



Page 1

**State of Colorado**  
**Oil and Gas Conservation Commission**

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)894-2100 Fax: (303)894-2109



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RECEIVED 3/4/2013			

**SUNDRY NOTICE**

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form.) Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b.)

1. OGCC Operator Number: 100185	4. Contact Name: Blake Ford	Complete the Attachment Checklist  OP OGCC
2. Name of Operator: Encana Oil & Gas (USA) Inc.	Blake Ford blake.ford@encana.com	
3. Address: 1125 Escalante Drive City: Rangely State: CO Zip: 81648	Phone: 970-675-4414 Fax: 970-379-9558	
5. API Number: 05-103-07458	OGCC Facility ID Number: 314871	Survey Plat
6. Well/Facility Name: Dragon Trail Unit	7. Well/Facility Number: 1309	Directional Survey
8. Location (Qtr/Qtr, Sec, Twp, Rng, Meridian): NENW SEC 24 T2S R103W 6PM		Surface Eqpm Diagram
9. County: Rio Blanco #103	10. Field Name: Dragon Trail #18700	Technical Info Page
11. Federal, Indian or State Lease Number: 44954		Other

**General Notice**

<input type="checkbox"/> <b>CHANGE OF LOCATION:</b> Attach New Survey Plat		(a change of surface qtr/qtr is substantive and requires a new permit)	
Change of Surface Footage from Exterior Section Lines:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change of Surface Footage to Exterior Section Lines:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change of Bottomhole Footage from Exterior Section Lines:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change of Bottomhole Footage to Exterior Section Lines:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bottomhole location Qtr/Qtr, Sec, Twp, Rng, Mer			
Latitude	Distance to nearest property line	Distance to nearest bldg, public rd, utility or RR	
Longitude	Distance to nearest lease line	Is location in a High Density Area (rule 603b)?	Yes/No <input type="checkbox"/>
Ground Elevation	Distance to nearest well same formation	Surface owner consultation date:	
<b>GPS DATA:</b>			
Date of Measurement	PDOP Reading	Instrument Operator's Name	
<input type="checkbox"/> <b>CHANGE SPACING UNIT</b>		<input type="checkbox"/> <b>Remove from surface bond</b>	
Formation	Formation Code	Spacing order number	Unit Acreage
			Unit configuration
<input type="checkbox"/> <b>CHANGE OF OPERATOR (prior to drilling):</b>		<input type="checkbox"/> <b>CHANGE WELL NAME</b>	
Effective Date:		From:	NUMBER
Plugging Bond: <input type="checkbox"/> Blanket <input type="checkbox"/> Individual		To:	
		Effective Date:	
<input type="checkbox"/> <b>ABANDONED LOCATION:</b>		<input type="checkbox"/> <b>NOTICE OF CONTINUED SHUT IN STATUS</b>	
Was location ever built? <input type="checkbox"/> Yes <input type="checkbox"/> No		Date well shut in or temporarily abandoned:	
Is site ready for inspection? <input type="checkbox"/> Yes <input type="checkbox"/> No		Has Production Equipment been removed from site? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Date Ready for Inspection:		MIT required if shut in longer than two years. Date of last MIT	
<input type="checkbox"/> <b>SPUD DATE:</b>		<input type="checkbox"/> <b>REQUEST FOR CONFIDENTIAL STATUS</b> (6 mos from date casing set)	
<input type="checkbox"/> <b>SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK</b>			
Method used	Cementing tool setting/perf depth	Cement volume	Cement top
			Cement bottom
			Date
<input type="checkbox"/> <b>RECLAMATION:</b> Attach technical page describing final reclamation procedures per Rule 1004.			
Final reclamation will commence on approximately		<input type="checkbox"/> Final reclamation is completed and site is ready for inspection.	

**Technical Engineering/Environmental Notice**

<input type="checkbox"/> <b>Notice of Intent</b>		<input checked="" type="checkbox"/> <b>Report of Work Done</b>	
Approximate Start Date:		Date Work Completed: 9/5/2012	
Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)			
<input type="checkbox"/> Intent to Recomplete (submit form 2)	<input type="checkbox"/> Request to Vent or Flare	<input type="checkbox"/> E&P Waste Disposal	
<input type="checkbox"/> Change Drilling Plans	<input type="checkbox"/> Repair Well	<input type="checkbox"/> Beneficial Reuse of E&P Waste	
<input type="checkbox"/> Gross Interval Changed?	<input type="checkbox"/> Rule 502 variance requested	<input checked="" type="checkbox"/> Status Update/Change of Remediation Plans	
<input type="checkbox"/> Casing/Cementing Program Change	<input type="checkbox"/> Other:	for Spills and Releases	

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct and complete.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_ Email: blake.ford@encana.com  
Print Name: Blake Ford Title: Environmental Field Coordinator

COGCC Approved:

Title:

Date:

CONDITIONS OF APPROVAL, IF ANY:

EPS  
NW Region  
04/05/2013

## TECHNICAL INFORMATION PAGE



FOR OGCC USE ONLY

1. COGCC Operator Number	100185	API Number:	05-103-07458
2. Name of Operator:	Encana Oil & Gas (USA) Inc.	COGCC Facility ID #	314871
3. Well/Facility Name:	Dragon Trail Unit	Well/Facility Number:	1309
4. Location (QtrQtr, Sec, Twp, Rng, Meridian):	NENW 24 T2S R103W 6 PM		

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. **DESCRIBE PROPOSED OR COMPLETED OPERATIONS**

**REPORT OF WORK COMPLETED:**

See attached Site Assessment Summary Report for Work Associated with Encana Production Pad #1309, Remediation Project #6735.

# **SITE ASSESSMENT SUMMARY REPORT**

**ENCANA PRODUCTION PAD #1309  
REMEDATION PROJECT #6735  
RIO BLANCO COUNTY, COLORADO**

**JANUARY 2013**

**Prepared for:**

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



# **SITE ASSESSMENT SUMMARY REPORT**

**ENCANA PRODUCTION PAD #1309  
REMEDATION PROJECT #6735  
RIO BLANCO COUNTY, COLORADO**

**JANUARY 2013**

**Prepared for:**

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

**Prepared by:**

**LT ENVIRONMENTAL, INC.  
820 Megan Avenue, Unit B  
Rifle, Colorado 81650  
(970) 285-9985**



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## **EXECUTIVE SUMMARY**

This report was prepared by LT Environmental, Inc. (LTE), under the direction of Encana Oil & Gas (USA), Inc., to document soil assessment activities at the Encana Production Pad #1309 (Site). 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. Additionally, the soil immediately surrounding the tank was excavated and removed on November 29, 2011, by HCSI, Environmental Consultants. 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 September 5, 2012, Site Services Drilling Company of Golden, Colorado, was contracted to advance five soil borings on site to depths ranging from four to seven feet below ground surface. 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.

Based on analytical results from soil boring samples collected during assessment activities, the impacted soil has naturally attenuated to within compliance standards of the Colorado Oil and Gas Conservation Commission Table 910-1 Concentration Levels.

No groundwater was encountered during the assessment activities. All soil borings were backfilled with soil generated from the borings 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 #1309 (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 29, 2011, Encana removed the buried production tank along with any observed hydrocarbon-impacted soil associated with the Site as depicted on Figure 2. Tank removal and excavation of soil was conducted by HCSI, Environmental Consultants. A summary of these activities are attached in Appendix A. 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. Residual total petroleum hydrocarbon (TPH) concentrations of 1,730 milligrams per kilogram (mg/kg) remained in soil at the base of the excavation, sample 1309-UNDERTANK-112911 and indicated in Table 1. This concentration exceeded the Colorado Oil and Gas Conservation Commission (COGCC) standard of 500 mg/kg, thus determining the need to assess the remaining TPH soil conditions at the Site. Encana also collected background soil samples at the time of excavation activities, which are indicated in Table 2.

On September 5, 2012, LTE advanced five soil borings at the Site to assess TPH impact of residual soil identified during production tank removal. All soil samples results were within the compliance standards of the COGCC, thus indicating that the residual hydrocarbon impacted soil has been naturally attenuated to acceptable 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 northwest quarter of Section 24, 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 a predominantly yellowish-brown silty-sand down to a competent yellowish sandstone.

The Site is located at an elevation of 6,727 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 September 5, 2012, LTE advanced five soil borings (1309-CB01-090512 through 1309-CB05-090512) to depths ranging from four to seven feet below ground surface (bgs) at the Site. 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. Soil boring 1309-CB01-090512 was placed at the former source area to confirm natural attenuation of hydrocarbon impacts in soil.

The soil borings were logged by an LTE environmental scientist 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 B.

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), for analysis of TPH-diesel range organics (DRO) by Environmental Protection Agency Method 3546. Samples collected and submitted for laboratory analysis were only analyzed for TPH-DRO due to it previously exceeding the COGCC Concentration Levels at the time the culvert pit was removed. All other constituents were below COGCC Concentration Levels or were within background concentration allowances.

### **2.2 ASSESSMENT FINDINGS**

Soil conditions at the Site were identified as a yellowish-brown silty-sand extending from the surface to approximately four to seven feet bgs at which point a dense yellowish sandstone was encountered. 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. Soil sample 1309-CB01-090512 registered a minor PID reading of 13.8 parts per million. No other soils samples that were field screened were observed to have PID readings, hydrocarbon odors, or staining.

## **3.0 ANALYTICAL RESULTS**

Soil samples collected from all soil borings confirmed that the hydrocarbon impacted soil exceeding regulatory standards have naturally attenuated since the excavation activities in



November of 2011. Soil sample laboratory analytical results are illustrated on Figure 3 and summarized in Table 3.

TPH-DRO concentrations in 1309-CB01-090512 were measured at 140 mg/kg; however, this concentration does not exceed the COGCC Table 910-1 TPH concentration levels of 500 mg/kg. All other sample results were measured at below the detection limits (BDL) for TPH. Copies of the laboratory analytical reports are included in Appendix C.

#### **4.0 SUMMARY AND CONCLUSIONS**

LTE was contracted by Encana to conduct soil assessment activities at the Encana Production Pad #1309 to assess any residual hydrocarbon impacted soil and/or groundwater 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 September 5, 2012, LTE field personnel observed the installation of five soil borings on site and collected soil samples 1309-CB01-090512 through 1309-CB05-090512. The five soil borings were advanced on site to depths ranging from four to seven feet bgs. No groundwater was encountered during the assessment activities.

Five soil samples were submitted to ESC for laboratory analysis of TPH-DRO. Analytical results from all soil boring samples indicate hydrocarbon impacted soil has naturally attenuated to within the compliance standards of the COGCC. All soil borings were backfilled with soil removed from the borings generated during assessment activities. Additional activities included on-site health and safety monitoring and preparation of this summary report.

Therefore, LTE recommends that Encana Site #1309 be granted closure regarding Remediation Number 6735 and that the COGCC provide closure documentation to Encana with regard to this recommendation.

## FIGURES







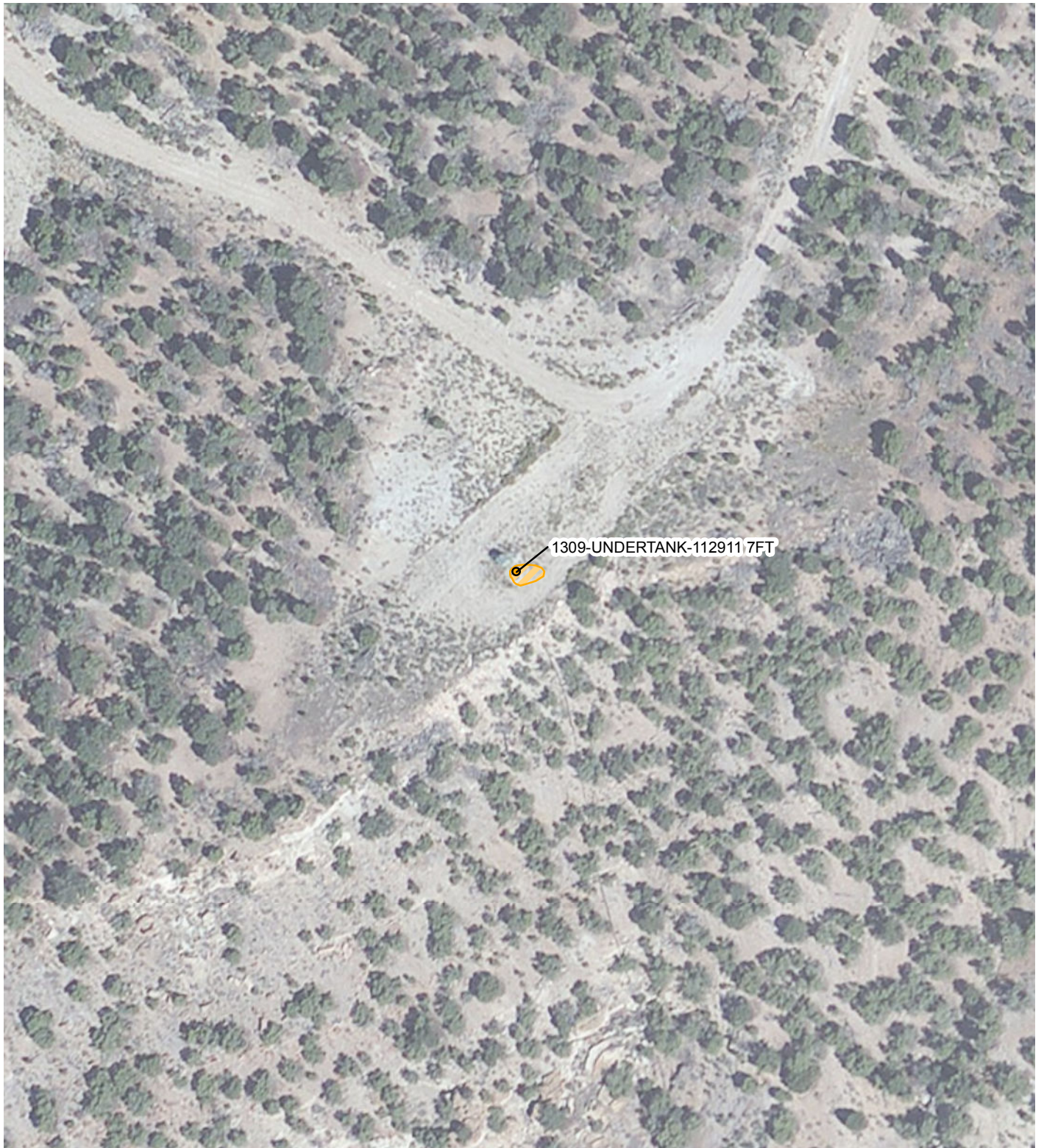




IMAGE COURTESY OF BING MAPS/ESRI

## LEGEND

-  SOIL SAMPLE
-  EXCAVATION EXTENT (NOVEMBER 2011)

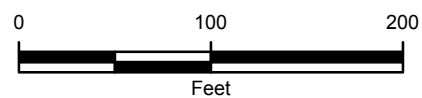


FIGURE 2  
PAD #1309  
NENW SEC 24 T2S R103W  
RIO BLANCO COUNTY, COLORADO

ENCANA OIL & GAS (USA) INC.





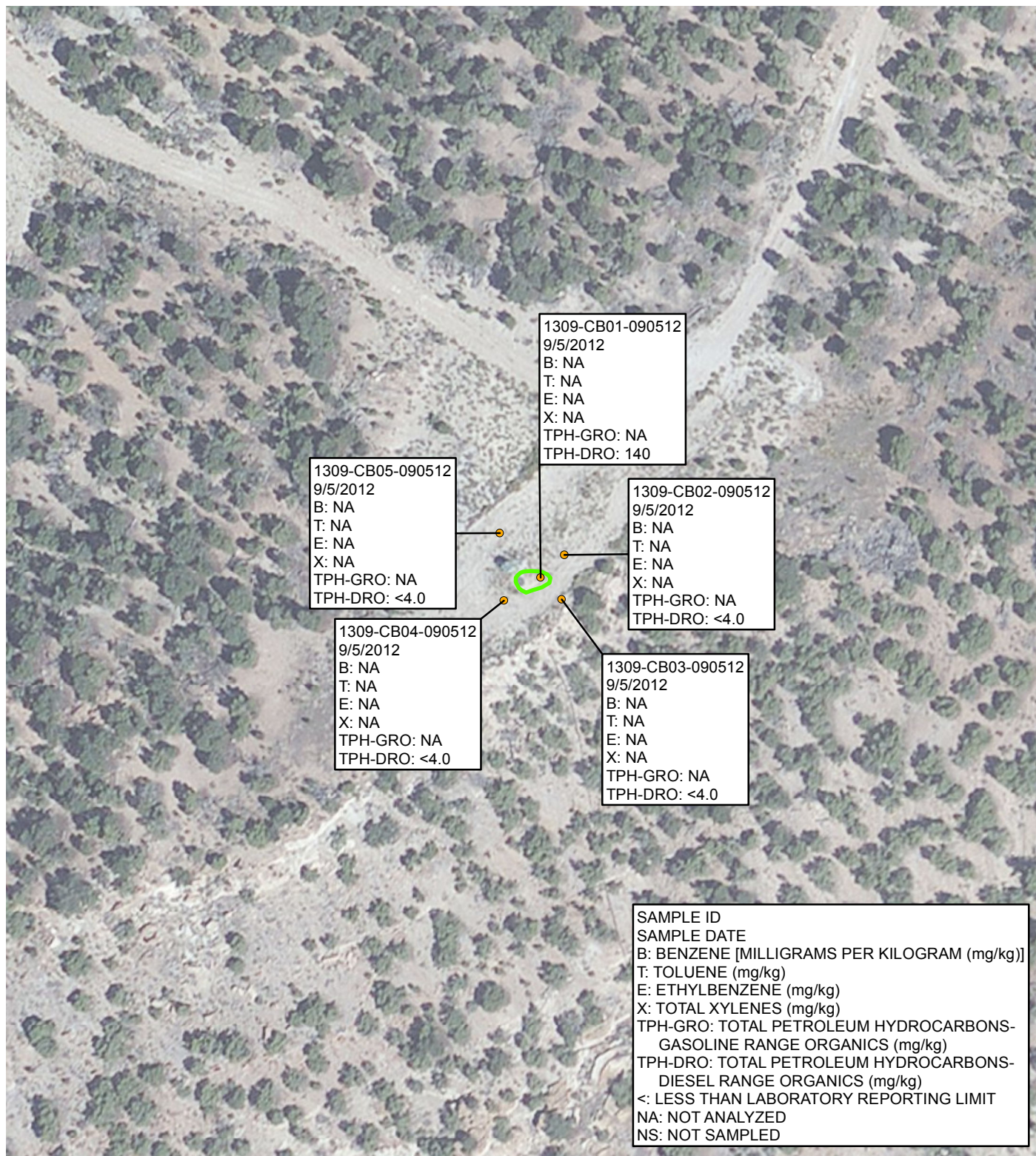
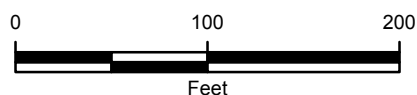


IMAGE COURTESY OF BING MAPS/ESRI

## LEGEND

- SOIL SAMPLE
- PREVIOUS EXCAVATION EXTENT (NOVEMBER 2011)



**FIGURE 3**  
**SOIL ANALYTICAL RESULTS**  
**PAD #1309**  
**NENW SEC 24 T2S R103W**  
**RIO BLANCO COUNTY, COLORADO**  
**ENCANA OIL & GAS (USA) INC.**



## TABLES

**TABLE 1**  
**PIT REMOVAL AND EXCAVATION**  
**ENCANA PRODUCTION PAD 1309**  
**RANGELY, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	1309-UNDERTANK-112911 7FT
Sample Date			11/29/2012
Sample Type			Confirmation
Arsenic	0.39	mg/kg	<b>5.1</b>
Barium	15,000	mg/kg	370
Cadmium	70	mg/kg	0.28
Chromium (III)	120,000	mg/kg	10.0
Chromium (VI)	23	mg/kg	<2.00
Copper	3,100	mg/kg	14.0
Lead	400	mg/kg	18.0
Mercury	23	mg/kg	<0.020
Nickel	1,600	mg/kg	16.0
Selenium	390	mg/kg	<5.0
Silver	390	mg/kg	<0.50
Zinc	23,000	mg/kg	700
EC	4.0	mmhos/cm	1.1
pH	6 - 9	SU	7.8
SAR	12	unitless	8.8
TPH-GRO		mg/kg	130
TPH-DRO		mg/kg	<b>1600</b>
TPH	500	mg/kg	<b>1730</b>
Benzene	0.17	mg/kg	0.040
Toluene	85	mg/kg	<0.25
Ethylbenzene	100	mg/kg	0.044
Total Xylenes	175	mg/kg	0.15
Acenaphthene	1000	mg/kg	<0.15
Anthracene	1000	mg/kg	<.17
Benzo(A)anthracene	0.22	mg/kg	<0.15
Benzo(B)fluoranthene	0.22	mg/kg	<0.15
Benzo(K)fluoranthene	2.2	mg/kg	<0.15
Benzo(A)pyrene	0.022	mg/kg	<0.15
Chrysene	22	mg/kg	<0.15
Dibenzo(A,H)anthracene	0.022	mg/kg	<0.15
Fluoranthene	1000	mg/kg	<0.15
Fluorene	1000	mg/kg	0.31
Indeno(1,2,3,C,D)pyrene	0.22	mg/kg	<0.15
Naphthalene	23	mg/kg	<0.19
Pyrene	1000	mg/kg	<0.15

**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 SAMPLES**  
**ENCANA PRODUCTION PAD 1309**  
**RANGELY, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	1309-BKG1-112911 6IN	1309-BKG2-112911 6IN	1309-BKG3-112911 6IN	1309-BKG4-112911 6IN	1309-BKG5-112911 6IN
Sample Date			11/29/2012	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Sample Type			Background	Background	Background	Background	Background
Arsenic	0.39	mg/kg	3.7	3.9	2.8	4.0	4.7
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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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 CONFORMATION BORINGS**  
**ENCANA PRODUCTION PAD 1309**  
**RANGELY, COLORADO**  
**ENCANA OIL GAS (USA) INC.**

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	1309-CB01-090512	1309-CB02-090512	1309-CB03-090512	1309-CB04-090512	1309-CB05-090512
Sample Date			11/29/2012	11/29/2012	11/29/2012	11/29/2012	11/29/2012
Sample Type			Conformation	Conformation	Conformation	Conformation	Conformation
Arsenic	0.39	mg/kg	NA	NA	NA	NA	NA
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	140	<4.0	<4.0	<4.0	<4.0
TPH	500	mg/kg	140	<4.0	<4.0	<4.0	<4.0
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:**

< - less than the stated reporting limit

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

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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



**APPENDIX A**

**SITE INVESTIGATION SUMMARY – DRAGON TRAIL #1309  
ENVIRONMENTAL CONSULTING SERVICES  
HCSI JOB NUMBER 10-418**





2385 F ½ Road  
Grand Junction, CO 81505  
1.970.243.3271

January 14, 2013

Encana Oil and Gas USA Inc.  
Blake Ford  
1125 Escalante Drive,  
Rangely, CO 81648

**RE: Site Investigation Summary – Dragon Trail #1309  
Environmental Consulting Services  
HCSI Job Number 10-418**

Dear Mr. Ford,

This document has been provided per your request for a summary of actions taken during the pit closure site investigation associated with the Dragon Trail #1309 (COGCC facility # 314871, remediation # 6735) by HRL Compliance Solutions, Inc. (HCSI) personnel during the 2011 field season. Please see below for the respective summary.

November 29, 2011

The site investigation was conducted by a qualified HCSI employee as authorized by Encana personnel. An Encana employee was on location during the site investigation. All samples were collected in accordance with Encana's Environmental Compliance Group's Sampling Procedures.

HCSI personnel, the respective excavation contractor and an Encana employee mobilized to the respective location. A trackhoe was utilized during the site investigation for excavation purposes. The culvert associated with the pit was carefully removed and stored onsite for later disposal or recycling. It should be noted that there was not any liquid associated with the culvert pit. The soil associated with the pit was characterized utilizing a photoionization detector (PID). There were no indicators of hydrocarbon impacts in accordance with field screen readings (60 ppm was the highest reading) or visual observations. Solid bedrock was encountered at the base of the excavation and lateral extents of excavation. The final dimensions of the excavation was 10'W x 10'L x 7'D. It was speculated that the pit was originally installed with the use of a jack-hammer or other equipment capable of breaking rock since the culvert pit had been installed into solid bedrock. The material that was excavated was fill material which had been backfilled during the culvert installation process. A grab sample from the pit bottom and background samples (with respect to arsenic) were collected and submitted to the analytical laboratory for analysis. Since the lateral extents of the pit were comprised of bedrock, no grab samples were collected. The analytical report indicated that the grab sample collected from the bottom of the pit exceeded the COGCC Table 910-1 standards with regards to Total Petroleum Hydrocarbons (TPH). Due to the remoteness of the location and proximity to equipment onsite, the pit was backfilled and compacted during the site investigation.

After receiving the analytical report and examining the specific site characteristics, HCSI recommended installation of groundwater monitoring wells, or the use of a drilling rig for further delineation of impacts associated with the pit in the surrounding bedrock.

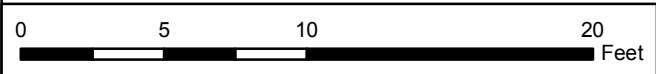
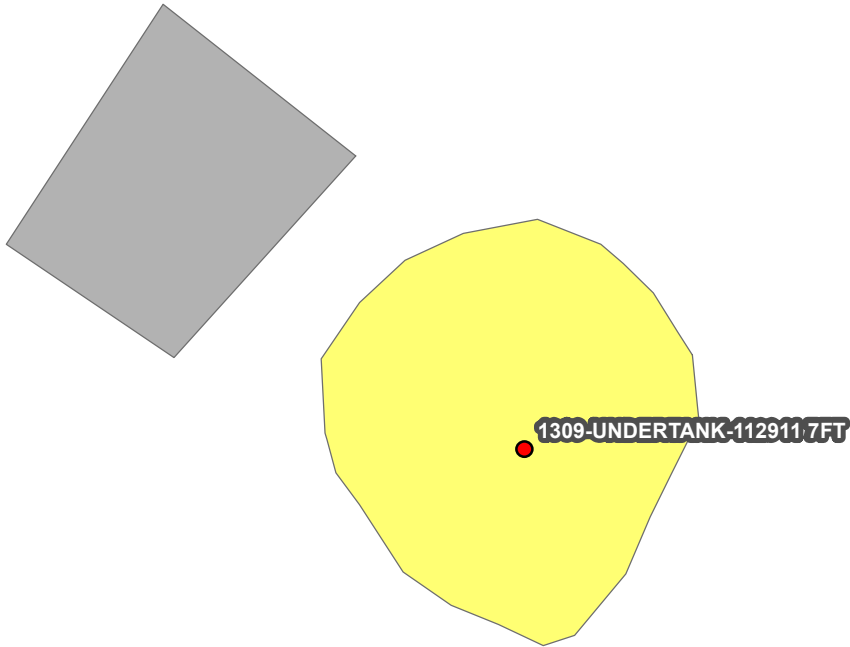
*Respectfully,*

**HRL Compliance Solutions, Inc.**

A handwritten signature in black ink, appearing to read "Kate Ramsay". The signature is stylized, with a large, looped initial "K" and a cursive "Ramsay".

Kate Ramsay  
Environmental Consultant

cc: Chantae Pennell (Encana – Rangely)  
Herman Lucero (HCSI)



**Legend**


- Sample Location

**Pipeline**

- Above Ground
- Buried
- Gathering
- Other

**Other Features**

- Excavated Area
- Pit Footprint
- Equipment
- Spoils Stockpile
- Containment





# Dragon Trail Unit 1309 Site Overview Map





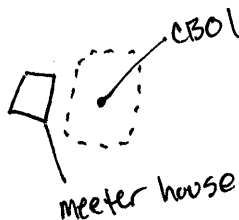
## **APPENDIX B**

### **SOIL BORING LITHOLOGIC LOGS**



N

⊗ Wellhead



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 Arvada, Colorado 80003

**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

Boring/Well Number: **CBO1** Project: **Encan Rangely Assessment**  
 Date: **9/5/12** Project Number: **033412042**  
 Logged By: **CM** Drilled By: **Site Services**

Elevation: — Detector: **Mini Rae 3000** Drilling Method: **Hollow Stem** Sampling Method: **split spoon**

Gravel Pack: — Seal: — Grout: —

Casing Type: — Diameter: — Length: — Hole Diameter: **8"** Depth to Liquid: **NA**

Screen Type: — Slot: — Diameter: — Length: — Total Depth: **5'** Depth to Water: **NA**

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
					0				
					4		SC	sand, yellow brown, dry/slightly moist v.f.g -f.g.	
soil flows	dry	13.9	NO		8		SPS	sandstone, yellow brown, dry very hard	
					12				
					16				
					20				
					24				
					28				
					32				
					36				
					40				
					44				
					48				
					52				
					56				
					58				



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N

Wellhead

• CB02



• CB01

Meterhouse



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Arvada, Colorado 80003

**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

Boring/Well Number:	CB02	Project:	Errata Rangely Assessment
Date:	9/5/12	Project Number:	033412042
Logged By:	CM	Drilled By:	Site Services

Elevation:	_____	Detector:	Mini Rae 3000	Drilling Method:	CME 75 Hollow Stem	Sampling Method:	Split Spoon
------------	-------	-----------	---------------	------------------	--------------------	------------------	-------------

Gravel Pack:	_____	Seal:	_____	Grout:	_____
--------------	-------	-------	-------	--------	-------

Casing Type:	_____	Diameter:	_____	Length:	_____	Hole Diameter:	8"	Depth to Liquid:	NA
--------------	-------	-----------	-------	---------	-------	----------------	----	------------------	----

Screen Type:	_____	Slot:	_____	Diameter:	_____	Length:	_____	Total Depth:	7'	Depth to Water:	NA
--------------	-------	-------	-------	-----------	-------	---------	-------	--------------	----	-----------------	----

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion		
					0			Sand/Fill, yellow/brown, v.f.g, slightly moist			
					4		SC				
					8		SPS				
ED blows	slight	G.O	NO		12			TD = 7' sandstone, yellow/brown, very hard, slightly moist			
					16						
					20						
					24						
					28						
					32						
					36						
					40						
					44						
					48						
					52						
					56						
					58						

4  
N

Well head

CB02

Meeter house



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**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

Boring/Well Number: CB03 Project: Rangely Site Assessment  
Date: 9/5/12 Project Number: 033412042  
Logged By: CM Drilled By: Site Services

Elevation: — Detector: Mini Rae 3000 Drilling Method: CME 75 Hollow Stem Sampling Method: split spoon  
Gravel Pack: — Seal: — Grout: —

Casing Type: — Diameter: — Length: — Hole Diameter: 8" Depth to Liquid: NA  
Screen Type: — Slot: — Diameter: — Length: — Total Depth: 4' Depth to Water: NA

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion
50 blows	slight	0.0	NO		0		SC	Sand, v.f.g, yellow/brown slightly moist	
					4		SPS	Sandstone, yellow/brown very hard, slightly moist	
					8				
					12				
					16				
					20				
					24				
					28				
					32				
					36				
					40				
					44				
					48				
					52				
					56				
					58				

4  
N

⊗ wellhead  
 ☐ meter house  
 • CB04



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**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

Boring/Well Number: CB04	Project: Rangely Site Assessment
Date: 9/5/12	Project Number: 033412042
Logged By: CM	Drilled By: Site Services

Elevation: _____	Detector: Mini Rae 3000	Drilling Method: CME 75 Hollow Stem	Sampling Method: Split Spoon
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Gravel Pack: _____	Seal: _____	Grout: _____
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Casing Type: _____	Diameter: _____ Length: _____	Hole Diameter: 8"	Depth to Liquid: NA
--------------------	-------------------------------	-------------------	---------------------

Screen Type: _____ Slot: _____	Diameter: _____ Length: _____	Total Depth: 4.5'	Depth to Water: NA
--------------------------------	-------------------------------	-------------------	--------------------

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion		
					0			Sand, yellow/brown, v.f.g, slight moisture			
50 blows	Slight	0.0	NO		4		SC				
							SPS	Sandstone, very hard, yellow brown, slightly moist.			
					8						
					12						
					16						
					20						
					24						
					28						
					32						
					36						
					40						
					44						
					48						
					52						
					56						
					58						

⑥ wellhead



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**4600 W. 60th Avenue**  
**Arvada, Colorado 80003**

## BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number:

CBO5

Project:

Project:	Rangely Site Assessment
----------	-------------------------

Date:

$$9 \mid 5 \mid 12$$

Project Number:

Number: 033412042

Logged By:

CM

Drilled By:

By: Site Services

Elevation:

Detector:

tor: Mini Rae 3000

Drilling Method:

- Hollow stem

Sampling Method	
-----------------	--

Method: Split Spoon

Gravel Pack:

Seal:

Grout:	
--------	--

Casing Type:

Diameter:

**Length:**

Hole Diameter:	8"
----------------	----

Depth to Liquid:

Screen Type:

Slot:

Diameter:

Length:

Total Depth:	
--------------	--

Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Soil/Rock Type	Lithology/Remarks	Well Completion		
					0						
					4		SC	Sand, yellow/brown, slightly moist, v.f.g.			
50 blows	Slight	0.0	NO				SPS	Sandstone, yellow/brown, very hard, slightly moist			
					8						
					12						
					16						
					20						
					24						
					28						
					32						
					36						
					40						
					44						
					48						
					52						
					56						
					58						

**APPENDIX C**  
**LABORATORY ANALYTICAL REPORTS**



[illegible][illegible]



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

## Report Summary

Wednesday December 07, 2011

Report Number: L548981

Samples Received: 11/30/11

Client Project:

Description: Culvert Pit Closure Project

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

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

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

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-UNDERTANK-112911 7FT  
Collected By : KHR  
Collection Date : 11/29/11 10:00

ESC Sample # : L548981-01

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	12/07/11	1
Chromium, Trivalent	10.	2.0	mg/kg	Calc.	12/03/11	1
ORP	160		mV	2580	12/02/11	1
pH	7.8		su	9045D	12/05/11	1
Sodium Adsorption Ratio	8.8			Calc.	12/01/11	1
Specific Conductance	1100		umhos/cm	9050AMod	12/01/11	1
Mercury	BDL	0.020	mg/kg	7471	12/02/11	1
Arsenic	5.1	1.0	mg/kg	6010B	12/03/11	1
Barium	370	0.25	mg/kg	6010B	12/03/11	1
Cadmium	0.28	0.25	mg/kg	6010B	12/03/11	1
Chromium	10.	0.50	mg/kg	6010B	12/03/11	1
Copper	14.	1.0	mg/kg	6010B	12/03/11	1
Lead	18.	0.25	mg/kg	6010B	12/03/11	1
Nickel	16.	1.0	mg/kg	6010B	12/03/11	1
Selenium	BDL	5.0	mg/kg	6010B	12/03/11	5
Silver	BDL	0.50	mg/kg	6010B	12/03/11	1
Zinc	700	1.5	mg/kg	6010B	12/03/11	1
Benzene	0.040	0.025	mg/kg	8021/8015	12/02/11	50
Toluene	BDL	0.25	mg/kg	8021/8015	12/02/11	50
Ethylbenzene	0.044	0.025	mg/kg	8021/8015	12/02/11	50
Total Xylene	0.15	0.075	mg/kg	8021/8015	12/02/11	50
TPH (GC/FID) Low Fraction	130	5.0	mg/kg	GRO	12/02/11	50
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	91.3		% Rec.	8021/8015	12/02/11	50
a,a,a-Trifluorotoluene(PID)	98.0		% Rec.	8021/8015	12/02/11	50
TPH (GC/FID) High Fraction	1600	80.	mg/kg	3546/DRO	12/01/11	20
Surrogate recovery(%)						
o-Terphenyl	0.00		% Rec.	3546/DRO	12/01/11	20
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.17	0.15	mg/kg	8270C-SIM	12/01/11	25
Acenaphthene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Acenaphthylene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Benzo(a)anthracene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Benzo(a)pyrene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25

BDL - Below Detection Limit  
Det. Limit - Practical Quantitation Limit(PQL)  
L548981-01 (PH) - 7.77@21.4c





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# REPORT OF ANALYSIS

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Grand Junction, CO 81506

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-UNDERTANK-112911 7FT  
Collected By : KHR  
Collection Date : 11/29/11 10:00

ESC Sample # : L548981-01

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Benzo(g,h,i)perylene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Benzo(k)fluoranthene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Chrysene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Dibenz(a,h)anthracene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Fluoranthene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Fluorene	0.31	0.15	mg/kg	8270C-SIM	12/01/11	25
Indeno(1,2,3-cd)pyrene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Naphthalene	0.19	0.15	mg/kg	8270C-SIM	12/01/11	25
Phenanthrene	0.46	0.15	mg/kg	8270C-SIM	12/01/11	25
Pyrene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
1-Methylnaphthalene	0.55	0.15	mg/kg	8270C-SIM	12/01/11	25
2-Methylnaphthalene	0.68	0.15	mg/kg	8270C-SIM	12/01/11	25
2-Chloronaphthalene	BDL	0.15	mg/kg	8270C-SIM	12/01/11	25
Surrogate Recovery						
Nitrobenzene-d5	0.00		% Rec.	8270C-SIM	12/01/11	25
2-Fluorobiphenyl	0.00		% Rec.	8270C-SIM	12/01/11	25
p-Terphenyl-d14	0.00		% Rec.	8270C-SIM	12/01/11	25

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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L548981-01 (PH) - 7.77@21.4c



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REPORT OF ANALYSIS

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

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-BKG1-112911 6IN  
Collected By : KHR  
Collection Date : 11/29/11 10:30

ESC Sample # : L548981-02

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	3.7	1.0	mg/kg	6010B	12/01/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Kate Ramsay  
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Grand Junction, CO 81506

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-BKG2-112911 6IN  
Collected By : KHR  
Collection Date : 11/29/11 10:35

ESC Sample # : L548981-03

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	3.9	1.0	mg/kg	6010B	12/01/11	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

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-BKG3-112911 6IN  
Collected By : KHR  
Collection Date : 11/29/11 10:40

ESC Sample # : L548981-04

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	2.8	1.0	mg/kg	6010B	12/01/11	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

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-BKG4-112911 6IN  
Collected By : KHR  
Collection Date : 11/29/11 10:45

ESC Sample # : L548981-05

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	4.0	1.0	mg/kg	6010B	11/30/11	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

December 07, 2011

Date Received : November 30, 2011  
Description : Culvert Pit Closure Project  
Sample ID : 1309-BKG5-112911 6IN  
Collected By : KHR  
Collection Date : 11/29/11 10:50

ESC Sample # : L548981-06

Site ID : DTU 1309

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	4.7	1.0	mg/kg	6010B	12/01/11	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: 12/07/11 16:21 Printed: 12/07/11 17:04

Attachment A  
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L548981-01	WG568037	SAMP	Selenium	R1953514	O
	WG567894	SAMP	Nitrobenzene-d5	R1952174	J7
	WG567894	SAMP	2-Fluorobiphenyl	R1952174	J7
	WG567894	SAMP	p-Terphenyl-d14	R1952174	J7
	WG568127	SAMP	ORP	R1952914	T8
	WG567755	SAMP	o-Terphenyl	R1951332	J7

Attachment B  
Explanation of QC Qualifier Codes

Qualifier	Meaning
J7	Surrogate recovery limits cannot be evaluated; surrogates were diluted out
O	(ESC) Sample diluted due to matrix interferences that impaired the ability to make an accurate analytical determination. The detection limit is elevated in order to reflect the necessary dilution.
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

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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Est. 1970

Quality Assurance Report  
Level II

L548981

December 07, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Arsenic	< 1	mg/kg			WG567929	11/30/11 22:10
TPH (GC/FID) High Fraction	< 4	ppm			WG567755	12/01/11 10:38
o-Terphenyl		% Rec.	76.14	50-150	WG567755	12/01/11 10:38
Specific Conductance	1.90	umhos/cm			WG567919	12/01/11 15:15
Mercury	< .02	mg/kg			WG568018	12/02/11 11:50
1-Methylnaphthalene	< .006	mg/kg			WG567894	12/01/11 09:15
2-Chloronaphthalene	< .006	mg/kg			WG567894	12/01/11 09:15
2-Methylnaphthalene	< .006	mg/kg			WG567894	12/01/11 09:15
Acenaphthene	< .006	mg/kg			WG567894	12/01/11 09:15
Acenaphthylene	< .006	mg/kg			WG567894	12/01/11 09:15
Anthracene	< .006	mg/kg			WG567894	12/01/11 09:15
Benzo(a)anthracene	< .006	mg/kg			WG567894	12/01/11 09:15
Benzo(a)pyrene	< .006	mg/kg			WG567894	12/01/11 09:15
Benzo(b)fluoranthene	< .006	mg/kg			WG567894	12/01/11 09:15
Benzo(g,h,i)perylene	< .006	mg/kg			WG567894	12/01/11 09:15
Benzo(k)fluoranthene	< .006	mg/kg			WG567894	12/01/11 09:15
Chrysene	< .006	mg/kg			WG567894	12/01/11 09:15
Dibenz(a,h)anthracene	< .006	mg/kg			WG567894	12/01/11 09:15
Fluoranthene	< .006	mg/kg			WG567894	12/01/11 09:15
Fluorene	< .006	mg/kg			WG567894	12/01/11 09:15
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG567894	12/01/11 09:15
Naphthalene	< .006	mg/kg			WG567894	12/01/11 09:15
Phenanthrene	< .006	mg/kg			WG567894	12/01/11 09:15
Pyrene	< .006	mg/kg			WG567894	12/01/11 09:15
2-Fluorobiphenyl		% Rec.	74.70	34-129	WG567894	12/01/11 09:15
Nitrobenzene-d5		% Rec.	82.85	14-141	WG567894	12/01/11 09:15
p-Terphenyl-d14		% Rec.	97.16	25-139	WG567894	12/01/11 09:15
Arsenic	< 1	mg/kg			WG568037	12/03/11 12:59
Barium	< .25	mg/kg			WG568037	12/03/11 12:59
Cadmium	< .25	mg/kg			WG568037	12/03/11 12:59
Chromium	< .5	mg/kg			WG568037	12/03/11 12:59
Copper	< 1	mg/kg			WG568037	12/03/11 12:59
Lead	< .25	mg/kg			WG568037	12/03/11 12:59
Nickel	< 1	mg/kg			WG568037	12/03/11 12:59
Selenium	< 1	mg/kg			WG568037	12/03/11 12:59
Silver	< .5	mg/kg			WG568037	12/03/11 12:59
Zinc	< 1.5	mg/kg			WG568037	12/03/11 12:59
Benzene	< .0005	mg/kg			WG568286	12/02/11 21:35
Ethylbenzene	< .0005	mg/kg			WG568286	12/02/11 21:35
Toluene	< .005	mg/kg			WG568286	12/02/11 21:35
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG568286	12/02/11 21:35
Total Xylene	< .0015	mg/kg			WG568286	12/02/11 21:35
a,a,a-Trifluorotoluene(FID)		% Rec.	96.37	59-128	WG568286	12/02/11 21:35
a,a,a-Trifluorotoluene(PID)		% Rec.	98.52	54-144	WG568286	12/02/11 21:35
pH	5.80	su			WG568344	12/05/11 10:54

\* Performance of this Analyte is outside of established criteria.

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Level II

L548981

December 07, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Chromium,Hexavalent	< 2	mg/kg			WG568504	12/07/11 13:58

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Arsenic	mg/kg	4.20	4.00	5.12	20	L548981-05	WG567929
Specific Conductance	umhos/cm	380.	360.	5.14	20	L548532-02	WG567919
Mercury	mg/kg	0.260	0.240	8.38	20	L549144-01	WG568018
ORP	mV	140.	150.	4.08	20	L548743-01	WG568127
Arsenic	mg/kg	2.70	3.20	16.6	20	L548790-21	WG568037
Barium	mg/kg	27.0	22.0	21.9*	20	L548790-21	WG568037
Cadmium	mg/kg	3.10	2.60	17.2	20	L548790-21	WG568037
Chromium	mg/kg	22.0	7.20	100.*	20	L548790-21	WG568037
Copper	mg/kg	31.0	27.3	14.0	20	L548790-21	WG568037
Lead	mg/kg	51.0	42.0	18.6	20	L548790-21	WG568037
Nickel	mg/kg	9.90	7.02	33.7*	20	L548790-21	WG568037
Silver	mg/kg	0	0	0	20	L548790-21	WG568037
Zinc	mg/kg	200.	193.	3.06	20	L548790-21	WG568037
Selenium	mg/kg	0	0	0	20	L548790-21	WG568037
pH	su	7.90	7.90	0.380	1	L548945-01	WG568344
pH	su	8.30	8.30	0.241	1	L549602-01	WG568344
Chromium,Hexavalent	mg/kg	0	0	0	20	L549619-01	WG568504
Chromium,Hexavalent	mg/kg	1.80	1.30	32.3*	20	L549638-07	WG568504

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Arsenic	mg/kg	92.6	86.4	93.3	82.9-117	WG567929
TPH (GC/FID) High Fraction o-Terphenyl	ppm	60	46.1	76.9 81.06	50-150 50-150	WG567755 WG567755
Specific Conductance	umhos/cm	427	420.	98.4	85-115	WG567919
Mercury	mg/kg	3.77	3.21	85.1	71.6-128	WG568018
1-Methylnaphthalene	mg/kg	.033	0.0284	86.0	48-113	WG567894
2-Chloronaphthalene	mg/kg	.033	0.0276	83.5	51-114	WG567894
2-Methylnaphthalene	mg/kg	.033	0.0286	86.7	44-109	WG567894
Acenaphthene	mg/kg	.033	0.0277	83.9	52-108	WG567894
Acenaphthylene	mg/kg	.033	0.0277	84.1	51-110	WG567894
Anthracene	mg/kg	.033	0.0287	87.0	58-120	WG567894
Benzo(a)anthracene	mg/kg	.033	0.0282	85.4	54-110	WG567894

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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Benzo(a)pyrene	mg/kg	.033	0.0284	86.1	56-118	WG567894
Benzo(b)fluoranthene	mg/kg	.033	0.0286	86.6	55-114	WG567894
Benzo(g,h,i)perylene	mg/kg	.033	0.0262	79.5	48-130	WG567894
Benzo(k)fluoranthene	mg/kg	.033	0.0288	87.2	55-122	WG567894
Chrysene	mg/kg	.033	0.0276	83.5	57-118	WG567894
Dibenz(a,h)anthracene	mg/kg	.033	0.0261	79.2	53-122	WG567894
Fluoranthene	mg/kg	.033	0.0290	88.0	58-118	WG567894
Fluorene	mg/kg	.033	0.0283	85.8	54-109	WG567894
Indeno(1,2,3-cd)pyrene	mg/kg	.033	0.0264	80.1	51-125	WG567894
Naphthalene	mg/kg	.033	0.0262	79.4	45-105	WG567894
Phenanthrene	mg/kg	.033	0.0277	83.9	53-114	WG567894
Pyrene	mg/kg	.033	0.0300	91.0	53-121	WG567894
2-Fluorobiphenyl				76.29	34-129	WG567894
Nitrobenzene-d5				82.16	14-141	WG567894
p-Terphenyl-d14				98.80	25-139	WG567894
ORP	mV	229	220.	96.1	95.6-104.37	WG568127
Arsenic	mg/kg	92.6	90.9	98.2	82.9-117	WG568037
Barium	mg/kg	169	173.	102.	82.8-117	WG568037
Cadmium	mg/kg	61.8	60.0	97.1	83.3-117	WG568037
Chromium	mg/kg	71.3	76.5	107.	81.8-118	WG568037
Copper	mg/kg	81.2	85.2	105.	83.9-116	WG568037
Lead	mg/kg	92.4	101.	109.	83.3-117	WG568037
Nickel	mg/kg	59.1	59.7	101.	83.8-116	WG568037
Selenium	mg/kg	89.5	85.5	95.5	79-121	WG568037
Silver	mg/kg	34.4	33.4	97.1	66.3-134	WG568037
Zinc	mg/kg	141	139.	98.6	80.9-119	WG568037
Benzene	mg/kg	.05	0.0401	80.2	76-113	WG568286
Ethylbenzene	mg/kg	.05	0.0432	86.5	78-115	WG568286
Toluene	mg/kg	.05	0.0434	86.9	76-114	WG568286
Total Xylene	mg/kg	.15	0.128	85.5	81-118	WG568286
a,a,a-Trifluorotoluene(PID)				93.41	54-144	WG568286
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.91	107.	67-135	WG568286
a,a,a-Trifluorotoluene(FID)				100.5	59-128	WG568286
pH	su	7.98	8.00	100.	98-101	WG568344
Chromium,Hexavalent	mg/kg	203	210.	103.	50-150	WG568504

Analyte	Units	Laboratory Control Sample Duplicate		%Rec	Limit	RPD	Limit	Batch
		Result	Ref					
TPH (GC/FID) High Fraction	ppm	45.6	46.1	76.0	50-150	1.17	25	WG567755
o-Terphenyl				83.60	50-150			WG567755
Specific Conductance	umhos/	420.	420.	98.0	85-115	0	20	WG567919
1-Methylnaphthalene	mg/kg	0.0282	0.0284	86.0	48-113	0.507	24	WG567894
2-Chloronaphthalene	mg/kg	0.0283	0.0276	86.0	51-114	2.86	24	WG567894
2-Methylnaphthalene	mg/kg	0.0297	0.0286	90.0	44-109	3.71	24	WG567894

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Analyte	Units	Laboratory Control		Sample Duplicate		Limit	RPD	Limit	Batch
		Result	Ref	%Rec					
Acenaphthene	mg/kg	0.0288	0.0277	87.0		52-108	3.83	22	WG567894
Acenaphthylene	mg/kg	0.0278	0.0277	84.0		51-110	0.352	21	WG567894
Anthracene	mg/kg	0.0290	0.0287	88.0		58-120	0.928	20	WG567894
Benzo(a)anthracene	mg/kg	0.0293	0.0282	89.0		54-110	3.78	22	WG567894
Benzo(a)pyrene	mg/kg	0.0299	0.0284	90.0		56-118	5.05	21	WG567894
Benzo(b)fluoranthene	mg/kg	0.0307	0.0286	93.0		55-114	7.26	20	WG567894
Benzo(g,h,i)perylene	mg/kg	0.0275	0.0262	83.0		48-130	4.69	20	WG567894
Benzo(k)fluoranthene	mg/kg	0.0306	0.0288	93.0		55-122	6.09	25	WG567894
Chrysene	mg/kg	0.0295	0.0276	89.0		57-118	6.77	20	WG567894
Dibenz(a,h)anthracene	mg/kg	0.0280	0.0261	85.0		53-122	6.91	20	WG567894
Fluoranthene	mg/kg	0.0307	0.0290	93.0		58-118	5.67	20	WG567894
Fluorene	mg/kg	0.0300	0.0283	91.0		54-109	5.77	20	WG567894
Indeno(1,2,3-cd)pyrene	mg/kg	0.0277	0.0264	84.0		51-125	4.66	21	WG567894
Naphthalene	mg/kg	0.0268	0.0262	81.0		45-105	2.20	24	WG567894
Phenanthrene	mg/kg	0.0289	0.0277	88.0		53-114	4.44	20	WG567894
Pyrene	mg/kg	0.0317	0.0300	96.0		53-121	5.26	20	WG567894
2-Fluorobiphenyl				78.22		34-129			WG567894
Nitrobenzene-d5				87.33		14-141			WG567894
p-Terphenyl-d14				104.7		25-139			WG567894
ORP	mV	230.	220.	100.		95.6-104.37	4.44	20	WG568127
Benzene	mg/kg	0.0409	0.0401	82.0		76-113	2.05	20	WG568286
Ethylbenzene	mg/kg	0.0437	0.0432	87.0		78-115	1.14	20	WG568286
Toluene	mg/kg	0.0439	0.0434	88.0		76-114	1.19	20	WG568286
Total Xylene	mg/kg	0.130	0.128	87.0		81-118	1.62	20	WG568286
a,a,a-Trifluorotoluene(PID)				95.12		54-144			WG568286
TPH (GC/FID) Low Fraction	mg/kg	6.16	5.91	112.		67-135	4.22	20	WG568286
a,a,a-Trifluorotoluene(FID)				100.1		59-128			WG568286
pH	su	8.00	8.00	100.		98-101	0	20	WG568344
Chromium,Hexavalent	mg/kg	183.	210.	90.0		50-150	13.7	20	WG568504

Analyte	Units	Matrix Spike				Limit	Ref Samp	Batch
		MS Res	Ref Res	TV	% Rec			
Arsenic	mg/kg	46.4	4.00	50	84.8	75-125	L548981-05	WG567929
TPH (GC/FID) High Fraction	ppm	40.6	0	60	67.7	50-150	L548842-04	WG567755
o-Terphenyl					79.40	50-150		WG567755
Mercury	mg/kg	0.494	0.240	.25	102.	70-130	L549144-01	WG568018
1-Methylnaphthalene	mg/kg	4.78	2.80	.033	120.	25-155	L548920-01	WG567894
2-Chloronaphthalene	mg/kg	0.201	0	.033	12.2*	31-153	L548920-01	WG567894
2-Methylnaphthalene	mg/kg	9.24	3.80	.033	330.*	22-172	L548920-01	WG567894
Acenaphthene	mg/kg	0.604	0.430	.033	10.5*	43-133	L548920-01	WG567894
Acenaphthylene	mg/kg	0.0988	0.0800	.033	57.1	42-146	L548920-01	WG567894
Anthracene	mg/kg	0.624	0.300	.033	982.*	38-153	L548920-01	WG567894
Benzo(a)anthracene	mg/kg	0.122	0.0290	.033	280.*	31-142	L548920-01	WG567894
Benzo(a)pyrene	mg/kg	0.0978	0.0200	.033	236.*	26-152	L548920-01	WG567894

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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Benzo(b)fluoranthene	mg/kg	0.129	0.0290	.033	302.*	10-188	L548920-01	WG567894
Benzo(g,h,i)perylene	mg/kg	0.0287	0	.033	87.0	10-176	L548920-01	WG567894
Benzo(k)fluoranthene	mg/kg	0.0545	0.00770	.033	142.	22-163	L548920-01	WG567894
Chrysene	mg/kg	0.106	0.0240	.033	248.*	26-146	L548920-01	WG567894
Dibenz(a,h)anthracene	mg/kg	0.0242	0	.033	73.3	10-160	L548920-01	WG567894
Fluoranthene	mg/kg	0.614	0.110	.033	1530*	23-160	L548920-01	WG567894
Fluorene	mg/kg	0.474	0.480	.033	0*	44-143	L548920-01	WG567894
Indeno(1,2,3-cd)pyrene	mg/kg	0.0317	0	.033	96.0	10-157	L548920-01	WG567894
Naphthalene	mg/kg	0.347	0.350	.033	0*	22-156	L548920-01	WG567894
Phenanthrene	mg/kg	3.07	1.30	.033	107.	23-164	L548920-01	WG567894
Pyrene	mg/kg	0.496	0.180	.033	956.*	12-170	L548920-01	WG567894
2-Fluorobiphenyl					161.8*	34-129		WG567894
Nitrobenzene-d5					1993.*	14-141		WG567894
p-Terphenyl-d14					108.8	25-139		WG567894
Arsenic	mg/kg	51.6	3.20	50	96.8	75-125	L548790-21	WG568037
Barium	mg/kg	68.3	22.0	50	92.6	75-125	L548790-21	WG568037
Cadmium	mg/kg	50.7	2.60	50	96.2	75-125	L548790-21	WG568037
Chromium	mg/kg	59.9	7.20	50	105.	75-125	L548790-21	WG568037
Copper	mg/kg	74.5	27.3	50	94.4	75-125	L548790-21	WG568037
Lead	mg/kg	101.	42.0	50	118.	75-125	L548790-21	WG568037
Nickel	mg/kg	54.4	7.02	50	94.8	75-125	L548790-21	WG568037
Silver	mg/kg	49.3	0	50	98.6	75-125	L548790-21	WG568037
Zinc	mg/kg	232.	193.	50	78.0	75-125	L548790-21	WG568037
Selenium	mg/kg	47.8	0	10	95.6	75-125	L548790-21	WG568037
Benzene	mg/kg	0.184	0	.05	73.7	32-137	L549492-03	WG568286
Ethylbenzene	mg/kg	0.194	0	.05	77.5	10-150	L549492-03	WG568286
Toluene	mg/kg	0.199	0	.05	79.5	20-142	L549492-03	WG568286
Total Xylene	mg/kg	0.577	0	.15	77.0	16-141	L549492-03	WG568286
a,a,a-Trifluorotoluene(PID)					96.45	54-144		WG568286
TPH (GC/FID) Low Fraction	mg/kg	29.2	0	5.5	106.	55-109	L549492-03	WG568286
a,a,a-Trifluorotoluene(FID)					95.87	59-128		WG568286
Chromium,Hexavalent	mg/kg	12.8	0	20	64.0	50-150	L549629-01	WG568504

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Arsenic	mg/kg	48.7	46.4	89.4	75-125	4.84	20	L548981-05	WG567929
TPH (GC/FID) High Fraction	ppm	39.9	40.6	66.5	50-150	1.85	25	L548842-04	WG567755
o-Terphenyl				76.16	50-150				WG567755
Mercury	mg/kg	0.467	0.494	90.8	70-130	5.62	20	L549144-01	WG568018
1-Methylnaphthalene	mg/kg	5.28	4.78	7510*	25-155	10.0	27	L548920-01	WG567894
2-Chloronaphthalene	mg/kg	0.226	0.201	685.*	31-153	11.5	22	L548920-01	WG567894
2-Methylnaphthalene	mg/kg	10.6	9.24	20600*	22-172	13.9	29	L548920-01	WG567894
Acenaphthene	mg/kg	0.634	0.604	618.*	43-133	4.89	26	L548920-01	WG567894
Acenaphthylene	mg/kg	0.0930	0.0988	39.4*	42-146	6.07	22	L548920-01	WG567894
Anthracene	mg/kg	0.550	0.624	757.*	38-153	12.6	27	L548920-01	WG567894
Benzo(a)anthracene	mg/kg	0.114	0.122	257.*	31-142	6.59	31	L548920-01	WG567894

\* Performance of this Analyte is outside of established criteria.

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HRL Compliance Solutions- CO  
Kate Ramsay  
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Grand Junction, CO 81506

Quality Assurance Report  
Level II

L548981

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1-800-767-5859  
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

December 07, 2011

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Benzo(a)pyrene	mg/kg	0.0871	0.0978	203.*	26-152	11.5	32	L548920-01	WG567894
Benzo(b)fluoranthene	mg/kg	0.109	0.129	244.*	10-188	16.2	33	L548920-01	WG567894
Benzo(g,h,i)perylene	mg/kg	0.0294	0.0287	89.1	10-176	2.38	30	L548920-01	WG567894
Benzo(k)fluoranthene	mg/kg	0.0527	0.0545	136.	22-163	3.49	29	L548920-01	WG567894
Chrysene	mg/kg	0.0936	0.106	211.*	26-146	12.3	30	L548920-01	WG567894
Dibenz(a,h)anthracene	mg/kg	0.0230	0.0242	69.8	10-160	4.98	39	L548920-01	WG567894
Fluoranthene	mg/kg	0.199	0.614	270.*	23-160	102.*	22	L548920-01	WG567894
Fluorene	mg/kg	0.482	0.474	4.58*	44-143	1.57	23	L548920-01	WG567894
Indeno(1,2,3-cd)pyrene	mg/kg	0.0328	0.0317	99.5	10-157	3.58	40	L548920-01	WG567894
Naphthalene	mg/kg	0.463	0.347	342.*	22-156	28.5*	27	L548920-01	WG567894
Phenanthrene	mg/kg	3.14	3.07	5590*	23-164	2.42	25	L548920-01	WG567894
Pyrene	mg/kg	0.273	0.496	281.*	12-170	58.0*	24	L548920-01	WG567894
2-Fluorobiphenyl				161.8*	34-129				WG567894
Nitrobenzene-d5				2628.*	14-141				WG567894
p-Terphenyl-d14				58.56	25-139				WG567894
Arsenic	mg/kg	50.4	51.6	94.4	75-125	2.35	20	L548790-21	WG568037
Barium	mg/kg	78.8	68.3	114.	75-125	14.3	20	L548790-21	WG568037
Cadmium	mg/kg	51.8	50.7	98.4	75-125	2.15	20	L548790-21	WG568037
Chromium	mg/kg	64.2	59.9	114.	75-125	6.93	20	L548790-21	WG568037
Copper	mg/kg	86.1	74.5	118.	75-125	14.4	20	L548790-21	WG568037
Lead	mg/kg	118.	101.	152.*	75-125	15.5	20	L548790-21	WG568037
Nickel	mg/kg	56.4	54.4	98.8	75-125	3.61	20	L548790-21	WG568037
Silver	mg/kg	48.4	49.3	96.8	75-125	1.84	20	L548790-21	WG568037
Zinc	mg/kg	270.	232.	154.*	75-125	15.1	20	L548790-21	WG568037
Selenium	mg/kg	46.4	47.8	92.8	75-125	2.97	20	L548790-21	WG568037
Benzene	mg/kg	0.212	0.184	84.7	32-137	13.9	39	L549492-03	WG568286
Ethylbenzene	mg/kg	0.216	0.194	86.4	10-150	10.9	44	L549492-03	WG568286
Toluene	mg/kg	0.223	0.199	89.2	20-142	11.5	42	L549492-03	WG568286
Total Xylene	mg/kg	0.642	0.577	85.6	16-141	10.6	46	L549492-03	WG568286
a,a,a-Trifluorotoluene(PID)				93.88	54-144				WG568286
TPH (GC/FID) Low Fraction	mg/kg	28.0	29.2	102.	55-109	4.15	20	L549492-03	WG568286
a,a,a-Trifluorotoluene(FID)				84.67	59-128				WG568286
Chromium,Hexavalent	mg/kg	12.9	12.8	64.5	50-150	0.778	20	L549629-01	WG568504

Batch number /Run number / Sample number cross reference

WG567929: R1950613: L548981-02 03 04 05 06  
WG567755: R1951332: L548981-01  
WG567919: R1951553: L548981-01  
WG567894: R1952174: L548981-01  
WG567809: R1952412: L548981-01  
WG568018: R1952613: L548981-01  
WG568127: R1952914: L548981-01  
WG568037: R1953514: L548981-01  
WG568286: R1953832: L548981-01  
WG568344: R1954434: L548981-01  
WG568504: R1957474: L548981-01

\* \* Calculations are performed prior to rounding of reported values.

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December 07, 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.



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

## Report Summary

Wednesday September 12, 2012

Report Number: L593839

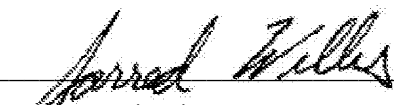
Samples Received: 09/07/12

Client Project: 033412042

Description: Rangely Site Assessement

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 - 01157CA, CT - PH-0197,  
FL - E87487, GA - 923, IN - C-TN-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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# REPORT OF ANALYSIS

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

September 12, 2012

Date Received : September 07, 2012  
Description : Rangely Site Assessment

Sample ID : 1309-CB01-090512 5FT

Collected By : Chris McKisson  
Collection Date : 09/05/12 12:20

ESC Sample # : L593839-03

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	140	4.0	mg/kg	3546/DRO	09/10/12	1
Surrogate recovery(%) o-Terphenyl	70.5		% Rec.	3546/DRO	09/10/12	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: 09/12/12 11:11 Printed: 09/12/12 13:46



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REPORT OF ANALYSIS

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

September 12, 2012

Date Received : September 07, 2012  
Description : Rangely Site Assessment  
Sample ID : 1309-CB02-090512 7FT  
Collected By : Chris McKisson  
Collection Date : 09/05/12 13:25

ESC Sample # : L593839-04

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	09/10/12	1
Surrogate recovery(%) o-Terphenyl	66.2		% Rec.	3546/DRO	09/10/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Reported: 09/12/12 11:11 Printed: 09/12/12 13:46



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REPORT OF ANALYSIS

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

September 12, 2012

Date Received : September 07, 2012  
Description : Rangely Site Assessment  
Sample ID : 1309-CB03-090512 4FT  
Collected By : Chris McKisson  
Collection Date : 09/05/12 14:05

ESC Sample # : L593839-05

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	09/10/12	1
Surrogate recovery(%) o-Terphenyl	58.5		% Rec.	3546/DRO	09/10/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

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Reported: 09/12/12 11:11 Printed: 09/12/12 13:46



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# REPORT OF ANALYSIS

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

September 12, 2012

Date Received : September 07, 2012  
Description : Rangely Site Assessment  
Sample ID : 1309-CB04-090512 4.5FT  
Collected By : Chris McKisson  
Collection Date : 09/05/12 15:05

ESC Sample # : L593839-06

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	09/10/12	1
Surrogate recovery(%) o-Terphenyl	65.2		% Rec.	3546/DRO	09/10/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 09/12/12 11:11 Printed: 09/12/12 13:46



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REPORT OF ANALYSIS

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

September 12, 2012

Date Received : September 07, 2012  
Description : Rangely Site Assessment  
Sample ID : 1309-CB05-090512 5FT  
Collected By : Chris McKisson  
Collection Date : 09/05/12 16:00

ESC Sample # : L593839-07

Site ID :

Project # : 033412042

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	09/10/12	1
Surrogate recovery(%) o-Terphenyl	70.4		% Rec.	3546/DRO	09/10/12	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 09/12/12 11:11 Printed: 09/12/12 13:46

Summary of Remarks For Samples Printed  
09/12/12 at 13:46:25

TSR Signing Reports: 358  
R5 - Desired TAT

Sample: L593839-03 Account: ENCANRCO Received: 09/07/12 09:00 Due Date: 09/14/12 00:00 RPT Date: 09/12/12 11:11  
Sample: L593839-04 Account: ENCANRCO Received: 09/07/12 09:00 Due Date: 09/14/12 00:00 RPT Date: 09/12/12 11:11  
Sample: L593839-05 Account: ENCANRCO Received: 09/07/12 09:00 Due Date: 09/14/12 00:00 RPT Date: 09/12/12 11:11  
Sample: L593839-06 Account: ENCANRCO Received: 09/07/12 09:00 Due Date: 09/14/12 00:00 RPT Date: 09/12/12 11:11  
Sample: L593839-07 Account: ENCANRCO Received: 09/07/12 09:00 Due Date: 09/14/12 00:00 RPT Date: 09/12/12 11:11



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Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
TPH (GC/FID) High Fraction	< 4	ppm			WG611592	09/10/12 11:59
o-Terphenyl		% Rec.	72.46	50-150	WG611592	09/10/12 11:59
Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
TPH (GC/FID) High Fraction	ppm	60	45.2	75.4	50-150	WG611592
o-Terphenyl				69.89	50-150	WG611592
Analyte	Units	Laboratory Control Sample Duplicate			Limit	Batch
		Result	Ref	%Rec		
TPH (GC/FID) High Fraction	ppm	42.9	45.2	72.0	50-150	WG611592
o-Terphenyl				60.58	50-150	WG611592
Analyte	Units	Matrix Spike				Batch
		MS Res	Ref Res	TV	% Rec	
TPH (GC/FID) High Fraction	ppm	231.	160.	60	119.	WG611592
o-Terphenyl					60.82	WG611592
Analyte	Units	Matrix Spike Duplicate			Limit	Batch
		MSD	Ref	%Rec		
TPH (GC/FID) High Fraction	ppm	268.	231.	180.*	50-150	WG611592
o-Terphenyl				71.40	50-150	WG611592

Batch number /Run number / Sample number cross reference

WG611592: R2337458: L593839-03 04 05 06 07

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