

# **SITE ASSESSMENT SUMMARY REPORT**

**ENCANA PRODUCTION PAD #1313  
REMEDIAATION PROJECT #6663  
RIO BLANCO COUNTY, COLORADO**

**NOVEMBER 2013**

**Prepared for:**

**ENCANA OIL & GAS USA INC.  
Rangely, Colorado**



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RIO BLANCO COUNTY, COLORADO**

**NOVEMBER 2013**

**Prepared for:**

**ENCANA OIL & GAS USA INC.  
1125 Escalante Drive  
Rangely, Colorado**

**Prepared by:**

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## **EXECUTIVE SUMMARY**

This report was prepared by LT Environmental, Inc., under the direction of Encana Oil & Gas (USA), Inc., to document soil assessment activities at the Encana Production Pad #1313. The Site is located approximately 20 miles south-west of Rangely, Colorado.

The scope of work for this project included assessing residual petroleum hydrocarbon impacts following the identification of a release associated with a partially buried produced water corrugated steel holding tank. The source of the release was identified when the buried holding tank was removed on November 11, 2011. Activities included advancing soil borings on site and collecting soil samples to submit for laboratory analysis, health and safety monitoring, drilling contractor oversight, and preparation of this summary report.

On August 30, 2012, four soil borings were conducted on site to depths ranging from 34 to 35 feet below ground surface. Six soil samples were submitted for laboratory analysis. All soil samples were observed to be in compliance with Colorado Oil and Gas Conservation Commission Table 910-1 Concentration Levels with one exception.

Therefore, additional assessment activities were conducted on August 23, 2013. One soil boring was conducted on site to a depth of 23 feet below ground surface. Based on analytical results from the confirmation soil boring sample collected on August 23, 2013, residual concentrations of total petroleum hydrocarbons previously observed in exceeding the compliance standards of the Colorado Oil and Gas Conservation Commission Table 910-1 Concentration Levels are now compliant. Therefore, all hydrocarbon-impacted soil observed onsite has been removed or has naturally attenuated to within the compliance standards of the Colorado Oil and Gas Conservation Commission Table 910-1.

All soil borings were advanced with hollow-stem augers. All soil borings were conducted within the production pad disturbance; therefore no borings were outside the pad disturbance on Bureau of Land Management land. No groundwater was encountered during the assessment activities. All soil borings were backfilled with soil generated during assessment drilling activities.

## 1.0 INTRODUCTION

LT Environmental, Inc. (LTE), under the direction of Encana Oil & Gas (USA), Inc. (Encana), was contracted to document soil assessment activities at the Encana Production Pad #1313 (Site) as depicted on Figure 1. The purpose of this project was to assess any residual hydrocarbon impacted soil remaining at the Site. A release of petroleum hydrocarbons was identified when a partially buried produced water corrugated steel holding tank was excavated and removed from the Site.

On November 11, 2011, Encana removed the buried production tank along with any observed hydrocarbon impacted soil associated with the Site as depicted on Figure 2. The buried production tank was installed prior to the development of the current liquid containment systems. At the time of excavation activities, Encana attempted to remove all associated hydrocarbon impacted soil, however the excavation extents were limited due to technical considerations, health and safety concerns, and property boundaries.

Concentrations of total petroleum hydrocarbon (TPH) and benzene were observed up to 6,100 milligrams per kilogram (mg/kg) and 0.66 mg/kg respectively (Table 1). These concentrations exceeded the Colorado Oil and Gas Conservation Commission (COGCC) standards of 500 mg/kg, and 0.17 mg/kg respectively, thus determining the need to return to the site and re-assess the remaining soil conditions. Background soil samples were also collected at the time of excavation activities, which are listed in Table 2.

On August 30, 2012, LTE conducted four soil borings on site to depths ranging from 34 to 35 feet (ft.) below ground surface (bgs). Based on analytical results from soil boring samples collected during assessment activities, residual concentration of TPH exceed the compliance standards of the COGCC Table 910-1 Concentration Levels in one soil sample. All other soil samples were observed to be compliant.

Therefore, LTE returned to the site to conduct additional assessment activities on August 23, 2013. One soil boring was advanced on site to a depth of 23 ft. bgs. Based on analytical results from the confirmation soil boring sample collected on August 23, 2013, residual concentrations of TPH previously observed to be exceeding COGCC Table 910-1 Concentration Levels were now observed to be compliant. Therefore, all hydrocarbon-impacted soil observed onsite has naturally attenuated to within compliance standards of the COGCC Table 910-1 Concentration Levels.

### 1.1 SITE DESCRIPTION

The Site is located approximately 20 miles south-west of Rangely, Colorado. The legal description of the Site is the northeast quarter of the northeast quarter of Section 25, Township 2 South, Range 103 West of the Sixth Principal Meridian in Rio Blanco County, Colorado (Figure 1). The Site is surrounded by Bureau of Land Management (BLM) property.

The general site geology was observed as redish-brown gravelly-sand with some clay including sandstone and claystone fragments down to a weathered sandstone bedrock at approximately 35 ft. bgs.

The Site is located at an elevation of 6,573 feet above mean sea level in an area with localized high plateau topography associated with the western edge of the Rocky Mountains near the Colorado Plateau.

## **1.2 SCOPE OF WORK**

The scope of work for this assessment project included advancing soil borings at the Site and collecting soil samples below the previous excavation and in all lateral directions outward from the initial source area.

During on-site assessment activities, LTE personnel conducted field screening of soil samples, soil sampling, borehole logging, health and safety monitoring, and documentation of field activities.

A summary of field activities, analytical results from soil sampling, and conclusions are presented in the subsequent sections.

## **2.0 SUMMARY OF FIELD ACTIVITIES**

### **2.1 ASSESSMENT ACTIVITIES**

On August 30, 2012, LTE advanced four soil borings (1313-CS01-083012 through 1313-CS04-083012) to depths ranging from 34 to 35 feet bgs. LTE contracted Site Services Drilling Company of Golden, Colorado, to install the soil borings using a CME-75 drill rig equipped with hollow-stem augers.

The soil borings were logged by an LTE geologist who inspected the soil for the presence or absence of petroleum hydrocarbon odor and/or staining. The soil was characterized by visually inspecting the soil samples collected in 2-foot long split-spoon samplers and field screening the soil headspace using a photo-ionization detector (PID) to monitor for the presence of volatile organic vapors. The soil boring logs are included in Appendix A.

Soil samples were collected from each soil boring and submitted with a completed chain-of-custody form to ESC Lab Sciences of Mt. Juliet, Tennessee (ESC), TPH, benzene, toluene, ethylbenzene and total xylene (BTEX). Samples collected and submitted for laboratory analysis were only analyzed for TPH and BTEX due to the fact that these were the only previous exceedances of the COGCC Concentration Levels at the time the culvert pit was removed.

LTE returned to the site to conduct additional assessment activities on August 23, 2013, Precision Sampling, Inc. of Colorado Springs, Colorado, was contracted to advance one soil boring on site to a depth of 24 ft. bgs. One soil sample (1313-CB01-082313) was submitted for laboratory analysis of TPH.

## **2.2 ASSESSMENT FINDINGS**

Soil conditions at the Site were identified as a redish-brown gravelly-sand with some clay including sandstone and claystone fragments down to a weathered sandstone bedrock at approximately 35 ft. bgs. Auger refusal at the sandstone layer determined the vertical depth of each soil boring. Groundwater was not encountered in any of the soil borings during drilling activities.

All soil samples were screened using a PID and placed in laboratory-prepared, wide-mouth glass sample jars for laboratory submittal. Samples field screened with the PID ranged from 0 to 2,280 parts per million. Soil samples were observed to have PID readings and hydrocarbon odors with no staining.

## **3.0 ANALYTICAL RESULTS**

Laboratory analytical results from soil sample 1313-CB01-083012 indicate a TPH concentration of 610 mg/kg, which exceeds COGCC standard concentration of 500 mg/kg. TPH concentrations in 1313-CB02-083012 through 1313-CB04-083012 ranged from below detection limit of <4.5 mg/kg to 20.8 mg/kg, demonstrating compliance with COGCC Table 910-1 standards.

On August 23, 2013, LTE returned to the site to advance one soil boring (1313-CB01-082313) and submit a soil sample for laboratory analysis of TPH. Analytical results for TPH in 1313-CB01-082313 was observed to be 5.4 mg/kg, below the COGCC Table 910-1 allowable concentration of 500 mg/kg.

Soil samples analyzed from the five soil borings confirmed that previously observed hydrocarbon impacted soil exceeding COGCC regulatory standards has been removed from the Site during on-site excavation activities or has naturally attenuated since excavation activities in November of 2011. Soil confirmation sample laboratory analytical results are illustrated on Figure 3 and summarized in Table 3. Copies of the laboratory analytical reports are included in Appendix B.

## **4.0 SUMMARY AND CONCLUSIONS**

LTE was contracted by Encana to conduct soil assessment activities at the Encana Production Pad #1313 to assess any residual hydrocarbon impacted soil following the identification of a release associated with a partially buried produced water corrugated steel holding tank. The tank was removed and associated hydrocarbon impacted soil excavated in November of 2011.

On August 30, 2012, LTE field personnel observed the installation of four soil borings on site and collected soil samples 1313-CB01-083012 through 1313-CB04-083012. The four soil borings were advanced on site to depths ranging from 34 to 35 ft. bgs. No groundwater was encountered during the assessment activities. Six soil samples were submitted to ESC for laboratory analysis of TPH and BTEX. Laboratory analytical results indicate that TPH concentrations in one sample (1313-CB01-083012) exceed the COGCC standard.

Additional assessment activities were conducted on August 23, 2013, to reassess residual TPH concentrations. A soil sample was collected and submitted for laboratory analysis from one boring (1313-CB01-082313). Based on analytical results from the confirmation soil boring sample collected on August 23, 2013, residual concentrations of TPH previously observed exceeding the compliance standards of the COGCC Table 910-1 Concentration Levels are now compliant.

Therefore, analytical results from soil assessment activities indicate that hydrocarbon impacted soil has been removed from the Site or has naturally attenuated to within the compliance standards of the COGCC.

Therefore, LTE recommends that Encana Site #1313 be granted closure regarding Remediation Number 6663 and that the COGCC provide closure documentation to Encana with regard to this recommendation.

## FIGURES

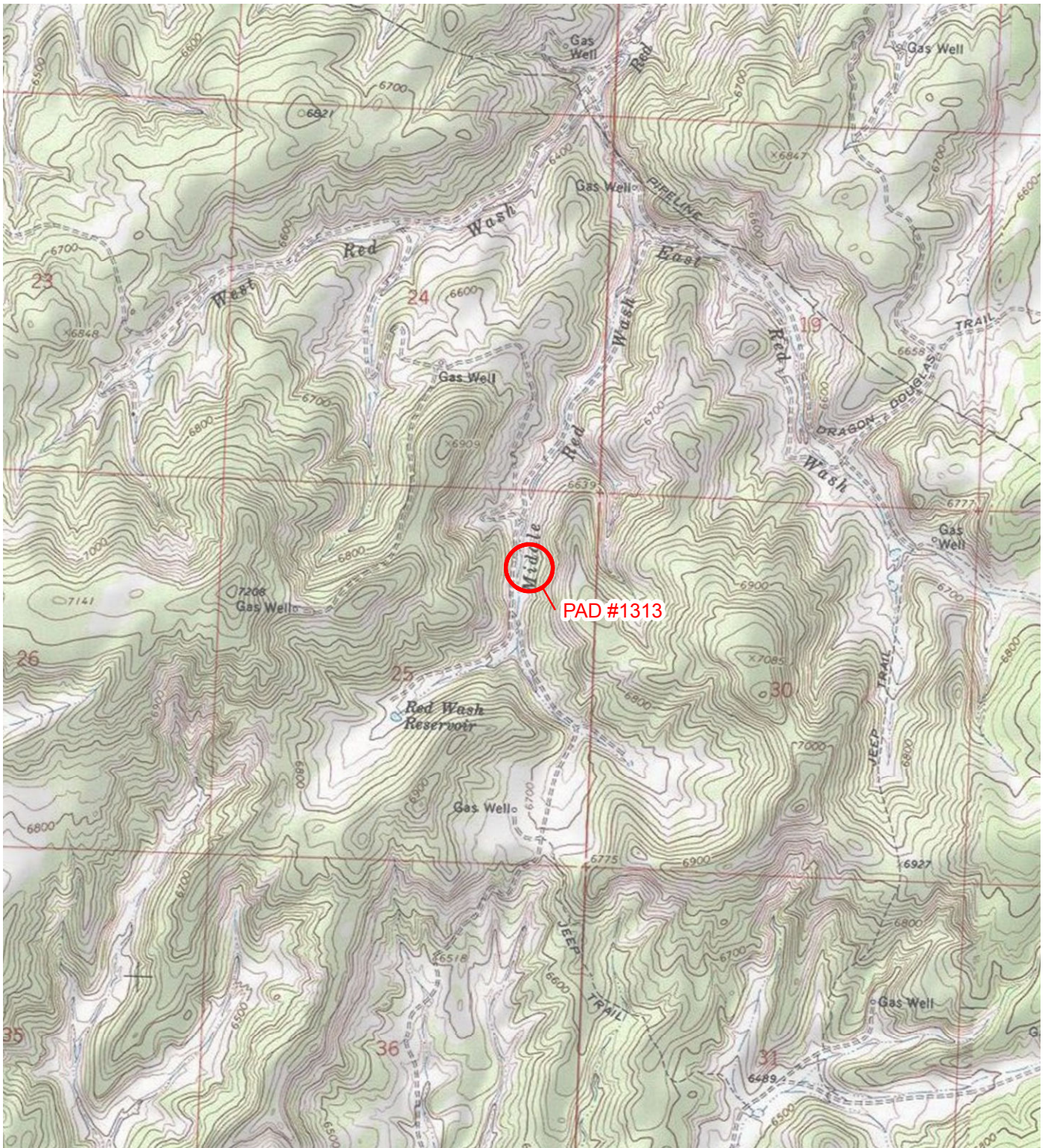


IMAGE COURTESY OF USGS/ESRI

# LEGEND

○ SITE LOCATION

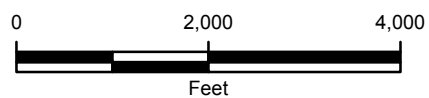


FIGURE 1  
 SITE LOCATION MAP  
 PAD #1313  
 NENE SEC 25 T2S R103W  
 RIO BLANCO COUNTY, COLORADO  
 ENCANNA OIL & GAS (USA) INC.



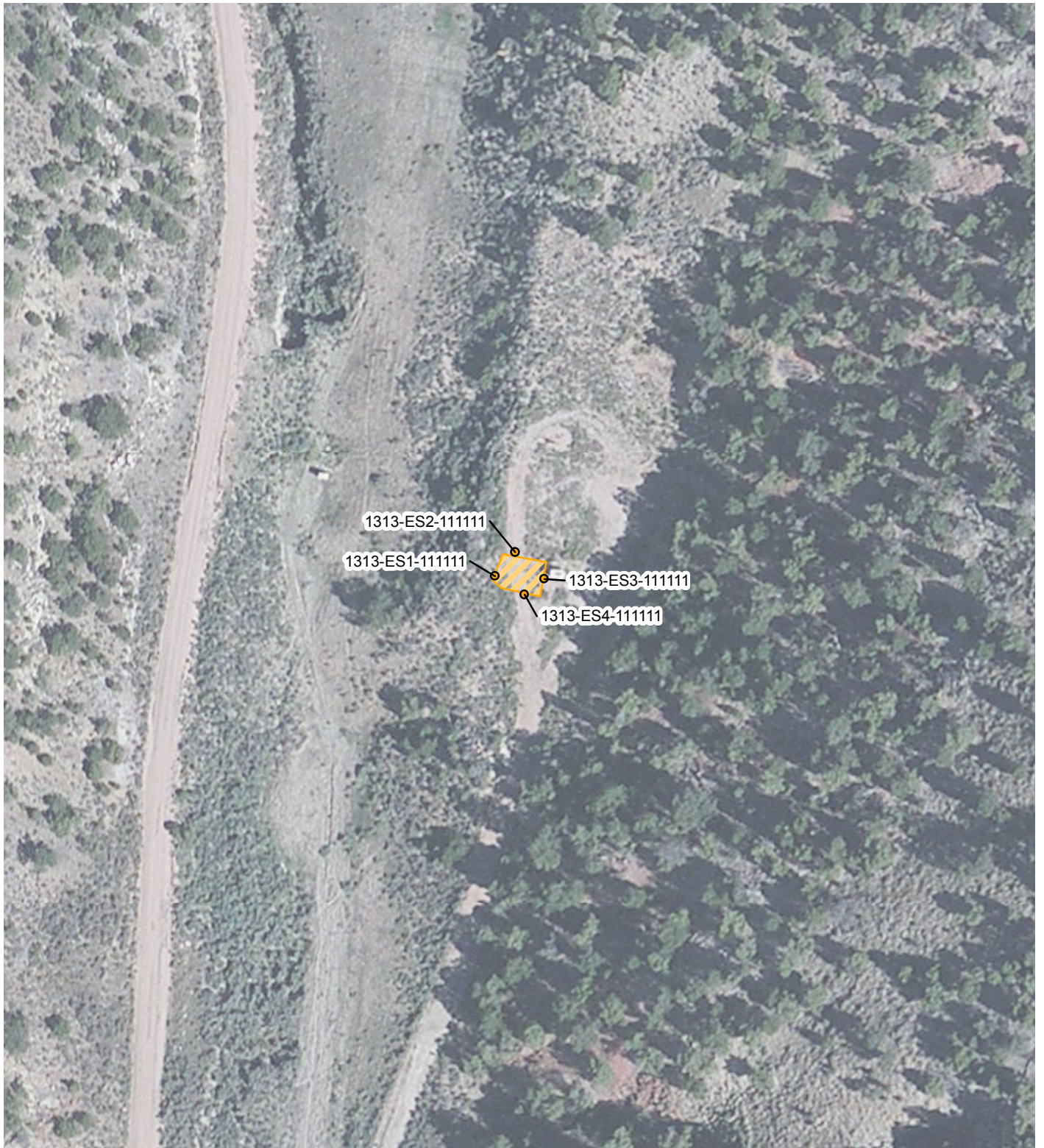


IMAGE COURTESY OF BING MAPS/ESRI

## LEGEND

- SOIL SAMPLE
- EXCAVATION EXTENT (NOVEMBER 2011)

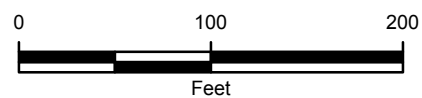


FIGURE 2  
PAD #1313  
NENE SEC 25 T2S R103W  
RIO BLANCO COUNTY, COLORADO

ENCANA OIL & GAS (USA) INC.



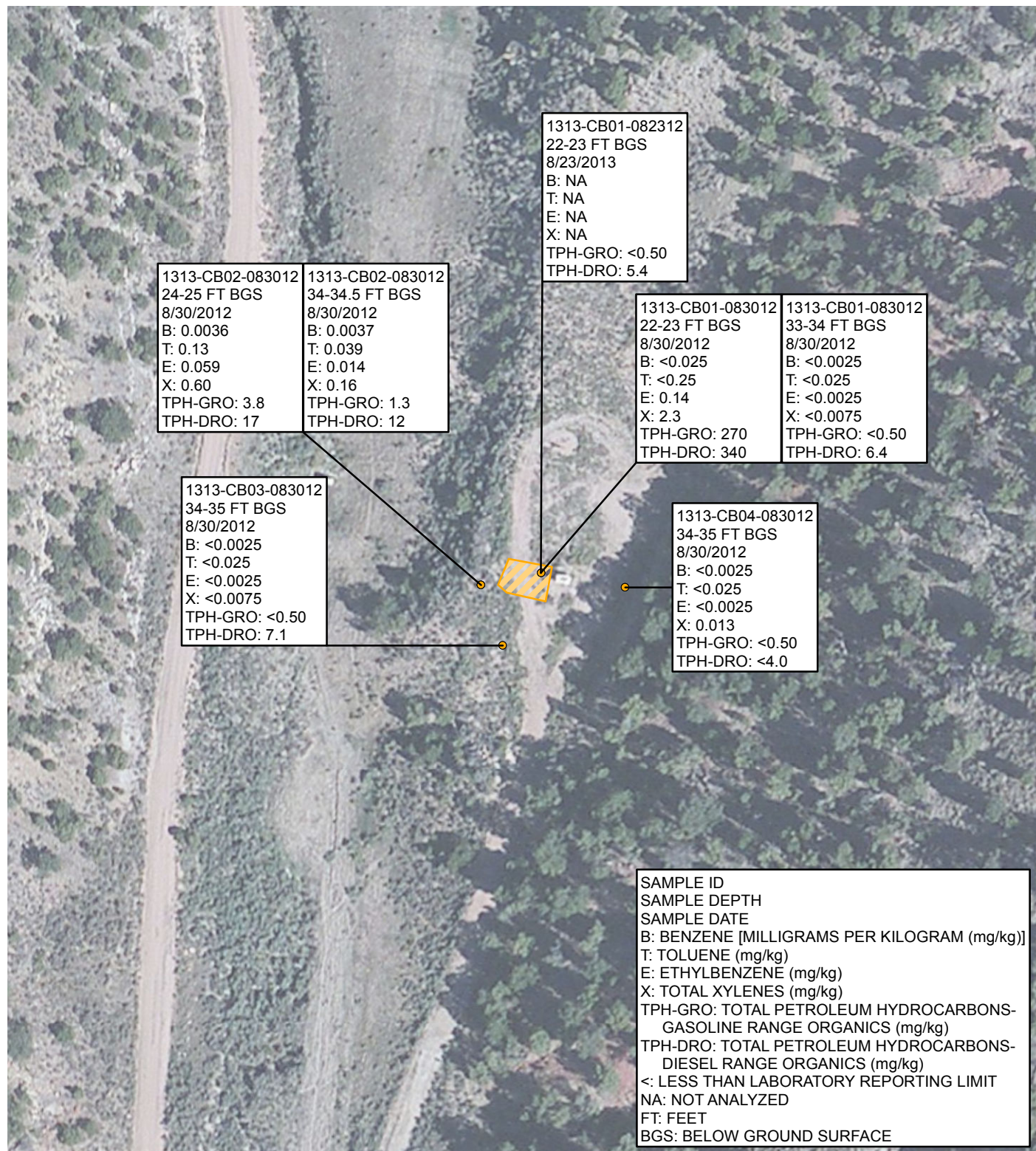
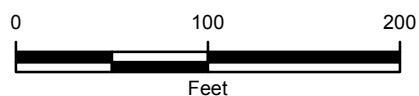


IMAGE COURTESY OF BING MAPS/ESRI

## LEGEND

- SOIL BORING LOCATIONS
- EXCAVATION EXTENT (NOVEMBER 2011)



**FIGURE 3**  
**SOIL ANALYTICAL RESULTS**  
**PAD #1313**  
**NENE SEC 25 T2S R103W**  
**RIO BLANCO COUNTY, COLORADO**  
**ENCANA OIL & GAS (USA) INC.**



## TABLES

**TABLE 1**  
**PIT REMOVAL AND EXCAVATION ANALYTICAL RESULTS**  
**ENCANA PRODUCTION PAD 1313**  
**RANGELY, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	1313-ES1-111111	1313-ES2-111111	1313-ES3-111111	1313-ES4-111111	1313-UNDERTANK- 111011	1313-SPOILS-120512
Sample Date			11/11/2011	11/11/2011	11/11/2011	11/11/2011	11/10/2011	12/5/2012
Sample Type			Excavation	Excavation	Excavation	Excavation	Excavation	Spoils
Arsenic	0.39	mg/kg	NA	NA	NA	NA	<1.0	NA
Barium	15,000	mg/kg	NA	NA	NA	NA	740	NA
Cadmium	70	mg/kg	NA	NA	NA	NA	0.56	NA
Chromium (III)	120,000	mg/kg	NA	NA	NA	NA	13	NA
Chromium (VI)	23	mg/kg	NA	NA	NA	NA	<2.0	NA
Copper	3,100	mg/kg	NA	NA	NA	NA	<20.0	NA
Lead	400	mg/kg	NA	NA	NA	NA	20	NA
Mercury	23	mg/kg	NA	0.041	NA	NA	0.042	NA
Nickel	1,600	mg/kg	NA	14.5	NA	NA	15	NA
Selenium	390	mg/kg	NA	BDL	NA	NA	<1.0	NA
Silver	390	mg/kg	NA	BDL	NA	NA	<0.50	NA
Zinc	23,000	mg/kg	NA	68.5	NA	NA	36	NA
EC	4.0	mmhos/cm	NA	NA	NA	NA	<b>11.0</b>	NA
pH	6 - 9	SU	NA	NA	NA	NA	6.3	NA
SAR	12	unitless	NA	NA	NA	NA	<b>50</b>	NA
TPH-GRO		mg/kg	4100	<.50	2400	3900	<b>2000</b>	<0.50
TPH-DRO		mg/kg	1300	<4.0	3700	770	<b>11000</b>	74.0
TPH	500	mg/kg	<b>5400</b>	<4.5	<b>6100</b>	<b>4670</b>	<b>13000</b>	74.0
Benzene	0.17	mg/kg	<b>0.66</b>	<0.0025	<0.0025	<1.0	<b>3</b>	<0.0025
Toluene	85	mg/kg	20.0	<0.025	0.14	<10.0	21	<0.025
Ethylbenzene	100	mg/kg	17.0	<0.0025	0.81	11.0	9.4	<0.0025
Total Xylenes	175	mg/kg	92.0	<0.0075	30.0	63.0	62	<0.50
Acenaphthene	1000	mg/kg	NA	NA	NA	NA	0.88	NA
Anthracene	1000	mg/kg	NA	NA	NA	NA	<0.30	NA
Benzo(A)anthracene	0.22	mg/kg	NA	NA	NA	NA	<0.30	NA
Benzo(B)fluoranthene	0.22	mg/kg	NA	NA	NA	NA	<0.30	NA
Benzo(K)fluoranthene	2.2	mg/kg	NA	NA	NA	NA	<0.30	NA
Benzo(A)pyrene	0.022	mg/kg	NA	NA	NA	NA	<0.30	NA
Chrysene	22	mg/kg	NA	NA	NA	NA	<0.30	NA
Dibenzo(A,H)anthracene	0.022	mg/kg	NA	NA	NA	NA	<0.30	NA
Fluoranthene	1000	mg/kg	NA	NA	NA	NA	<0.30	NA
Fluorene	1000	mg/kg	NA	NA	NA	NA	1.0	NA
Indeno(1,2,3,C,D)pyrene	0.22	mg/kg	NA	NA	NA	NA	<0.30	NA
Naphthalene	23	mg/kg	NA	NA	NA	NA	<b>25</b>	NA
Pyrene	1000	mg/kg	NA	NA	NA	NA	<0.30	NA

**NOTES:**

< - less than the stated reporting limit

**BOLD** - indicates result exceeds the COGCC concentration level

COGCC - Colorado Oil and Gas Conservation Commission

EC- electrical conductivity

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed

SU - standard unit

TPH-GRO - total petroleum hydrocarbons-gasoline range organics

TPH-DRO - total petroleum hydrocarbons-diesel range organics

TPH - combination of TPH-GRO and TPH-DRO



**TABLE 2**  
**BACKGROUND ANALYTICAL RESULTS**  
**ENCANA PRODUCTION PAD 1313**  
**RANGELY, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	1313-BKG1-111111	1313-BKG2-111111	1313-BKG3-111111	1313-BKG4-111111	1313-BKG5-111111
Sample Date			11/11/2011	11/11/2011	11/11/2011	11/11/2011	11/11/2011
Sample Type			Background	Background	Background	Background	Background
Arsenic	0.39	mg/kg	<b>3.6</b>	<b>4.0</b>	<b>4.4</b>	<b>3.6</b>	<b>2.8</b>
Barium	15,000	mg/kg	NA	NA	NA	NA	NA
Cadmium	70	mg/kg	NA	NA	NA	NA	NA
Chromium (III)	120,000	mg/kg	NA	NA	NA	NA	NA
Chromium (VI)	23	mg/kg	NA	NA	NA	NA	NA
Copper	3,100	mg/kg	NA	NA	NA	NA	NA
Lead	400	mg/kg	NA	NA	NA	NA	NA
Mercury	23	mg/kg	NA	NA	NA	NA	NA
Nickel	1,600	mg/kg	NA	NA	NA	NA	NA
Selenium	390	mg/kg	NA	NA	NA	NA	NA
Silver	390	mg/kg	NA	NA	NA	NA	NA
Zinc	23,000	mg/kg	NA	NA	NA	NA	NA
EC	4.0	mmhos/cm	NA	NA	NA	NA	NA
pH	6 - 9	SU	NA	NA	NA	NA	NA
SAR	12	unitless	NA	NA	NA	NA	NA
TPH-GRO		mg/kg	NA	NA	NA	NA	NA
TPH-DRO		mg/kg	NA	NA	NA	NA	NA
TPH	500	mg/kg	NA	NA	NA	NA	NA
Benzene	0.17	mg/kg	NA	NA	NA	NA	NA
Toluene	85	mg/kg	NA	NA	NA	NA	NA
Ethylbenzene	100	mg/kg	NA	NA	NA	NA	NA
Total Xylenes	175	mg/kg	NA	NA	NA	NA	NA
Acenaphthene	1000	mg/kg	NA	NA	NA	NA	NA
Anthracene	1000	mg/kg	NA	NA	NA	NA	NA
Benzo(A)anthracene	0.22	mg/kg	NA	NA	NA	NA	NA
Benzo(B)fluoranthene	0.22	mg/kg	NA	NA	NA	NA	NA
Benzo(K)fluoranthene	2.2	mg/kg	NA	NA	NA	NA	NA
Benzo(A)pyrene	0.022	mg/kg	NA	NA	NA	NA	NA
Chrysene	22	mg/kg	NA	NA	NA	NA	NA
Dibenzo(A,H)anthracene	0.022	mg/kg	NA	NA	NA	NA	NA
Fluoranthene	1000	mg/kg	NA	NA	NA	NA	NA
Fluorene	1000	mg/kg	NA	NA	NA	NA	NA
Indeno(1,2,3,C,D)pyrene	0.22	mg/kg	NA	NA	NA	NA	NA
Naphthalene	23	mg/kg	NA	NA	NA	NA	NA
Pyrene	1000	mg/kg	NA	NA	NA	NA	NA

**NOTES:**

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mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed

SU - standard unit

TPH-GRO - total petroleum hydrocarbons-gasoline range organics

TPH-DRO - total petroleum hydrocarbons-diesel range organics

TPH - combination of TPH-GRO and TPH-DRO



**TABLE 3**  
**SOIL CONFIRMATION ANALYTICAL RESULTS**  
**ENCANA PRODUCTION PAD 1313**  
**RANGELY, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	1313-CB01-083012 22-23FT BGS	1313-CB01-082313 22-23FT BGS	1313-CB01-083012 33-34FT BGS	1313-CB02-083012 24-25FT BGS	1313-CB02-083012 34-34.5FT BGS	1313-CB03-083012 34-35FT BGS	1313-CB04-083012 34-35FT BGS
Sample Date			8/30/2012	8/23/2013	8/30/2012	8/30/2012	8/30/2012	8/30/2012	8/30/2012
Sample Type			Confirmation	Confirmation	Confirmation	Confirmation	Confirmation	Confirmation	Confirmation
Arsenic	0.39	mg/kg	NA	NA	NA	NA	NA	NA	NA
Barium	15,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Cadmium	70	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chromium (III)	120,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chromium (VI)	23	mg/kg	NA	NA	NA	NA	NA	NA	NA
Copper	3,100	mg/kg	NA	NA	NA	NA	NA	NA	NA
Lead	400	mg/kg	NA	NA	NA	NA	NA	NA	NA
Mercury	23	mg/kg	NA	NA	NA	NA	NA	NA	NA
Nickel	1,600	mg/kg	NA	NA	NA	NA	NA	NA	NA
Selenium	390	mg/kg	NA	NA	NA	NA	NA	NA	NA
Silver	390	mg/kg	NA	NA	NA	NA	NA	NA	NA
Zinc	23,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
EC	4.0	mmhos/cm	NA	NA	NA	NA	NA	NA	NA
pH	6 - 9	SU	NA	NA	NA	NA	NA	NA	NA
SAR	12	unitless	NA	NA	NA	NA	NA	NA	NA
TPH-GRO		mg/kg	270	<0.50	<0.50	3.8	1.3	<0.50	<0.50
TPH-DRO		mg/kg	340	5.4	4.6	17	12	7.1	<4.0
TPH	500	mg/kg	<b>610</b>	5.4	6.4	20.8	13.3	7.1	<4.0
Benzene	0.17	mg/kg	<0.025	NA	<0.0025	0.0036	0.0037	<0.0025	<0.0025
Toluene	85	mg/kg	<0.25	NA	<0.025	0.13	0.039	<0.025	<0.025
Ethylbenzene	100	mg/kg	0.14	NA	<0.0025	0.059	0.014	<0.0025	<0.0025
Total Xylenes	175	mg/kg	2.3	NA	<0.0075	0.60	0.16	<0.0075	0.013
Acenaphthene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Anthracene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(A)anthracene	0.22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(B)fluoranthene	0.22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(K)fluoranthene	2.2	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(A)pyrene	0.022	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chrysene	22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Dibenzo(A,H)anthracene	0.022	mg/kg	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Fluorene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3,C,D)pyrene	0.22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Naphthalene	23	mg/kg	NA	NA	NA	NA	NA	NA	NA
Pyrene	1000	mg/kg	NA	NA	NA	NA	NA	NA	NA

**NOTES:**

< - less than the stated reporting limit

**BOLD** - indicates result exceeds the COGCC concentration level

COGCC - Colorado Oil and Gas Conservation Commission

EC- electrical conductivity

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed

SU - standard unit

TPH-GRO - total petroleum hydrocarbons-gasoline range organics

TPH-DRO - total petroleum hydrocarbons-diesel range organics

TPH - combination of TPH-GRO and TPH-DRO

FT -Feet

BGS - Below ground surface

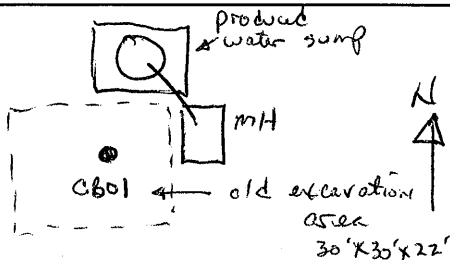


**APPENDIX A**  
**SOIL BORING LITHOLOGIC LOGS**



Location Map:

Plot 1313



Compliance <sup>™</sup> Engineering <sup>™</sup> Remediation  
 LT Environmental, Inc.  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: CB01	Project: Encana Rangeby Assessments
Date: 8/30/12	Project Number: 033412042
Logged By: Unger	Drilled By: Site Services
Drilling Method: H.S. Augers CME-75	Sampling Method: split spoon
Seal:	Grout:

Elevation:	Detector: mini-Rae 3000	Drilling Method: H.S. Augers CME-75	Sampling Method: split spoon
Gravel Pack:		Seal:	Grout:
Casing Type:	Diameter:	Length:	Hole Diameter: 8" Depth to Liquid:
Screen Type:	Slot:	Diameter:	Length:
			Total Depth: 35' Depth to Water: dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				
					2		Fill/SC	Sand, v.f.g.-f.g., slightly clayey, reddish brown, medium moist, no odor, Fill, some gravel size sandstone fragments	
					4				
					6				
					8				
					10				
					12		Fill/SC	Sand, v.f.g.-m.f.g., slightly clayey, reddish brown, medium moist, Fill, no odor, some small sandstone fragments	
					14				
					16				
					18				
24/58/1/6 3		942	NO		20	0820	SPS	Sandstone, v.f.g., light gray, medium moist, very hard, slight odor	
34/59/1/6 2		1205	NO	22-23	22	0825			
					24				
44/80/1/6 14		1696	NO		26				
					28		SPS	Sandstone, v.f.g., gray, medium moist, very hard, odor	
45/59/1/6 1		2280	NO		30				

Location Map: Pad 1313



Compliance <sub>M</sub> Engineering <sub>M</sub> Remediation  
 LT Environmental, Inc.  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

Boring/Well Number: CBO1 Project: Encana Range Assessments  
 Date: 8/30/12 Project Number: 033412042  
 Logged By: Unger Drilled By: Site Services  
 Drilling Method: H.S. Augers CME 75 Sampling Method: split spoon  
 Seal: Grout:

(See page 1)

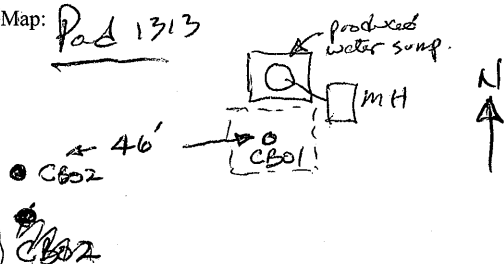
Elevation: Detector: mini-Rae 3000  
 Gravel Pack: Casing Type: Diameter: Length: Hole Diameter: 8" Depth to Liquid:  
 Screen Type: Slot: Diameter: Length: Total Depth: 35' Depth to Water: dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
41/50 16/4		22	NO	33-34	30				
				0920	32		SPS	Sandstone, v.f.g., gray, slightly moist, drills very hard.	
48/50 16/1		4	NO	0920	34				
low v. dry					36			TD = 35' BGS	
					38				
					40				
					42				
					44				
					46				
					48				
					50				
					52				
					54				
					56				
					58				
					60				

Location/Map:

Pad 1313

slope



Compliance <sup>M</sup> Engineering <sup>M</sup> Remediation  
 LT Environmental, Inc.  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:

CB02

Project:

Encana Rangely Assessments

Date:

8/30/12

Project Number:

033412042

Logged By:

Unge

Drilled By:

Site Services

Elevation:

Detector:

mini-Rae 3000

Drilling Method:

H.S. Augers CME 75

Sampling Method:

split speed

Gravel Pack:

Seal:

Grout:

Casing Type:

Diameter:

Length:

Hole Diameter:

8"

Depth to Liquid:

Screen Type:

Slot:

Diameter:

Length:

Total Depth:

34.5'

Depth to Water:

dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				
					2		SC		
		0	NO		4			Sand, v.f.g. - m.g., some gravel to boulder size sandstone fragments, slightly clayey to clayey, light brown, medium moist, no odor	
4/19 1/6 1/6					6	1020			
4/19 1/6 1/6		0	NO		8				
4/11 1/6 1/6					10				
11/50 1/6 1/4					12	1030	SC		
					14			Sand, v.f.g. - c.g., some gravel to boulder size sandstone fragments, slightly clayey, light brown, medium moist, no odor	
18/23 1/6 1/6		0	NO		16	1045			
20/50 1/6 1/2					18				
50/50 1/6 1/2		8	NO		20	1100	SPS		
					22			Sandstone, v.f.g. - f.g., light gray, slightly moist, very hard, no odor to a very slight odor	
47/64 5/3		119	NO	24-25	24	1120			
50/50 1/6 1/2					26	1120			
					28				
44/50 1/6 1/3		11	NO		30	1140	SPS		
								Sandstone, v.f.g. - f.g., light gray, slightly moist, very hard, very slight odor	

Location Map:

Pad 1313



Compliance <sub>M</sub> Engineering <sub>M</sub> Remediation  
 LT Environmental, Inc.  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

(see page 1)

## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:

CB02

Project:

Encana Rangely Assessment

Date:

8/30/12

Project Number:

033412042

Logged By:

Unger

Drilled By:

Site Services

Elevation:

Detector:

mini-Rae 3000

Drilling Method:

H.S. Auger CME 75

Sampling Method:

split spoon

Gravel Pack:

Seal:

Grout:

Casing Type:

Diameter:

Length:

Hole Diameter:

8"

Depth to Liquid:

Screen Type:

Slot:

Diameter:

Length:

Total Depth:

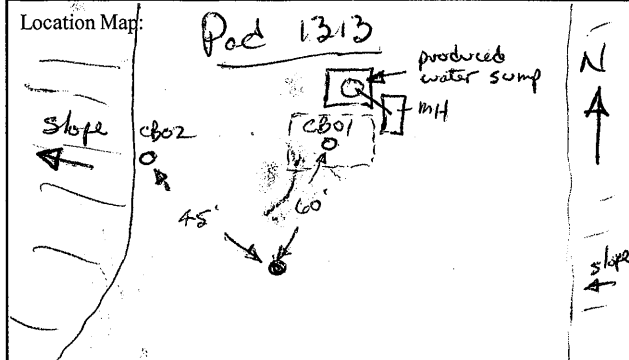
34.5'

Depth to Water:

dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
48/52 6/2		2	NO		30				
					32		SPS	Sandstone, v.f.g. - f.g., 1/2 gray to gray, medium moist, very hard, NO odor	
					34	1205		TA = 34.5' BGS	
					36				
					38				
					40				
					42				
					44				
					46				
					48				
					50				
					52				
					54				
					56				
					58				
					60				

Location Map:



Compliance <sub>M</sub> Engineering <sub>M</sub> Remediation  
 LT Environmental, Inc.  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:	CBO3	Project:	Encana Rangely Assessments
Date:	8/30/12	Project Number:	033412042
Logged By:	Ungr	Drilled By:	Site Services
Drilling Method:	H.S. Augers CM75	Sampling Method:	split spoon
Seal:		Grout:	
Casing Type:		Diameter:	
Screen Type:		Length:	
		Hole Diameter:	8"
		Depth to Liquid:	
		Total Depth:	34.5'
		Depth to Water:	dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				
					2		SC		
14/24 16/16		0	NO		4			Sand, r.f.g. - c. 8", some gravel to boulder size sandstone fragments, slightly clayey, l. gray to l. brown, slightly moist	
					6	1250			
					8				
28/19 16/16		0	NO		10		SC		
					12	1300			
					14				
50/11		0	NO		16	1310			
					18		CLS	Claystone/shale, gray, hard, medium moist, no odor,	
47/50 16/14		1	NO		20	1320			
					22				
					24		SPS		
40/50 16/12		1	NO		26	1330		Sandstone, r.f.g. - f.f.g., brown to l. brown, medium moist, very hard	
					28				
50/15		1	NO		30	1340			

Location Map:

Pad 1313



Compliance <sub>M</sub> Engineering <sub>M</sub> Remediation  
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## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:

CB03

Project:

Encana Rangely Assessments

Date:

8/30/12

Project Number:

033412042

Logged By:

Unger

Drilled By:

Site Services

Elevation:

Detector:

mini-rac 3000

Drilling Method:

A.S. Augers CM575

Sampling Method:

split spoon

Gravel Pack:

Seal:

Grout:

Casing Type:

Diameter:

Length:

Hole Diameter:

8"

Depth to Liquid:

Screen Type:

Slot:

Diameter:

Length:

Total Depth:

34.5'

Depth to Water:

dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					30				
					32				
					34				
					36				
					38				
					40				
					42				
					44				
					46				
					48				
					50				
					52				
					54				
					56				
					58				
					60				

15/20  
 16/3

1

No

34-34.5'  
 1400

SPS

Sandstone, v.f.g. - f.g., gray,  
 medium moist, very hard, no odor  
 or staining

TD = 34.5' BGS

Location Map: <u>Pad 1313</u> 		 <b>Compliance <sub>M</sub> Engineering <sub>M</sub> Remediation</b> <b>LT Environmental, Inc.</b> 4600 W. 60th Avenue Arvada, Colorado 80003	
<b>BORING LOG/MONITORING WELL COMPLETION DIAGRAM</b>			
Boring/Well Number: <u>CB04</u>		Project: <u>Encana Rangeley Assessment</u>	
Date: <u>8/30/12</u>		Project Number: <u>033412042</u>	
Logged By: <u>Unger</u>		Drilled By: <u>Site Services</u>	
Elevation:	Detector: <u>mini-hae 3000</u>	Drilling Method: <u>H.S. Auger</u>	Sampling Method: <u>split spoon</u>
Gravel Pack:		Seal:	Grout:
Casing Type:	Diameter:	Length:	Hole Diameter: <u>8"</u> Depth to Liquid:
Screen Type:	Slot:	Diameter:	Length:
		Total Depth: <u>34.5'</u>	Depth to Water: <u>dry</u>

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				
		○	NO		2		SC	Sand, v.f.g. - c.g., brown, dry	
<u>50/5</u>		○	NO		4		SPS		
<u>bouncing</u>					6	<u>11435</u>		Sandstone, v.f.g. - f.g., brown to light brown, dry to slightly moist, very hard, no odor or staining	
					8				
<u>16/8</u>		○	NO		10		CLS		
<u>8/10</u>					12	<u>1445</u>		Claystone, light red to white, soft, medium moist to moist, no odor	
					14		SPS		
<u>50/1</u>		○	NO		16				
<u>bouncing</u>					18	<u>1500</u>		Sandstone, v.f.g. - f.g., very hard, slightly moist, no odor or staining, extremely hard drilling from 14' - 18' bgs.	
					20				
<u>50/2</u>		○	NO		22	<u>1535</u>			
<u>bouncing</u>					24				
<u>50/5</u>		○	NO		26	<u>1540</u>			
<u>bouncing</u>					28		SCS		
					30	<u>1550</u>		Sandstone, v.f.g. - f.g., slightly clayey, light gray to gray, medium moist, no odor	
<u>17/10</u>		1	NO						
<u>50/3</u>									

Location Map:

Pad 1313

Compliance <sub>M</sub> Engineering <sub>M</sub> Remediation  
 LT Environmental, Inc.  
 4600 W. 60th Avenue  
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## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:

CB04

Project:

Encawa Range Assessments

Date:

8/30/12

Project Number:

0334-12042

Logged By:

Unger

Drilled By:

Site Services

Elevation:

Detector:

mini-Rae 3000

Drilling Method:

H.S. Augers CMETS

Sampling Method:

split spoon

Gravel Pack:

Seal:

Grout:

Casing Type:

Diameter:

Length:

Hole Diameter:

8"

Depth to Liquid:

Screen Type:

Slot:

Diameter:

Length:

Total Depth:

34.5'

Depth to Water:

dry

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					30				
					32				
					34				
					34.5'				
					36				
					38				
					40				
					42				
					44				
					46				
					48				
					50				
					52				
					54				
					56				
					58				
					60				

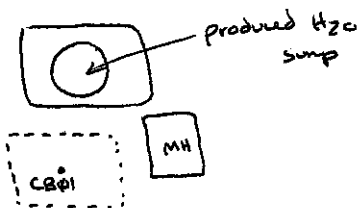
SCS

Sandstone, v.f.g. - f.g., clayey, gray,  
 hard to very hard drilling,  
 medium moist, no odor  
 or staining

TD = 34.5' BGS

1N

Location Map: 1313



Compliance ■ Engineering ■ Remediation  
 LT Environmental, Inc.  
 820 Megan Ave Unit B  
 Rifle, Colorado 81650

## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: <b>C801</b>	Project: <b>Rangely Site Assessment</b>
Date: <b>8/23/13</b>	Project Number: <b>022412042</b>
Logged By: <b>Dustin Held</b>	Drilled By: <b>Precision Samplings CME 75</b>
Drilling Method: <b>Hollow Stem Auger</b>	Sampling Method: <b>Split Spoon</b>
Gravel Pack: <b>Silica Sand</b>	Seal: <b>Bentonite Chips</b>
Casing Type: <b>PVC</b>	Grout: <b>NA</b>
Screen Type: <b>PVC</b>	Diameter: 2" Length: 20'
Slot: <b>0.020</b>	Hole Diameter: 8" Depth to Liquid: NA
Diameter: 2" Length: 5'	Total Depth: 24' Depth to Water: NA

Penetration Resistance	Staining?	Odor?	Moisture Content	PID (ppm)	Time	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
						0			0-18' - fill material, fine gr. silty clayey sands w/ angular sandstone fragments, no odor, reddish brown dry.	
						2				
						4				
						6				
						8			18'-23' - grey, very fine gr. sandstone, well sorted/well rounded, odor, hard dense, hydrated oxides	
						10				
						12				
						14				
						16				
						18				
						20				
						22			22'-23' grey, very fine gr. sands, well rounded, well sorted sandstone, odor, dense, oxides, hydrated	
						24			TP = 24' bgs - submit	
						26				
						28				
						30				

**APPENDIX B**  
**LABORATORY ANALYTICAL REPORTS**





12065 Lebanon Rd.  
Mt. Juliet, TN 37122  
(615) 758-5858  
1-800-767-5859  
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

## Report Summary

Friday November 18, 2011

Report Number: L546619

Samples Received: 11/12/11

Client Project:

Description:

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:

Jayred Willis , 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, PA - 68-02979

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REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-BKG1-111111

Collected By : KHR  
Collection Date : 11/11/11 09:00

ESC Sample # : L546619-01

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	3.6	1.0	mg/kg	6010B	11/16/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-BKG2-111111

Collected By : KHR  
Collection Date : 11/11/11 09:10

ESC Sample # : L546619-02

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	4.0	1.0	mg/kg	6010B	11/16/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-BKG3-111111

Collected By : KHR  
Collection Date : 11/11/11 09:15

ESC Sample # : L546619-03

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	4.4	1.0	mg/kg	6010B	11/16/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-BKG4-111111

Collected By : KHR  
Collection Date : 11/11/11 09:20

ESC Sample # : L546619-04

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	3.6	1.0	mg/kg	6010B	11/16/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-BKG5-111111

Collected By : KHR  
Collection Date : 11/11/11 09:25

ESC Sample # : L546619-05

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	2.8	1.0	mg/kg	6010B	11/16/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 11/18/11 08:41 Printed: 11/18/11 10:29



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# REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-ES1-111111

Collected By : KHR  
Collection Date : 11/11/11 12:50

ESC Sample # : L546619-06

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.66	0.25	mg/kg	8021/8015	11/16/11	500
Toluene	20.	2.5	mg/kg	8021/8015	11/16/11	500
Ethylbenzene	17.	0.25	mg/kg	8021/8015	11/16/11	500
Total Xylene	92.	0.75	mg/kg	8021/8015	11/16/11	500
TPH (GC/FID) Low Fraction	4100	50.	mg/kg	GRO	11/16/11	500
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	93.8		% Rec.	8021/8015	11/16/11	500
a,a,a-Trifluorotoluene(PID)	100.		% Rec.	8021/8015	11/16/11	500
TPH (GC/FID) High Fraction	1300	80.	mg/kg	3546/DRO	11/17/11	20
Surrogate recovery(%)						
o-Terphenyl	0.00		% Rec.	3546/DRO	11/17/11	20

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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.

Reported: 11/18/11 08:41 Printed: 11/18/11 10:29

REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-ES2-111111

Collected By : KHR  
Collection Date : 11/11/11 13:10

ESC Sample # : L546619-07

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0025	mg/kg	8021/8015	11/16/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/16/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/16/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/16/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/16/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.3		% Rec.	8021/8015	11/16/11	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	11/16/11	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	11/16/11	1
Surrogate recovery(%)						
o-Terphenyl	94.9		% Rec.	3546/DRO	11/16/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 11/18/11 08:41 Printed: 11/18/11 10:29

REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-ES3-111111

Collected By : KHR  
Collection Date : 11/11/11 13:15

ESC Sample # : L546619-08

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0025	mg/kg	8021/8015	11/16/11	5
Toluene	0.14	0.025	mg/kg	8021/8015	11/16/11	5
Ethylbenzene	0.81	0.0025	mg/kg	8021/8015	11/16/11	5
Total Xylene	30.	0.75	mg/kg	8021/8015	11/17/11	500
TPH (GC/FID) Low Fraction	2400	50.	mg/kg	GRO	11/17/11	500
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	94.6		% Rec.	8021/8015	11/17/11	500
a,a,a-Trifluorotoluene(PID)	105.		% Rec.	8021/8015	11/16/11	5
TPH (GC/FID) High Fraction	3700	80.	mg/kg	3546/DRO	11/17/11	20
Surrogate recovery(%)						
o-Terphenyl	0.00		% Rec.	3546/DRO	11/17/11	20

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Reported: 11/18/11 08:41 Printed: 11/18/11 10:29

REPORT OF ANALYSIS

Kate Ramsay  
HRL Compliance Solutions- CO  
744 Horizon Ct., Suite 140  
Grand Junction, CO 81506

November 18, 2011

Date Received : November 12, 2011  
Description :

Sample ID : 1313-ES4-111111

Collected By : KHR  
Collection Date : 11/11/11 13:20

ESC Sample # : L546619-09

Site ID : DTU 1313

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	1.0	mg/kg	8021/8015	11/16/11	2000
Toluene	BDL	10.	mg/kg	8021/8015	11/16/11	2000
Ethylbenzene	11.	1.0	mg/kg	8021/8015	11/16/11	2000
Total Xylene	63.	3.0	mg/kg	8021/8015	11/16/11	2000
TPH (GC/FID) Low Fraction	3900	200	mg/kg	GRO	11/16/11	2000
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	96.3		% Rec.	8021/8015	11/16/11	2000
a,a,a-Trifluorotoluene(PID)	97.5		% Rec.	8021/8015	11/16/11	2000
TPH (GC/FID) High Fraction	770	20.	mg/kg	3546/DRO	11/17/11	5
Surrogate recovery(%)						
o-Terphenyl	101.		% Rec.	3546/DRO	11/17/11	5

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
L546619-06	WG565703	SAMP	o-Terphenyl	R1933333	J7
L546619-08	WG565703	SAMP	o-Terphenyl	R1933333	J7

Attachment B  
Explanation of QC Qualifier Codes

Qualifier	Meaning
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 Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography 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.

Summary of Remarks For Samples Printed  
11/18/11 at 10:29:44

TSR Signing Reports: 358  
R5 - Desired TAT

Accounting - pending credit application. TSR - pending info release authorization.

Sample: L546619-01 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-02 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-03 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-04 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-05 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-06 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-07 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-08 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41  
Sample: L546619-09 Account: HRLCSCO Received: 11/12/11 09:00 Due Date: 11/18/11 00:00 RPT Date: 11/18/11 08:41



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Tax I.D. 62-0814289

Est. 1970

November 18, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Benzene	< .0005	mg/kg			WG565706	11/15/11 17:41
Ethylbenzene	< .0005	mg/kg			WG565706	11/15/11 17:41
Toluene	< .005	mg/kg			WG565706	11/15/11 17:41
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG565706	11/15/11 17:41
Total Xylene	< .0015	mg/kg			WG565706	11/15/11 17:41
a,a,a-Trifluorotoluene(FID)		% Rec.	97.13	59-128	WG565706	11/15/11 17:41
a,a,a-Trifluorotoluene(PID)		% Rec.	96.69	54-144	WG565706	11/15/11 17:41
TPH (GC/FID) High Fraction	< 4	ppm			WG565703	11/16/11 03:51
o-Terphenyl		% Rec.	95.49	50-150	WG565703	11/16/11 03:51
Arsenic	< 1	mg/kg			WG565624	11/16/11 15:39
Benzene	< .0005	mg/kg			WG565453	11/15/11 23:29
Ethylbenzene	< .0005	mg/kg			WG565453	11/15/11 23:29
Toluene	< .005	mg/kg			WG565453	11/15/11 23:29
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG565453	11/15/11 23:29
Total Xylene	< .0015	mg/kg			WG565453	11/15/11 23:29
a,a,a-Trifluorotoluene(FID)		% Rec.	97.56	59-128	WG565453	11/15/11 23:29
a,a,a-Trifluorotoluene(PID)		% Rec.	102.9	54-144	WG565453	11/15/11 23:29
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG566114	11/17/11 17:30
Total Xylene	< .0015	mg/kg			WG566114	11/17/11 17:30
a,a,a-Trifluorotoluene(FID)		% Rec.	94.69	59-128	WG566114	11/17/11 17:30
a,a,a-Trifluorotoluene(PID)		% Rec.	101.0	54-144	WG566114	11/17/11 17:30

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Arsenic	mg/kg	3.90	4.40	11.8	20	L546619-03	WG565624

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Benzene	mg/kg	.05	0.0463	92.7	76-113	WG565706
Ethylbenzene	mg/kg	.05	0.0487	97.4	78-115	WG565706
Toluene	mg/kg	.05	0.0514	103.	76-114	WG565706
Total Xylene	mg/kg	.15	0.140	93.5	81-118	WG565706
a,a,a-Trifluorotoluene(PID)				96.94	54-144	WG565706
TPH (GC/FID) Low Fraction	mg/kg	5.5	6.58	120.	67-135	WG565706
a,a,a-Trifluorotoluene(FID)				104.6	59-128	WG565706
TPH (GC/FID) High Fraction	ppm	60	48.5	80.9	50-150	WG565703
o-Terphenyl				105.8	50-150	WG565703
Arsenic	mg/kg	92.6	86.5	93.4	82.9-117	WG565624
Benzene	mg/kg	.05	0.0487	97.4	76-113	WG565453
Ethylbenzene	mg/kg	.05	0.0540	108.	78-115	WG565453
Toluene	mg/kg	.05	0.0547	109.	76-114	WG565453
Total Xylene	mg/kg	.15	0.158	106.	81-118	WG565453
a,a,a-Trifluorotoluene(PID)				103.3	54-144	WG565453

\* 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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November 18, 2011

Analyte	Units	Laboratory Control		Sample	% Rec	Limit	Batch
		Known	Val	Result			
TPH (GC/FID) Low Fraction	mg/kg	5.5		6.60	120.	67-135	WG565453
a,a,a-Trifluorotoluene(FID)					102.8	59-128	WG565453
Total Xylene	mg/kg	.15		0.154	103.	81-118	WG566114
a,a,a-Trifluorotoluene(PID)					98.34	54-144	WG566114
TPH (GC/FID) Low Fraction	mg/kg	5.5		6.22	113.	67-135	WG566114
a,a,a-Trifluorotoluene(FID)					101.1	59-128	WG566114

Analyte	Units	Laboratory Control		Sample Duplicate	Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Benzene	mg/kg	0.0493	0.0463	98.0	76-113	6.17	20	WG565706
Ethylbenzene	mg/kg	0.0514	0.0487	103.	78-115	5.49	20	WG565706
Toluene	mg/kg	0.0546	0.0514	109.	76-114	5.91	20	WG565706
Total Xylene	mg/kg	0.147	0.140	98.0	81-118	5.01	20	WG565706
a,a,a-Trifluorotoluene(PID)				99.67	54-144			WG565706
TPH (GC/FID) Low Fraction	mg/kg	6.64	6.58	121.	67-135	0.820	20	WG565706
a,a,a-Trifluorotoluene(FID)				105.6	59-128			WG565706
TPH (GC/FID) High Fraction	ppm	47.4	48.5	79.0	50-150	2.33	20	WG565703
o-Terphenyl				96.24	50-150			WG565703
Benzene	mg/kg	0.0483	0.0487	96.0	76-113	0.910	20	WG565453
Ethylbenzene	mg/kg	0.0534	0.0540	107.	78-115	1.05	20	WG565453
Toluene	mg/kg	0.0534	0.0547	107.	76-114	2.51	20	WG565453
Total Xylene	mg/kg	0.156	0.158	104.	81-118	1.66	20	WG565453
a,a,a-Trifluorotoluene(PID)				101.2	54-144			WG565453
TPH (GC/FID) Low Fraction	mg/kg	6.71	6.60	122.	67-135	1.63	20	WG565453
a,a,a-Trifluorotoluene(FID)				103.2	59-128			WG565453
Total Xylene	mg/kg	0.153	0.154	102.	81-118	0.570	20	WG566114
a,a,a-Trifluorotoluene(PID)				99.20	54-144			WG566114
TPH (GC/FID) Low Fraction	mg/kg	6.09	6.22	111.	67-135	2.13	20	WG566114
a,a,a-Trifluorotoluene(FID)				100.4	59-128			WG566114

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Benzene	mg/kg	0.209	0	.05	83.7	32-137	L546475-05	WG565706
Ethylbenzene	mg/kg	0.214	0	.05	85.6	10-150	L546475-05	WG565706
Toluene	mg/kg	0.230	0	.05	91.9	20-142	L546475-05	WG565706
Total Xylene	mg/kg	0.616	0	.15	82.1	16-141	L546475-05	WG565706
a,a,a-Trifluorotoluene(PID)					96.78	54-144		WG565706
TPH (GC/FID) Low Fraction	mg/kg	29.5	0	5.5	107.	55-109	L546475-05	WG565706
a,a,a-Trifluorotoluene(FID)					103.0	59-128		WG565706
Arsenic	mg/kg	51.5	4.40	50	94.2	75-125	L546619-03	WG565624
Benzene	mg/kg	0.244	0	.05	97.6	32-137	L546475-06	WG565453
Ethylbenzene	mg/kg	0.258	0	.05	103.	10-150	L546475-06	WG565453
Toluene	mg/kg	0.266	0	.05	106.	20-142	L546475-06	WG565453
Total Xylene	mg/kg	0.758	0	.15	101.	16-141	L546475-06	WG565453
a,a,a-Trifluorotoluene(PID)					102.4	54-144		WG565453

\* 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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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
TPH (GC/FID) Low Fraction	mg/kg	30.2	0	5.5	110.*	55-109	L546475-06	WG565453
a,a,a-Trifluorotoluene(FID)					101.8	59-128		WG565453
Total Xylene	mg/kg	0.781	0	.15	104.	16-141	L547150-01	WG566114
a,a,a-Trifluorotoluene(PID)					98.87	54-144		WG566114
TPH (GC/FID) Low Fraction	mg/kg	27.7	0	5.5	100.	55-109	L547150-01	WG566114
a,a,a-Trifluorotoluene(FID)					100.7	59-128		WG566114

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Benzene	mg/kg	0.229	0.209	91.5	32-137	8.85	39	L546475-05	WG565706
Ethylbenzene	mg/kg	0.236	0.214	94.3	10-150	9.71	44	L546475-05	WG565706
Toluene	mg/kg	0.253	0.230	101.	20-142	9.73	42	L546475-05	WG565706
Total Xylene	mg/kg	0.675	0.616	90.0	16-141	9.24	46	L546475-05	WG565706
a,a,a-Trifluorotoluene(PID)				99.02	54-144				WG565706
TPH (GC/FID) Low Fraction	mg/kg	27.7	29.5	101.	55-109	6.02	20	L546475-05	WG565706
a,a,a-Trifluorotoluene(FID)				102.0	59-128				WG565706
Arsenic	mg/kg	50.9	51.5	93.0	75-125	1.17	20	L546619-03	WG565624
Benzene	mg/kg	0.221	0.244	88.3	32-137	9.99	39	L546475-06	WG565453
Ethylbenzene	mg/kg	0.241	0.258	96.3	10-150	6.99	44	L546475-06	WG565453
Toluene	mg/kg	0.243	0.266	97.2	20-142	9.07	42	L546475-06	WG565453
Total Xylene	mg/kg	0.693	0.758	92.3	16-141	8.97	46	L546475-06	WG565453
a,a,a-Trifluorotoluene(PID)				102.9	54-144				WG565453
TPH (GC/FID) Low Fraction	mg/kg	27.2	30.2	98.9	55-109	10.6	20	L546475-06	WG565453
a,a,a-Trifluorotoluene(FID)				101.2	59-128				WG565453
Total Xylene	mg/kg	0.696	0.781	92.9	16-141	11.5	46	L547150-01	WG566114
a,a,a-Trifluorotoluene(PID)				97.76	54-144				WG566114
TPH (GC/FID) Low Fraction	mg/kg	26.4	27.7	96.0	55-109	4.65	20	L547150-01	WG566114
a,a,a-Trifluorotoluene(FID)				99.58	59-128				WG566114

Batch number /Run number / Sample number cross reference

WG565706: R1932772: L546619-09  
WG565703: R1933333: L546619-06 07 08 09  
WG565624: R1934754: L546619-01 02 03 04 05  
WG565453: R1935554: L546619-06 07 08  
WG566114: R1936092: L546619-08

\* \* 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.'



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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.



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Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

## Report Summary

Thursday September 20, 2012

Report Number: L593096


Samples Received: 09/01/12

Client Project: 033412042

Description: Encana Rangely Assessments

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:

  
Jared Willis , ESC Representative

### Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,  
FL - E87487, GA - 923, IN - C-IN-01, KY - 90010, KYUST - 0016,  
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,  
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,  
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,  
TX - T104704245-11-3, OK - 9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

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

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Tax I.D. 62-0814289

Est. 1970

# REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1313-CB01-083012 22-23FT  
Collected By : Mike Unger  
Collection Date : 08/30/12 08:25

ESC Sample # : L593096-01

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.025	mg/kg	8021/8015	09/06/12	50
Toluene	BDL	0.25	mg/kg	8021/8015	09/06/12	50
Ethylbenzene	0.14	0.025	mg/kg	8021/8015	09/06/12	50
Total Xylene	2.3	0.075	mg/kg	8021/8015	09/06/12	50
TPH (GC/FID) Low Fraction	270	5.0	mg/kg	GRO	09/06/12	50
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	86.2		% Rec.	8021/8015	09/06/12	50
a,a,a-Trifluorotoluene(PID)	92.2		% Rec.	8021/8015	09/06/12	50
TPH (GC/FID) High Fraction	340	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%)						
o-Terphenyl	108.		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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# REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1313-CB01-083012 33-34FT  
Collected By : Mike Unger  
Collection Date : 08/30/12 09:20

ESC Sample # : L593096-02

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0025	mg/kg	8021/8015	09/06/12	5
Toluene	BDL	0.025	mg/kg	8021/8015	09/06/12	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	09/06/12	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	09/06/12	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/06/12	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	86.1		% Rec.	8021/8015	09/06/12	5
a,a,a-Trifluorotoluene(PID)	91.9		% Rec.	8021/8015	09/06/12	5
TPH (GC/FID) High Fraction	6.4	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%)						
o-Terphenyl	82.8		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1313-CB02-083012 24-25FT  
Collected By : Mike Unger  
Collection Date : 08/30/12 11:20

ESC Sample # : L593096-03

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.0036	0.0025	mg/kg	8021/8015	09/06/12	5
Toluene	0.13	0.025	mg/kg	8021/8015	09/06/12	5
Ethylbenzene	0.059	0.0025	mg/kg	8021/8015	09/06/12	5
Total Xylene	0.60	0.0075	mg/kg	8021/8015	09/06/12	5
TPH (GC/FID) Low Fraction	3.8	0.50	mg/kg	GRO	09/06/12	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	86.5		% Rec.	8021/8015	09/06/12	5
a,a,a-Trifluorotoluene(PID)	92.5		% Rec.	8021/8015	09/06/12	5
TPH (GC/FID) High Fraction	17.	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%)						
o-Terphenyl	85.2		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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# REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1313-CB02-083012 34-34.5FT  
Collected By : Mike Unger  
Collection Date : 08/30/12 12:05

ESC Sample # : L593096-04

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.0037	0.0025	mg/kg	8021/8015	09/06/12	5
Toluene	0.039	0.025	mg/kg	8021/8015	09/06/12	5
Ethylbenzene	0.014	0.0025	mg/kg	8021/8015	09/06/12	5
Total Xylene	0.16	0.0075	mg/kg	8021/8015	09/06/12	5
TPH (GC/FID) Low Fraction	1.3	0.50	mg/kg	GRO	09/06/12	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	86.3		% Rec.	8021/8015	09/06/12	5
a,a,a-Trifluorotoluene(PID)	92.1		% Rec.	8021/8015	09/06/12	5
TPH (GC/FID) High Fraction	12.	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%)						
o-Terphenyl	99.1		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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# REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1313-CB03-083012 34-34.5FT  
Collected By : Mike Unger  
Collection Date : 08/30/12 14:00

ESC Sample # : L593096-05

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0025	mg/kg	8021/8015	09/06/12	5
Toluene	BDL	0.025	mg/kg	8021/8015	09/06/12	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	09/06/12	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	09/06/12	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/06/12	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	86.1		% Rec.	8021/8015	09/06/12	5
a,a,a-Trifluorotoluene(PID)	92.1		% Rec.	8021/8015	09/06/12	5
TPH (GC/FID) High Fraction	7.1	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%)						
o-Terphenyl	94.6		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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# REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1313-CB04-083012 34-34.5FT  
Collected By : Mike Unger  
Collection Date : 08/30/12 16:05

ESC Sample # : L593096-06

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0025	mg/kg	8021/8015	09/04/12	5
Toluene	BDL	0.025	mg/kg	8021/8015	09/04/12	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	09/04/12	5
Total Xylene	0.013	0.0075	mg/kg	8021/8015	09/04/12	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	09/04/12	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	78.0		% Rec.	8021/8015	09/04/12	5
a,a,a-Trifluorotoluene(PID)	82.1		% Rec.	8021/8015	09/04/12	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%)						
o-Terphenyl	89.6		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1303-CB01-083112 5.5-6FT  
Collected By : Mike Unger  
Collection Date : 08/31/12 09:30

ESC Sample # : L593096-07

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	67.	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%) o-Terphenyl	93.3		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Reported: 09/13/12 09:34 Revised: 09/20/12 12:06



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# REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1303-CB01-083112 7.5-8FT  
Collected By : Mike Unger  
Collection Date : 08/31/12 10:00

ESC Sample # : L593096-08

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	70.	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%) o-Terphenyl	85.7		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1303-CB02-083112 7.5-8FT  
Collected By : Mike Unger  
Collection Date : 08/31/12 10:45

ESC Sample # : L593096-09

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	12.	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%) o-Terphenyl	107.		% Rec.	3546/DRO	09/12/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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REPORT OF ANALYSIS

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1303-CB03-083112 5-5.5FT  
Collected By : Mike Unger  
Collection Date : 08/31/12 11:20

ESC Sample # : L593096-10  
Site ID :  
Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	5.7	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%) o-Terphenyl	102.		% Rec.	3546/DRO	09/12/12	1

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

Blake Ford  
EnCana Oil & Gas - Rangely, CO  
1125 Escalante Drive  
Rangely, CO 81648-3600

September 20, 2012

Date Received : September 01, 2012  
Description : Encana Rangely Assessments  
Sample ID : 1303-CB04-083112 2.5-3FT  
Collected By : Mike Unger  
Collection Date : 08/31/12 12:05

ESC Sample # : L593096-11

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	19.	4.0	mg/kg	3546/DRO	09/12/12	1
Surrogate recovery(%) o-Terphenyl	80.6		% Rec.	3546/DRO	09/12/12	1

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Det. Limit - Practical Quantitation Limit(PQL)

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Attachment A  
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L593096-06	WG610712	SAMP	TPH (GC/FID) Low Fraction	R2329453	J3

Attachment B  
Explanation of QC Qualifier Codes

Qualifier	Meaning
J3	The associated batch QC was outside the established quality control range for precision.

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 Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography 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.



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Chris Hines  
EnCana Oil & Gas Inc. - CO  
143 Diamond Avenue  
Parachute, CO 81635

## Report Summary

Tuesday September 03, 2013

Report Number: L654178


Samples Received: 08/27/13

Client Project: 033412042

Description: Rangley Site Assessment

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:

  
Jarred Willis , ESC Representative

### Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,  
FL - E87487, GA - 923, IN - C-IN-01, KY - 90010, KYUST - 0016,  
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,  
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,  
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,  
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

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

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# REPORT OF ANALYSIS

September 03, 2013

Chris Hines  
EnCana Oil & Gas Inc. - CO  
143 Diamond Avenue  
Parachute, CO 81635

Date Received : August 27, 2013  
Description : Rangley Site Assessment  
Sample ID : 082313-1313 (CB01) 22-23  
Collected By : Dustin Held  
Collection Date : 08/23/13 08:45

ESC Sample # : L654178-01

Site ID : 1313

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015D/GRO	08/28/13	5
Surrogate Recovery (70-130)						
a,a,a-Trifluorotoluene(FID)	91.8		% Rec.	602/8015	08/28/13	5
TPH (GC/FID) High Fraction	5.4	4.0	mg/kg	8015D/DRO	09/01/13	1
Surrogate recovery(%)						
o-Terphenyl	72.9		% Rec.	8015D/DRO	09/01/13	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Reported: 09/03/13 11:24 Printed: 09/03/13 11:25

Summary of Remarks For Samples Printed  
09/03/13 at 11:25:15

TSR Signing Reports: 358  
R5 - Desired TAT

Log ALL samples for EDD (COGCC EDD). Log all PAHs as PAHSIM. DRO and DRO-SGT needed if TPH is listed twice on COC, one being TPH-GEL EXTRACT.

Sample: L654178-01 Account: ENCANACO Received: 08/27/13 09:30 Due Date: 09/04/13 00:00 RPT Date: 09/03/13 11:24