AECOM Environment

Submitted to:
Encana Oil & Gas (USA) Inc.
Denver, Colorado

Submitted by:
AECOM
Fort Collins, Colorado
60221849.600
February 2012

Pavillion Natural Gas Field, Fremont County, Wyoming, Encana Oil & Gas (USA) Inc.

2011 Pit Investigation Report – Tribal Pavillion 12-13

DRAFT

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Prepared by
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Reviewed by
Dustin Krajewski, P.E., Project Manager/Project Engineer

List of Acronyms

AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
DRO	diesel range organics
Encana	Encana Oil & Gas (USA) Inc.
ESC	Environmental Science Corporation
GRO	gasoline range organics
IME	Inberg Miller Engineers
mg/kg	milligrams per kilogram
PID	photoionization detector
Ppm	parts per million
SHWD	Solid and Hazardous Waste Division
SVOC	semi-volatile organic compounds
TPH	total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
WDEQ	Wyoming Department of Environmental Quality
WOGCC	Wyoming Oil and Gas Conservation Commission

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EPAPAV0130835

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1.0 Introduction

This investigation report has been prepared by AECOM Technical Services, Inc. (AECOM) on behalf of Encana Oil & Gas (USA) Inc. (Encana). The purpose of this report is to summarize the results of the site investigation activities performed at the Tribal Pavillion 12-13 (TP 12-13) pit location within the Pavillion Natural Gas Field east of the town of Pavillion, Fremont County, Wyoming (see **Figure 1-1** for a site location map). The work activities completed at the pit site were detailed in the August 18, 2011 *Draft Pavillion Natural Gas Field, Fremont County, Wyoming, Field Work Plan for Site Investigations – August and September 2011* (AECOM 2011) (work plan).

The TP 12-13 location was drilled in 1978 and plugged and abandoned in 2001. This location was never subject to environmental investigation. The site was identified by an area landowner in 2011 as an area of concern requiring a field investigation. This site was selected for pit investigation by the Pavillion Field Working Group, Pit subgroup. The August/September 2011 pit investigation was targeted toward an area adjacent to an irrigation ditch. The area is currently used for farming equipment storage. This area was identified as the approximate former pit location by the person whom had plowed the location several years ago and believed that he had encountered a pit. This report documents the investigation activities performed at the TP 12-13 pit location in accordance with the field work plan.

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2.0 Summary of Field Activities

The primary field activities conducted at TP 12-13 included: utility clearance; soil boring advancement and soil sampling; and final field surveying of all boreholes.

2.1 Ground Disturbance Activities

In accordance with Encana's Ground Disturbance Practice, all utilities within a 100 foot radius search area were marked. All utilities within 15 feet of a proposed ground disturbance location were positively identified using air and water excavation.

2.2 Soil Assessment

Four soil borings were advanced at the site using direct-push drilling technology following utility clearance. Soil borings SB-1-11 (TP 12-13) through SB-4-11 (TP 12-13) were advanced in the approximate location of the former pit (south of the irrigation canal) as shown on **Figure 2-1**. Drilling activities were performed by Inberg Miller Engineers (IME) of Riverton, Wyoming on August 31, 2011. Each soil boring was logged by a field geologist. Photoionization detector (PID) headspace readings were collected and recorded at every 2-foot interval. No additional soil borings were necessary based on lack of visual observations of impacts and PID readings less than 100 parts per million (ppm). The soil boring logs are provided in **Appendix A**.

The soil borings ranged from depths of 8 to 10.5 feet below ground surface (bgs). These depths were just below the water table which was encountered at a range of approximately 7 to 9.5 feet bgs. Since the potential for groundwater impacts was not identified based on field screening and observations, the soil borings were not extended any deeper and monitoring wells were not constructed.

One soil sample was collected from each boring from the interval immediately above the water table. All soil samples were collected for analysis of total petroleum hydrocarbons (TPH) as gasoline range organics (GRO) and diesel range organics (DRO), as required by WOGCC. Although none of the soil borings exhibited evidence of soil impact based on field screening and observations, one sample also was selected for analysis of benzene, toluene, ethylbenzene, and total xylene (BTEX) and semi-volatile organic compounds (SVOC). The sampling and analysis conducted on each boring is provided below:

- SB-1-11 (TP 12-13) – One sample was collected for TPH, BTEX, and SVOC analyses;
- SB-2-11 (TP 12-13) – One sample was collected for TPH analysis;
- SB-3-11 (TP 12-13) – One sample was collected for TPH analysis; and
- SB -4-11 (TP 12-13) – One sample was collected for TPH analysis.

All soil samples were submitted to Environmental Science Corporation (ESC) of Mt. Juliet, Tennessee, for laboratory analysis. Analysis of TPH-GRO and DRO was completed using (U.S. Environmental Protection Agency (USEPA) Method 8015. Analysis of BTEX was completed using USEPA Method 8260B. Analysis of SVOC was completed using USEPA Method 8070C. A discussion of analytical results is provided in Section 3.1.

All soil borings were surveyed and are shown on **Figure 2-1**. All soil borings were abandoned with hydrated bentonite chips.

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3.0 Analytical Sample Summary

3.1 Soil Sample Results

All soil samples were submitted for analysis of TPH-GRO and DRO. One sample was also analyzed for BTEX and SVOC. Soil sample TPH results were compared to the TPH cleanup level of 1,000 milligrams per kilogram (mg/kg). This concentration represents the most stringent cleanup level identified by the Wyoming Oil and Gas Conservation Commission (WOGCC) "Guideline for Closure of Unlined Production Pits". Concentrations of BTEX and SVOC from all soil samples were compared to the residential soil cleanup level and the migration to groundwater cleanup level, both based on the Wyoming Department of Environmental Quality/Solid and Hazardous Waste Division (DEQ/SHWD) cleanup level spreadsheet effective June 30, 2009. Analytical soil sample results are summarized in **Table 3-1** and are shown on **Figure 3-1**. A copy of the laboratory report is provided in **Appendix C**.

Concentrations of TPH-GRO, TPH-DRO, BTEX, and SVOC were not detected in any of the soil samples collected at the site.

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4.0 Discussion

Analytical results at the site indicate that constituents of concern were not detected at the site. No further investigation is recommended at site TP 12-13.

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5.0 References

AECOM. 2011. Pavillion Natural Gas Field, Fremont County, Wyoming, Encana Oil and Gas (USA) Inc., Field Work Plan for Site Investigations – August and September 2011. August 2011.

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EPAPAV0130842

Tables

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EPAPAV0130843

Draft - Table 1 - Soil Sample Analytical Results, August 31, 2011
Tribal Pavillion 12-13, Pavillion Natural Gas Field, Wyoming

Sample Name					SB-1-11[1]	SB-2-11	SB-3-11	SB-4-11
Sample Depth (feet)					6-8	7-8	9-10	9.5-10.5
Sample Date					8/31/2011	8/31/2011	8/31/2011	8/31/2011
Analyte	**Units**	**Method**	**Residential Soil Cleanup Levels (mg/kg)[3]**	**Migration to Groundwater Cleanup Levels (mg/kg)[3]**	**Results**			
TPH (GC/FID) Low Fraction	mg/kg	GRO	1,000 (Combined)[2]		< 0.50	< 0.50	< 0.50	< 0.50
TPH (GC/FID) High Fraction (DRO Wyoming C10-C32)	mg/kg	8015			< 4.0	< 4.0	< 4.0	< 4.0
Benzene	mg/kg	8260B	1.1	0.00023	< 0.0050	--	--	--
Toluene	mg/kg	8260B	5,000	1.7	< 0.025	--	--	--
Ethylbenzene	mg/kg	8260B	5.7	0.0019	< 0.0050	--	--	--
Total Xylenes	mg/kg	8260B	600	0.23	< 0.015	--	--	--
Semi-Volatile Organic Compounds (SVOC)	mg/kg	8270C	Note[3]	Note[3]	Not Detected[1]	--	--	--

Notes:

-- = not analyze; < = sample result is less than the laboratory detection limit; DRO = diesel range organics; FID = flame ionization detector; GC = gas chromatograph; GRO = gasoline range organics; mg/kg = milligrams per kilogram; NA = not available; TPH = total petroleum hydrocarbons

[1] Sample SB-1-11 6-8 was analyzed for SVOCs using method 8270C. All SVOCs were below detection limits (see corresponding laboratory report).

[2] The TPH cleanup level of 1,000 mg/kg is based on the most stringent cleanup level identified in the Wyoming Oil and Gas Conservation Commission "Guideline for Closure of Unlined Production Pits". If TPH is detected at a level greater than 1,000 mg/kg then the appropriate cleanup level will be determined based on the Oil Contaminated Soil Remediation Ranking System (OCSRRS).

[3] Soil cleanup levels are based on the Wyoming Department of Environmental Quality/Solid and Hazardous Waste Division (DEQ/SHWD) cleanup level spreadsheet effective June 30, 2009.

Figures

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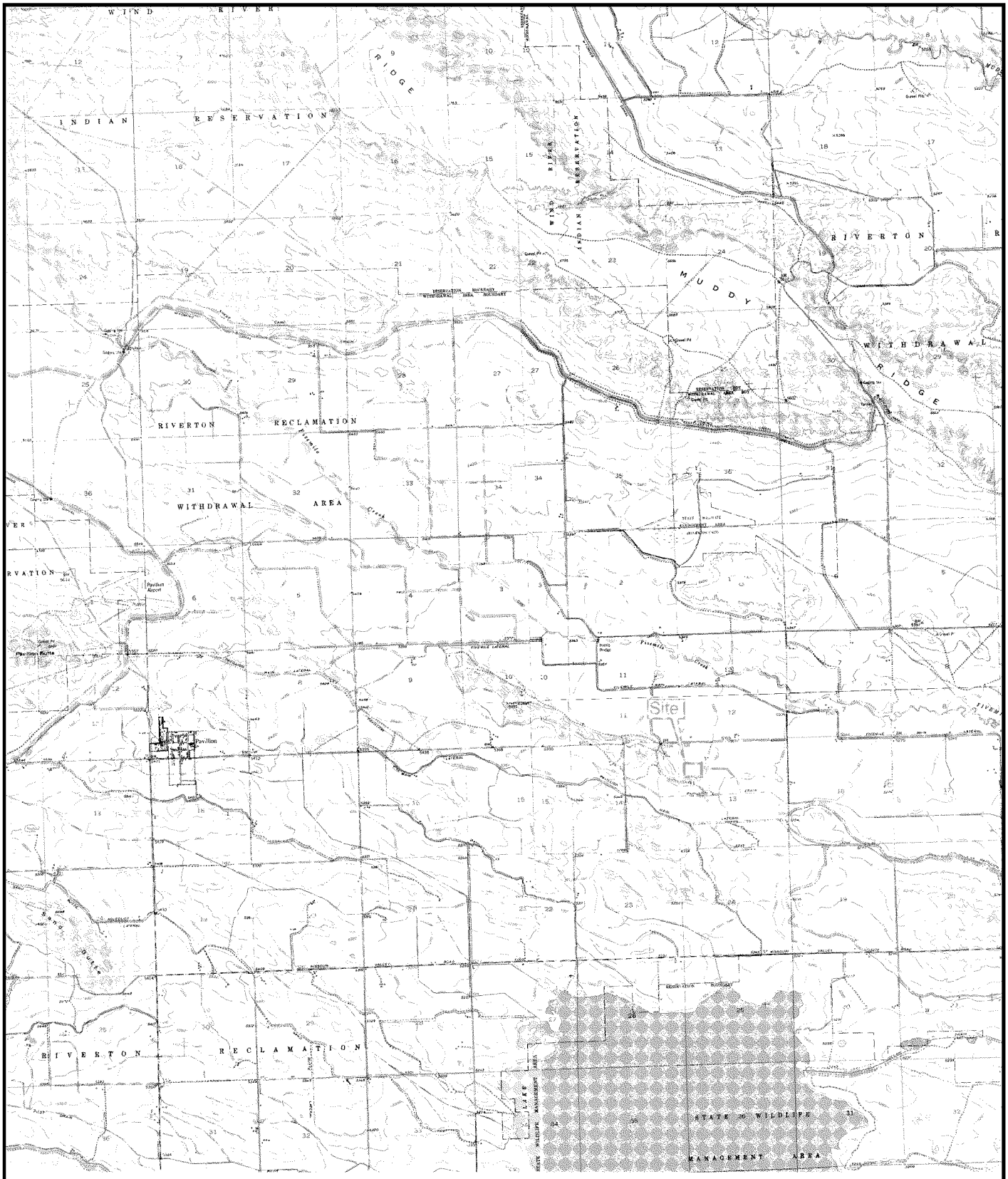


0 1000' 2000'

N

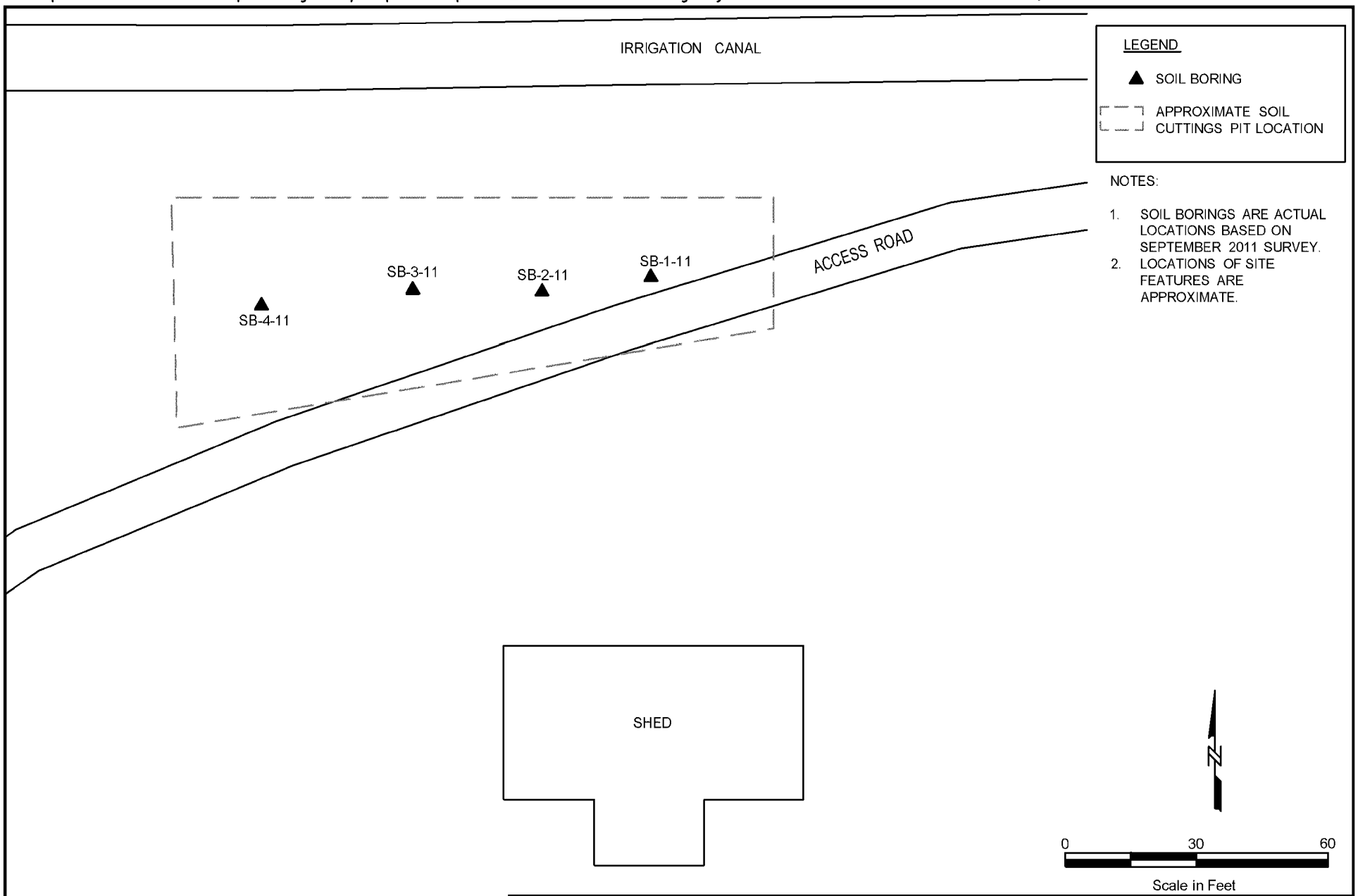
AECOM

ENCANA OIL & GAS (USA) INC. PAVILLION NATURAL GAS FIELD FREMONT COUNTY, WYOMING	TRIBAL PAVILLION 12-13 SITE LOCATION MAP
DATE: 12/29/11 DRWN: EM/FTC	FIGURE 1-1

File: Z:\Encana Pavillion Remediation\Pit Investigation Reports\TP 12-13\FIG 1-1_Site Location.dwg Layout: ANSI_Avl-CP User: marshalle Plotted: Dec 28, 2011 - 2:25pm

EPAPAV0130846

File: Z:\Encana Pavillion Remediation\Pit InvestigationReports\TP 12-13\FIG 2-1_TP 12-13 SITE LAYOUT.dwg Layout: TP 12-13 User: marshalle Plotted: Jan 19, 2012 - 10:56am Xref's:



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ENCANA OIL & GAS (USA) INC.
PAVILLION NATURAL GAS FIELD
FREMONT COUNTY, WYOMING

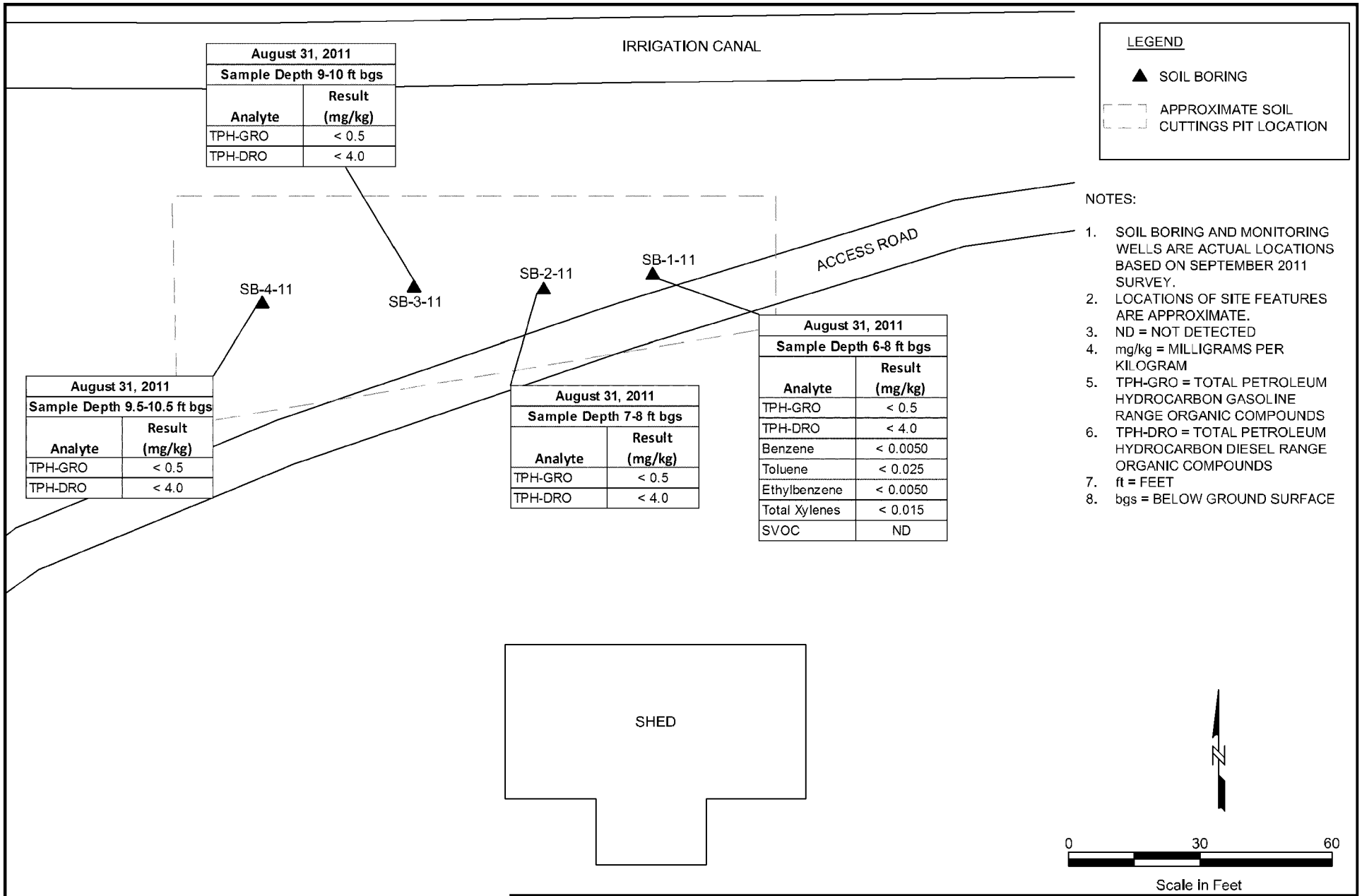
DATE: 1/19/12 | DRWN: EM/FTC

TRIBAL PAVILLION 12-13
SITE LAYOUT

FIGURE 2-1

EPAPAV0130847

EPAPAV0130848



August 31, 2011	
Sample Depth 9-10 ft bgs	
Analyte	Result (mg/kg)
TPH-GRO	< 0.5
TPH-DRO	< 4.0

August 31, 2011	
Sample Depth 9.5-10.5 ft bgs	
Analyte	Result (mg/kg)
TPH-GRO	< 0.5
TPH-DRO	< 4.0

August 31, 2011	
Sample Depth 7-8 ft bgs	
Analyte	Result (mg/kg)
TPH-GRO	< 0.5
TPH-DRO	< 4.0

August 31, 2011	
Sample Depth 6-8 ft bgs	
Analyte	Result (mg/kg)
TPH-GRO	< 0.5
TPH-DRO	< 4.0
Benzene	< 0.0050
Toluene	< 0.025
Ethylbenzene	< 0.0050
Total Xylenes	< 0.015
SVOC	ND

LEGEND

▲ SOIL BORING

APPROXIMATE SOIL CUTTINGS PIT LOCATION

NOTES:

1. SOIL BORING AND MONITORING WELLS ARE ACTUAL LOCATIONS BASED ON SEPTEMBER 2011 SURVEY.
2. LOCATIONS OF SITE FEATURES ARE APPROXIMATE.
3. ND = NOT DETECTED
4. mg/kg = MILLIGRAMS PER KILOGRAM
5. TPH-GRO = TOTAL PETROLEUM HYDROCARBON GASOLINE RANGE ORGANIC COMPOUNDS
6. TPH-DRO = TOTAL PETROLEUM HYDROCARBON DIESEL RANGE ORGANIC COMPOUNDS
7. ft = FEET
8. bgs = BELOW GROUND SURFACE

AECOM

ENCANA OIL & GAS (USA) INC.
PAVILLION NATURAL GAS FIELD
FREMONT COUNTY, WYOMING

TRIBAL PAVILLION 12-13
SOIL ANALYTICAL RESULTS

DATE: 1/19/12 | DRWN: EM/FTC

FIGURE 3-1

Appendix A

Soil Boring Logs

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AECOM	*Client:* Encana Oil & Gas (USA) Inc.	***BORING ID:*** SB-1-11 (TP-12-13)
	Project Number: 60221849	
	Site Location: Pavillion, WY	
	Coordinates: TBD *Elevation:* TBD	*Sheet:* 1 of 1
	Drilling Method: Geoprobe Direct Push	*Monitoring Well Installed:* No
	Sample Type(s): Soil *Boring Diameter:* 2-inch	*Screened Interval:* NA
Drilling Contractor: Inberg-Miller Engineers	*Logged By:* J.Hurshman *Date/Time Started:* 8/31/11 14:10	*Depth of Boring:* 8 ft
	Ground Elevation: TBD *Date/Time Finished:* 8/31/11 14:30	*Water Level:* 7 to 8 ft

Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	**MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)**	Lab Sample ID	Lab Sample Depth (ft)
1	DP		50%	NA	ML	Light brown silt with minor clay, DRY no odor, no staining, few organics near surface.	SB-1-11(TP-12-13)(6-8) 14:20 TPH, SVOC, BTEX	6-8
2				0.0				
3								
4								
5	DP		75%	0.0		Clayey silt to 6 ft.		
6								
7				0.0	SP	Fine grained sand, yellow orange color no odor, no staining, moist to wet at 7 to 8 ft. Well sorted, homogeneous		
8								
9						Total Depth = 8 ft		
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

NOTES:
Blow count not recorded for Geoprobe Rig
DP= direct Push, 4 foot acetate sleeve
Boring abandoned with bentonite chips
NA = not applicable

ppm = parts per million
TBD = to be determined
ft = feet
bgs = below ground surface

Checked by: Jeremy Hurshman Date: 11/23/11

AECOM	*Client:* Encana Oil & Gas (USA) Inc.		***BORING ID:*** SB-2-11 (TP-12-13)
	Project Number: 60221849		
	Site Location: Pavillion, WY		
	Coordinates: TBD	*Elevation:* TBD	*Sheet:* 1 of 1
	Drilling Method: Geoprobe Direct Push		*Monitoring Well Installed:* No
	Sample Type(s): Soil	*Boring Diameter:* 2-inch	*Screened Interval:* Na
Drilling Contractor: Inberg-Miller Engineers	*Logged By:* J.Hurshman	*Date/Time Started:* 8/31/11 13:50	*Depth of Boring:* 10 ft
	Ground Elevation: TBD	*Date/Time Finished:* 8/31/11 14:10	*Water Level:* 7 to 8 ft

Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	**MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)**	Lab Sample ID	Lab Sample Depth (ft)
1	DP		75	NA	ML	Tightly packed silt with clay, dark brown DRY, no odor, no staining, homogeneous.	SB-2-11 (TP-12-13)(7-8) - 14:05 TPH	7-8
2				0.0				
3								
4								
5	DP		25	NA		Continued as above to 7.5 ft Increasing Clay content.		
6								
7								
8				0.0	SP	Sand, fine grained. tan with orange oxidation, moist, well sorted. homogeneous, no odor, no staining.		
9	DP		75	0.0		Continued sand to 10 ft.		
10								
11						Total Depth = 10 ft		
12								
13								
14								
15								
16								
17								
18								
19								
20								

NOTES:
Blow count not recorded for Geoprobe Rig
DP= direct Push, 4 foot acetate sleeve
Boring abandoned with bentonite chips
NA = not applicable

ppm = parts per million
TBD = to be determined
ft = feet
bgs = below ground surface

Checked by: Jeremy Hurshman Date: 11/28/11

AECOM	*Client:* Encana Oil & Gas (USA) Inc.	***BORING ID:*** SB-3-11(TP-12-13)
	Project Number: 60221849	
	Site Location: Pavillion, WY	
	Coordinates: TBD *Elevation:* TBD	*Sheet:* 1 of 1
	Drilling Method: Geoprobe Direct Push	*Monitoring Well Installed:* No
	Sample Type(s): Soil *Boring Diameter:* 2-inch	*Screened Interval:* NA
Drilling Contractor: Inberg-Miller Engineers	*Logged By:* J.Hurshman *Date/Time Started:* 8/31/11 13:30	*Depth of Boring:* 10 ft
	Ground Elevation: TBD *Date/Time Finished:* 8/31/11 13:50	*Water Level:* 9 ft

Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	**MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)**	Lab Sample ID	Lab Sample Depth (ft)
1	DP		75	0.0	SM	Silt with minor sand and clay, very hard, DRY, no odor, no staining, moderate sorting, brown, very little color variation.	SB-3-11(TP-12-13) (9-10) - 13:45 TPH	9-10
2								
3				0.0				
4								
5	DP		25	NA	SC	Continued as above to 8 ft.		
6						Increasing clay content.		
7				0.0				
8			50	NA				
9	DP			0.0	CL	Clay, brown, moist, hard to 9 ft		
10					SP	Sand at 9 ft, tan with orange oxidation zones, fine grained, homogeneous tight packed, well sorted, WET, no odor, no staining.		
11						Total Depth = 10 ft Refusal with geoprobe at 10 ft		
12								
13								
14								
15								
16								
17								
18								
19								
20								

NOTES:
Blow count not recorded for Geoprobe Rig
DP= direct Push, 4 foot acetate sleeve
Boring abandoned with bentonite chips
NA = not applicable

ppm = parts per million
TBD = to be determined
ft = feet
bgs = below ground surface

Checked by: Jeremy Hurshman Date: 11/28/11

AECOM	*Client:* Encana Oil & Gas (USA) Inc.	***BORING ID:*** SB-4-11(TP-12-13)
	Project Number: 60221849	
	Site Location: Pavillion, WY	
	Coordinates: TBD *Elevation:* TBD	*Sheet:* 1 of 1
	Drilling Method: Geoprobe Direct Push	*Monitoring Well Installed:* No
	Sample Type(s): Soil *Boring Diameter:* 2-inch	*Screened Interval:* NA
Drilling Contractor: Inberg-Miller Engineers	*Logged By:* J.Hurshman *Date/Time Started:* 8/31/11 13:00	*Depth of Boring:* 10.5 ft
	Ground Elevation: TBD *Date/Time Finished:* 8/31/11 13:30	*Water Level:* 9.5 ft

Depth (ft)	Sample Type	Blows per 6"	Recovery (%)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (ft)
1	DP		75	NA	ML	Brown. silt, dry, homogeneous, no sand, little dry, no odor, no staining.	SB-4-11(TP-113)(9.5-10.5) TPH 13:25	9.5-10.5
2				0.0				
3								
4								
5	DP		50	NA				
6						Continued silt to 7 ft.		
7				0.0				
8					CL	Silty clay, dark brown, no odor, no staining, white veins in clay, dry, slight plasticity, hard clay to 9.5 ft.		
9	DP		50	0.0				
10					SP	Wet Sand. medium to fine grained, all fine sand at 10 ft. Light brown no odor no staining, orange oxidation lines in sand refusal at 10.5 ft. sand at 10 to 10.5 ft.		
11						Total Depth = 10.5 ft		
12								
13								
14								
15								
16								
17								
18								
19								
20								

NOTES:
Blow count not recorded for Geoprobe Rig
DP= direct Push, 4 foot acetate sleeve
Boring abandoned with bentonite chips
NA = not applicable

ppm = parts per million
TBD = to be determined
ft = feet
bgs = below ground surface

Checked by: Jeremy Hurshman Date: 11/28/11

Appendix B

Laboratory Analytical Report

DRAFT

EPAPAV0130854

12065 Lebanon Rd.
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Tax I.D. 62-0814289

Est. 1970

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

Report Summary

Tuesday September 13, 2011

Report Number: L533941
Samples Received: 09/01/11
Client Project: 60221849

Description: EnCana Pavillion

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Leslie Newton

Leslie Newton , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002,NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915

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Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

EPAPAV0130855

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YOUR LAB OF CHOICE

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Est. 1970

REPORT OF ANALYSIS

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 13, 2011

ESC Sample # : L533941-06

Date Received : September 01, 2011
Description : EnCana Pavillion

Site ID : PAVILLION WY

Sample ID : SB-1-11CTP-12-13 6-8 FT

Project # : 60221849

Collected By : Jeremy Hurshman
Collection Date : 08/31/11 14:20

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/04/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	92.6		% Rec.	GRO	09/04/11	5
Benzene	BDL	0.0050	mg/kg	8260B	09/03/11	5
Toluene	BDL	0.025	mg/kg	8260B	09/03/11	5
Ethylbenzene	BDL	0.0050	mg/kg	8260B	09/03/11	5
Total Xylenes	BDL	0.015	mg/kg	8260B	09/03/11	5
Surrogate Recovery						
Toluene-d8	104.		% Rec.	8260B	09/03/11	5
Dibromofluoromethane	112.		% Rec.	8260B	09/03/11	5
a,a,a-Trifluorotoluene	118.		% Rec.	8260B	09/03/11	5
4-Bromofluorobenzene	108.		% Rec.	8260B	09/03/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/07/11	1
Surrogate recovery(%)						
o-Terphenyl	74.8		% Rec.	8015	09/07/11	1
Base/Neutral Extractables						
Acenaphthene	BDL	0.033	mg/kg	8270C	09/04/11	1
Acenaphthylene	BDL	0.033	mg/kg	8270C	09/04/11	1
Anthracene	BDL	0.033	mg/kg	8270C	09/04/11	1
Benzidine	BDL	0.33	mg/kg	8270C	09/04/11	1
Benzo(a)anthracene	BDL	0.033	mg/kg	8270C	09/04/11	1
Benzo(b)fluoranthene	BDL	0.033	mg/kg	8270C	09/04/11	1
Benzo(k)fluoranthene	BDL	0.033	mg/kg	8270C	09/04/11	1
Benzo(g,h,i)perylene	BDL	0.033	mg/kg	8270C	09/04/11	1
Benzo(a)pyrene	BDL	0.033	mg/kg	8270C	09/04/11	1
Bis(2-chlorethoxy)methane	BDL	0.33	mg/kg	8270C	09/04/11	1
Bis(2-chloroethyl)ether	BDL	0.33	mg/kg	8270C	09/04/11	1
Bis(2-chloroisopropyl)ether	BDL	0.33	mg/kg	8270C	09/04/11	1
4-Bromophenyl-phenylether	BDL	0.33	mg/kg	8270C	09/04/11	1
2-Chloronaphthalene	BDL	0.033	mg/kg	8270C	09/04/11	1
4-Chlorophenyl-phenylether	BDL	0.33	mg/kg	8270C	09/04/11	1
Chrysene	BDL	0.033	mg/kg	8270C	09/04/11	1
Dibenz(a,h)anthracene	BDL	0.033	mg/kg	8270C	09/04/11	1
3,3-Dichlorobenzidine	BDL	0.33	mg/kg	8270C	09/04/11	1
2,4-Dinitrotoluene	BDL	0.33	mg/kg	8270C	09/04/11	1
2,6-Dinitrotoluene	BDL	0.33	mg/kg	8270C	09/04/11	1
Fluoranthene	BDL	0.033	mg/kg	8270C	09/04/11	1
Fluorene	BDL	0.033	mg/kg	8270C	09/04/11	1
Hexachlorobenzene	BDL	0.33	mg/kg	8270C	09/04/11	1
Hexachloro-1,3-butadiene	BDL	0.33	mg/kg	8270C	09/04/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 13, 2011

ESC Sample # : L533941-06

Date Received : September 01, 2011
Description : EnCana Pavillion

Site ID : PAVILLION WY

Sample ID : SB-1-11CTP-12-13 6-8 FT

Project # : 60221849

Collected By : Jeremy Hurshman
Collection Date : 08/31/11 14:20

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Hexachlorocyclopentadiene	BDL	0.33	mg/kg	8270C	09/04/11	1
Hexachloroethane	BDL	0.33	mg/kg	8270C	09/04/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.033	mg/kg	8270C	09/04/11	1
Isophorone	BDL	0.33	mg/kg	8270C	09/04/11	1
Naphthalene	BDL	0.033	mg/kg	8270C	09/04/11	1
Nitrobenzene	BDL	0.33	mg/kg	8270C	09/04/11	1
n-Nitrosodimethylamine	BDL	0.33	mg/kg	8270C	09/04/11	1
n-Nitrosodiphenylamine	BDL	0.33	mg/kg	8270C	09/04/11	1
n-Nitrosodi-n-propylamine	BDL	0.33	mg/kg	8270C	09/04/11	1
Phenanthrene	BDL	0.033	mg/kg	8270C	09/04/11	1
Benzylbutyl phthalate	BDL	0.33	mg/kg	8270C	09/04/11	1
Bis(2-ethylhexyl)phthalate	BDL	0.33	mg/kg	8270C	09/04/11	1
Di-n-butyl phthalate	BDL	0.33	mg/kg	8270C	09/04/11	1
Diethyl phthalate	BDL	0.33	mg/kg	8270C	09/04/11	1
Dimethyl phthalate	BDL	0.33	mg/kg	8270C	09/04/11	1
Di-n-octyl phthalate	BDL	0.33	mg/kg	8270C	09/04/11	1
Pyrene	BDL	0.033	mg/kg	8270C	09/04/11	1
1,2,4-Trichlorobenzene	BDL	0.33	mg/kg	8270C	09/04/11	1
Acid Extractables						
4-Chloro-3-methylphenol	BDL	0.33	mg/kg	8270C	09/04/11	1
2-Chlorophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
2,4-Dichlorophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
2,4-Dimethylphenol	BDL	0.33	mg/kg	8270C	09/04/11	1
4,6-Dinitro-2-methylphenol	BDL	0.33	mg/kg	8270C	09/04/11	1
2,4-Dinitrophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
2-Nitrophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
4-Nitrophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
Pentachlorophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
Phenol	BDL	0.33	mg/kg	8270C	09/04/11	1
2,4,6-Trichlorophenol	BDL	0.33	mg/kg	8270C	09/04/11	1
Surrogate Recovery						
2-Fluorophenol	85.4		% Rec.	8270C	09/04/11	1
Phenol-d5	96.2		% Rec.	8270C	09/04/11	1
Nitrobenzene-d5	81.6		% Rec.	8270C	09/04/11	1
2-Fluorobiphenyl	98.2		% Rec.	8270C	09/04/11	1
2,4,6-Tribromophenol	120.		% Rec.	8270C	09/04/11	1
p-Terphenyl-d14	102.		% Rec.	8270C	09/04/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
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REPORT OF ANALYSIS

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 13, 2011

ESC Sample # : L533941-07

Date Received : September 01, 2011
Description : EnCana Pavillion

Site ID : PAVILLION WY

Sample ID : SB-2-11CTP-12-13 7-8 FT

Project # : 60221849

Collected By : Jeremy Hurshman
Collection Date : 08/31/11 14:05

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/04/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	92.6		% Rec.	GRO	09/04/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/08/11	1
Surrogate recovery(%)						
o-Terphenyl	73.6		% Rec.	8015	09/08/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
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REPORT OF ANALYSIS

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 13, 2011

ESC Sample # : L533941-08

Date Received : September 01, 2011
Description : EnCana Pavillion

Site ID : PAVILLION WY

Sample ID : SB-3-11CTP-12-13 9-10 FT

Project # : 60221849

Collected By : Jeremy Hurshman
Collection Date : 08/31/11 13:45

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/04/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	96.5		% Rec.	GRO	09/04/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/08/11	1
Surrogate recovery(%)						
o-Terphenyl	72.6		% Rec.	8015	09/08/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
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REPORT OF ANALYSIS

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 13, 2011

ESC Sample # : L533941-09

Date Received : September 01, 2011
Description : EnCana Pavillion

Site ID : PAVILLION WY

Sample ID : SB-4-11CTP-12-13 9.5-10.5 FT

Project # : 60221849

Collected By : Jeremy Hurshman
Collection Date : 08/31/11 13:25

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/04/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	96.5		% Rec.	GRO	09/04/11	5
DRO Wyoming C10-C32						
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015	09/08/11	1
Surrogate recovery(%)						
o-Terphenyl	76.8		% Rec.	8015	09/08/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
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REPORT OF ANALYSIS

Mr. Dustin Krajewski
AECOM Inc. - Fort Collins, CO
1601 Prospect Parkway
Fort Collins, CO 80525

September 13, 2011

ESC Sample # : L533941-10

Date Received : September 01, 2011
Description : EnCana Pavillion

Site ID : PAVILLION WY

Sample ID : TRIP BLANK

Project # : 60221849

Collected By : Jeremy Hurshman
Collection Date : 08/31/11 08:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0010	mg/l	8260B	09/02/11	1
Toluene	BDL	0.0050	mg/l	8260B	09/02/11	1
Ethylbenzene	BDL	0.0010	mg/l	8260B	09/02/11	1
Total Xylenes	BDL	0.0030	mg/l	8260B	09/02/11	1
Surrogate Recovery						
Toluene-d8	105.		% Rec.	8260B	09/02/11	1
Dibromofluoromethane	104.		% Rec.	8260B	09/02/11	1
a,a,a-Trifluorotoluene	107.		% Rec.	8260B	09/02/11	1
4-Bromofluorobenzene	114.		% Rec.	8260B	09/02/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
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Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L533941-04	WG553588	SAMP	Isophorone	R1845992	J4
	WG553368	SAMP	a,a,a-Trifluorotoluene	R1850352	J1
	WG553867	SAMP	o-Terphenyl	R1847632	J7
L533941-06	WG553588	SAMP	Isophorone	R1845992	J4

EPAPAV0130862

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits
J4	The associated batch QC was outside the established quality control range for accuracy.
J7	Surrogate recovery limits cannot be evaluated; surrogates were diluted out

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods,it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

EPAPAV0130863

Summary of Remarks For Samples Printed
09/13/11 at 12:49:07

TSR Signing Reports: 044
R5 - Desired TAT

Always run BTEX by 8260 unless noted otherwise. ln 9/2/11

Sample: L533941-01 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-02 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-03 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-04 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-05 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-06 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-07 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-08 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-09 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

Sample: L533941-10 Account: ENSRFCCO Received: 09/01/11 09:00 Due Date: 09/09/11 00:00 RPT Date: 09/13/11 12:47

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AECOM Inc. - Fort Collins, CO
Mr. Dustin Krajewski
1601 Prospect Parkway

Fort Collins, CO 80525

Quality Assurance Report
Level II

L533941

September 13, 2011

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Benzene	< .001	mg/l			WG553386	09/02/11 00:36
Ethylbenzene	< .001	mg/l			WG553386	09/02/11 00:36
Toluene	< .005	mg/l			WG553386	09/02/11 00:36
Total Xylenes	< .003	mg/l			WG553386	09/02/11 00:36
4-Bromofluorobenzene		% Rec.	113.6	75-128	WG553386	09/02/11 00:36
Dibromofluoromethane		% Rec.	105.5	79-125	WG553386	09/02/11 00:36
Toluene-d8		% Rec.	103.0	87-114	WG553386	09/02/11 00:36
a,a,a-Trifluorotoluene		% Rec.	104.7	84-114	WG553386	09/02/11 00:36
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG553660	09/04/11 15:38
a,a,a-Trifluorotoluene(FID)		% Rec.	97.74	59-128	WG553660	09/04/11 15:38
1,2,4-Trichlorobenzene	< .333	mg/kg			WG553588	09/04/11 09:08
2,4,6-Trichlorophenol	< .333	mg/kg			WG553588	09/04/11 09:08
2,4-Dichlorophenol	< .333	mg/kg			WG553588	09/04/11 09:08
2,4-Dimethylphenol	< .333	mg/kg			WG553588	09/04/11 09:08
2,4-Dinitrophenol	< .333	mg/kg			WG553588	09/04/11 09:08
2,4-Dinitrotoluene	< .333	mg/kg			WG553588	09/04/11 09:08
2,6-Dinitrotoluene	< .333	mg/kg			WG553588	09/04/11 09:08
2-Chloronaphthalene	< .033	mg/kg			WG553588	09/04/11 09:08
2-Chlorophenol	< .333	mg/kg			WG553588	09/04/11 09:08
2-Nitrophenol	< .333	mg/kg			WG553588	09/04/11 09:08
3,3-Dichlorobenzidine	< .333	mg/kg			WG553588	09/04/11 09:08
4,6-Dinitro-2-methylphenol	< .333	mg/kg			WG553588	09/04/11 09:08
4-Bromophenyl-phenylether	< .333	mg/kg			WG553588	09/04/11 09:08
4-Chloro-3-methylphenol	< .333	mg/kg			WG553588	09/04/11 09:08
4-Chlorophenyl-phenylether	< .333	mg/kg			WG553588	09/04/11 09:08
4-Nitrophenol	< .333	mg/kg			WG553588	09/04/11 09:08
Acenaphthene	< .033	mg/kg			WG553588	09/04/11 09:08
Acenaphthylene	< .033	mg/kg			WG553588	09/04/11 09:08
Anthracene	< .033	mg/kg			WG553588	09/04/11 09:08
Benzidine	< .333	mg/kg			WG553588	09/04/11 09:08
Benzo(a)anthracene	< .033	mg/kg			WG553588	09/04/11 09:08
Benzo(a)pyrene	< .033	mg/kg			WG553588	09/04/11 09:08
Benzo(b)fluoranthene	< .033	mg/kg			WG553588	09/04/11 09:08
Benzo(g,h,i)perylene	< .033	mg/kg			WG553588	09/04/11 09:08
Benzo(k)fluoranthene	< .033	mg/kg			WG553588	09/04/11 09:08
Benzylbutyl phthalate	< .333	mg/kg			WG553588	09/04/11 09:08
Bis(2-chlorethoxy)methane	< .333	mg/kg			WG553588	09/04/11 09:08
Bis(2-chloroethyl)ether	< .333	mg/kg			WG553588	09/04/11 09:08
Bis(2-chloroisopropyl)ether	< .333	mg/kg			WG553588	09/04/11 09:08
Bis(2-ethylhexyl)phthalate	< .333	mg/kg			WG553588	09/04/11 09:08
Chrysene	< .033	mg/kg			WG553588	09/04/11 09:08
Di-n-butyl phthalate	< .333	mg/kg			WG553588	09/04/11 09:08
Di-n-octyl phthalate	< .333	mg/kg			WG553588	09/04/11 09:08
Dibenz(a,h)anthracene	< .033	mg/kg			WG553588	09/04/11 09:08
Diethyl phthalate	< .333	mg/kg			WG553588	09/04/11 09:08
Dimethyl phthalate	< .333	mg/kg			WG553588	09/04/11 09:08
Fluoranthene	< .033	mg/kg			WG553588	09/04/11 09:08
Fluorene	< .033	mg/kg			WG553588	09/04/11 09:08
Hexachloro-1,3-butadiene	< .333	mg/kg			WG553588	09/04/11 09:08
Hexachlorobenzene	< .333	mg/kg			WG553588	09/04/11 09:08
Hexachlorocyclopentadiene	< .333	mg/kg			WG553588	09/04/11 09:08
Hexachloroethane	< .333	mg/kg			WG553588	09/04/11 09:08
Indeno(1,2,3-cd)pyrene	< .033	mg/kg			WG553588	09/04/11 09:08
Isophorone	< .333	mg/kg			WG553588	09/04/11 09:08
n-Nitrosodi-n-propylamine	< .333	mg/kg			WG553588	09/04/11 09:08

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Mr. Dustin Krajewski
1601 Prospect Parkway

Fort Collins, CO 80525

Quality Assurance Report
Level II

L533941

September 13, 2011

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
n-Nitrosodimethylamine	< .333	mg/kg			WG553588	09/04/11 09:08
n-Nitrosodiphenylamine	< .333	mg/kg			WG553588	09/04/11 09:08
Naphthalene	< .033	mg/kg			WG553588	09/04/11 09:08
Nitrobenzene	< .333	mg/kg			WG553588	09/04/11 09:08
Pentachlorophenol	< .333	mg/kg			WG553588	09/04/11 09:08
Phenanthrene	< .033	mg/kg			WG553588	09/04/11 09:08
Phenol	< .333	mg/kg			WG553588	09/04/11 09:08
Pyrene	< .033	mg/kg			WG553588	09/04/11 09:08
2,4,6-Tribromophenol		mg/kg	87.56	16-136	WG553588	09/04/11 09:08
2-Fluorobiphenyl		mg/kg	82.64	37-119	WG553588	09/04/11 09:08
2-Fluorophenol		mg/kg	70.27	22-114	WG553588	09/04/11 09:08
Nitrobenzene-d5		mg/kg	61.30	20-114	WG553588	09/04/11 09:08
Phenol-d5		mg/kg	82.28	26-127	WG553588	09/04/11 09:08
p-Terphenyl-d14		mg/kg	81.48	15-174	WG553588	09/04/11 09:08
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG553535	09/04/11 02:56
a,a,a-Trifluorotoluene(FID)		% Rec.	93.80	59-128	WG553535	09/04/11 02:56
TPH (GC/FID) High Fraction	< 4	ppm			WG553867	09/07/11 10:47
o-Terphenyl		% Rec.	79.97	50-150	WG553867	09/07/11 10:47
TPH (GC/FID) High Fraction	< 4	ppm			WG553869	09/07/11 19:19
o-Terphenyl		% Rec.	73.82	50-150	WG553869	09/07/11 19:19
Benzene	< .001	mg/kg			WG553368	09/03/11 15:47
Ethylbenzene	< .001	mg/kg			WG553368	09/03/11 15:47
Toluene	< .005	mg/kg			WG553368	09/03/11 15:47
Total Xylenes	< .003	mg/kg			WG553368	09/03/11 15:47
4-Bromofluorobenzene		% Rec.	103.9	59-140	WG553368	09/03/11 15:47
Dibromofluoromethane		% Rec.	106.7	63-139	WG553368	09/03/11 15:47
Toluene-d8		% Rec.	104.7	84-116	WG553368	09/03/11 15:47
a,a,a-Trifluorotoluene		% Rec.	113.5	80-118	WG553368	09/03/11 15:47

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Benzene	mg/l	.025	0.0263	105.	67-126	WG553386
Ethylbenzene	mg/l	.025	0.0245	98.2	76-129	WG553386
Toluene	mg/l	.025	0.0237	94.8	72-122	WG553386
Total Xylenes	mg/l	.075	0.0734	97.8	75-128	WG553386
4-Bromofluorobenzene				109.2	75-128	WG553386
Dibromofluoromethane				107.1	79-125	WG553386
Toluene-d8				104.2	87-114	WG553386
a,a,a-Trifluorotoluene				105.9	84-114	WG553386
TPH (GC/FID) Low Fraction	mg/kg	5.5	6.78	123.	67-135	WG553660
a,a,a-Trifluorotoluene(FID)				101.4	59-128	WG553660
1,2,4-Trichlorobenzene	mg/kg	.333	0.195	58.7	48-87	WG553588
2,4,6-Trichlorophenol	mg/kg	.333	0.229	68.9	50-98	WG553588
2,4-Dichlorophenol	mg/kg	.333	0.226	67.8	56-96	WG553588
2,4-Dimethylphenol	mg/kg	.333	0.224	67.2	52-101	WG553588
2,4-Dinitrophenol	mg/kg	.333	0.205	61.7	10-109	WG553588

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AECOM Inc. - Fort Collins, CO
Mr. Dustin Krajewski
1601 Prospect Parkway

Fort Collins, CO 80525

Quality Assurance Report
Level II

L533941

September 13, 2011

Analyte	Units	Laboratory Control Sample Known Val	Result	% Rec	Limit	Batch
2,4-Dinitrotoluene	mg/kg	.333	0.230	69.0	54-103	WG553588
2,6-Dinitrotoluene	mg/kg	.333	0.223	66.9	53-99	WG553588
2-Chloronaphthalene	mg/kg	.333	0.202	60.5	55-96	WG553588
2-Chlorophenol	mg/kg	.333	0.203	60.9	52-88	WG553588
2-Nitrophenol	mg/kg	.333	0.212	63.6	55-106	WG553588
3,3-Dichlorobenzidine	mg/kg	.333	0.207	62.3	36-84	WG553588
4,6-Dinitro-2-methylphenol	mg/kg	.333	0.234	70.2	24-98	WG553588
4-Bromophenyl-phenylether	mg/kg	.333	0.232	69.6	58-111	WG553588
4-Chloro-3-methylphenol	mg/kg	.333	0.215	64.6	58-98	WG553588
4-Chlorophenyl-phenylether	mg/kg	.333	0.217	65.1	59-103	WG553588
4-Nitrophenol	mg/kg	.333	0.173	52.0	34-101	WG553588
Acenaphthene	mg/kg	.333	0.225	67.6	55-96	WG553588
Acenaphthylene	mg/kg	.333	0.232	69.6	61-107	WG553588
Anthracene	mg/kg	.333	0.217	65.2	58-105	WG553588
Benzidine	mg/kg	.333	0.0373	11.2	10-21	WG553588
Benzo(a)anthracene	mg/kg	.333	0.233	69.8	56-103	WG553588
Benzo(a)pyrene	mg/kg	.333	0.226	68.0	57-103	WG553588
Benzo(b)fluoranthene	mg/kg	.333	0.221	66.4	52-106	WG553588
Benzo(g,h,i)perylene	mg/kg	.333	0.233	70.0	47-112	WG553588
Benzo(k)fluoranthene	mg/kg	.333	0.230	69.2	53-104	WG553588
Benzylbutyl phthalate	mg/kg	.333	0.217	65.1	61-118	WG553588
Bis(2-chlorethoxy)methane	mg/kg	.333	0.203	60.8	58-104	WG553588
Bis(2-chloroethyl)ether	mg/kg	.333	0.194	58.4	51-103	WG553588
Bis(2-chloroisopropyl)ether	mg/kg	.333	0.213	63.9	56-95	WG553588
Bis(2-ethylhexyl)phthalate	mg/kg	.333	0.220	66.1	56-120	WG553588
Chrysene	mg/kg	.333	0.235	70.6	55-102	WG553588
Di-n-butyl phthalate	mg/kg	.333	0.228	68.4	59-114	WG553588
Di-n-octyl phthalate	mg/kg	.333	0.221	66.4	51-119	WG553588
Dibenz(a,h)anthracene	mg/kg	.333	0.222	66.6	49-111	WG553588
Diethyl phthalate	mg/kg	.333	0.224	67.3	61-105	WG553588
Dimethyl phthalate	mg/kg	.333	0.231	69.5	60-106	WG553588
Fluoranthene	mg/kg	.333	0.241	72.5	59-108	WG553588
Fluorene	mg/kg	.333	0.214	64.3	59-100	WG553588
Hexachloro-1,3-butadiene	mg/kg	.333	0.232	69.6	53-106	WG553588
Hexachlorobenzene	mg/kg	.333	0.221	66.3	50-108	WG553588
Hexachlorocyclopentadiene	mg/kg	.333	0.153	45.8	36-117	WG553588
Hexachloroethane	mg/kg	.333	0.204	61.2	45-83	WG553588
Indeno(1,2,3-cd)pyrene	mg/kg	.333	0.225	67.7	50-110	WG553588
Isophorone	mg/kg	.333	0.159	47.8*	51-99	WG553588
n-Nitrosodi-n-propylamine	mg/kg	.333	0.203	60.9	52-103	WG553588
n-Nitrosodimethylamine	mg/kg	.333	0.189	56.8	31-107	WG553588
n-Nitrosodiphenylamine	mg/kg	.333	0.206	61.8	57-121	WG553588
Naphthalene	mg/kg	.333	0.204	61.3	55-91	WG553588
Nitrobenzene	mg/kg	.333	0.210	63.1	47-92	WG553588
Pentachlorophenol	mg/kg	.333	0.210	63.0	10-89	WG553588
Phenanthrene	mg/kg	.333	0.218	65.4	55-103	WG553588
Phenol	mg/kg	.333	0.189	56.9	49-99	WG553588
Pyrene	mg/kg	.333	0.212	63.7	54-104	WG553588
2,4,6-Tribromophenol				93.19	16-136	WG553588
2-Fluorobiphenyl				80.22	37-119	WG553588
2-Fluorophenol				71.63	22-114	WG553588
Nitrobenzene-d5				71.55	20-114	WG553588
Phenol-d5				83.74	26-127	WG553588
p-Terphenyl-d14				79.52	15-174	WG553588
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.65	103.	67-135	WG553535
a,a,a-Trifluorotoluene(FID)				99.15	59-128	WG553535

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Fort Collins, CO 80525

Quality Assurance Report
Level II

L533941

September 13, 2011

Analyte	Units	Laboratory Control Sample Known Val	Result	% Rec	Limit	Batch
Benzene	mg/kg	.025	0.0278	111.	65-128	WG553368
Ethylbenzene	mg/kg	.025	0.0298	119.	74-128	WG553368
Toluene	mg/kg	.025	0.0287	115.	70-120	WG553368
Total Xylenes	mg/kg	.075	0.0889	119.	74-127	WG553368
4-Bromofluorobenzene				103.6	59-140	WG553368
Dibromofluoromethane				104.7	63-139	WG553368
Toluene-d8				105.5	84-116	WG553368
a,a,a-Trifluorotoluene				110.6	80-118	WG553368

Analyte	Units	Laboratory Control Sample Duplicate Result	Ref	%Rec	Limit	RPD	Limit	Batch
Benzene	mg/l	0.0275	0.0263	110.	67-126	4.50	20	WG553386
Ethylbenzene	mg/l	0.0264	0.0245	106.	76-129	7.29	20	WG553386
Toluene	mg/l	0.0250	0.0237	100.	72-122	5.35	20	WG553386
Total Xylenes	mg/l	0.0780	0.0734	104.	75-128	6.06	20	WG553386
4-Bromofluorobenzene				110.1	75-128			WG553386
Dibromofluoromethane				108.0	79-125			WG553386
Toluene-d8				104.1	87-114			WG553386
a,a,a-Trifluorotoluene				104.5	84-114			WG553386
TPH (GC/FID) Low Fraction	mg/kg	7.16	6.78	130.	67-135	5.51	20	WG553660
a,a,a-Trifluorotoluene(FID)				102.2	59-128			WG553660
1,2,4-Trichlorobenzene	mg/kg	0.218	0.195	66.0	48-87	11.0	20	WG553588
2,4,6-Trichlorophenol	mg/kg	0.254	0.229	76.0	50-98	10.2	20	WG553588
2,4-Dichlorophenol	mg/kg	0.236	0.226	71.0	56-96	4.50	20	WG553588
2,4-Dimethylphenol	mg/kg	0.232	0.224	70.0	52-101	3.50	20	WG553588
2,4-Dinitrophenol	mg/kg	0.230	0.205	69.0	10-109	11.4	39	WG553588
2,4-Dinitrotoluene	mg/kg	0.251	0.230	76.0	54-103	9.09	20	WG553588
2,6-Dinitrotoluene	mg/kg	0.248	0.223	74.0	53-99	10.8	20	WG553588
2-Chloronaphthalene	mg/kg	0.224	0.202	67.0	55-96	10.4	20	WG553588
2-Chlorophenol	mg/kg	0.206	0.203	62.0	52-88	1.49	20	WG553588
2-Nitrophenol	mg/kg	0.238	0.212	72.0	55-106	11.7	20	WG553588
3,3-Dichlorobenzidine	mg/kg	0.224	0.207	67.0	36-84	7.90	20	WG553588
4,6-Dinitro-2-methylphenol	mg/kg	0.241	0.234	72.0	24-98	3.09	32	WG553588
4-Bromophenyl-phenylether	mg/kg	0.253	0.232	76.0	58-111	8.71	20	WG553588
4-Chloro-3-methylphenol	mg/kg	0.229	0.215	69.0	58-98	6.16	20	WG553588
4-Chlorophenyl-phenylether	mg/kg	0.234	0.217	70.0	59-103	7.72	20	WG553588
4-Nitrophenol	mg/kg	0.215	0.173	65.0	34-101	21.8	26	WG553588
Acenaphthene	mg/kg	0.240	0.225	72.0	55-96	6.31	20	WG553588
Acenaphthylene	mg/kg	0.241	0.232	72.0	61-107	4.04	20	WG553588
Anthracene	mg/kg	0.243	0.217	73.0	58-105	11.3	20	WG553588
Benzidine	mg/kg	0.0430	0.0373	13.0	10-21	14.2	40	WG553588
Benzo(a)anthracene	mg/kg	0.248	0.233	74.0	56-103	6.51	20	WG553588
Benzo(a)pyrene	mg/kg	0.237	0.226	71.0	57-103	4.54	20	WG553588
Benzo(b)fluoranthene	mg/kg	0.227	0.221	68.0	52-106	2.73	20	WG553588
Benzo(g,h,i)perylene	mg/kg	0.245	0.233	73.0	47-112	4.80	20	WG553588
Benzo(k)fluoranthene	mg/kg	0.252	0.230	76.0	53-104	9.14	20	WG553588
Benzylbutyl phthalate	mg/kg	0.228	0.217	68.0	61-118	4.97	20	WG553588
Bis(2-chlorethoxy)methane	mg/kg	0.221	0.203	66.0	58-104	8.83	20	WG553588
Bis(2-chloroethyl)ether	mg/kg	0.197	0.194	59.0	51-103	1.39	20	WG553588
Bis(2-chloroisopropyl)ether	mg/kg	0.196	0.213	59.0	56-95	8.28	20	WG553588
Bis(2-ethylhexyl)phthalate	mg/kg	0.237	0.220	71.0	56-120	7.54	20	WG553588
Chrysene	mg/kg	0.244	0.235	73.0	55-102	3.58	20	WG553588
Di-n-butyl phthalate	mg/kg	0.243	0.228	73.0	59-114	6.69	20	WG553588

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Quality Assurance Report
Level II

L533941

September 13, 2011

Analyte	Units	Laboratory Control Sample Duplicate Result	Ref	%Rec	Limit	RPD	Limit	Batch
Di-n-octyl phthalate	mg/kg	0.239	0.221	72.0	51-119	7.61	22	WG553588
Dibenz(a,h)anthracene	mg/kg	0.232	0.222	70.0	49-111	4.53	20	WG553588
Diethyl phthalate	mg/kg	0.245	0.224	74.0	61-105	8.79	20	WG553588
Dimethyl phthalate	mg/kg	0.236	0.231	71.0	60-106	1.97	20	WG553588
Fluoranthene	mg/kg	0.246	0.241	74.0	59-108	1.77	20	WG553588
Fluorene	mg/kg	0.237	0.214	71.0	59-100	10.0	20	WG553588
Hexachloro-1,3-butadiene	mg/kg	0.244	0.232	73.0	53-106	5.00	20	WG553588
Hexachlorobenzene	mg/kg	0.239	0.221	72.0	50-108	7.77	20	WG553588
Hexachlorocyclopentadiene	mg/kg	0.170	0.153	51.0	36-117	10.9	20	WG553588
Hexachloroethane	mg/kg	0.201	0.204	60.0	45-83	1.52	20	WG553588
Indeno(1,2,3-cd)pyrene	mg/kg	0.239	0.225	72.0	50-110	5.80	20	WG553588
Isophorone	mg/kg	0.187	0.159	56.0	51-99	16.0	20	WG553588
n-Nitrosodi-n-propylamine	mg/kg	0.199	0.203	60.0	52-103	2.05	20	WG553588
n-Nitrosodimethylamine	mg/kg	0.201	0.189	60.0	31-107	6.23	23	WG553588
n-Nitrosodiphenylamine	mg/kg	0.222	0.206	66.0	57-121	7.32	20	WG553588
Naphthalene	mg/kg	0.219	0.204	66.0	55-91	6.93	20	WG553588
Nitrobenzene	mg/kg	0.227	0.210	68.0	47-92	7.60	20	WG553588
Pentachlorophenol	mg/kg	0.228	0.210	68.0	10-89	8.37	28	WG553588
Phenanthrene	mg/kg	0.236	0.218	71.0	55-103	8.06	20	WG553588
Phenol	mg/kg	0.194	0.189	58.0	49-99	2.29	20	WG553588
Pyrene	mg/kg	0.230	0.212	69.0	54-104	8.34	20	WG553588
2,4,6-Tribromophenol				95.14	16-136			WG553588
2-Fluorobiphenyl				81.21	37-119			WG553588
2-Fluorophenol				63.93	22-114			WG553588
Nitrobenzene-d5				74.68	20-114			WG553588
Phenol-d5				77.01	26-127			WG553588
p-Terphenyl-d14				81.38	15-174			WG553588
TPH (GC/FID) Low Fraction	mg/kg	5.67	5.65	103.	67-135	0.480	20	WG553535
a,a,a-Trifluorotoluene(FID)				97.86	59-128			WG553535
Benzene	mg/kg	0.0282	0.0278	113.	65-128	1.60	20	WG553368
Ethylbenzene	mg/kg	0.0289	0.0298	116.	74-128	2.93	20	WG553368
Toluene	mg/kg	0.0285	0.0287	114.	70-120	0.710	20	WG553368
Total Xylenes	mg/kg	0.0888	0.0889	118.	74-127	0.100	20	WG553368
4-Bromofluorobenzene				103.2	59-140			WG553368
Dibromofluoromethane				105.1	63-139			WG553368
Toluene-d8				103.9	84-116			WG553368
a,a,a-Trifluorotoluene				112.4	80-118			WG553368

Analyte	Units	Matrix Spike MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Benzene	mg/l	0.0246	0	.025	98.5	16-158	L533479-03	WG553386
Ethylbenzene	mg/l	0.0239	0	.025	95.8	29-150	L533479-03	WG553386
Toluene	mg/l	0.0234	0	.025	93.5	22-152	L533479-03	WG553386
Total Xylenes	mg/l	0.0707	0	.075	94.2	27-151	L533479-03	WG553386
4-Bromofluorobenzene					107.1	75-128		WG553386
Dibromofluoromethane					106.1	79-125		WG553386
Toluene-d8					104.7	87-114		WG553386
a,a,a-Trifluorotoluene					105.9	84-114		WG553386
TPH (GC/FID) Low Fraction	mg/kg	25.6	0	5.5	93.2	55-109	L533837-01	WG553660
a,a,a-Trifluorotoluene(FID)					96.77	59-128		WG553660

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Quality Assurance Report
Level II

L533941

September 13, 2011

Analyte	Units	Matrix Spike MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
TPH (GC/FID) Low Fraction	mg/kg	25.5	0	5.5	92.7	55-109	L533941-01	WG553535
a,a,a-Trifluorotoluene(FID)					97.50	59-128		WG553535
Benzene	mg/kg	0.113	0	.025	90.7	16-143	L533944-02	WG553368
Ethylbenzene	mg/kg	0.116	0	.025	92.6	12-137	L533944-02	WG553368
Toluene	mg/kg	0.122	0.00540	.025	93.0	12-136	L533944-02	WG553368
Total Xylenes	mg/kg	0.361	0.00790	.075	94.2	10-138	L533944-02	WG553368
4-Bromofluorobenzene					106.8	59-140		WG553368
Dibromofluoromethane					107.0	63-139		WG553368
Toluene-d8					105.4	84-116		WG553368
a,a,a-Trifluorotoluene					111.8	80-118		WG553368

Analyte	Units	Matrix Spike Duplicate MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Benzene	mg/l	0.0267	0.0246	107.	16-158	8.09	21	L533479-03	WG553386
Ethylbenzene	mg/l	0.0265	0.0239	106.	29-150	9.99	24	L533479-03	WG553386
Toluene	mg/l	0.0253	0.0234	101.	22-152	7.96	22	L533479-03	WG553386
Total Xylenes	mg/l	0.0783	0.0707	104.	27-151	10.2	23	L533479-03	WG553386
4-Bromofluorobenzene				109.0	75-128				WG553386
Dibromofluoromethane				105.5	79-125				WG553386
Toluene-d8				104.3	87-114				WG553386
a,a,a-Trifluorotoluene				104.2	84-114				WG553386
TPH (GC/FID) Low Fraction	mg/kg	27.3	25.6	99.3	55-109	6.42	20	L533837-01	WG553660
a,a,a-Trifluorotoluene(FID)				96.51	59-128				WG553660
TPH (GC/FID) Low Fraction	mg/kg	21.8	25.5	79.4	55-109	15.4	20	L533941-01	WG553535
a,a,a-Trifluorotoluene(FID)				95.91	59-128				WG553535
Benzene	mg/kg	0.114	0.113	91.5	16-143	0.860	31	L533944-02	WG553368
Ethylbenzene	mg/kg	0.121	0.116	96.8	12-137	4.36	36	L533944-02	WG553368
Toluene	mg/kg	0.125	0.122	95.3	12-136	2.37	32	L533944-02	WG553368
Total Xylenes	mg/kg	0.372	0.361	97.2	10-138	3.07	36	L533944-02	WG553368
4-Bromofluorobenzene				107.5	59-140				WG553368
Dibromofluoromethane				105.1	63-139				WG553368
Toluene-d8				104.4	84-116				WG553368
a,a,a-Trifluorotoluene				110.0	80-118				WG553368

Batch number /Run number / Sample number cross reference

WG553386: R1844072: L533941-10
WG553660: R1844212: L533941-08 09
WG553588: R1845992: L533941-04 06
WG553535: R1846273: L533941-01 02 03 04 05 06 07
WG553867: R1847632: L533941-01 02 03 04 05 06
WG553869: R1849498: L533941-07 08 09
WG553368: R1850352: L533941-04 06

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

EPAPAV0130870

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Est. 1970

AECOM Inc. - Fort Collins, CO
Mr. Dustin Krajewski
1601 Prospect Parkway

Fort Collins, CO 80525

Quality Assurance Report
Level II

L533941

September 13, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

EPAPAV0130871

AECOM, Inc.
1601 Prospect Pkwy.
Fort Collins, CO 80525

Alternate billing information:

Report to: Dustin Krajewski
Email to: Dustin.krajewski@aecom.com

Chain of Custody
Page 1 of 1

Prepared by: B051

ENVIRONMENTAL SCIENCE CORP.
12065 Lebanon Road
Mt. Juliet, TN 37122
Phone (615) 758-5858
Phone (800) 767-5859
FAX (615) 758-5859

Project Description: EnCana Pavillion
City/Sate Collected: WY
Phone: 970-493-8878
FAX:
Client Project #: 60221849
ESC Key: ENSRFCCO-ENCANAPA
Collected by: Jeremy Husbank
Site/Facility ID#: Pavillion WY
P.O.#:
Collected by (signature): T. [illegible]
Packed on Ice N Y X

Rush? (Lab MUST Be Notified)
____ Same Day.....200%
____ Next Day.....100%
____ Two Day.....50%

Date Results Needed:
Email? __No__Yes
FAX? __No__Yes

CoCode ENSRFCCO (lab use only)
Template/Prelogin
Shipped Via:

Analysis/Container/Preservative

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	TPH-GRO+DRO (8015)	BTEX (8260)	SVOCs					Remarks/Contaminant	Sample # (lab only)
SB-1-11 (TP-42x-12) (7-8)	Grab	SS	(7-8)	8/31/11	1205	1	X								1533941.01
SB-2-11 (TP-42x-12) (6-8)	Grab	SS	6-8	8/31/11	1207	1	X								02
SB-3-11 (TP-42x-12) (6-7)	Grab	SS	6-7	8/31/11	1210	1	X								03
SB-4-11 (TP-42x-12) (4-5)	Grab	SS	4-5	8/31/11	12:12	3	X	X	X						04
SB-5-11 (TP-42x-12) (4-6)	Grab	SS	4-6	8/31/11	12:15	1	X								05
SB-1-11 (TP-12-13) (6-8)	Grab	SS	6-8	8/31/11	14:20	3	X	X	X						06
SB-2-11 (TP-12-13) (7-8)	Grab	SS	7-8	8/31/11	1405	1	X								07
SB-3-11 (TP-12-13) (9-10)	Grab	SS	9-10	8/31/11	1345	1	X								08
SB-4-11 (TP-12-13) (9.5-10.5)	Grab	SS	9.5-10.5	8/31/11	1325	1	X								09
Trip Blank	Grab	WT	—	8/31/11	0800	1	X	X							10

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other _____ 4963 4591 4712 pH _____ Temp _____

Remarks:

Flow _____ Other _____

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☑ FedEx ☐ Courier ☐	Condition: (lab use only)
T. [illegible]	8/31/11	1630	FedEx		COC SI
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.7°C / Bottles Received: 14	
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 9-1-11 / Time: 0900	pH Checked: / NCF:

Troy [illegible]