylcyclohexane	108-87-2	N.D.	0.066	0.33	57.01
10237	Methylene Chloride	75-09-2	N.D.	0.13	0.33	57.01
10237	Styrene	100-42-5	N.D.	0.066	0.33	57.01
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.066	0.33	57.01
10237	Tetrachloroethene	127-18-4	N.D.	0.066	0.33	57.01
10237	Toluene	108-88-3	N.D.	0.066	0.33	57.01
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.066	0.33	57.01
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.066	0.33	57.01
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.066	0.33	57.01
10237	Trichloroethene	79-01-6	N.D.	0.066	0.33	57.01
10237	Trichlorofluoromethane	75-69-4	N.D.	0.13	0.33	57.01
10237	Vinyl Chloride	75-01-4	N.D.	0.066	0.33	57.01
10237	Xylene (Total)	1330-20-7	0.074 J	0.066	0.33	57.01

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177553
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1752-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0023	0.0057	1
10725	Acenaphthylene	208-96-8	N.D.	0.0011	0.0057	1
10725	Anthracene	120-12-7	N.D.	0.0011	0.0057	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0023	0.0057	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0023	0.0057	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0023	0.0057	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0023	0.0057	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0023	0.0057	1
10725	Chrysene	218-01-9	N.D.	0.0011	0.0057	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0023	0.0057	1
10725	Fluoranthene	206-44-0	N.D.	0.0023	0.0057	1
10725	Fluorene	86-73-7	N.D.	0.0023	0.0057	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0023	0.0057	1
10725	Naphthalene	91-20-3	0.0080	0.0023	0.0057	1
10725	Phenanthrene	85-01-8	N.D.	0.0023	0.0057	1
10725	Pyrene	129-00-0	N.D.	0.0023	0.0057	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	3.6 J	0.7	7.0	29.96
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.	5.7	17	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	13.8	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177553
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1752-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 12:00	Jennifer K Howe	57.01
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146839	08/24/2017 14:55	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 10:49	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 15:54	Marie D Beamenderfer	29.96
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146839	08/24/2017 14:55	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146839	08/24/2017 14:55	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 09:51	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177554
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1752L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Acetone	67-64-1	0.011 J	0.005	0.015	0.64
10237	Benzene	71-43-2	0.001 J	0.0004	0.004	0.64
10237	Bromodichloromethane	75-27-4	N.D.	0.0007	0.004	0.64
10237	Bromoform	75-25-2	N.D.	0.0007	0.004	0.64
10237	Bromomethane	74-83-9	N.D.	0.001	0.004	0.64
10237	2-Butanone	78-93-3	0.005 J	0.003	0.007	0.64
10237	Carbon Disulfide	75-15-0	0.004 J	0.0007	0.004	0.64
10237	Carbon Tetrachloride	56-23-5	N.D.	0.0007	0.004	0.64
10237	Chlorobenzene	108-90-7	N.D.	0.0007	0.004	0.64
10237	Chloroethane	75-00-3	N.D.	0.001	0.004	0.64
10237	Chloroform	67-66-3	N.D.	0.0007	0.004	0.64
10237	Chloromethane	74-87-3	N.D.	0.001	0.004	0.64
10237	Cyclohexane	110-82-7	0.030	0.0007	0.004	0.64
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.001	0.004	0.64
10237	Dibromochloromethane	124-48-1	N.D.	0.0007	0.004	0.64
10237	1,2-Dibromoethane	106-93-4	N.D.	0.0007	0.004	0.64
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.0007	0.004	0.64
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.0007	0.004	0.64
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.0007	0.004	0.64
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.001	0.004	0.64
10237	1,1-Dichloroethane	75-34-3	N.D.	0.0007	0.004	0.64
10237	1,2-Dichloroethane	107-06-2	N.D.	0.0007	0.004	0.64
10237	1,1-Dichloroethene	75-35-4	N.D.	0.0007	0.004	0.64
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.0007	0.004	0.64
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.0007	0.004	0.64
10237	1,2-Dichloropropane	78-87-5	N.D.	0.0007	0.004	0.64
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.0007	0.004	0.64
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.0007	0.004	0.64
10237	Ethylbenzene	100-41-4	0.01	0.0007	0.004	0.64
10237	Freon 113	76-13-1	N.D.	0.001	0.007	0.64
10237	2-Hexanone	591-78-6	N.D.	0.002	0.007	0.64
10237	Isopropylbenzene	98-82-8	0.0009 J	0.0007	0.004	0.64
10237	Methyl Acetate	79-20-9	N.D.	0.001	0.004	0.64
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0004	0.004	0.64
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.002	0.007	0.64
10237	Methylcyclohexane	108-87-2	0.042	0.0007	0.004	0.64
10237	Methylene Chloride	75-09-2	N.D.	0.001	0.004	0.64
10237	Styrene	100-42-5	N.D.	0.0007	0.004	0.64
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.0007	0.004	0.64
10237	Tetrachloroethene	127-18-4	N.D.	0.0007	0.004	0.64
10237	Toluene	108-88-3	0.010	0.0007	0.004	0.64
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.0007	0.004	0.64
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.0007	0.004	0.64
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.0007	0.004	0.64
10237	Trichloroethene	79-01-6	N.D.	0.0007	0.004	0.64
10237	Trichlorofluoromethane	75-69-4	N.D.	0.001	0.004	0.64
10237	Vinyl Chloride	75-01-4	N.D.	0.0007	0.004	0.64
10237	Xylene (Total)	1330-20-7	0.035	0.0007	0.004	0.64

*=This limit was used in the evaluation of the final result

Sample Description: SB17-5-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177554
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:55 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1752L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
Wet Chemistry	**SM 2540 G-1997**		%	%	%	
00118	Moisture	n.a.	13.8	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/04/2017 00:04	Stephen C Nolte	0.64
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146844	08/24/2017 14:55	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146844	08/24/2017 14:55	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177555
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:25 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-6-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg	mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.	1.2	3.3	134.04
10237	Benzene	71-43-2	1.0	0.083	0.83	134.04
10237	Bromodichloromethane	75-27-4	N.D.	0.17	0.83	134.04
10237	Bromoform	75-25-2	N.D.	0.17	0.83	134.04
10237	Bromomethane	74-83-9	N.D.	0.33	0.83	134.04
10237	2-Butanone	78-93-3	N.D.	0.66	1.7	134.04
10237	Carbon Disulfide	75-15-0	N.D.	0.17	0.83	134.04
10237	Carbon Tetrachloride	56-23-5	N.D.	0.17	0.83	134.04
10237	Chlorobenzene	108-90-7	N.D.	0.17	0.83	134.04
10237	Chloroethane	75-00-3	N.D.	0.33	0.83	134.04
10237	Chloroform	67-66-3	N.D.	0.17	0.83	134.04
10237	Chloromethane	74-87-3	N.D.	0.33	0.83	134.04
10237	Cyclohexane	110-82-7	100	1.7	8.3	1340.35
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.33	0.83	134.04
10237	Dibromochloromethane	124-48-1	N.D.	0.17	0.83	134.04
10237	1,2-Dibromoethane	106-93-4	N.D.	0.17	0.83	134.04
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.17	0.83	134.04
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.17	0.83	134.04
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.17	0.83	134.04
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.33	0.83	134.04
10237	1,1-Dichloroethane	75-34-3	N.D.	0.17	0.83	134.04
10237	1,2-Dichloroethane	107-06-2	N.D.	0.17	0.83	134.04
10237	1,1-Dichloroethene	75-35-4	N.D.	0.17	0.83	134.04
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.17	0.83	134.04
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.17	0.83	134.04
10237	1,2-Dichloropropane	78-87-5	N.D.	0.17	0.83	134.04
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.17	0.83	134.04
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.17	0.83	134.04
10237	Ethylbenzene	100-41-4	44	0.17	0.83	134.04
10237	Freon 113	76-13-1	N.D.	0.33	1.7	134.04
10237	2-Hexanone	591-78-6	N.D.	0.50	1.7	134.04
10237	Isopropylbenzene	98-82-8	6.2	0.17	0.83	134.04
10237	Methyl Acetate	79-20-9	N.D.	0.33	0.83	134.04
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.083	0.83	134.04
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.50	1.7	134.04
10237	Methylcyclohexane	108-87-2	67	1.7	8.3	1340.35
10237	Methylene Chloride	75-09-2	N.D.	0.33	0.83	134.04
10237	Styrene	100-42-5	N.D.	0.17	0.83	134.04
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.17	0.83	134.04
10237	Tetrachloroethene	127-18-4	N.D.	0.17	0.83	134.04
10237	Toluene	108-88-3	35	0.17	0.83	134.04
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.17	0.83	134.04
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.17	0.83	134.04
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.17	0.83	134.04
10237	Trichloroethene	79-01-6	N.D.	0.17	0.83	134.04
10237	Trichlorofluoromethane	75-69-4	N.D.	0.33	0.83	134.04
10237	Vinyl Chloride	75-01-4	N.D.	0.17	0.83	134.04
10237	Xylene (Total)	1330-20-7	510	1.7	8.3	1340.35

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177555
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:25 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-6-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	0.0042 J	0.0024	0.0061	1
10725	Acenaphthylene	208-96-8	0.0014 J	0.0012	0.0061	1
10725	Anthracene	120-12-7	N.D.	0.0012	0.0061	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0024	0.0061	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0024	0.0061	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0024	0.0061	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0024	0.0061	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0024	0.0061	1
10725	Chrysene	218-01-9	N.D.	0.0012	0.0061	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0024	0.0061	1
10725	Fluoranthene	206-44-0	N.D.	0.0024	0.0061	1
10725	Fluorene	86-73-7	0.0066	0.0024	0.0061	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0024	0.0061	1
10725	Naphthalene	91-20-3	3.8	0.012	0.030	5
10725	Phenanthrene	85-01-8	0.0082	0.0024	0.0061	1
10725	Pyrene	129-00-0	N.D.	0.0024	0.0061	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	4,900	300	3,000	12079.74
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	45	5.0	15	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	18.9	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-15-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177555
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 13:25 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17-6-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 14:25	Jennifer K Howe	1340.35
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172481AA	09/05/2017 22:38	Jeremy C Giffin	134.04
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146839	08/24/2017 13:25	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 11:18	Joseph M Gambler	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 16:00	William H Saadeh	5
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 23:45	Marie D Beamenderfer	12079.74
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146839	08/24/2017 13:25	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146839	08/24/2017 13:25	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 10:20	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177557
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1762-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Acetone	67-64-1	N.D.	0.42	1.2	56.2
10237	Benzene	71-43-2	N.D.	0.030	0.30	56.2
10237	Bromodichloromethane	75-27-4	N.D.	0.060	0.30	56.2
10237	Bromoform	75-25-2	N.D.	0.060	0.30	56.2
10237	Bromomethane	74-83-9	N.D.	0.12	0.30	56.2
10237	2-Butanone	78-93-3	N.D.	0.24	0.60	56.2
10237	Carbon Disulfide	75-15-0	N.D.	0.060	0.30	56.2
10237	Carbon Tetrachloride	56-23-5	N.D.	0.060	0.30	56.2
10237	Chlorobenzene	108-90-7	N.D.	0.060	0.30	56.2
10237	Chloroethane	75-00-3	N.D.	0.12	0.30	56.2
10237	Chloroform	67-66-3	N.D.	0.060	0.30	56.2
10237	Chloromethane	74-87-3	N.D.	0.12	0.30	56.2
10237	Cyclohexane	110-82-7	0.061 J	0.060	0.30	56.2
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.	0.12	0.30	56.2
10237	Dibromochloromethane	124-48-1	N.D.	0.060	0.30	56.2
10237	1,2-Dibromoethane	106-93-4	N.D.	0.060	0.30	56.2
10237	1,2-Dichlorobenzene	95-50-1	N.D.	0.060	0.30	56.2
10237	1,3-Dichlorobenzene	541-73-1	N.D.	0.060	0.30	56.2
10237	1,4-Dichlorobenzene	106-46-7	N.D.	0.060	0.30	56.2
10237	Dichlorodifluoromethane	75-71-8	N.D.	0.12	0.30	56.2
10237	1,1-Dichloroethane	75-34-3	N.D.	0.060	0.30	56.2
10237	1,2-Dichloroethane	107-06-2	N.D.	0.060	0.30	56.2
10237	1,1-Dichloroethene	75-35-4	N.D.	0.060	0.30	56.2
10237	cis-1,2-Dichloroethene	156-59-2	N.D.	0.060	0.30	56.2
10237	trans-1,2-Dichloroethene	156-60-5	N.D.	0.060	0.30	56.2
10237	1,2-Dichloropropane	78-87-5	N.D.	0.060	0.30	56.2
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.	0.060	0.30	56.2
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.	0.060	0.30	56.2
10237	Ethylbenzene	100-41-4	N.D.	0.060	0.30	56.2
10237	Freon 113	76-13-1	N.D.	0.12	0.60	56.2
10237	2-Hexanone	591-78-6	N.D.	0.18	0.60	56.2
10237	Isopropylbenzene	98-82-8	N.D.	0.060	0.30	56.2
10237	Methyl Acetate	79-20-9	N.D.	0.12	0.30	56.2
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.030	0.30	56.2
10237	4-Methyl-2-pentanone	108-10-1	N.D.	0.18	0.60	56.2
10237	Methylcyclohexane	108-87-2	N.D.	0.060	0.30	56.2
10237	Methylene Chloride	75-09-2	N.D.	0.12	0.30	56.2
10237	Styrene	100-42-5	N.D.	0.060	0.30	56.2
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.	0.060	0.30	56.2
10237	Tetrachloroethene	127-18-4	N.D.	0.060	0.30	56.2
10237	Toluene	108-88-3	N.D.	0.060	0.30	56.2
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.	0.060	0.30	56.2
10237	1,1,1-Trichloroethane	71-55-6	N.D.	0.060	0.30	56.2
10237	1,1,2-Trichloroethane	79-00-5	N.D.	0.060	0.30	56.2
10237	Trichloroethene	79-01-6	N.D.	0.060	0.30	56.2
10237	Trichlorofluoromethane	75-69-4	N.D.	0.12	0.30	56.2
10237	Vinyl Chloride	75-01-4	N.D.	0.060	0.30	56.2
10237	Xylene (Total)	1330-20-7	0.078 J	0.060	0.30	56.2

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177557
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1762-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	N.D.	0.0020	0.0051	1
10725	Acenaphthylene	208-96-8	N.D.	0.0010	0.0051	1
10725	Anthracene	120-12-7	N.D.	0.0010	0.0051	1
10725	Benzo(a)anthracene	56-55-3	N.D.	0.0020	0.0051	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0020	0.0051	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0020	0.0051	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0020	0.0051	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0020	0.0051	1
10725	Chrysene	218-01-9	N.D.	0.0010	0.0051	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0020	0.0051	1
10725	Fluoranthene	206-44-0	N.D.	0.0020	0.0051	1
10725	Fluorene	86-73-7	N.D.	0.0020	0.0051	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0020	0.0051	1
10725	Naphthalene	91-20-3	N.D.	0.0020	0.0051	1
10725	Phenanthrene	85-01-8	N.D.	0.0020	0.0051	1
10725	Pyrene	129-00-0	N.D.	0.0020	0.0051	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	1.9 J	0.6	5.7	26.86
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	N.D.	4.2	13	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	6.1	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-22-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177557
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1762-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 12:25	Jennifer K Howe	56.2
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146839	08/24/2017 14:00	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 11:48	Joseph M Gambler	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	08/31/2017 20:28	Marie D Beamenderfer	26.86
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146839	08/24/2017 14:00	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146839	08/24/2017 14:00	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 10:48	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177558
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1762L

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	0.011		0.003	0.009	0.43
10237	Benzene	71-43-2	N.D.		0.0002	0.002	0.43
10237	Bromodichloromethane	75-27-4	N.D.		0.0005	0.002	0.43
10237	Bromoform	75-25-2	N.D.		0.0005	0.002	0.43
10237	Bromomethane	74-83-9	N.D.		0.0009	0.002	0.43
10237	2-Butanone	78-93-3	N.D.		0.002	0.005	0.43
10237	Carbon Disulfide	75-15-0	N.D.		0.0005	0.002	0.43
10237	Carbon Tetrachloride	56-23-5	N.D.		0.0005	0.002	0.43
10237	Chlorobenzene	108-90-7	N.D.		0.0005	0.002	0.43
10237	Chloroethane	75-00-3	N.D.		0.0009	0.002	0.43
10237	Chloroform	67-66-3	N.D.		0.0005	0.002	0.43
10237	Chloromethane	74-87-3	N.D.		0.0009	0.002	0.43
10237	Cyclohexane	110-82-7	0.002	J	0.0005	0.002	0.43
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.0009	0.002	0.43
10237	Dibromochloromethane	124-48-1	N.D.		0.0005	0.002	0.43
10237	1,2-Dibromoethane	106-93-4	N.D.		0.0005	0.002	0.43
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.0005	0.002	0.43
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.0005	0.002	0.43
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.0005	0.002	0.43
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.0009	0.002	0.43
10237	1,1-Dichloroethane	75-34-3	N.D.		0.0005	0.002	0.43
10237	1,2-Dichloroethane	107-06-2	N.D.		0.0005	0.002	0.43
10237	1,1-Dichloroethene	75-35-4	N.D.		0.0005	0.002	0.43
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.0005	0.002	0.43
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.0005	0.002	0.43
10237	1,2-Dichloropropane	78-87-5	N.D.		0.0005	0.002	0.43
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.0005	0.002	0.43
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.0005	0.002	0.43
10237	Ethylbenzene	100-41-4	0.001	J	0.0005	0.002	0.43
10237	Freon 113	76-13-1	N.D.		0.0009	0.005	0.43
10237	2-Hexanone	591-78-6	N.D.		0.001	0.005	0.43
10237	Isopropylbenzene	98-82-8	N.D.		0.0005	0.002	0.43
10237	Methyl Acetate	79-20-9	N.D.		0.0009	0.002	0.43
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.0002	0.002	0.43
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.001	0.005	0.43
10237	Methylcyclohexane	108-87-2	0.002	J	0.0005	0.002	0.43
10237	Methylene Chloride	75-09-2	0.002	J	0.0009	0.002	0.43
10237	Styrene	100-42-5	N.D.		0.0005	0.002	0.43
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.0005	0.002	0.43
10237	Tetrachloroethene	127-18-4	N.D.		0.0005	0.002	0.43
10237	Toluene	108-88-3	0.003		0.0005	0.002	0.43
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.0005	0.002	0.43
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.0005	0.002	0.43
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.0005	0.002	0.43
10237	Trichloroethene	79-01-6	N.D.		0.0005	0.002	0.43
10237	Trichlorofluoromethane	75-69-4	N.D.		0.0009	0.002	0.43
10237	Vinyl Chloride	75-01-4	N.D.		0.0005	0.002	0.43
10237	Xylene (Total)	1330-20-7	0.011		0.0005	0.002	0.43

*=This limit was used in the evaluation of the final result

Sample Description: SB17-6-S-22-170824 LOW LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177558
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 14:00 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

1762L

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
	The secondary vial was analyzed and no valid data was collected during re-analysis. Therefore the matrix effects observed in the initial analysis could not be confirmed. The values reported here are from the initial analysis.					
Wet Chemistry		**SM 2540 G-1997**	%	%	%	
00118	Moisture	n.a.	6.1	0.50	0.50	1

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	X172461AA	09/04/2017 00:27	Stephen C Nolte	0.43
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	1	201724146844	08/24/2017 14:00	Client Supplied	1
02392	GC/MS - Field Preserved NaHSO4	SW-846 5035A	2	201724146844	08/24/2017 14:00	Client Supplied	1
00118	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Sample Description: DUP-2-S-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177559
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17D2-

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		mg/kg		mg/kg	mg/kg	
10237	Acetone	67-64-1	N.D.		0.90	2.6	115.25
10237	Benzene	71-43-2	0.50	J	0.064	0.64	115.25
10237	Bromodichloromethane	75-27-4	N.D.		0.13	0.64	115.25
10237	Bromoform	75-25-2	N.D.		0.13	0.64	115.25
10237	Bromomethane	74-83-9	N.D.		0.26	0.64	115.25
10237	2-Butanone	78-93-3	N.D.		0.51	1.3	115.25
10237	Carbon Disulfide	75-15-0	N.D.		0.13	0.64	115.25
10237	Carbon Tetrachloride	56-23-5	N.D.		0.13	0.64	115.25
10237	Chlorobenzene	108-90-7	N.D.		0.13	0.64	115.25
10237	Chloroethane	75-00-3	N.D.		0.26	0.64	115.25
10237	Chloroform	67-66-3	N.D.		0.13	0.64	115.25
10237	Chloromethane	74-87-3	N.D.		0.26	0.64	115.25
10237	Cyclohexane	110-82-7	13		0.13	0.64	115.25
10237	1,2-Dibromo-3-chloropropane	96-12-8	N.D.		0.26	0.64	115.25
10237	Dibromochloromethane	124-48-1	N.D.		0.13	0.64	115.25
10237	1,2-Dibromoethane	106-93-4	N.D.		0.13	0.64	115.25
10237	1,2-Dichlorobenzene	95-50-1	N.D.		0.13	0.64	115.25
10237	1,3-Dichlorobenzene	541-73-1	N.D.		0.13	0.64	115.25
10237	1,4-Dichlorobenzene	106-46-7	N.D.		0.13	0.64	115.25
10237	Dichlorodifluoromethane	75-71-8	N.D.		0.26	0.64	115.25
10237	1,1-Dichloroethane	75-34-3	N.D.		0.13	0.64	115.25
10237	1,2-Dichloroethane	107-06-2	N.D.		0.13	0.64	115.25
10237	1,1-Dichloroethene	75-35-4	N.D.		0.13	0.64	115.25
10237	cis-1,2-Dichloroethene	156-59-2	N.D.		0.13	0.64	115.25
10237	trans-1,2-Dichloroethene	156-60-5	N.D.		0.13	0.64	115.25
10237	1,2-Dichloropropane	78-87-5	N.D.		0.13	0.64	115.25
10237	cis-1,3-Dichloropropene	10061-01-5	N.D.		0.13	0.64	115.25
10237	trans-1,3-Dichloropropene	10061-02-6	N.D.		0.13	0.64	115.25
10237	Ethylbenzene	100-41-4	53		1.3	6.4	1152.5
10237	Freon 113	76-13-1	N.D.		0.26	1.3	115.25
10237	2-Hexanone	591-78-6	N.D.		0.39	1.3	115.25
10237	Isopropylbenzene	98-82-8	3.6		0.13	0.64	115.25
10237	Methyl Acetate	79-20-9	0.35	J	0.26	0.64	115.25
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.		0.064	0.64	115.25
10237	4-Methyl-2-pentanone	108-10-1	N.D.		0.39	1.3	115.25
10237	Methylcyclohexane	108-87-2	20		0.13	0.64	115.25
10237	Methylene Chloride	75-09-2	N.D.		0.26	0.64	115.25
10237	Styrene	100-42-5	N.D.		0.13	0.64	115.25
10237	1,1,2,2-Tetrachloroethane	79-34-5	N.D.		0.13	0.64	115.25
10237	Tetrachloroethene	127-18-4	N.D.		0.13	0.64	115.25
10237	Toluene	108-88-3	37		0.13	0.64	115.25
10237	1,2,4-Trichlorobenzene	120-82-1	N.D.		0.13	0.64	115.25
10237	1,1,1-Trichloroethane	71-55-6	N.D.		0.13	0.64	115.25
10237	1,1,2-Trichloroethane	79-00-5	N.D.		0.13	0.64	115.25
10237	Trichloroethene	79-01-6	N.D.		0.13	0.64	115.25
10237	Trichlorofluoromethane	75-69-4	N.D.		0.26	0.64	115.25
10237	Vinyl Chloride	75-01-4	N.D.		0.13	0.64	115.25
10237	Xylene (Total)	1330-20-7	450		1.3	6.4	1152.5

*=This limit was used in the evaluation of the final result

Sample Description: DUP-2-S-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177559
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17D2-

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit*	Dry Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**mg/kg**	**mg/kg**	**mg/kg**	
10725	Acenaphthene	83-32-9	0.064	0.0022	0.0055	1
10725	Acenaphthylene	208-96-8	0.0031 J	0.0011	0.0055	1
10725	Anthracene	120-12-7	0.020	0.0011	0.0055	1
10725	Benzo(a)anthracene	56-55-3	0.0032 J	0.0022	0.0055	1
10725	Benzo(a)pyrene	50-32-8	N.D.	0.0022	0.0055	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	0.0022	0.0055	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	0.0022	0.0055	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	0.0022	0.0055	1
10725	Chrysene	218-01-9	0.0029 J	0.0011	0.0055	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	0.0022	0.0055	1
10725	Fluoranthene	206-44-0	0.015	0.0022	0.0055	1
10725	Fluorene	86-73-7	0.046	0.0022	0.0055	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	0.0022	0.0055	1
10725	Naphthalene	91-20-3	11	0.044	0.11	20
10725	Phenanthrene	85-01-8	0.067	0.0022	0.0055	1
10725	Pyrene	129-00-0	0.013	0.0022	0.0055	1
	Reporting limits were raised due to limited sample volume.					
GC Volatiles	**AK 101**		**mg/kg**	**mg/kg**	**mg/kg**	
01450	TPH-GRO AK soil C6-C10	n.a.	6,000	250	2,500	11044.44
GC Petroleum Hydrocarbons	**AK 102/AK 103 04/08/02**		**mg/kg**	**mg/kg**	**mg/kg**	
01742	TPH-DRO AK soil C10-C25	n.a.	120	4.7	14	1
	The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. A reextraction was unable to be performed within the hold time.					
Wet Chemistry	**SM 2540 G-1997**		**%**	**%**	**%**	
00111	Moisture	n.a.	10.2	0.50	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

Sample Comments

State of Alaska Lab Certification No. UST-061

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

*=This limit was used in the evaluation of the final result

Sample Description: DUP-2-S-170824 HIGH LEVEL Grab Soil
Facility# 211083
230 Old Steese Hwy - Fairbanks, AK

ELLE Sample # SW 9177559
ELLE Group # 1843005
Account # 10880

Project Name: 211083

Collected: 08/24/2017 by OY

Submitted: 08/26/2017 09:45
Reported: 09/18/2017 14:43

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

17D2-

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172441AA	09/01/2017 15:13	Jennifer K Howe	1152.5
10237	VOCs- Solid by 8260B	SW-846 8260B	1	R172481AA	09/05/2017 23:02	Jeremy C Giffin	115.25
06173	GC/MS - Field Preserved (Ak)	SW-846 5035	1	201724146839	08/24/2017 00:00	Client Supplied	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 12:17	Joseph M Gambler	1
10725	PAH SIM 8270 Soil Microwave	SW-846 8270C SIM	1	17241SLB026	08/31/2017 16:29	William H Saadeh	20
10811	BNA Soil Microwave SIM	SW-846 3546	1	17241SLB026	08/29/2017 16:50	Elizabeth E Donovan	1
01450	TPH-GRO AK soil C6-C10	AK 101	1	17243A34A	09/01/2017 00:24	Marie D Beamenderfer	11044.4
06119	GC - Field Preserved (AK-101)	AK 101	1	201724146839	08/24/2017 00:00	Client Supplied	1
06119	GC - Field Preserved (AK-101)	AK 101	2	201724146839	08/24/2017 00:00	Client Supplied	1
01742	TPH-DRO AK soil C10-C25	AK 102/AK 103 04/08/02	1	172440004A	09/06/2017 11:17	Nicholas R Rossi	1
11222	AK DRO Soils Extraction	AK 102/AK 103 04/08/02	1	172440004A	09/01/2017 18:20	Sally L Appleyard	1
00111	Moisture	SM 2540 G-1997	2	17244820014A	09/01/2017 21:20	Scott W Freisher	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Batch number: R172441AA	Sample number(s): 9177551,9177553,9177555,9177557,9177559		
Acetone	N.D.	0.35	1.0
Benzene	N.D.	0.025	0.25
Bromodichloromethane	N.D.	0.050	0.25
Bromoform	N.D.	0.050	0.25
Bromomethane	N.D.	0.10	0.25
2-Butanone	N.D.	0.20	0.50
Carbon Disulfide	N.D.	0.050	0.25
Carbon Tetrachloride	N.D.	0.050	0.25
Chlorobenzene	N.D.	0.050	0.25
Chloroethane	N.D.	0.10	0.25
Chloroform	N.D.	0.050	0.25
Chloromethane	N.D.	0.10	0.25
Cyclohexane	N.D.	0.050	0.25
1,2-Dibromo-3-chloropropane	N.D.	0.10	0.25
Dibromochloromethane	N.D.	0.050	0.25
1,2-Dibromoethane	N.D.	0.050	0.25
1,2-Dichlorobenzene	N.D.	0.050	0.25
1,3-Dichlorobenzene	N.D.	0.050	0.25
1,4-Dichlorobenzene	N.D.	0.050	0.25
Dichlorodifluoromethane	N.D.	0.10	0.25
1,1-Dichloroethane	N.D.	0.050	0.25
1,2-Dichloroethane	N.D.	0.050	0.25
1,1-Dichloroethene	N.D.	0.050	0.25
cis-1,2-Dichloroethene	N.D.	0.050	0.25
trans-1,2-Dichloroethene	N.D.	0.050	0.25
1,2-Dichloropropane	N.D.	0.050	0.25
cis-1,3-Dichloropropene	N.D.	0.050	0.25
trans-1,3-Dichloropropene	N.D.	0.050	0.25
Ethylbenzene	N.D.	0.050	0.25
Freon 113	N.D.	0.10	0.50
2-Hexanone	N.D.	0.15	0.50
Isopropylbenzene	N.D.	0.050	0.25
Methyl Acetate	N.D.	0.10	0.25
Methyl Tertiary Butyl Ether	N.D.	0.025	0.25
4-Methyl-2-pentanone	N.D.	0.15	0.50
Methylcyclohexane	N.D.	0.050	0.25
Methylene Chloride	N.D.	0.10	0.25
Styrene	N.D.	0.050	0.25
1,1,2,2-Tetrachloroethane	N.D.	0.050	0.25
Tetrachloroethene	N.D.	0.050	0.25

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Toluene	N.D.	0.050	0.25
1,2,4-Trichlorobenzene	N.D.	0.050	0.25
1,1,1-Trichloroethane	N.D.	0.050	0.25
1,1,2-Trichloroethane	N.D.	0.050	0.25
Trichloroethene	N.D.	0.050	0.25
Trichlorofluoromethane	N.D.	0.10	0.25
Vinyl Chloride	N.D.	0.050	0.25
Xylene (Total)	N.D.	0.050	0.25
Batch number: R172481AA	Sample number(s): 9177555,9177559		
Acetone	N.D.	0.35	1.0
Benzene	N.D.	0.025	0.25
Bromodichloromethane	N.D.	0.050	0.25
Bromoform	N.D.	0.050	0.25
Bromomethane	N.D.	0.10	0.25
2-Butanone	N.D.	0.20	0.50
Carbon Disulfide	N.D.	0.050	0.25
Carbon Tetrachloride	N.D.	0.050	0.25
Chlorobenzene	N.D.	0.050	0.25
Chloroethane	N.D.	0.10	0.25
Chloroform	N.D.	0.050	0.25
Chloromethane	N.D.	0.10	0.25
Cyclohexane	N.D.	0.050	0.25
1,2-Dibromo-3-chloropropane	N.D.	0.10	0.25
Dibromochloromethane	N.D.	0.050	0.25
1,2-Dibromoethane	N.D.	0.050	0.25
1,2-Dichlorobenzene	N.D.	0.050	0.25
1,3-Dichlorobenzene	N.D.	0.050	0.25
1,4-Dichlorobenzene	N.D.	0.050	0.25
Dichlorodifluoromethane	N.D.	0.10	0.25
1,1-Dichloroethane	N.D.	0.050	0.25
1,2-Dichloroethane	N.D.	0.050	0.25
1,1-Dichloroethene	N.D.	0.050	0.25
cis-1,2-Dichloroethene	N.D.	0.050	0.25
trans-1,2-Dichloroethene	N.D.	0.050	0.25
1,2-Dichloropropane	N.D.	0.050	0.25
cis-1,3-Dichloropropene	N.D.	0.050	0.25
trans-1,3-Dichloropropene	N.D.	0.050	0.25
Ethylbenzene	N.D.	0.050	0.25
Freon 113	N.D.	0.10	0.50
2-Hexanone	N.D.	0.15	0.50
Isopropylbenzene	N.D.	0.050	0.25
Methyl Acetate	N.D.	0.10	0.25
Methyl Tertiary Butyl Ether	N.D.	0.025	0.25
4-Methyl-2-pentanone	N.D.	0.15	0.50
Methylcyclohexane	N.D.	0.050	0.25
Methylene Chloride	N.D.	0.10	0.25
Styrene	N.D.	0.050	0.25
1,1,2,2-Tetrachloroethane	N.D.	0.050	0.25

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Tetrachloroethene	N.D.	0.050	0.25
Toluene	N.D.	0.050	0.25
1,2,4-Trichlorobenzene	N.D.	0.050	0.25
1,1,1-Trichloroethane	N.D.	0.050	0.25
1,1,2-Trichloroethane	N.D.	0.050	0.25
Trichloroethene	N.D.	0.050	0.25
Trichlorofluoromethane	N.D.	0.10	0.25
Vinyl Chloride	N.D.	0.050	0.25
Batch number: X172461AA	Sample number(s): 9177554,9177558		
Acetone	N.D.	0.007	0.020
Benzene	N.D.	0.0005	0.005
Bromodichloromethane	N.D.	0.001	0.005
Bromoform	N.D.	0.001	0.005
Bromomethane	N.D.	0.002	0.005
2-Butanone	N.D.	0.004	0.010
Carbon Disulfide	N.D.	0.001	0.005
Carbon Tetrachloride	N.D.	0.001	0.005
Chlorobenzene	N.D.	0.001	0.005
Chloroethane	N.D.	0.002	0.005
Chloroform	N.D.	0.001	0.005
Chloromethane	N.D.	0.002	0.005
Cyclohexane	N.D.	0.001	0.005
1,2-Dibromo-3-chloropropane	N.D.	0.002	0.005
Dibromochloromethane	N.D.	0.001	0.005
1,2-Dibromoethane	N.D.	0.001	0.005
1,2-Dichlorobenzene	N.D.	0.001	0.005
1,3-Dichlorobenzene	N.D.	0.001	0.005
1,4-Dichlorobenzene	N.D.	0.001	0.005
Dichlorodifluoromethane	N.D.	0.002	0.005
1,1-Dichloroethane	N.D.	0.001	0.005
1,2-Dichloroethane	N.D.	0.001	0.005
1,1-Dichloroethene	N.D.	0.001	0.005
cis-1,2-Dichloroethene	N.D.	0.001	0.005
trans-1,2-Dichloroethene	N.D.	0.001	0.005
1,2-Dichloropropane	N.D.	0.001	0.005
cis-1,3-Dichloropropene	N.D.	0.001	0.005
trans-1,3-Dichloropropene	N.D.	0.001	0.005
Ethylbenzene	N.D.	0.001	0.005
Freon 113	N.D.	0.002	0.010
2-Hexanone	N.D.	0.003	0.010
Isopropylbenzene	N.D.	0.001	0.005
Methyl Acetate	N.D.	0.002	0.005
Methyl Tertiary Butyl Ether	N.D.	0.0005	0.005
4-Methyl-2-pentanone	N.D.	0.003	0.010
Methylcyclohexane	N.D.	0.001	0.005
Methylene Chloride	N.D.	0.002	0.005
Styrene	N.D.	0.001	0.005
1,1,2,2-Tetrachloroethane	N.D.	0.001	0.005

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Method Blank (continued)

Analysis Name	Result	MDL**	LOQ
	mg/kg	mg/kg	mg/kg
Tetrachloroethene	N.D.	0.001	0.005
Toluene	N.D.	0.001	0.005
1,2,4-Trichlorobenzene	N.D.	0.001	0.005
1,1,1-Trichloroethane	N.D.	0.001	0.005
1,1,2-Trichloroethane	N.D.	0.001	0.005
Trichloroethene	N.D.	0.001	0.005
Trichlorofluoromethane	N.D.	0.002	0.005
Vinyl Chloride	N.D.	0.001	0.005
Xylene (Total)	N.D.	0.001	0.005
Batch number: 17241SLB026	Sample number(s): 9177551,9177553,9177555,9177557,9177559		
Acenaphthene	N.D.	0.00067	0.0017
Acenaphthylene	N.D.	0.00033	0.0017
Anthracene	N.D.	0.00033	0.0017
Benzo(a)anthracene	N.D.	0.00067	0.0017
Benzo(a)pyrene	N.D.	0.00067	0.0017
Benzo(b)fluoranthene	N.D.	0.00067	0.0017
Benzo(g,h,i)perylene	N.D.	0.00067	0.0017
Benzo(k)fluoranthene	N.D.	0.00067	0.0017
Chrysene	N.D.	0.00033	0.0017
Dibenz(a,h)anthracene	N.D.	0.00067	0.0017
Fluoranthene	N.D.	0.00067	0.0017
Fluorene	N.D.	0.00067	0.0017
Indeno(1,2,3-cd)pyrene	N.D.	0.00067	0.0017
Naphthalene	N.D.	0.00067	0.0017
Phenanthrene	N.D.	0.00067	0.0017
Pyrene	N.D.	0.00067	0.0017
Batch number: 17243A34A	Sample number(s): 9177553,9177555,9177557,9177559		
TPH-GRO AK soil C6-C10	N.D.	0.5	5.0
Batch number: 17243A34B	Sample number(s): 9177551		
TPH-GRO AK soil C6-C10	N.D.	0.5	5.0
Batch number: 172440004A	Sample number(s): 9177551,9177553,9177555,9177557,9177559		
TPH-DRO AK soil C10-C25	N.D.	4.0	12

LCS/LCSD

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: R172441AA	Sample number(s): 9177551,9177553,9177555,9177557,9177559								
Acetone	7.50	6.36	7.50	6.69	85	89	32-144	5	30
Benzene	1.00	0.979	1.00	0.996	98	100	80-120	2	30
Bromodichloromethane	1.00	0.876	1.00	0.892	88	89	70-120	2	30
Bromoform	1.00	0.841	1.00	0.865	84	86	54-120	3	30

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromomethane	1.00	0.982	1.00	0.922	98	92	31-160	6	30
2-Butanone	7.50	7.97	7.50	7.78	106	104	49-128	2	30
Carbon Disulfide	1.00	0.813	1.00	0.804	81	80	60-128	1	30
Carbon Tetrachloride	1.00	0.746	1.00	0.763	75	76	62-129	2	30
Chlorobenzene	1.00	0.937	1.00	0.957	94	96	80-120	2	30
Chloroethane	1.00	1.13	1.00	0.988	113	99	43-137	13	30
Chloroform	1.00	0.931	1.00	0.923	93	92	80-120	1	30
Chloromethane	1.00	0.968	1.00	0.962	97	96	56-120	1	30
Cyclohexane	1.00	0.815	1.00	0.813	81	81	58-126	0	30
1,2-Dibromo-3-chloropropane	1.00	0.784	1.00	0.818	78	82	47-126	4	30
Dibromochloromethane	1.00	0.855	1.00	0.879	85	88	65-120	3	30
1,2-Dibromoethane	1.00	0.927	1.00	0.946	93	95	74-120	2	30
1,2-Dichlorobenzene	1.00	1.00	1.00	1.03	100	103	80-120	3	30
1,3-Dichlorobenzene	1.00	0.983	1.00	1.02	98	102	80-120	4	30
1,4-Dichlorobenzene	1.00	1.02	1.00	1.04	102	104	80-120	2	30
Dichlorodifluoromethane	1.00	0.603	1.00	0.578	60	58	10-133	4	30
1,1-Dichloroethane	1.00	0.960	1.00	0.959	96	96	77-120	0	30
1,2-Dichloroethane	1.00	0.932	1.00	0.942	93	94	71-128	1	30
1,1-Dichloroethene	1.00	0.958	1.00	0.970	96	97	73-129	1	30
cis-1,2-Dichloroethene	1.00	1.01	1.00	1.02	101	102	80-120	1	30
trans-1,2-Dichloroethene	1.00	1.02	1.00	0.997	102	100	80-125	2	30
1,2-Dichloropropane	1.00	0.939	1.00	0.955	94	95	76-120	2	30
cis-1,3-Dichloropropene	1.00	0.867	1.00	0.880	87	88	66-120	1	30
trans-1,3-Dichloropropene	1.00	0.890	1.00	0.898	89	90	63-124	1	30
Ethylbenzene	1.00	0.898	1.00	0.917	90	92	80-120	2	30
Freon 113	1.00	0.759	1.00	0.814	76	81	59-139	7	30
2-Hexanone	5.00	5.32	5.00	5.43	106	109	51-131	2	30
Isopropylbenzene	1.00	0.825	1.00	0.819	83	82	76-120	1	30
Methyl Acetate	1.00	1.05	1.00	1.02	105	102	54-146	3	30
Methyl Tertiary Butyl Ether	1.00	0.875	1.00	0.871	87	87	66-123	0	30
4-Methyl-2-pentanone	5.00	5.29	5.00	5.22	106	104	53-134	1	30
Methylcyclohexane	1.00	0.714	1.00	0.722	71	72	61-124	1	30
Methylene Chloride	1.00	1.01	1.00	0.997	101	100	76-122	2	30
Styrene	1.00	0.929	1.00	0.947	93	95	76-120	2	30
1,1,2,2-Tetrachloroethane	1.00	1.05	1.00	1.08	105	108	61-131	3	30
Tetrachloroethene	1.00	0.886	1.00	0.888	89	89	73-120	0	30
Toluene	1.00	0.940	1.00	0.961	94	96	80-120	2	30
1,2,4-Trichlorobenzene	1.00	0.804	1.00	0.880	80	88	62-127	9	30
1,1,1-Trichloroethane	1.00	0.800	1.00	0.788	80	79	61-125	2	30
1,1,2-Trichloroethane	1.00	1.01	1.00	1.01	101	101	80-120	0	30
Trichloroethene	1.00	0.899	1.00	0.913	90	91	80-120	2	30
Trichlorofluoromethane	1.00	0.816	1.00	0.816	82	82	47-132	0	30
Vinyl Chloride	1.00	0.925	1.00	0.900	92	90	59-120	3	30
Xylene (Total)	3.00	2.66	3.00	2.71	89	90	80-120	2	30
Batch number: R172481AA	Sample number(s): 9177555,9177559								
Acetone	7.50	7.88	7.50	7.69	105	103	32-144	2	30
Benzene	1.00	1.05	1.00	1.03	105	103	80-120	2	30

*- Outside of specification
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(1) The result for one or both determinations was less than five times the LOQ.
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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Bromodichloromethane	1.00	0.954	1.00	0.943	95	94	70-120	1	30
Bromoform	1.00	0.871	1.00	0.853	87	85	54-120	2	30
Bromomethane	1.00	0.824	1.00	0.813	82	81	31-160	1	30
2-Butanone	7.50	7.57	7.50	7.70	101	103	49-128	2	30
Carbon Disulfide	1.00	0.764	1.00	0.721	76	72	60-128	6	30
Carbon Tetrachloride	1.00	0.837	1.00	0.778	84	78	62-129	7	30
Chlorobenzene	1.00	0.948	1.00	0.930	95	93	80-120	2	30
Chloroethane	1.00	0.847	1.00	0.841	85	84	43-137	1	30
Chloroform	1.00	0.978	1.00	0.963	98	96	80-120	2	30
Chloromethane	1.00	0.996	1.00	0.970	100	97	56-120	3	30
Cyclohexane	1.00	0.884	1.00	0.834	88	83	58-126	6	30
1,2-Dibromo-3-chloropropane	1.00	0.867	1.00	0.835	87	83	47-126	4	30
Dibromochloromethane	1.00	0.867	1.00	0.861	87	86	65-120	1	30
1,2-Dibromoethane	1.00	0.916	1.00	0.919	92	92	74-120	0	30
1,2-Dichlorobenzene	1.00	1.03	1.00	1.00	103	100	80-120	3	30
1,3-Dichlorobenzene	1.00	1.03	1.00	0.976	103	98	80-120	5	30
1,4-Dichlorobenzene	1.00	1.03	1.00	1.03	103	103	80-120	0	30
Dichlorodifluoromethane	1.00	0.590	1.00	0.571	59	57	10-133	3	30
1,1-Dichloroethane	1.00	1.02	1.00	0.998	102	100	77-120	2	30
1,2-Dichloroethane	1.00	1.00	1.00	0.960	100	96	71-128	4	30
1,1-Dichloroethene	1.00	1.03	1.00	0.974	103	97	73-129	5	30
cis-1,2-Dichloroethene	1.00	1.05	1.00	1.05	105	105	80-120	1	30
trans-1,2-Dichloroethene	1.00	1.06	1.00	1.03	106	103	80-125	3	30
1,2-Dichloropropane	1.00	1.01	1.00	0.986	101	99	76-120	3	30
cis-1,3-Dichloropropene	1.00	0.926	1.00	0.922	93	92	66-120	0	30
trans-1,3-Dichloropropene	1.00	0.894	1.00	0.902	89	90	63-124	1	30
Ethylbenzene	1.00	0.927	1.00	0.887	93	89	80-120	4	30
Freon 113	1.00	0.888	1.00	0.864	89	86	59-139	3	30
2-Hexanone	5.00	5.47	5.00	5.43	109	109	51-131	1	30
Isopropylbenzene	1.00	0.863	1.00	0.820	86	82	76-120	5	30
Methyl Acetate	1.00	1.10	1.00	1.04	110	104	54-146	6	30
Methyl Tertiary Butyl Ether	1.00	0.934	1.00	0.898	93	90	66-123	4	30
4-Methyl-2-pentanone	5.00	5.46	5.00	5.52	109	110	53-134	1	30
Methylcyclohexane	1.00	0.867	1.00	0.832	87	83	61-124	4	30
Methylene Chloride	1.00	1.04	1.00	1.01	104	101	76-122	3	30
Styrene	1.00	0.942	1.00	0.915	94	91	76-120	3	30
1,1,2,2-Tetrachloroethane	1.00	1.11	1.00	1.06	111	106	61-131	4	30
Tetrachloroethene	1.00	0.876	1.00	0.869	88	87	73-120	1	30
Toluene	1.00	0.968	1.00	0.936	97	94	80-120	3	30
1,2,4-Trichlorobenzene	1.00	1.04	1.00	0.945	104	94	62-127	10	30
1,1,1-Trichloroethane	1.00	0.853	1.00	0.833	85	83	61-125	2	30
1,1,2-Trichloroethane	1.00	0.978	1.00	1.02	98	102	80-120	4	30
Trichloroethene	1.00	0.939	1.00	0.941	94	94	80-120	0	30
Trichlorofluoromethane	1.00	0.886	1.00	0.860	89	86	47-132	3	30
Vinyl Chloride	1.00	0.981	1.00	0.908	98	91	59-120	8	30
Batch number: X172461AA	Sample number(s): 9177554,9177558								
Acetone	0.150	0.146	0.150	0.143	97	95	32-144	2	30

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Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

LCS/LCSD (continued)

Analysis Name	LCS Spike Added mg/kg	LCS Conc mg/kg	LCSD Spike Added mg/kg	LCSD Conc mg/kg	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Benzene	0.0200	0.0206	0.0200	0.0204	103	102	80-120	1	30
Bromodichloromethane	0.0200	0.0184	0.0200	0.0182	92	91	70-120	1	30
Bromoform	0.0200	0.0165	0.0200	0.0159	82	80	54-120	3	30
Bromomethane	0.0200	0.0166	0.0200	0.0158	83	79	31-160	5	30
2-Butanone	0.150	0.137	0.150	0.136	92	91	49-128	1	30
Carbon Disulfide	0.0200	0.0199	0.0200	0.0194	100	97	60-128	3	30
Carbon Tetrachloride	0.0200	0.0178	0.0200	0.0175	89	87	62-129	2	30
Chlorobenzene	0.0200	0.0204	0.0200	0.0202	102	101	80-120	1	30
Chloroethane	0.0200	0.0171	0.0200	0.0163	86	81	43-137	5	30
Chloroform	0.0200	0.0195	0.0200	0.0194	98	97	80-120	0	30
Chloromethane	0.0200	0.0162	0.0200	0.0158	81	79	56-120	2	30
Cyclohexane	0.0200	0.0183	0.0200	0.0178	92	89	58-126	3	30
1,2-Dibromo-3-chloropropane	0.0200	0.0169	0.0200	0.0172	84	86	47-126	2	30
Dibromochloromethane	0.0200	0.0186	0.0200	0.0181	93	91	65-120	2	30
1,2-Dibromoethane	0.0200	0.0195	0.0200	0.0196	98	98	74-120	1	30
1,2-Dichlorobenzene	0.0200	0.0195	0.0200	0.0193	97	97	80-120	1	30
1,3-Dichlorobenzene	0.0200	0.0196	0.0200	0.0194	98	97	80-120	1	30
1,4-Dichlorobenzene	0.0200	0.0201	0.0200	0.0198	101	99	80-120	2	30
Dichlorodifluoromethane	0.0200	0.0134	0.0200	0.0129	67	64	10-133	4	30
1,1-Dichloroethane	0.0200	0.0202	0.0200	0.0198	101	99	77-120	2	30
1,2-Dichloroethane	0.0200	0.0194	0.0200	0.0194	97	97	71-128	0	30
1,1-Dichloroethene	0.0200	0.0208	0.0200	0.0204	104	102	73-129	2	30
cis-1,2-Dichloroethene	0.0200	0.0202	0.0200	0.0199	101	99	80-120	1	30
trans-1,2-Dichloroethene	0.0200	0.0206	0.0200	0.0201	103	100	80-125	3	30
1,2-Dichloropropane	0.0200	0.0206	0.0200	0.0204	103	102	76-120	1	30
cis-1,3-Dichloropropene	0.0200	0.0182	0.0200	0.0182	91	91	66-120	0	30
trans-1,3-Dichloropropene	0.0200	0.0186	0.0200	0.0186	93	93	63-124	0	30
Ethylbenzene	0.0200	0.0205	0.0200	0.0203	103	101	80-120	1	30
Freon 113	0.0200	0.0189	0.0200	0.0185	94	92	59-139	2	30
2-Hexanone	0.100	0.0981	0.100	0.0969	98	97	51-131	1	30
Isopropylbenzene	0.0200	0.0200	0.0200	0.0195	100	97	76-120	2	30
Methyl Acetate	0.0200	0.0197	0.0200	0.0191	98	95	54-146	3	30
Methyl Tertiary Butyl Ether	0.0200	0.0172	0.0200	0.0172	86	86	66-123	0	30
4-Methyl-2-pentanone	0.100	0.0941	0.100	0.0931	94	93	53-134	1	30
Methylcyclohexane	0.0200	0.0183	0.0200	0.0179	92	89	61-124	2	30
Methylene Chloride	0.0200	0.0205	0.0200	0.0203	102	102	76-122	1	30
Styrene	0.0200	0.0195	0.0200	0.0193	98	97	76-120	1	30
1,1,2,2-Tetrachloroethane	0.0200	0.0206	0.0200	0.0201	103	100	61-131	3	30
Tetrachloroethene	0.0200	0.0192	0.0200	0.0187	96	94	73-120	2	30
Toluene	0.0200	0.0207	0.0200	0.0204	104	102	80-120	2	30
1,2,4-Trichlorobenzene	0.0200	0.0171	0.0200	0.0173	86	87	62-127	1	30
1,1,1-Trichloroethane	0.0200	0.0173	0.0200	0.0169	87	85	61-125	2	30
1,1,2-Trichloroethane	0.0200	0.0207	0.0200	0.0203	104	101	80-120	2	30
Trichloroethene	0.0200	0.0193	0.0200	0.0189	96	95	80-120	2	30
Trichlorofluoromethane	0.0200	0.0179	0.0200	0.0172	89	86	47-132	4	30
Vinyl Chloride	0.0200	0.0163	0.0200	0.0159	82	79	59-120	3	30
Xylene (Total)	0.0600	0.0603	0.0600	0.0592	100	99	80-120	2	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

LCS/LCSD (continued)

Analysis Name	LCS Spike Added	LCS Conc	LCSD Spike Added	LCSD Conc	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 17241SLB026	Sample number(s): 9177551,9177553,9177555,9177557,9177559								
Acenaphthene	0.0333	0.0324			97		85-122		
Acenaphthylene	0.0333	0.0241			72		68-102		
Anthracene	0.0333	0.0282			85		75-111		
Benzo(a)anthracene	0.0333	0.0303			91		83-112		
Benzo(a)pyrene	0.0333	0.0273			82		78-108		
Benzo(b)fluoranthene	0.0333	0.0282			85		75-120		
Benzo(g,h,i)perylene	0.0333	0.0255			76		71-109		
Benzo(k)fluoranthene	0.0333	0.0291			87		78-113		
Chrysene	0.0333	0.0282			85		79-111		
Dibenz(a,h)anthracene	0.0333	0.0271			81		66-119		
Fluoranthene	0.0333	0.0277			83		82-110		
Fluorene	0.0333	0.0294			88		81-115		
Indeno(1,2,3-cd)pyrene	0.0333	0.0264			79		65-114		
Naphthalene	0.0333	0.0265			79		71-114		
Phenanthrene	0.0333	0.0277			83		78-106		
Pyrene	0.0333	0.0328			98		73-109		
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 17243A34A	Sample number(s): 9177553,9177555,9177557,9177559								
TPH-GRO AK soil C6-C10	11	10.22	11	9.98	93	91	60-120	2	20
Batch number: 17243A34B	Sample number(s): 9177551								
TPH-GRO AK soil C6-C10	11	10.22	11	9.98	93	91	60-120	2	20
	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 172440004A	Sample number(s): 9177551,9177553,9177555,9177557,9177559								
TPH-DRO AK soil C10-C25	32	23.05	32	24.9	72*	78	75-125	8	50
	%	%	%	%					
Batch number: 17244820014A	Sample number(s): 9177551,9177553-9177555,9177557-9177559								
Moisture	89.5	89.43			100		99-101		
Moisture	89.5	89.43			100		99-101		

MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc	MS Spike Added	MS Conc	MSD Spike Added	MSD Conc	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 17241SLB026	Sample number(s): 9177551,9177553,9177555,9177557,9177559 UNSPK: P166615									
Acenaphthene	N.D.	0.0331	0.0320	0.0331	0.0307	96	93	85-122	4	30
Acenaphthylene	N.D.	0.0331	0.0228	0.0331	0.0242	69	73	68-102	6	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

MS/MSD (continued)

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc mg/kg	MS Spike Added mg/kg	MS Conc mg/kg	MSD Spike Added mg/kg	MSD Conc mg/kg	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Anthracene	0.000432	0.0331	0.0263	0.0331	0.0270	78	80	75-111	2	30
Benzo(a)anthracene	0.00103	0.0331	0.0284	0.0331	0.0294	83	86	83-112	3	30
Benzo(a)pyrene	0.000757	0.0331	0.0254	0.0331	0.0259	74*	76*	78-108	2	30
Benzo(b)fluoranthene	0.00200	0.0331	0.0279	0.0331	0.0310	78	88	75-120	11	30
Benzo(g,h,i)perylene	0.000995	0.0331	0.0238	0.0331	0.0257	69*	75	71-109	8	30
Benzo(k)fluoranthene	N.D.	0.0331	0.0276	0.0331	0.0253	83	76*	78-113	9	30
Chrysene	0.00147	0.0331	0.0273	0.0331	0.0281	78*	81	79-111	3	30
Dibenz(a,h)anthracene	N.D.	0.0331	0.0263	0.0331	0.0266	79	80	66-119	1	30
Fluoranthene	0.00172	0.0331	0.0307	0.0331	0.0286	87	81*	82-110	7	30
Fluorene	N.D.	0.0331	0.0276	0.0331	0.0250	83	76*	81-115	10	30
Indeno(1,2,3-cd)pyrene	0.000716	0.0331	0.0260	0.0331	0.0260	76	76	65-114	0	30
Naphthalene	0.0110	0.0331	0.0266	0.0331	0.0279	47*	51*	71-114	5	30
Phenanthrene	0.00272	0.0331	0.0276	0.0331	0.0289	75*	79	78-106	5	30
Pyrene	0.00168	0.0331	0.0284	0.0331	0.0298	81	85	73-109	5	30
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg					
Batch number: 172440004A	Sample number(s): 9177551,9177553,9177555,9177557,9177559 UNSPK: P177908									
TPH-DRO AK soil C10-C25	67.3	31.8	614.26	31.8	88.43	1720*	66	60-140	150*	50

Laboratory Duplicate

Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	BKG Conc %	DUP Conc %	DUP RPD	DUP RPD Max
Batch number: 17244820014A	Sample number(s): 9177551,9177553-9177555,9177557-9177559 BKG: P182584			
Moisture	12.92	13.17	2	5
Moisture	12.92	13.17	2	5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- Solid by 8260B
Batch number: R172441AA

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: VOCs- Solid by 8260B
Batch number: R172441AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177551	78	84	76	98
9177553	85	92	83	79
9177557	85	94	82	78
Blank	106	112	104	93
LCS	93	101	93	90
LCSD	93	99	94	90
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: R172481AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177555	82	88	97	125
9177559	61	63	64	102
Blank	89	97	82	78
LCS	97	105	91	89
LCSD	94	102	90	87
Limits:	50-141	54-135	52-141	50-131

Analysis Name: VOCs- Solid by 8260B
Batch number: X172461AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
9177554	94	100	104	101
9177558	98	115	99	94
Blank	96	99	103	95
LCS	96	101	104	99
LCSD	96	99	104	99
Limits:	50-141	54-135	52-141	50-131

Analysis Name: PAH SIM 8270 Soil Microwave
Batch number: 17241SLB026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
9177551	88	97	93
9177553	97	96	86
9177555	84	94	85
9177557	85	91	80
9177559	86	104	102
Blank	90	96	85
LCS	86	98	91

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: PAH SIM 8270 Soil Microwave
Batch number: 17241SLB026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
MS	96	92	65
MSD	86	92	89
Limits:	47-120	51-117	53-116

Analysis Name: TPH-GRO AK soil C6-C10
Batch number: 17243A34A

	Trifluorotoluene-F
9177553	92
9177555	4965*
9177557	102
9177559	7395*
Blank	101
LCS	102
LCSD	98
Limits:	60-120

Analysis Name: TPH-GRO AK soil C6-C10
Batch number: 17243A34B

	Trifluorotoluene-F
9177551	728*
Blank	90
LCS	102
LCSD	98
Limits:	60-120

Analysis Name: TPH-DRO AK soil C10-C25
Batch number: 172440004A

	Orthoterphenyl
9177551	103
9177553	100
9177555	103
9177557	90
9177559	98
Blank	94
LCS	82
LCSD	82
MS	113
MSD	88

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: ChevronTexaco
Reported: 09/18/2017 14:43

Group Number: 1843005

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report. For dual column analyses, the surrogate (at least one surrogate for multi-surrogate tests) must be within the acceptance limits on at least one of the two columns.

Analysis Name: TPH-DRO AK soil C10-C25
Batch number: 172440004A

Limits: 50-150

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Chevron Generic Analysis Request/Chain of Custody

eurofins | Lancaster Laboratories Environmental

Acct. # 10880 | For Eurofins Lancaster Laboratories Environmental use only | Group # 1843005 | Sample # 9177551-60

Instructions on reverse side correspond with circled numbers.

SCR #: 210728

1 Client Information

Facility # CEMC 211083 | WBS

Site Address: 230 OLD STEESE HWY, FAIRBANKS, AK

Chevron PM: DANIEL CARRIER | Lead Consultant: GHD SERVICES, INC.

Consultant/Office: SIOBHAN PRITCHARD

Consultant Project Mgr.: 645 G STREET, STE 401, ANCHORAGE, AK

Consultant Phone #: (720) 974-0835

Sampler: O.YAN / T. WEAVER

4 Matrix

Sediment ☐ | Ground ☐ | Surface ☐ | Potable ☐ | NPDES ☐ | Air ☐

5 Analyses Requested

Total Number of Containers

BTEX + MTBE 8021 ☐ 8260 ☐ Naphth ☐ | 8260 full scan | Oxygenates ____ | TPH-GRO 8015 ☐ 8260 ☐ AK101 | TPH-DRO without Silica Gel Cleanup ☐ AK102 | TPH-DRO with Silica Gel Cleanup ☐ | VPH ☐ EPH ☐ Method ____ | Lead Total ☐ Diss. ☐ Method ____ | PAHs by 8270 SIM | Moisture

- ☐ Results in Dry Weight
- ☐ J value reporting needed
- ☐ Must meet lowest detection limits possible for 8260 compounds
- ☐ 8021 MTBE Confirmation
- ☐ Confirm MTBE + Naphthalene
- ☐ Confirm highest hit by 8260
- ☐ Confirm all hits by 8260
- ☐ Run _____ oxy's on highest hit
- ☐ Run _____ oxy's on all hits

6 Remarks

email results to siobhan.pritchard@ghd.com and oliver.yan@ghd.com

2 Sample Identification	Collected Date	Collected Time	3 Grab	Composite	Soil	Water	Oil	Total Containers	BTEX+MTBE	8260 full scan	Oxygenates	TPH-GRO	TPH-DRO w/o SGC	TPH-DRO w/ SGC	VPH	EPH	Lead	PAHs	Moisture
SB17-5-S-15-170824	8/24/17	1444	X		X			9		X		X	X					X	X
SB17-5-S-22-170824	↓	1455	X		X			9		X		X	X					X	X
SB17-6-S-15-170824		1325	X		X			9		X		X	X					X	X
SB17-6-S-22-170824		1400	X		X			9		X		X	X					X	X
DUP-2-S-170824		—	X		X			9		X		X	X					X	X

7 Turnaround Time Requested (TAT) (please circle)

Standard | 5 day | 4 day | 72 hour | 48 hour | 24 hour

8 Data Package (circle if required)

Type I - Full | Alaska/Type III | Type VI (Raw Data)

EDD (circle if required): CVX-RTBU-FI_05 (default) | Other: _____

Relinquished by	Date	Time	Received by	Date	Time
	8-16-17	1415		8/17/17	1600
	8/25/17	0800		Date	Time

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Received by | Date 8/26/17 | Time 945

Temperature Upon Receipt 0.8-3.2 °C

Custody Seals Intact? Yes / No

eurofins | Lancaster Laboratories Environmental

Sample Administration Receipt Documentation Log

Doc Log ID: 192702

Group Number(s): 1843005

Client: Chevron

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	08/26/2017 9:45
Number of Packages:	4	Number of Projects:	1
State/Province of Origin:	AK		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Simon Nies (25112) at 14:52 on 08/26/2017

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT146	2.7	DT	Wet	Y	Bagged	N
2	DT146	1.3	DT	Wet	Y	Bagged	N
3	DT146	0.8	DT	Wet	Y	Bagged	N
4	DT146	3.2	DT	Wet	Y	Bagged	N

2425 New Holland Pike
Lancaster, PA 17605-2425
T | 717-656-2300
F | 717-656-2681
www.LancasterLabs.com

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	non-detect
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Appendix K
ADEC Laboratory Data Review Checklist and Memorandum

Laboratory Data Review Checklist

Completed by:

J Cloud

Title:

Project Chemist

Date:

January 31, 2018

CS Report Name:

Report Date:

September 18, 2017

Consultant Firm:

GHD Services Inc.

Laboratory Name:

Eurofins Lancaster Laboratories Environmental

Laboratory Report Number:

1843003 and 1843005

ADEC File Number:

Hazard Identification Number:

1. Laboratory

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

      (•) Yes ( ) No Comments:

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

      ( ) Yes (•) No Comments:

      Samples not transferred

2. Chain of Custody (COC)

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

      (•) Yes ( ) No Comments:

   b. Correct analyses requested?

      (•) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

      (•) Yes ( ) No Comments:

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

      (•) Yes ( ) No Comments:

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

      (•) Yes ( ) No Comments:

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

      ( ) Yes (•) No Comments:

      No discrepancies

e. Data quality or usability affected?

Comments:

None

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

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

Comments:

The total xylenes result for sample SB17-1-22 was reported outside of the upper end of the instrument calibration range and was qualified as estimated.

5. Samples Results

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

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

c. All soils reported on a dry weight basis?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

e. Data quality or usability affected?

Comments:

None

6. QC Samples

a. Method Blank

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

(•) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(•) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

No affected samples

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

( ) Yes (•) No Comments:

No affected samples

v. Data quality or usability affected?

Comments:

None

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

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

(•) Yes ( ) No Comments:

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

( ) Yes (•) No Comments:

The moisture analysis did not have a project related matrix duplicate

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

○ Yes ◉ No Comments:

One method 8270 LCS had a low benzo(a)pyrene recovery and the method AK102 LCS/LCSD set had a low DRO recovery

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

◉ Yes ○ No Comments:

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

Comments:

All samples were affected

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

◉ Yes ○ No Comments:

vii. Data quality or usability affected?

Comments:

The benzo(a)pyrene results for samples SB17-1-15, SB17-1-22, SB17-2-15, SB17-2-22, SB17-3-15, SB17-3-20, SB17-3-22 and SB17-4-15 and all DRO results were qualified as estimated due to the implied low bias

c. Surrogates – Organics Only

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

◉ Yes ○ No Comments:

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

◉ Yes ○ No Comments:

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

○ Yes ◉ No Comments:

No failed surrogates

iv. Data quality or usability affected?

Comments:

None

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

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

○ Yes ◉ No Comments:

Not submitted

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

○ Yes ○ No Comments:

Not submitted

iii. All results less than LOQ?

○ Yes ◉ No Comments:

Not submitted

iv. If above LOQ, what samples are affected?

Comments:

Not submitted

v. Data quality or usability affected?

Comments:

Not submitted

e. Field Duplicate

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

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

○ Yes ◉ No Comments:

One field duplicate sample set had several high RPDs

iv. Data quality or usability affected?

Comments:

The cyclohexane, methylcyclohexane, acenaphthene, anthracene, fluorene, phenanthrene and DRO results for samples SB17-6-15 and DUP-2 were qualified as estimated due to variability

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below.)

○ Yes ○ No ◉ Not Applicable

i. All results less than LOQ?

○ Yes ◉ No Comments:

Not collected

ii. If above LOQ, what samples are affected?

Comments:

Not collected

iii. Data quality or usability affected?

Comments:

Not collected

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

a. Defined and appropriate?

◉ Yes ○ No Comments:

Memorandum

April 2, 2018

To:	ADEC	Ref. No.:	065004
	AuthorInitials		
From:	Jeffrey Cloud	Tel:	206-914-3141
cc:	Siobhan Pritchard		

Subject: **QA/QC Review**
ChevronTexaco Site 21-1083
Job # 1843003 and 1843005
August 2017

1. Introduction

This document details a reduced validation of analytical results for soil samples collected in Fairbanks, Alaska during August 2017. Samples were submitted to Eurofins Lancaster Laboratories Environmental, located in Lancaster, Pennsylvania.

Standard GHD report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody forms, finished report forms, method blank data, recovery data from surrogate spikes, laboratory control samples and field QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods and applicable guidance from the document entitled "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008 subsequently referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria and sample preservation requirements for the analyses are summarized in the methods. The sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly delivered on ice and stored by the laboratory at the required temperature (0-6°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices. Due to necessary sample dilutions, surrogate recoveries were not assessed for some samples.

All samples submitted for volatile organic compound (VOC), semivolatile organic compound (SVOC), gasoline range organics (GRO) and diesel range organics (DRO) analysis were spiked with the appropriate number of surrogate compounds prior to sample extraction.

Each individual surrogate compound is expected to meet the associated control limits with the exception of SVOC analyses. According to the "Guidelines" for SVOC analyses, up to one outlying surrogate in the base/neutral or acid fractions is acceptable as long as the recovery is at least 10 percent.

Surrogate recoveries were assessed against the control limits. All surrogate recoveries met the associated criteria.

5. Laboratory Control Sample Analyses

Laboratory control samples (LCS)/laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS or LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

The LCS and LCS/LCSD contained all analytes of interest. All LCS and LCS/LCSD recoveries and RPDs were within associated control limits, demonstrating acceptable analytical accuracy and precision (where applicable) with the exception of two low recoveries. The benzo(a)pyrene results for samples SB17-1-15, SB17-1-22, SB17-2-15, SB17-2-22, SB17-3-15, SB17-3-20, SB17-3-22 and SB17-4-15 and all DRO results were qualified as estimated due to the implied low bias.

6. Field QA/QC Samples

The field QA/QC consisted of two field duplicate sample sets.

To assess the analytical and sampling protocol precision, two field duplicate samples were collected and submitted "blind" to the laboratory. The RPDs associated with these duplicate samples must be less than 100 percent. If the reported concentration in both the investigative sample and its duplicate is less than five times the reporting limit (RL), the evaluation criterion is two times the RL value.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision with a few exceptions. The cyclohexane, methylcyclohexane, acenaphthene, anthracene, fluorene, phenanthrene and DRO results for samples SB17-6-15 and DUP-2 were qualified as estimated due to variability.

7. Analyte Reporting

Non-detect data were reported down to the laboratory's method detections limit (MDL) for each analyte. Positive analyte detections less than the reporting limit (RL) but greater than the MDL were reported as estimated (J).

All soil results were reported on a dry weight basis.

The total xylenes result for sample SB17-1-22 was reported outside of the upper end of the instrument calibration range and was qualified as estimated.

8. Conclusion

Based on the assessment detailed in the foregoing, the summarized data are acceptable with the specific qualifications noted herein.

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