2107.26.003

CONESTOGA-ROVERS
& ASSOCIATES

2828 North Speer Boulevard, Suite 140
Denver, Colorado 80211
Telephone: (303) 433-3650
Facsimile: (303) 433-3974
CRAworld.com

December 4, 2008

Mr. Robert Weimer
Alaska Department of Environmental Conservation
555 Cordova Street
Anchorage, Alaska 99501

Re: **Well Decommission and Installation Report**
Chevron-branded Service Station 9-1252
11836 Old Glenn Highway
Eagle River, Alaska
Hazard ID: 23709
File ID: 2107.26.003
CRA Project No. 620914

Dear Mr. Weimer:

Conestoga-Rovers & Associates (CRA) is submitting this *Well Decommission and Installation Report* to the Alaska Department of Environmental Conservation (ADEC) on behalf of Chevron Environmental Management Company (Chevron) for the site referenced above. CRA decommissioned and replaced monitoring well MW-1, which historically contained insufficient groundwater for sampling. The site background, field activities, and conclusions are presented below.

SITE BACKGROUND

Site Description: The site is currently a Chevron-branded service station located at 11836 Old Glenn Highway in Eagle River, Alaska (Figure 1). Site facilities include three underground storage tanks (USTs), fuel dispenser islands, associated piping, and a station building. Four on-site monitoring wells are currently sampled semiannually.

Regional Geology: The site is located in the glacially carved Eagle River Valley west of the Chugach Mountains and east of the Knik Arm of the Cook Inlet. Regional geology consists of Pleistocene glacial, alluvial and colluvial deposits, underlain by Tertiary and Mesozoic rocks. Glacial deposits consisting of interbedded sands, gravel and cobbles have been encountered to the explored depth of 44 feet below grade (fbg).

FIELD ACTIVITIES

Well Decommission and Installation Rationale

Groundwater monitoring well MW-1 was installed in a perched aquifer at a depth of 23.25 fbg in 2003, and has historically contained insufficient groundwater for sampling. CRA decommissioned groundwater monitoring well MW-1 and installed replacement well MW-1R with a deeper screen interval (Figure 2).

Well Decommissioning

CRA decommissioned the well in accordance with the ADEC's *Monitoring Well Design and Construction for Investigation of Contaminated Sites, February 2008.* The well plug was removed and backfilled with bentonite chips to approximately 1 fbg. Then entire casing was removed with an air rotary drill rig. The well vault was removed and the area was finished to grade with concrete underlain by clean silica sand.

Soil Boring and Well Installation

CRA conducted all activities in accordance with the ADEC's *Monitoring Well Design and Construction for Investigation of Contaminated Sites, February 2008,* and CRA's Chevron approved *Health and Safety Plan* and *Journey Management Plan.* Details of the soil borings and well installations are presented below.

Drilling Dates: September 17, 2008 and October 23, 2008

CRA Personnel: Nick Greco and Eric Purcell supervised vacuum truck utility clearance. Brian Duggan and Eric Purcell supervised drilling.

Drilling Companies: AK Pipeliner of Anchorage, Alaska was subcontracted to clear utilities to 8 fbg with a vacuum truck. Wininger & Sons of Wasilla, Alaska (Wininger) via Discovery Drilling of Anchorage, Alaska (Discovery) was subcontracted to conduct air rotary drilling.

Site Health and Safety Plan: CRA prepared a site health and safety plan to inform site workers of known hazards and to provide health and safety guidance. In addition, job loss analyses and a journey management plan were reviewed with site workers to address any

safety concerns and safe traffic routes to be used during site activities. The plans were onsite at all times during field work and signed daily by all site workers.

Subsurface Utility Clearance: Alaska Digline was notified prior to site activities to clear the well decommission and installation locations with utility companies. A private utility locator was used to identify subsurface utilities. The soil boring was cleared to 8 fbg with a vacuum truck prior to drilling.

Soil Borings: Soil boring SB-1R was cleared by vacuum truck to 8 fbg and advanced to 42 fbg by air rotary equipped with 6-inch outer diameter drill casings. Samples were collected with a 2-foot core barrel advanced by a 300-pound slide hammer at approximately 5-foot intervals between 10 and 42 fbg. A trained geologist and ADEC Qualified Person logged the soil boring. The soil boring log is presented as Attachment A. CRA's standard operating procedures for soil borings are presented as Attachment B.

Well Installation: Soil boring SB-1R was advanced to approximately 42 fbg and completed as groundwater monitoring well MW-1R. Department of Natural Resources water well logs are presented as Attachment C.

Well Construction: Monitoring well MW-1R was constructed of 2-inch diameter, schedule 40 PVC pipe with 0.020-inch screen and clean #10/20 silica sand. The well is screened from 25 to 40 fbg. The well was set in a 6-inch outer diameter boring and completed with a flush mount vault and graded with concrete. CRA's standard operating procedures for monitoring well installation are presented as Attachment D.

Site Stratigraphy: Site sediments were primarily well-graded gravel with sand approximately 10 to 20 fbg and 35 to 40 fbg. A small, perched water table was underlain by a silty clay confining layer located approximately 20 to 22 fbg. Sediments located 22 to 35 fbg were primarily silt and sand with gravel. The soil boring and monitoring well log is presented as Attachment A.

Soil Screening: Soil samples were screened for petroleum hydrocarbons using a photo ionization detector (PID). Soil samples were submitted for laboratory analyses based on PID screening results.

Laboratory Analyses: The collected soil samples, equipment blank, and trip blanks were analyzed for one or more of the following analytes:

- DRO by Alaska Series Method AK102,
- GRO by Alaska Series Method AK101, and
- BTEX by EPA Method 8021B

Soil Disposal: Soil cuttings were stored in 55-gallon Department of Transportation approved drums. ADEC approved soil disposal in a November 11, 2008 electronic mail to CRA. ASR will treat the soil when operations continue in 2009.

Well Development: CRA personnel developed groundwater monitoring well MW-1R on October 24, 2008 by agitating the water column for approximately ten minutes with a surge block, followed by purging to remove silt and draw in formation water. Well development forms are presented as Attachment E. CRA's standard operating procedures for well development are presented as Attachment F.

SOIL SAMPLING RESULTS

Laboratory Analytical Results: The maximum detected DRO concentration was 22 milligrams per kilogram (mg/kg) at 20 to 22 fbg. GRO concentrations ranged from 0.3 to 9.1 mg/kg. Benzene exceeded soil cleanup levels in sample SB-1R-20-22 (4.1 mg/kg) and the duplicate sample DUP-1 (2.2 mg/kg). Soil analytical results are summarized in Table 1. Petroleum hydrocarbon concentrations are presented on Figure 2. The laboratory analytical report is presented at Attachment G. The ADEC laboratory summary and data review checklist is presented as Attachment H.

CONCLUSIONS

Boring log data from MW-1R (CRA 2008), MW-1 (Secor 2003), SB-2 (Secor 2003) and BH-02 (Fluor Daniel 1998) have identified low permeability silty clay/sandy clay/clayey silt units at approximately 15-21 fbg. Boring log data from SB-1 and SB-4 (Secor 2003) and MW-5 and MW-6 (Cambria 2006) contained permeable silty gravels/sandy gravels at approximately 15-21 fbg suggesting that a confining unit or perched aquifer is present along the eastern site margin at approximately 15-21 fbg.

Historical DRO concentrations in groundwater samples collected from MW-1 have ranged from 0.77 mg/L to 3.9 mg/L, above the ADEC cleanup standard of 2.2 mg/L. MW-1 is located at the eastern site boundary approximately 30 ft west of the Old Glenn Highway (Figure 2). MW-1 is upgradient of the site UST complex, dispensers and associated piping. It is highly likely that groundwater impact near well MW-1 or MW-1R is from an offsite source.

No DRO, GRO, toluene, ethylbenzene, or xylenes were detected above ADEC Method II Soil Cleanup Levels (18 Alaska Administrative Code (AAC) 75.341) in soil samples collected from SB-1R/MW-1R. Benzene exceeded ADEC Method II Table B1 cleanup levels in soil sample SB-1R/MW-1R-20-22 (4.1 mg/kg) and the duplicate sample DUP-1 (2.2 mg/kg). The soil impact may be retained by the confining unit encountered at 20 ft bgs and has likely migrated from an offsite upgradient/crossgradient source.

Groundwater impact has attenuated to below ADEC Table C cleanup levels in site wells MW-2, MW-3, and MW-4, MW-5 and MW-6 for all constituents of concern. Groundwater quality has been below Table C levels for a minimum of four consecutive sampling events.

RECOMMENDATIONS

CRA recommends semiannual sampling of well MW-1R to assess groundwater quality and assess whether upgradient sources are migrating onsite. CRA recommends a historical file review to identify potential source areas near the site. Groundwater quality at the site is within cleanup standards with the exception of newly installed well MW-1R. CRA recommends evaluating groundwater conditions in MW-1R upon completion of the 2009 sampling events and discussing the potential for Cleanup Complete with Institutional Controls with the ADEC.

CLOSING

We appreciate the opportunity to work with Chevron and the ADEC on this project. Alaska Qualified Personnel in accordance with *18 AAC 75, Article 3 and 18 AAC 78, Article 2, 6, and 9,* conducted and/or supervised all project work. Please call Andy Ellsmore at (303) 433-3650 with any questions regarding this report.

Sincerely,
Conestoga-Rovers & Associates

Andy Ellsmore, GIT
Project Geologist

John Riggi, P.G.
Senior Project Geologist

Figures: 1 – Vicinity Map
2 – Soil Sample Concentration Map

Table: 1 – Soil Analytical Results

Attachments: A – Soil Boring and Monitoring Well Logs
B – Standard Operating Procedures for Soil Borings
C – Department of Natural Resources Water Well Logs
D – Standard Operating Procedures for Monitoring Well Installation
E – Well Development Forms
F – Standard Operating Procedures for Well Development
G – Laboratory Analytical Report
H – ADEC Laboratory Summary and Data Review Checklist

cc: Mr. Greg Barton, Chevron Environmental Management Company,
6111 Bollinger Canyon Road, Room 3620, San Ramon, California 94583

Mr. Steve Ellis, Cook Inlet Marketing Group, PO Box 231084, Anchorage, Alaska 99523

Conestoga-Rovers & Associates

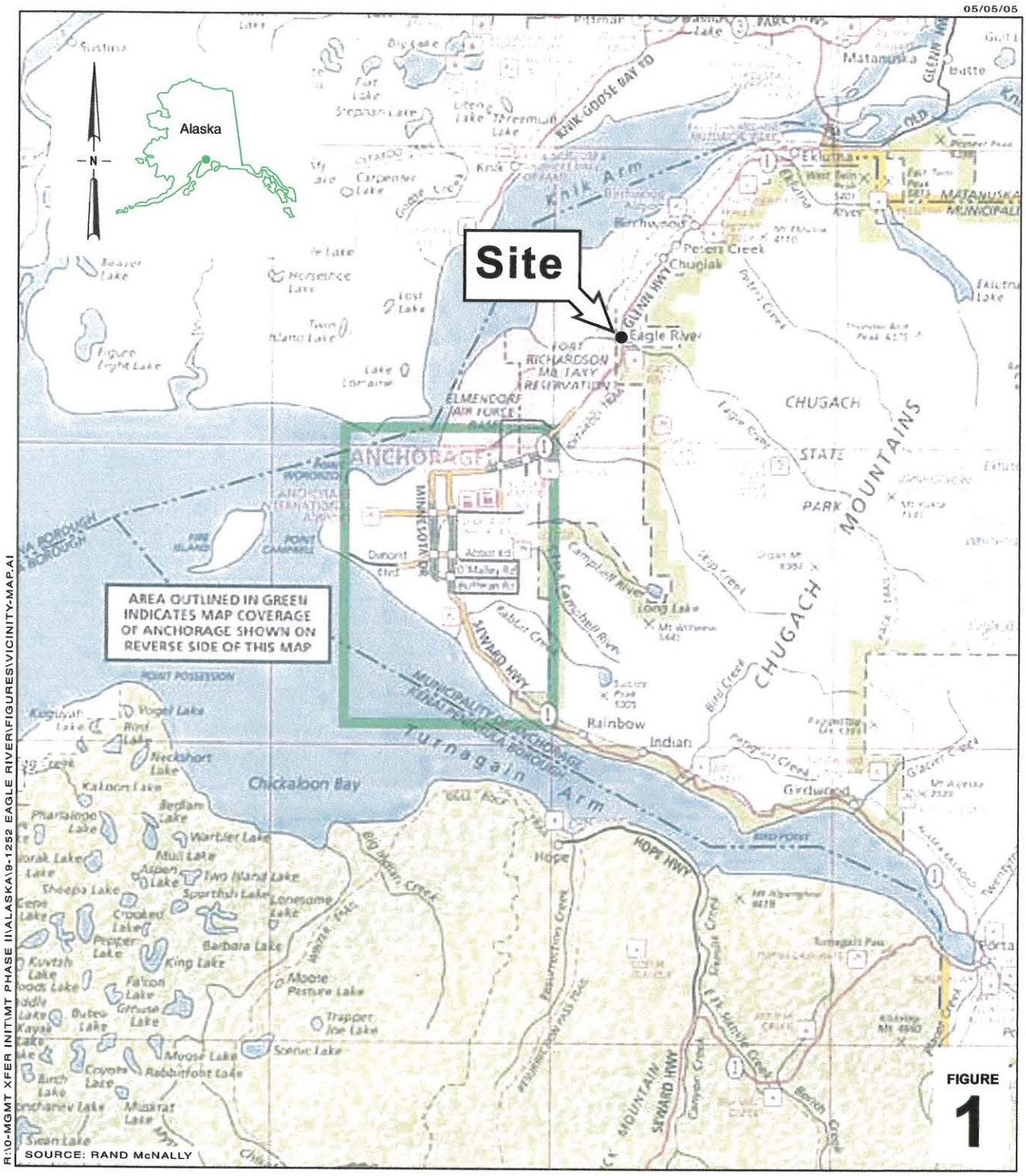
I:\Denver\Alaska Diamond Projects\9-1252 Eagle River\Reports\Subsurface Investigation 2008\9-1252 SSI 12-08 Final.doc

REFERENCES

Alaska Department of Environmental Conservation, *Monitoring Well Design and Construction for Investigation of Contaminated Sites,* February 2008

Alaska Department of Environmental Conservation, *Underground Storage Tanks Procedures Manual, Guidance for Treatment of Petroleum-Contaminated Soil and Groundwater and Standard Sampling Procedures*, November 7, 2002

United States Geological Survey, *Geologic Map of Alaska*, Complied by Helen M. Belkman, 1980.



Chevron Service Station 9-1252

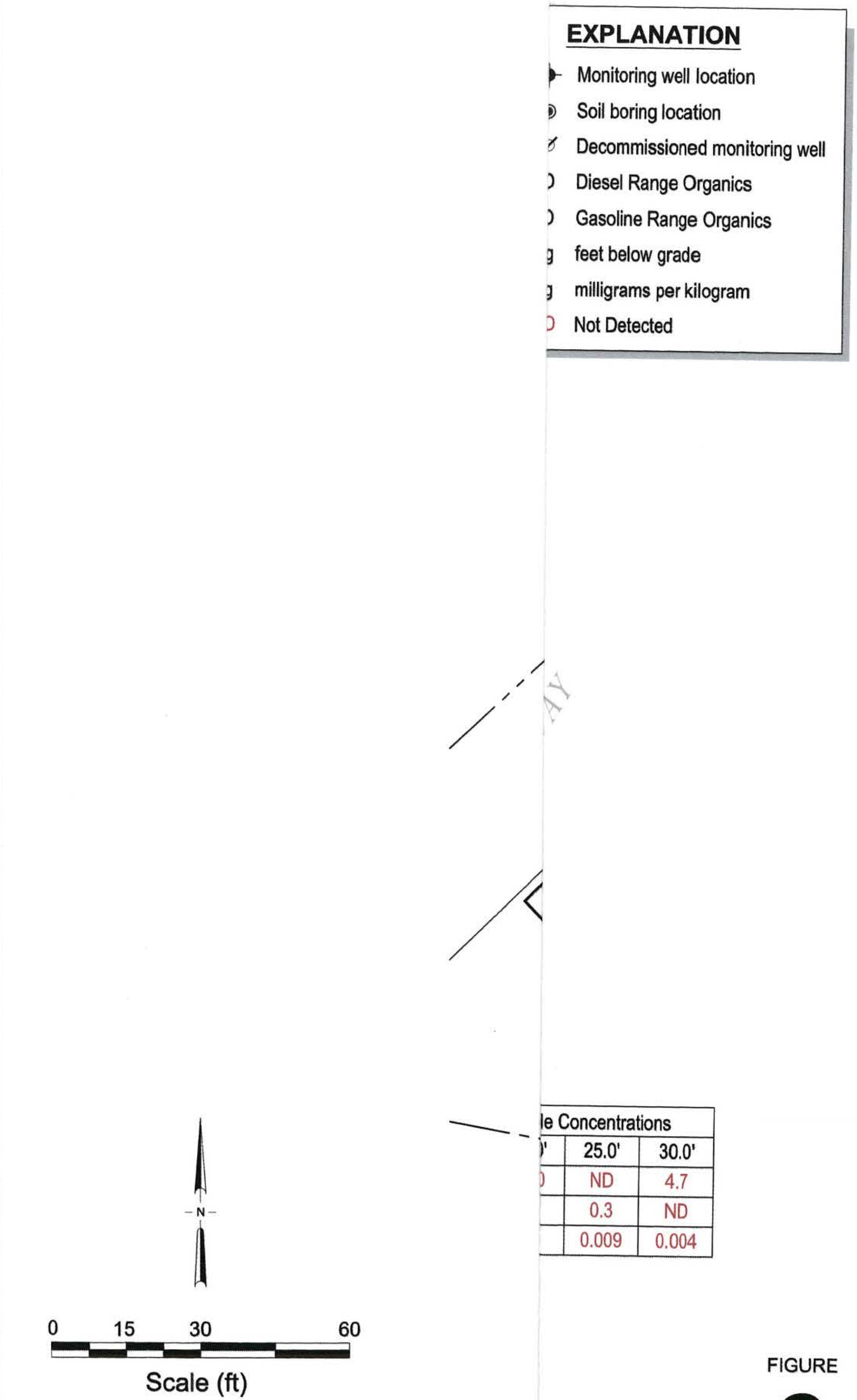
11836 Old Glenn Highway

Eagle River, Alaska

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map

12/04/08



This figure is based on a siteplan provided by Fluor Daniel GTI, Dated September 1998 and is intended for illustration only

R:\0-MGMT TRANSFER INITIATIVE\MT PHASE II\ALASKA\9-1252 EAGLE RIVER\FIGURES\9-1252_SAMPLES.dwg

FIGURE

2

Soil Sample Concentration Map

CONESTOGA-ROVERS & ASSOCIATES

Chevron Service Station 9-1252
11836 Old Glenn Highway
Eagle River, Alaska

Table 1. **Soil Analytical Results** - Chevron-branded Service Station 9-1252, 11836 Old Glenn Highway, Eagle River, Alaska

Sample ID	Date Sampled	Sample Depth (fbg)	DRO	GRO	Benzene	Toluene	Ethylbenzene	Xylenes
			← (mg/kg) →					
SB-1R-17-19	10/23/2008	17.0	7.0	0.30	0.01	0.03	0.005	0.06
SB-1R-20-22	10/23/2008	20.0	8.0	9.1	**4.1**	0.01	0.008	0.04
SB-1R-20-22(d)	10/23/2008	20.0	52	7.8	**2.2**	0.05	0.3	1.2
SB-1R-25-27	10/23/2008	25.0	<4.3	0.3	0.009	0.01	<0.003	<0.01
SB-1R-30-32	10/23/2008	30.0	4.7	<0.3	0.004	0.004	<0.003	<0.01
EB-1(w)*	10/23/2008	--	0.10	0.07	<0.001	<0.001	<0.001	<0.002
Trip Blank (m)	--	--	--	<0.5	<0.005	0.01	<0.005	<0.02
ADEC Method II Soil Cleanup Levels**			**250**	**300**	**0.025**	**6.5**	**6.9**	**63**

Abbreviations and Methods:

DRO = Diesel range organics by Alaska Series Method AK102
GRO = Gasoline range organics by Alaska Series Method AK101
BTEX = Benzene, toluene, ethylbenzene, and xylenes by Method SW-846 8021B
fbg = Feet below grade
mg/kg = Milligrams per kilogram
<x = Constituent not detected above x milligrams per kilogram
-- = Not analyzed / applicable
(d) = Duplicate sample
(w) = Water sample
EB = Equipment blank
(m) = Methanol trip blank
ADEC = Alaska Department of Environmental Conservation
EPA = Environmental Protection Agency
* = Concentrations in milligrams per Liter
** = Levels established in ADEC Method II - Soil Cleanup Levels, Revised October 2008, 18 AAC 75.341

ATTACHMENT A

Soil Boring and Monitroing Well Logs

Conestoga-Rovers & Associates
2828 North Speer Boulevard, Suite 140
Denver, CO 80211
Telephone: 303-433-3650
Fax: 303-433-3974

BORING / WELL LOG

CLIENT NAME	Chevron Environmental Management Company	**BORING/WELL NAME**	MW-1R
JOB/SITE NAME	Chevron-branded Service Station 9-1252	**DRILLING STARTED**	17-Sep-08
LOCATION	11836 Old Glenn Highway Eagle River, Alaska	**DRILLING COMPLETED**	23-Oct-08
PROJECT NUMBER	622059	**WELL DEVELOPMENT DATE (YIELD)**	24-Oct-08
DRILLER	Discovery (Wininger & Sons)	**GROUND SURFACE ELEVATION**	NA
DRILLING METHOD	Air Rotary	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	6-inch	**SCREENED INTERVALS**	25 to 40 fbg
LOGGED BY	Eric Purcell	**DEPTH TO WATER (First Encountered)**	19.0 fbg (23-Oct-08) ▽
REVIEWED BY	Brian Duggan, P.E. 40693	**DEPTH TO WATER (Static)**	30.55 fbg (28-Oct-08) ▼
REMARKS	Cleared to 8 feet below grade with vacuum-truck		

PID (ppm)	BLOW COUNTS	SAMPLE ID	DEPTH (fbg)	U.S.C.S.	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)
			5	GW	**FILL:** 50% sand, 50% gravel, and 20% 8-inch cobbles by volume.	8.0
0	60+		10		REFUSAL	10.0
						12.0
0	13 13 13 16		15	GW	**GRAVEL with sand:** Light brown; moist; 60% well-graded, fine to coarse, angular to subangular, gravel and 40% sand.	15.0 17.0
0.4	65+	SB-1R -17-19		GW	**GRAVEL with sand:** Brown; wet; well-graded, fine to coarse, angular to subangular, 60% gravel and 40% sand. ▽ Refusal at 18 fbg.	18.0
9.7	11 16 100	SB-1R -20-22	20	CL	**Silty CLAY:** Brown; moist; low plasticity; 70% clay, 25% silt, 5% gravel.	20.0 21.5
0.1	23 34 37	SB-1R -25-27	25	ML	**SILT with gravel:** Brown; dry; 60% silt, 30% gravel, 5% sand, 5% clay. Refusal at 26.5 fbg.	25.0 26.5
0.3	25 28 31 38	SB-1R -30-32	30	SM	**Silty SAND:** Brown; moist to wet; 60% well-graded, very fine to medium sand, 35% silt, and 5% gravel. ▼	30.0 32.0
0.2	75+		35	GM	**GRAVEL with silt:** Gray brown; wet; 85% well-graded gravel, 10% silt, and 5% sand. Refusal at 35.5 fbg.	35.0 35.5
0	17 45 55 57		40	SW	**SAND:** Dark brown; wet; 95% well-graded, angular sand and 5% gravel.	40.0 42.0

WELL DIAGRAM: Concrete; Hydrated Bentonite; 10/20 Silica Sand; 2-inch diam., 0.020 Slotted Schedule 40 PVC; Bottom of Boring @ 42 fbg

WELL LOG (PID) DENVER C:\DOCUMENTS AND SETTINGS\MWERNER\DESKTOP\622059 9-1252 (OCT-2009) BORING LOG GINT SPREADSHEET (DRAFT).GPJ DEFAULT.GDT 12/4/08

ATTACHMENT B

Standard Operating Procedures for Soil Borings

CONESTOGA-ROVERS
& ASSOCIATES

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

This document describes Conestoga-Rovers & Associates' standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate groundwater depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist or engineer working under the supervision of an Alaska Qualified Person (AQP). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel),
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic push technologies. Prior to drilling, the first 8 ft of the boring are cleared using an air or water knife and vacuum extraction. This minimizes the potential for impacting utilities.

At least one and one half feet of the soil column is collected for every five ft of drilled depth. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and sampling equipment is decontaminated per Alaska Department of Environmental Conservation regulations prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

CONESTOGA-ROVERS
& ASSOCIATES

Sample Storage, Handling and Transport

Single use plastic sterile-scoops are used to transfer approximately 20 to 40 grams of soil sample from the split-spoon sampler to 4 oz. amber glass jars with Teflon lined screw cap lids containing methanol preservative such that the entire vial of methanol covers the matrix. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

The some of the remaining soil from the split-spoon sampler is collected in a plastic bag and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the bag headspace, extracting the vapor through a slit in the bag. PID measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are collected at a rate of one blind sample for every 10 soil samples. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

9/22/08

ATTACHMENT C

Department of Natural Resources Water Well Logs

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
WATER WELL LOG

Drilling Started: 9 / 17 / 2008, Completed: 10 / 23 / 2008

City/Borough:	Subdivision:	BLOCK	LOT	Property Owner Name & Address:
Eagle River	Regional Park #3	N/A	N3	Cook Inlet Marketing, P.O. Box 231084, Anchorage, Alaska 99523

Meridian na Township na Range na Section na , ____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4

BOREHOLE DATA: (from ground surface) **Depth**

Material: Type, Color & wetness	From	To
Sand and gravel fill, grey brown, dry	0	10
Gravel with sand; light brwn; moist-wet	10	19
Silty clay; brown; moist	19	22
Silt with gravel; brown; dry	22	28
Silty sand; brown; moist	28	33
Gravel with silt; grey brown; wet	33	40
Sand; dark brown; wet	40	42

Drilling method: ☒ Air rotary, ☐ Cable tool ☐ Other ____

Well use: ☐ Public supply, ☐ Domestic, ☒ Other monitoring

Depth of hole: 42 ft, Casing stickup: 0 ft

Casing type: PVC Thickness na inches

Casing diameter: 2 inches Casing depth 40 ft

Liner type: na Diameter: na inches Depth: na ft

Note: .....

Static water (from top of casing): 30.55 ft on 10 / 28 / 08

Pumping level & yield: na feet after na hours at na gpm

Recovery rate: na gpm, Method of testing: na

Development method: Bailer/surge block Duration: ~85 min

Well intake opening type: ☐ Open end ☐ Open hole, Other ☐

☒ Screened; Start: 25 ft, Stopped 40 ft

Screen type: PVC Slot/mesh size 0.02 inch

☐ Perforated; Start: ____ ft, Stopped ____ ft

Start: ____ ft, Stopped ____ ft

Gravel packed ☒ Yes ☐ No From 23 ft to 40 ft

Note: Screen packed with clean #10/20 silica sand

Grout type: bentonite Volume ____

Depth; from 1 ft, to 23 ft

Pump intake depth: na ft

Pump size na hp Brand name na

Was well disinfected upon completion? ☐ Yes ☒ No

Method of disinfection: .....

Driller comments/ disclaimers: Monitoring well MW-1R installation

Well driller name: Joe Wininger

Company name: Discovery Drilling

Mailing address: 11341 Olive Lane

City: Anchorage State: AK Zip ____

Phone number: (907) 344 - 6431

Drillers signature: [signature] as agent for Discovery Drilling

Date: 12 / 4 / 08

Alaska state law requires that a copy of this well log be forwarded to the Department of Natural Resources within 45 days (AK statutes 38.05.020, 38.05.035, 41.08.020, 46.15.020 and AK regulations 11 AAC 93.140). Faxes are acceptable.

Alaska DNR, Division of Mining, Land and Water,
550 W 7th Avenue, Suite 1020
Anchorage, AK 99501-3562

Phone (907)269-8639 and fax (907)269-8947

If the well is within city limits, the City of Anchorage requires that a copy of this well log be forwarded to the city within 60 days and another copy of this log be forwarded to the owner of the property, on which the well is located, within 30 days.

City Permit Number: ____

Date of Issue: ____/____/____

Parcel Identification Number: ____-____-____

Is well located at approved permit location? Yes ☐ or No ☐

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER
WATER WELL LOG

Drilling Started: 9 / 17 / 2008, Completed: 10 / 23 / 2008

City/Borough:	Subdivision:	BLOCK	LOT	Property Owner Name & Address:
Eagle River	Regional Park #3	N/A	N3	Cook Inlet Marketing, P.O. Box 231084, Anchorage, Alaska 99523

Meridian _____ Township _____ Range _____ Section _____, ____ 1/4 of ____ 1/4 of ____ 1/4 of ____ 1/4

BOREHOLE DATA: (from ground surface) Depth

Material: Type, Color & wetness	From	To
bentonite	0	23
MW-1 Decommissioned		

Drilling method: ☒ Air rotary, ☐ Cable tool ☐ Other _____

Well use: ☐ Public supply, ☐ Domestic, ☒ Other monitoring

Depth of hole: 23 ft, Casing stickup: 0 ft

Casing type: PVC Thickness na inches

Casing diameter: 2 inches Casing depth 25 ft

Liner type: na Diameter: na inches Depth: na ft

Note: .....

Static water (from top of casing): 19.49 ft on 9 / 15 / 08

Pumping level & yield: na feet after na hours at na gpm

Recovery rate: na gpm, Method of testing: na

Development method: _____ Duration: _____

Well intake opening type: ☐ Open end ☐ Open hole, Other ☐

☒ Screened; Start: 13 ft, Stopped 23 ft

Screen type: PVC Slot/mesh size 0.02 inch

☐ Perforated; Start: _____ ft, Stopped _____ ft

Start: _____ ft, Stopped _____ ft

Gravel packed ☒ Yes ☐ No From 11 ft to 23 ft

Note: Packed with sand

Grout type: bentonite Volume _____

Depth; from 1 ft, to 23 ft

Pump intake depth: na ft

Pump size na hp Brand name na

Was well disinfected upon completion? ☐ Yes ☐ No

Method of disinfection: .....

Driller comments/ disclaimers: Monitoring well MW-1 decommissio

.....

.....

Well driller name: Joe Wininger

Company name: Discovery Drilling

Mailing address: 11341 Olive Lane

City: Anchorage State: AK Zip _____

Phone number: (907) 344 - 6431

Drillers signature: [signature] as agent for Discovery Drilling

Date: 12 / 4 / 08

Alaska state law requires that a copy of this well log be forwarded to the Department of Natural Resources within 45 days (AK statutes 38.05.020, 38.05.035, 41.08.020, 46.15.020 and AK regulations 11 AAC 93.140). Faxes are acceptable.

Alaska DNR, Division of Mining, Land and Water,
550 W 7th Avenue, Suite 1020
Anchorage, AK 99501-3562

Phone (907)269-8639 and fax (907)269-8947

If the well is within city limits, the City of Anchorage requires that a copy of this well log be forwarded to the city within 60 days and another copy of this log be forwarded to the owner of the property, on which the well is located, within 30 days.

City Permit Number: _____

Date of Issue: ____/____/_____

Parcel Identification Number: _____-_____-_____

Is well located at approved permit location? Yes ☐ or No ☐

ATTACHMENT D

Standard Operating Procedures for Monitoring Well Installation

CONESTOGA-ROVERS
& ASSOCIATES

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

DRILLING AND SAMPLING

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of an ADEC Qualified Person.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Prior to drilling, the first 8 feet (ft) of the boring are cleared using an air or water knife and vacuum extraction. This minimizes the potential for impacting utilities.

Soil samples are collected at least every 5 ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is decontaminated per Alaska Department of Environmental Conservation regulations prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

CONESTOGA-ROVERS
& ASSOCIATES

Sample Analysis

Single use plastic sterile-scoops are used to transfer approximately 20 to 40 grams of soil sample from the hand-auger bucket to 4 oz. amber glass jars with Teflon lined screw cap lids containing methanol preservative such that the entire vial of methanol covers the matrix. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 fee below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

CONESTOGA-ROVERS
& ASSOCIATES

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. Rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two feet above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

CONESTOGA-ROVERS
& ASSOCIATES

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically stored onsite in sealed 55-gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Upon receipt of analytic results, the water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

ATTACHMENT E

Well Development Forms

CONESTOGA-ROVERS & ASSOCIATES

WELL DEVELOPMENT FORM

Project Name: 9-1252	CRA Mgr: A. Ellsmore	Well ID: MW-1R
Project Number: 622059	Date: 10/24/08	Well Yield: —
Site Address: 11836 Old Glenn Hwy Eagle River, AK	Development Method: Surge block / bailer	Well Diameter: 2"
		Technician(s): E. Purcell B. Duggan
Initial Depth to Water: 30.45	Total Well Depth: 38.27	Water Column Height: 7.82
Volume/ft: 0.16	1 Casing Volume: 1.25	10 Casing Volumes: 12.50
Purging Device: bailer	Did Well Dewater?: NO	Total Gallons Purged: 13

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Activity	Water Depth	Gallons Purged	Comments
1100	Surge	—	—	
1112	Purge	—	~4.0	
1127	Surge	—	—	
1140	purge	30.31	5.0	
1149	Surge	—	—	
1209	purge	30.22	9.0	
1215	Surge	—	—	
1225	purge	30.23	13.0	

ATTACHMENT F

Standard Operating Procedures for Well Development

CONESTOGA-ROVERS
& ASSOCIATES

STANDARD FIELD PROCEDURES FOR MONITORING WELL DEVELOPMENT

This document presents standard field methods for developing groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

MONITORING WELL DEVELOPMENT

Objectives

Monitoring well development objectives include removal of sediments that may have accumulated in the water column during drilling operations, stabilize the filter pack and formation materials opposite the well screen, and ensure the well produces water free of suspended solids. All development activities are conducted by a trained geologist working under the supervision of an Alaska Qualified Personnel in accordance with *18 Alaska Administrative Code (AAC) 75, Article 3 and 18 AAC 78, Article 2, 6, and 9*. Monitoring wells are developed no less than 24 hours post-installation as to allow the well seals and grout to set.

Well Development

Wells are developed using a combination of groundwater surging and purging. Surging includes the entire submerged portion of the screened interval with the use of surge blocks, bailers, or other equipment that frequently and repeatedly reverses the flow of water through the well screen. It is important that surging activities be started slowly and be increased in vigor as to free the fine particles from the sand pack, allowing them to be drawn into the water column, settling the coarser particles around the well screen and enhancing contact with the aquifer.

Purging is accomplished with the use of a bailer, submersible pump, or other equipment that adequately extracts groundwater from the water column. Development consists of a cycle of surging for several minutes followed by several minutes of purging to remove the fine sediments collecting in the well. This cycle is repeated for a minimum of 30 minutes. Purging continues until 10 well volumes of groundwater are removed or the extracted groundwater is free of suspended solids.

In the event the well is purged dry, an alternate development method is used. Following purging the well dry, one well casing volume of potable water is added to the well. The well is then surged vigorously for 10 minutes and purged dry again to complete the process. Additional water may be added to the well as necessary to properly develop the well, but should only be done as a

CONESTOGA-ROVERS
& ASSOCIATES

last resort. If the well does recover, continued development should occur only with formation water.

Groundwater Sampling

Following completion of well development activities, groundwater samples are collected for characterization using disposable bailers or the effluent portion of the pumping apparatus and decanted into the appropriate containers supplied by the analytical laboratory. Samples are labeled, placed in protective foam sleeves, stored on ice or other approved artificial cooling substance at $4^{\circ} \pm 2$ °C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples per matrix, analysis, and cooler and are analyzed to check for cross-contamination. A duplicate sample is collected and submitted per matrix, analysis, and 10 project samples for quality assurance purposes. An equipment blank will be submitted for analysis if non-dedicated sampling equipment is used.

Waste Handling and Disposal

Groundwater removed during development is typically stored onsite in sealed 55-gallon steel drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification, and consultant contact. Upon receipt of analytical results, the water is either pumped out using a vacuum truck for transport or the individual drums are picked up and transported by licensed waste haulers to a licensed waste treatment/disposal facility where the drum contents are removed and appropriately disposed.

ATTACHMENT G

Lancaster Laboratories Analytical Report

ATTACHMENT H

ADEC Laboratory Summary and Data Review Checklist

CONESTOGA-ROVERS & ASSOCIATES

2055 Niagara Falls Blvd., Suite #3
Niagara Falls, New York 14304
Telephone: (716) 297-6150 Fax: (716) 297-2265
www.CRAworld.com

MEMORANDUM

TO:	ADEC	REF. NO.:	622059
FROM:	Susan Scrocchi	DATE:	December 1, 2008
CC:	John Riggi		Send via E-Mail and U.S. Mail
RE:	**QA/QC Review** **ChevronTexaco Site # 9-1252** **Job #AKD01** **October 2008**		

INTRODUCTION

Soil samples were submitted to Lancaster Laboratories, located in Lancaster, Pennsylvania. Samples were analyzed for the methods requested on the Chain of Custody.

A full Level III data package was received from the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were reviewed. Evaluation of the data was based on information obtained from the Chain of Custody forms, finished report forms, blank data, and spike recoveries.

QA/QC REVIEW

All samples were prepared and/or analyzed within the required holding times. All water samples were properly preserved and maintained at 4°C (±2°C).

All samples and blanks were spiked with surrogate compounds prior to sample preparation and/or analysis in accordance with the organic methods. All surrogate spike recoveries met the associated method criteria indicating adequate analytical efficiency.

Method blanks were prepared and analyzed with the samples for all parameters. All blank results were non-detect for the analytes of interest.

Laboratory control samples (LCS) were analyzed for all parameters in duplicate. All recoveries were within required control limits showing adequate analytical accuracy and precision.

Matrix spikes were prepared and analyzed for the AK102 parameters. All recoveries were within required control limits showing adequate analytical accuracy.

A trip blank and equipment blank were collected and analyzed with the investigative samples.

All trip blank results were non-detect for the compounds of interest with the exception of toluene at 0.01mg/Kg. The toluene results for the following samples should be considered suspect: SB-1R-17-19,

SB-1R-20-22, SB-1R-25-27 and SB-1R-30-32.

The equipment blank yielded GRO at 0.07mg/L and DRO at 0.10mg/L. The GRO results for samples SB-1R-17-19 and SB-1R-25-27 should be considered suspect. The DRO results for following samples should be considered suspect: SB-1R-17-19, SB-1R-20-22 and SB-1R-30-32.

A field duplicate was collected and submitted blind to the laboratory. The sample ID was SB-1R-20-22 and its duplicate was DUP-1. All positive results showed variability. This may be due to sample non-homogeneity and the results should be considered estimated.

CONCLUSION

Based on the QA/QC review, the data submitted were judged to be acceptable for use with the qualifications noted herein.

Laboratory Data Review Checklist

Completed by:	Susan Scrocchi
Title:	Project Chemist
Date:	December 01, 2008
CS Report Name:	Well Decommission and Installation Report
Report Date:	November 20, 2008
Consultant Firm:	Conestoga-Rovers and Associates, Inc.
Laboratory Name:	Lancaster Laboratories
Laboratory Report Number:	AKD01
ADEC File Number:	2107.26.003
ADEC RecKey Number:	1995210032108

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:

   NA

2. Chain of Custody (COC)

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

   ☑ Yes ☐ No Comments:

b. Correct analyses requested?

☒ Yes ☐ No Comments:

3. Laboratory Sample Receipt Documentation

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

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

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

☒ Yes ☐ No Comments:

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:

NA

e. Data quality or usability affected? Explain.

Comments:

NA

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:

NA

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

Comments:

NA

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 PQLs less than the Cleanup Level or the minimum required detection level for the project?

☒ Yes ☐ No Comments:

e. Data quality or usability affected? Explain.

Comments:

NA

6. QC Samples

a. Method Blank

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

☒ Yes ☐ No Comments:

ii. All method blank results less than PQL?

☒ Yes ☐ No Comments:

iii. If above PQL, what samples are affected?

Comments:

NA

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

☐ Yes ☐ No Comments:

NA

v. Data quality or usability affected? Explain.

Comments:

NA

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

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

☒ Yes ☐ No Comments:

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

☐ Yes ☐ No Comments:

NA

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

☒ Yes ☐ No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/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:

NA

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

☐ Yes ☐ No Comments:

NA

vii. Data quality or usability affected? Explain.

Comments:

NA

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:

iv. Data quality or usability affected? Explain.

Comments:

Samples SB-1R-20-22 and DUP-1 required dilutions for benzene causing failed surrogates. Recoveries in undiluted analysis were acceptable indicating no quality or usability issues.

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

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

☒ Yes ☐ No Comments:

ii. All results less than PQL?

☐ Yes ☒ No Comments:

Toluene present at 0.01 mg/Kg

iii. If above PQL, what samples are affected?

Comments:

SB-1R-17-19, SB-1R-20-22, SB-1R-25-27 and SB-1R-30-32.

iv. Data quality or usability affected? Explain.

Comments:

All toluene results for the samples listed above were less than 5 times the blank and should be considered suspect.

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)

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☒ No Comments:

iv. Data quality or usability affected? Explain.

Comments:

All positive sample results had an RPD >50%. Variability may be due to non-homogeneity of the sample. Results should be considered estimated.

f. Decontamination or Equipment Blank (if applicable)

☒ Yes ☐ No ☐ Not Applicable

i. All results less than PQL?

☐ Yes ☒ No Comments:

GRO present 0.07 mg/L and DRO present at 0.10mg/L.

ii. If above PQL, what samples are affected?

Comments:

GRO:SB-1R-170-19 and SB-1R-25-27. DRO:SB-1R-17-19, SB-1R-20-22 and SB-1R-30-32

iii. Data quality or usability affected? Explain.

Comments:

The results associated with the above samples were all within 5 times the blank results (after converting to mg/Kg) and should be considered suspect.

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

   a. Defined and appropriate?

   ☒ Yes ☐ No Comments: