

State of Colorado
Oil and Gas Conservation Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203
Phone: (303) 894-2100 Fax: (303) 894-2109

DE	ET	OE	ES
Document Number: 400745034			
Date Received: 12/09/2014			
Loc ID 335428			

SUNDRY NOTICE

Submit a signed original. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full in Comments or provide as an attachment. Identify Well by API Number; identify Oil and Gas Location by Location ID Number; identify other Facility by Facility ID Number.

OGCC Operator Number:	100185	Contact Name	Chris Hines
Name of Operator:	ENCANA OIL & GAS (USA) INC		Phone: (970) 285-2653
Address:	370 17TH ST STE 1700		Fax: ()
City:	DENVER	State:	CO Zip: 80202-5632 Email: chris.hines@encana.com

Doc# 2313351

Complete the Attachment
Checklist

OP OGCC

API Number :	05-04500	OGCC Facility ID Number:	335428
Well/Facility Name:	Benjamin Federal	Well/Facility Number:	28-12B2 (K28NW)
Location QtrQtr:	NESW	Section:	28 Township: 6S Range: 93W Meridian: 6
County:	GARFIELD	Field Name:	MAMM CREEK
Federal, Indian or State Lease Number:			

Survey Plat		
Directional Survey		
Srvc Eqpmt Diagram		
Technical Info Page		
Other		

CHANGE OF LOCATION OR AS BUILT GPS REPORT

☐ Change of Location * ☐ As-Built GPS Location Report ☐ As-Built GPS Location Report with Survey

* Well location change requires new plat. A substantive surface location change may require new Form 2A.

SURFACE LOCATION GPS DATA Data must be provided for Change of Surface Location and As Built Reports.

Latitude _____ PDOP Reading _____ Date of Measurement _____
Longitude _____ GPS Instrument Operator's Name _____

LOCATION CHANGE (all measurements in Feet)

Well will be: _____ (Vertical, Directional, Horizontal)

Change of **Surface** Footage **From** Exterior Section Lines:

FNL/FSL	FEL/FWL
1716 FSL	2536 FWL

Change of **Surface** Footage **To** Exterior Section Lines:Current **Surface** Location **From** QtrQtr **NESW** Sec **28**Twp **6S** Range **93W** Meridian **6**New **Surface** Location **To** QtrQtr _____ Sec _____

Twp _____ Range _____ Meridian _____

Change of **Top of Productive Zone** Footage **From** Exterior Section Lines:

--	--

Change of **Top of Productive Zone** Footage **To** Exterior Section Lines:

--	--

**

Current **Top of Productive Zone** Location **From** Sec _____

Twp _____ Range _____

New **Top of Productive Zone** Location **To** Sec _____

Twp _____ Range _____

Change of **Bottomhole** Footage **From** Exterior Section Lines:

--	--

Change of **Bottomhole** Footage **To** Exterior Section Lines:

--	--

**

Current **Bottomhole** Location Sec _____ Twp _____

Range _____ ** attach deviated drilling plan

New **Bottomhole** Location Sec _____ Twp _____

Range _____

Is location in High Density Area? _____

Distance, in feet, to nearest building _____, public road: _____, above ground utility: _____, railroad: _____,

property line: _____, lease line: _____, well in same formation: _____

Ground Elevation _____ feet Surface owner consultation date _____

OTHER CHANGES

☐ **REMOVE FROM SURFACE BOND** Signed surface use agreement is a required attachment

☐ **CHANGE OF WELL, FACILITY OR OIL & GAS LOCATION NAME OR NUMBER**

From: Name BENJAMIN FEDERAL Number 28-12B2 (K28NW) Effective Date: _____

To: Name _____ Number _____

☐ **ABANDON PERMIT: Permit can only be abandoned if the permitted operation has NOT been conducted. Field inspection will be conducted to verify site status.**

☐ WELL: Abandon Application for Permit-to-Drill (Form2) – Well API Number _____ has not been drilled.

☐ PIT: Abandon Earthen Pit Permit (Form 15) – COGCC Pit Facility ID Number _____ has not been constructed (Permitted and constructed pit requires closure per Rule 905)

☐ CENTRALIZED E&P WASTE MANAGEMENT FACILITY: Abandon Centralized E&P Waste Management Facility Permit (Form 28) – Facility ID Number _____ has not been constructed (Constructed facility requires closure per Rule 908)

OIL & GAS LOCATION ID Number: _____

☐ Abandon Oil & Gas Location Assessment (Form 2A) – Location has not been constructed and site will not be used in the future.

☐ Keep Oil & Gas Location Assessment (Form 2A) active until expiration date. This site will be used in the future.

Surface disturbance from Oil and Gas Operations must be reclaimed per Rule 1003 and Rule 1004.

☐ **REQUEST FOR CONFIDENTIAL STATUS**

☐ **DIGITAL WELL LOG UPLOAD**

☐ **DOCUMENTS SUBMITTED** Purpose of Submission: _____

RECLAMATION

INTERIM RECLAMATION

☐ Interim Reclamation will commence approximately _____

Per Rule 1003.e.(3) operator shall submit Sundry Notice reporting interim reclamation is complete and site is ready for inspection when vegetation reaches 80% coverage.

☐ Interim reclamation complete, site ready for inspection.

Per Rule 1003.e(3) describe interim reclamation procedure in Comments below or provide as an attachment and attach required location photographs.

Field inspection will be conducted to document Rule 1003.e. compliance

FINAL RECLAMATION

☐ Final Reclamation will commence approximately _____

Per Rule 1004.c.(4) operator shall submit Sundry Notice reporting final reclamation is complete and site is ready for inspection when vegetation reaches 80% coverage.

☐ Final reclamation complete, site ready for inspection. Per Rule 1004.c(4) describe final reclamation procedure in Comments below or provide as an attachment.

Field inspection will be conducted to document Rule 1004.c. compliance

Comments:

ENGINEERING AND ENVIRONMENTAL WORK

☐ NOTICE OF CONTINUED TEMPORARILY ABANDONED STATUS

Indicate why the well is temporarily abandoned and describe future plans for utilization in the COMMENTS box below or provide as an attachment, as required by Rule 319.b.(3).

Date well temporarily abandoned _____ Has Production Equipment been removed from site? _____

Mechanical Integrity Test (MIT) required if shut in longer than 2 years. Date of last MIT _____

☐ SPUD DATE: _____

TECHNICAL ENGINEERING AND ENVIRONMENTAL WORK

Details of work must be described in full in the COMMENTS below or provided as an attachment.

☐ NOTICE OF INTENT Approximate Start Date _____

☒ REPORT OF WORK DONE Date Work Completed 10/30/2014

- | | | |
|--|---|--|
| <input type="checkbox"/> Intent to Recomplete (Form 2 also required) | <input type="checkbox"/> Request to Vent or Flare | <input type="checkbox"/> E&P Waste Mangement Plan |
| <input type="checkbox"/> Change Drilling Plan | <input type="checkbox"/> Repair Well | <input type="checkbox"/> Beneficial Reuse of E&P Waste |
| <input type="checkbox"/> Gross Interval Change | <input type="checkbox"/> Rule 502 variance requested. Must provide detailed info regarding request. | |
| <input checked="" type="checkbox"/> Other <u>cuttings disposal</u> | <input type="checkbox"/> Status Update/Change of Remediation Plans for Spills and Releases | |

COMMENTS:

This form is being submitted to document onsite cuttings disposal. See attachments for lab summaries, site diagrams, and description of work completed.

Attention Carlos Lujan.

H2S REPORTING

Data Fields in this section are intended to document Sample and Location Data associated with the collection of a Gas Sample that is submitted for Laboratory Analysis.

Gas Analysis Report must be attached.

H2S Concentration: _____ in ppm (parts per million) Date of Measurement or Sample Collection _____

Description of Sample Point:

Absolute Open Flow Potential _____ in CFPD (cubic feet per day)

Description of Release Potential and Duration (If flow is not open to the atmosphere, identify the duration in which the container or pipeline would likely be opened for servicing operations.):

Distance to nearest occupied residence, school, church, park, school bus stop, place of business, or other areas where the public could reasonably be expected to frequent: _____

Distance to nearest Federal, State, County, or municipal road or highway owned and principally maintained for public use: _____

COMMENTS:

--

Best Management Practices

No BMP/COA Type

Description

--	--	--

Operator Comments:

This form is being submitted to document onsite cuttings disposal. See attachments for lab summaries, site diagrams, and description of work completed.

Attention Carlos Lujan.

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

Signed: _____

Print Name: Chris Hines

Title: Environmental Specialist

Email: chris.hines@encana.com

Date: _____

Based on the information provided herein, this Sundry Notice (Form 4) complies with COGCC Rules and applicable orders and is hereby approved.

COGCC Approved:

Date:

CONDITIONS OF APPROVAL, IF ANY:

General Comments

User Group

Comment

Comment Date

--	--	--

Total: 0 comment(s)

Attachment Check List

Att Doc Num

Name

400745035	FORM 4 SUBMITTED
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Total Attach: 1 Files

K28NW Cuttings Disposal (Form 4)
(Location ID – 335428)

Encana Oil & Gas (USA) Inc. (Encana) is submitting this Sundry Notice to document the onsite disposal of drill cuttings which exceed allowable levels for several of the inorganic constituents of concern identified in the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1. Included in the Sundry is a general description of the onsite disposition of the material, a characterization of the material, and the regulatory justification for disposal of material with elevated inorganic constituent levels.

The K28NW well pad is not found within any of the COGCC 317B, Public Water System Protection areas. The location is not within a sensitive area, and according to the soil survey in this area, there is no zone of water saturation within 80 inches of the surface.

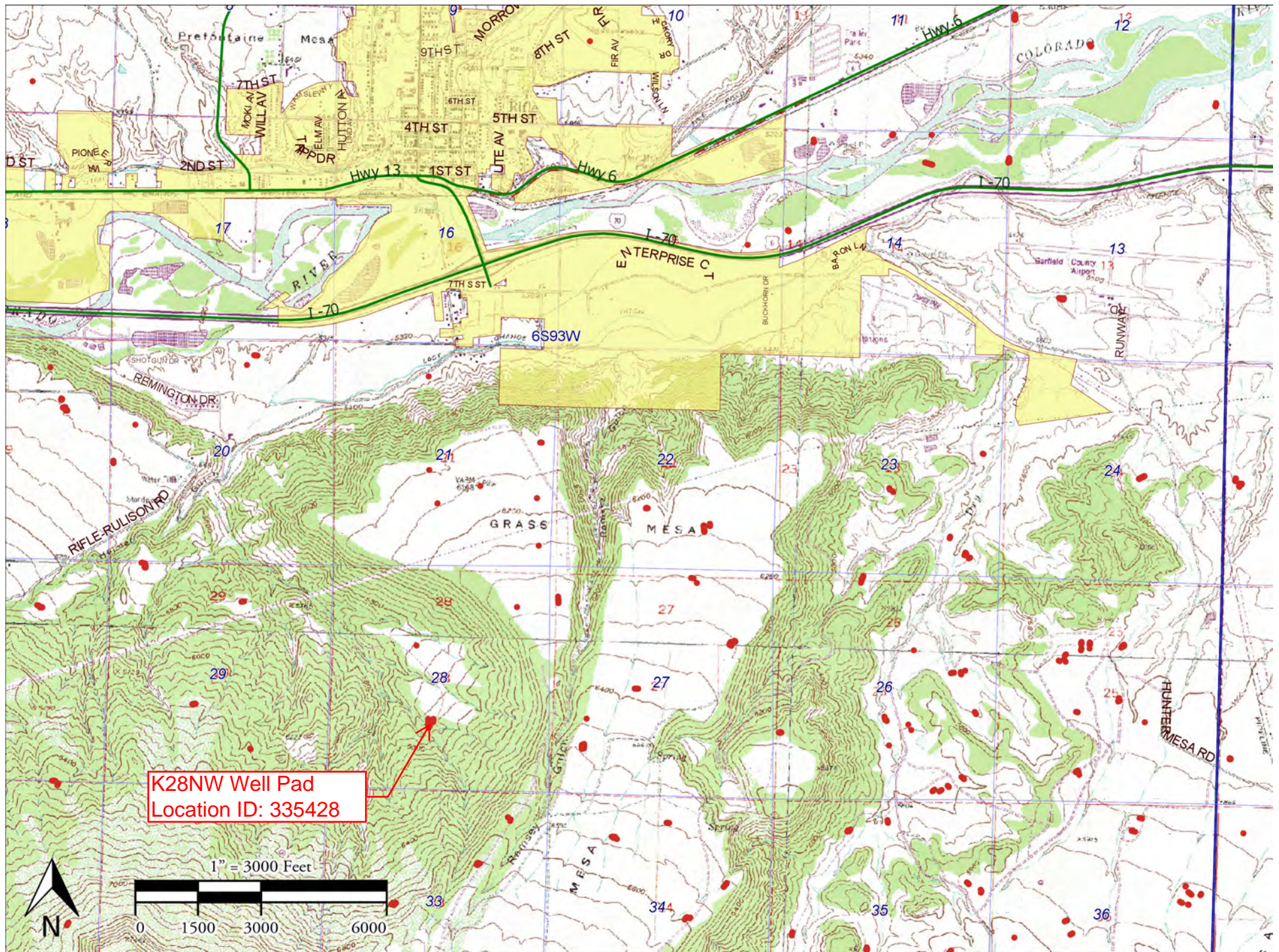
REPORT OF WORK COMPLETED

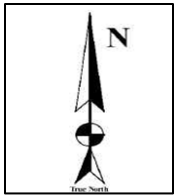
In accordance with COGCC Rule 907 for the management of exploration and production (E&P) waste, Encana collects representative samples of drill cuttings on each of its locations for the purpose of comparing constituent levels to the allowable limits identified by the COGCC. All samples collected on behalf of Encana's Parachute Field Office are collected and documented in accordance with the Environmental Department's Sampling Procedure. Area background samples are also collected to establish a baseline for naturally occurring concentrations/levels for Arsenic and other constituents of concern. Laboratory results are presented in the attached summary table, and are also provided in the attached laboratory reports.

Encana disposed of approximately 8,300 cubic yards of cuttings from 13 wells on the K28NW well pad. For stabilization purposes the cuttings were blended with sawdust. The stabilized cuttings were buried in a vault on the east side of the pad along the length of the cutslope. Before burial, seven (7) representative 5-point composite samples were collected for characterization: one (1) composite of both stockpiles in June, 2011; and six (6) composite samples (three (3) from each stockpile) in June, 2014 to conform to updated Encana sampling procedures. Sample results indicate that the drill cuttings on the K28NW well pad have exceedances of COGCC Table 910-1 allowable concentrations for arsenic (3.8 – 7.7 ppm), Sodium Adsorption Ratio [SAR] (14 – 30), and pH (9.1 – 9.3). Though the arsenic concentration in the drill cuttings is above the allowable concentration identified in Table 910-1, the concentration is within the range of arsenic background values in this area. Based on these results and footnote 1 to COGCC Table 910-1, Encana requests that the COGCC consider the higher range of background arsenic value(s) as the allowable concentration for this constituent. Also, to assure successful reclamation of the pad, and to comply with the intent of the COGCC 1000 Series Rules for handling of material with elevated levels of SAR and pH, the cuttings were buried under approximately five feet (5') of clean native fill and topsoil.

Attachments: Topographic Location Map
Site Diagram - Onsite Cuttings Disposal
Laboratory Results Summary Table(s)
Cuttings Laboratory Report(s)

K28NW Well Pad Location



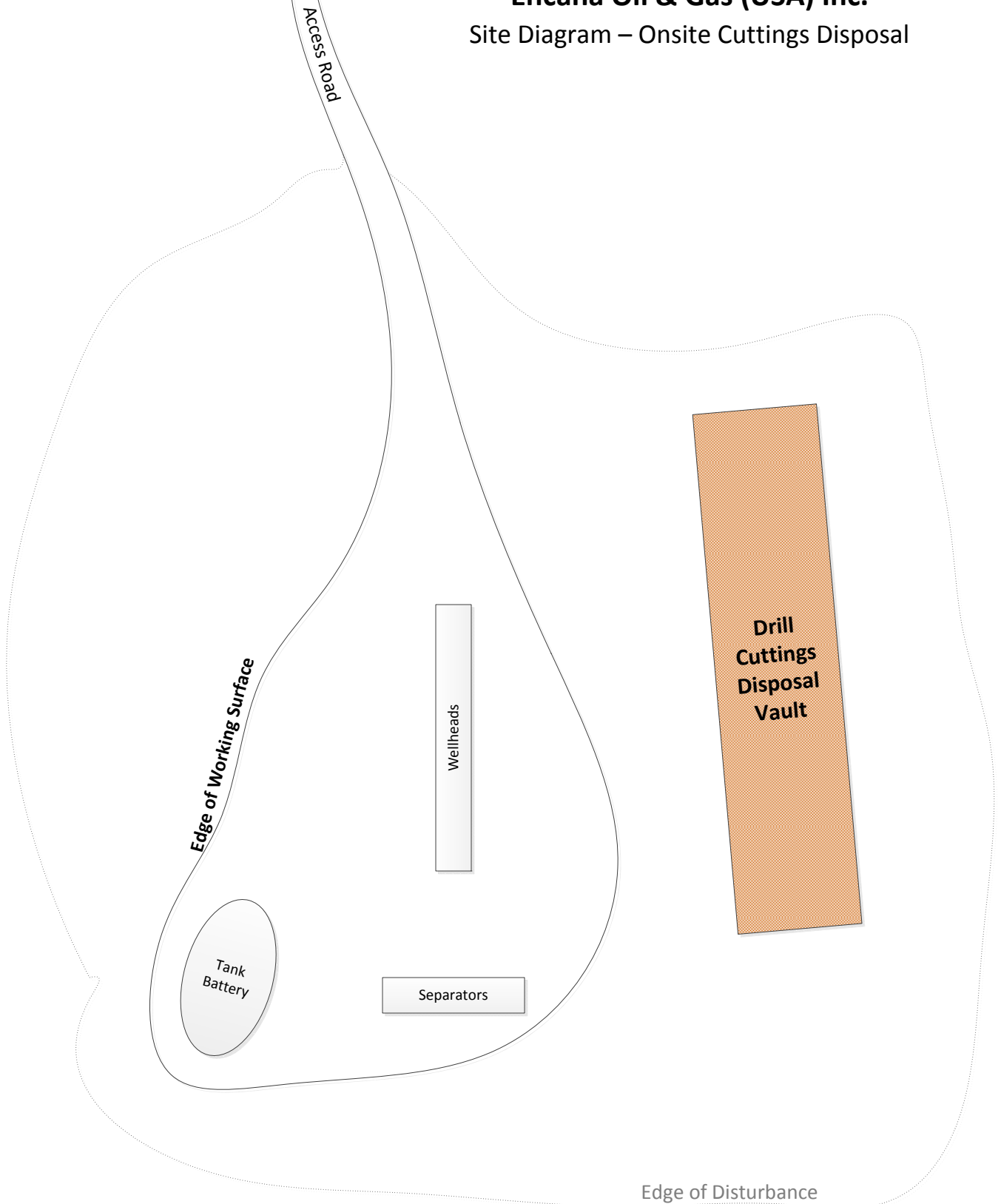


K28NW Well Pad (Mamm Creek Field)

COGCC Location ID: 335428

NESW, Section 28, T6S-R93W

Encana Oil & Gas (USA) Inc.
Site Diagram – Onsite Cuttings Disposal



Allowable Concentration -->				Organic Compounds in Soil (mg/kg [ppm])																		Inorganics in Soil			Metals in Soil (mg/kg [ppm])														
Location	Sample Date:	Sample Matrix	Matrix Notes	500			0.17	85	100	175	1000	1000	0.22	0.22	2.2	0.022	22	0.022	1000	1000	0.22	23	1000		<12	(6-9)		0.39	15000	70	120000	23	3100	400	23	1600	390	390	23000
				TPH (total volatile and extractable petroleum hydrocarbons)	TPH-GRO (C6-C10) Low Fraction	TPH-DRO (C10-C36) High Fraction	Benzene	Toluene	Ethylbenzene	Xylenes - total	Acenaphthene	Anthracene	Benzo(A)anthracene	Benzo(B)fluoranthene	Benzo(K)fluoranthene	Benzo(A)pyrene	Chrysene	Dibenzo(A,H)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-C,D)pyrene	Naphthalene	Pyrene	EC (<4 mmhos/cm or 2x background)	SAR (calculation)	pH	Arsenic	Barium - EPA Total Barium	Cadmium	Chromium (III)	Chromium (VI)	Copper	Lead (inorganic)	Mercury	Nickel (soluble salts)	Selenium	Silver	Zinc	
K28NW	06/28/11	Cuttings	characterization	411.7	1.7	410	BDL	BDL	BDL	BDL	0.015	BDL	BDL	0.0088	BDL	0.007	0.014	BDL	0.016	0.051	BDL	0.15	0.018	1.4	30	9.1	3.8	6300	1.4	BDL	17	7.3	0.035	7.7	BDL	BDL	39		
K28NW	06/18/14	Cuttings	stockpile 1 composite 1	4.5	BDL	4.5	BDL	BDL	BDL	BDL	0.007	BDL	BDL	BDL	BDL	BDL	0.017	BDL	BDL	0.015	BDL	0.089	0.062	1.3	18	9.3	4.5	9200	BDL	12	BDL	14	6.7	0.042	8	2.5	BDL	32	
K28NW	06/18/14	Cuttings	stockpile 1 composite 2	7.6	BDL	7.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0086	BDL	BDL	0.011	BDL	0.074	0.0061	1.4	20	9.2	3.8	9700	BDL	10	BDL	12	5.8	0.041	6.7	3.2	BDL	29	
K28NW	06/18/14	Cuttings	stockpile 1 composite 3	18	BDL	18	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0065	BDL	BDL	0.0078	BDL	0.051	BDL	1.5	21	9	5	9000	BDL	12	BDL	14	7.9	0.036	10	2.8	BDL	39	
K28NW	06/18/14	Cuttings	stockpile 2 composite 1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.034	BDL	1.3	17	8.7	6.8	9300	0.56	16	BDL	15	9.1	0.027	14	2.6	BDL	45	
K28NW	06/18/14	Cuttings	stockpile 2 composite 2	16	BDL	16	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.0066	BDL	0.048	0.0086	1.5	20	8.7	7.2	8200	0.62	15	BDL	16	8.9	0.024	14	3	BDL	54	
K28NW	06/18/14	Cuttings	stockpile 2 composite 3	36	BDL	36	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.006	0.0092	BDL	0.061	0.013	1.4	14	8.6	7.7	8000	0.64	16	BDL	15	9.7	0.026	15	2.8	BDL	50



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

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

Report Summary

Thursday July 07, 2011

Report Number: L523961

Samples Received: 07/01/11

Client Project:

Description: K28NW-Cuttings

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

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.

This report may not be reproduced, except in full, without written approval from ESC Lab Sciences. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

REPORT OF ANALYSIS

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

July 07, 2011

Date Received : July 01, 2011
Description : K28NW-Cuttings
Sample ID : K28NW-CUT-062811 12-14IN
Collected By : Brennen Graff
Collection Date : 06/28/11 08:06

ESC Sample # : L523961-01

Site ID : K28NW

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	07/07/11	1
Chromium, Trivalent	13.	0.50	mg/kg	Calc.	07/03/11	1
ORP	57.		mV	2580	07/05/11	1
pH	9.1		su	9045D	07/06/11	1
Sodium Adsorption Ratio	30.			Calc.	07/05/11	1
Specific Conductance	1400		umhos/cm	9050AMod	07/06/11	1
Mercury	0.035	0.020	mg/kg	7471	07/02/11	1
Arsenic	3.8	1.0	mg/kg	6010B	07/03/11	1
Barium	6300	1.2	mg/kg	6010B	07/04/11	5
Cadmium	1.4	0.25	mg/kg	6010B	07/03/11	1
Chromium	13.	0.50	mg/kg	6010B	07/03/11	1
Copper	17.	1.0	mg/kg	6010B	07/03/11	1
Lead	7.3	0.25	mg/kg	6010B	07/03/11	1
Nickel	7.7	1.0	mg/kg	6010B	07/03/11	1
Selenium	BDL	1.0	mg/kg	6010B	07/03/11	1
Silver	BDL	0.50	mg/kg	6010B	07/03/11	1
Zinc	39.	1.5	mg/kg	6010B	07/03/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	07/02/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	07/02/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	07/02/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	07/02/11	5
TPH (GC/FID) Low Fraction	1.7	0.50	mg/kg	GRO	07/02/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.7		% Rec.	8021/8015	07/02/11	5
a,a,a-Trifluorotoluene(PID)	104.		% Rec.	8021/8015	07/02/11	5
TPH (GC/FID) High Fraction	410	80.	mg/kg	3546/DRO	07/07/11	20
Surrogate recovery(%)						
o-Terphenyl	0.00		% Rec.	3546/DRO	07/07/11	20
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	07/05/11	1
Acenaphthene	0.015	0.0060	mg/kg	8270C-SIM	07/05/11	1
Acenaphthylene	0.0063	0.0060	mg/kg	8270C-SIM	07/05/11	1
Benzo(a)anthracene	BDL	0.012	mg/kg	8270C-SIM	07/06/11	2
Benzo(a)pyrene	0.0070	0.0060	mg/kg	8270C-SIM	07/05/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L523961-01 (PH) - 9.1@20.3c



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REPORT OF ANALYSIS

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

July 07, 2011

Date Received : July 01, 2011
Description : K28NW-Cuttings
Sample ID : K28NW-CUT-062811 12-14IN
Collected By : Brennen Graff
Collection Date : 06/28/11 08:06

ESC Sample # : L523961-01

Site ID : K28NW

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	0.0088	0.0060	mg/kg	8270C-SIM	07/05/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	07/05/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	07/05/11	1
Chrysene	0.014	0.012	mg/kg	8270C-SIM	07/06/11	2
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	07/05/11	1
Fluoranthene	0.016	0.0060	mg/kg	8270C-SIM	07/05/11	1
Fluorene	0.051	0.0060	mg/kg	8270C-SIM	07/05/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	07/05/11	1
Naphthalene	0.15	0.0060	mg/kg	8270C-SIM	07/05/11	1
Phenanthrene	0.11	0.0060	mg/kg	8270C-SIM	07/05/11	1
Pyrene	0.018	0.012	mg/kg	8270C-SIM	07/06/11	2
1-Methylnaphthalene	0.11	0.0060	mg/kg	8270C-SIM	07/05/11	1
2-Methylnaphthalene	0.32	0.0060	mg/kg	8270C-SIM	07/05/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	07/05/11	1
Surrogate Recovery						
Nitrobenzene-d5	140.		% Rec.	8270C-SIM	07/05/11	1
2-Fluorobiphenyl	65.6		% Rec.	8270C-SIM	07/05/11	1
p-Terphenyl-d14	142.		% Rec.	8270C-SIM	07/06/11	2

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: 07/07/11 17:00 Printed: 07/07/11 17:12
L523961-01 (PH) - 9.1@20.3c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L523961-01	WG544038	SAMP	Nitrobenzene-d5	R1750051	J1
	WG543965	SAMP	pH	R1750929	J3
	WG543797	SAMP	o-Terphenyl	R1751570	J7

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits
J3	The associated batch QC was outside the established quality control range for precision.
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.



YOUR LAB OF CHOICE

EnCana Oil & Gas Inc. - CO
Chris Hines
2717 County Road 215, Suite 100

Parachute, CO 81635

Quality Assurance Report
Level II

L523961

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

July 07, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Benzene	< .0005	mg/kg			WG543856	07/02/11 04:08
Ethylbenzene	< .0005	mg/kg			WG543856	07/02/11 04:08
Toluene	< .005	mg/kg			WG543856	07/02/11 04:08
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG543856	07/02/11 04:08
Total Xylene	< .0015	mg/kg			WG543856	07/02/11 04:08
a,a,a-Trifluorotoluene(FID)		% Rec.	99.22	59-128	WG543856	07/02/11 04:08
a,a,a-Trifluorotoluene(PID)		% Rec.	104.3	54-144	WG543856	07/02/11 04:08
Mercury	< .02	mg/kg			WG543756	07/02/11 11:34
Arsenic	< 1	mg/kg			WG543894	07/03/11 17:01
Barium	< .25	mg/kg			WG543894	07/03/11 17:01
Cadmium	< .25	mg/kg			WG543894	07/03/11 17:01
Chromium	< .5	mg/kg			WG543894	07/03/11 17:01
Copper	< 1	mg/kg			WG543894	07/03/11 17:01
Lead	< .25	mg/kg			WG543894	07/03/11 17:01
Nickel	< 1	mg/kg			WG543894	07/03/11 17:01
Selenium	< 1	mg/kg			WG543894	07/03/11 17:01
Silver	< .5	mg/kg			WG543894	07/03/11 17:01
Zinc	< 1.5	mg/kg			WG543894	07/03/11 17:01
1-Methylnaphthalene	< .006	mg/kg			WG544038	07/05/11 11:27
2-Chloronaphthalene	< .006	mg/kg			WG544038	07/05/11 11:27
2-Methylnaphthalene	< .006	mg/kg			WG544038	07/05/11 11:27
Acenaphthene	< .006	mg/kg			WG544038	07/05/11 11:27
Acenaphthylene	< .006	mg/kg			WG544038	07/05/11 11:27
Anthracene	< .006	mg/kg			WG544038	07/05/11 11:27
Benzo(a)anthracene	< .006	mg/kg			WG544038	07/05/11 11:27
Benzo(a)pyrene	< .006	mg/kg			WG544038	07/05/11 11:27
Benzo(b)fluoranthene	< .006	mg/kg			WG544038	07/05/11 11:27
Benzo(g,h,i)perylene	< .006	mg/kg			WG544038	07/05/11 11:27
Benzo(k)fluoranthene	< .006	mg/kg			WG544038	07/05/11 11:27
Chrysene	< .006	mg/kg			WG544038	07/05/11 11:27
Dibenz(a,h)anthracene	< .006	mg/kg			WG544038	07/05/11 11:27
Fluoranthene	< .006	mg/kg			WG544038	07/05/11 11:27
Fluorene	< .006	mg/kg			WG544038	07/05/11 11:27
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG544038	07/05/11 11:27
Naphthalene	< .006	mg/kg			WG544038	07/05/11 11:27
Phenanthrene	< .006	mg/kg			WG544038	07/05/11 11:27
Pyrene	< .006	mg/kg			WG544038	07/05/11 11:27
2-Fluorobiphenyl		% Rec.	85.54	21-120	WG544038	07/05/11 11:27
Nitrobenzene-d5		% Rec.	83.85	33-114	WG544038	07/05/11 11:27
p-Terphenyl-d14		% Rec.	90.58	18-142	WG544038	07/05/11 11:27
pH	4.50	su			WG543965	07/06/11 13:34
Specific Conductance	0.560	umhos/cm			WG544228	07/06/11 18:17
TPH (GC/FID) High Fraction	< 4	ppm			WG543797	07/06/11 19:07
o-Terphenyl		% Rec.	75.64	50-150	WG543797	07/06/11 19:07
Chromium,Hexavalent	< 2	mg/kg			WG543815	07/07/11 12:08

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Tax I.D. 62-0814289

Est. 1970

July 07, 2011

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Mercury	mg/kg	0	0	0	20	L523905-01	WG543756
Arsenic	mg/kg	8.60	10.2	17.4	20	L523884-01	WG543894
Barium	mg/kg	37.0	40.0	8.33	20	L523884-01	WG543894
Chromium	mg/kg	8.00	9.29	14.3	20	L523884-01	WG543894
Copper	mg/kg	25.0	28.4	11.9	20	L523884-01	WG543894
Lead	mg/kg	78.0	54.2	36.1*	20	L523884-01	WG543894
Nickel	mg/kg	12.0	14.6	16.3	20	L523884-01	WG543894
Silver	mg/kg	0	0.0552	NA	20	L523884-01	WG543894
Zinc	mg/kg	39.0	51.4	26.4*	20	L523884-01	WG543894
Cadmium	mg/kg	0	0	0	20	L523884-01	WG543894
Selenium	mg/kg	16.0	0	NA	20	L523884-01	WG543894
ORP	mV	84.0	82.0	2.41	20	L523950-01	WG544078
ORP	mV	110.	110.	0.913	20	L524165-08	WG544078
pH	su	6.60	6.50	1.53*	1	L523669-09	WG543965
pH	su	9.00	9.10	1.10*	1	L523961-01	WG543965
Specific Conductance	umhos/cm	2500	2700	9.22	20	L523742-01	WG544228
Specific Conductance	umhos/cm	1800	1800	2.19	20	L524092-01	WG544228
Chromium, Hexavalent	mg/kg	0	0	0	20	L523961-01	WG543815
Chromium, Hexavalent	mg/kg	0	0	0	20	L523604-01	WG543815

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Benzene	mg/kg	.05	0.0485	96.9	76-113	WG543856
Ethylbenzene	mg/kg	.05	0.0462	92.4	78-115	WG543856
Toluene	mg/kg	.05	0.0473	94.6	76-114	WG543856
Total Xylene	mg/kg	.15	0.142	94.7	81-118	WG543856
a,a,a-Trifluorotoluene(PID)				103.2	54-144	WG543856
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.15	93.6	67-135	WG543856
a,a,a-Trifluorotoluene(FID)				110.1	59-128	WG543856
Mercury	mg/kg	8.77	8.15	92.9	71.6-127.7	WG543756
Arsenic	mg/kg	192	184.	95.8	78.6-120.8	WG543894
Barium	mg/kg	420	412.	98.1	78.8-121.4	WG543894
Cadmium	mg/kg	70.1	66.6	95.0	78.5-121.5	WG543894
Chromium	mg/kg	168	166.	98.8	80.4-120.2	WG543894
Copper	mg/kg	122	126.	103.	81.6-119.7	WG543894
Lead	mg/kg	113	110.	97.3	77.3-122.1	WG543894
Nickel	mg/kg	74.1	71.5	96.5	78.8-121.2	WG543894
Selenium	mg/kg	176	165.	93.8	75.6-125.0	WG543894
Silver	mg/kg	115	110.	95.7	66-133.9	WG543894
Zinc	mg/kg	437	439.	100.	78.5-121.7	WG543894
ORP	mV	229	220.	96.1	95.6-104.37	WG544078

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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
1-Methylnaphthalene	mg/kg	.033	0.0288	87.3	41-110	WG544038
2-Chloronaphthalene	mg/kg	.033	0.0296	89.8	43-109	WG544038
2-Methylnaphthalene	mg/kg	.033	0.0285	86.5	38-104	WG544038
Acenaphthene	mg/kg	.033	0.0281	85.1	48-103	WG544038
Acenaphthylene	mg/kg	.033	0.0288	87.3	43-106	WG544038
Anthracene	mg/kg	.033	0.0298	90.2	51-110	WG544038
Benzo(a)anthracene	mg/kg	.033	0.0278	84.1	38-126	WG544038
Benzo(a)pyrene	mg/kg	.033	0.0310	93.9	47-118	WG544038
Benzo(b)fluoranthene	mg/kg	.033	0.0321	97.3	47-118	WG544038
Benzo(g,h,i)perylene	mg/kg	.033	0.0303	91.7	40-125	WG544038
Benzo(k)fluoranthene	mg/kg	.033	0.0297	90.0	45-121	WG544038
Chrysene	mg/kg	.033	0.0311	94.2	35-135	WG544038
Dibenz(a,h)anthracene	mg/kg	.033	0.0296	89.7	41-124	WG544038
Fluoranthene	mg/kg	.033	0.0314	95.1	50-114	WG544038
Fluorene	mg/kg	.033	0.0291	88.2	49-109	WG544038
Indeno(1,2,3-cd)pyrene	mg/kg	.033	0.0301	91.2	40-126	WG544038
Naphthalene	mg/kg	.033	0.0276	83.7	36-100	WG544038
Phenanthrene	mg/kg	.033	0.0298	90.3	46-108	WG544038
Pyrene	mg/kg	.033	0.0294	89.0	30-136	WG544038
2-Fluorobiphenyl				88.82	33-114	WG544038
Nitrobenzene-d5				86.70	21-120	WG544038
p-Terphenyl-d14				89.98	18-142	WG544038
pH	su	6.3	6.30	100.	97.98-102.02	WG543965
Specific Conductance	umhos/cm	445	440.	98.9	85-115	WG544228
TPH (GC/FID) High Fraction	ppm	60	48.3	80.5	50-150	WG543797
o-Terphenyl				77.62	50-150	WG543797
Chromium,Hexavalent	mg/kg	132	90.6	68.6	50-150	WG543815

Analyte	Units	Laboratory Control Sample Duplicate		%Rec	Limit	RPD	Limit	Batch
		Result	Ref					
Benzene	mg/kg	0.0493	0.0485	99.0	76-113	1.78	20	WG543856
Ethylbenzene	mg/kg	0.0473	0.0462	95.0	78-115	2.40	20	WG543856
Toluene	mg/kg	0.0476	0.0473	95.0	76-114	0.780	20	WG543856
Total Xylene	mg/kg	0.144	0.142	96.0	81-118	1.18	20	WG543856
a,a,a-Trifluorotoluene(PID)				104.0	54-144			WG543856
TPH (GC/FID) Low Fraction	mg/kg	5.18	5.15	94.0	67-135	0.570	20	WG543856
a,a,a-Trifluorotoluene(FID)				110.9	59-128			WG543856
ORP	mV	220.	220.	96.0	95.6-104.37	0	20	WG544078
1-Methylnaphthalene	mg/kg	0.0249	0.0288	75.0	41-110	14.6	24	WG544038
2-Chloronaphthalene	mg/kg	0.0249	0.0296	76.0	43-109	17.2	21	WG544038
2-Methylnaphthalene	mg/kg	0.0244	0.0285	74.0	38-104	15.6	24	WG544038
Acenaphthene	mg/kg	0.0254	0.0281	77.0	48-103	9.93	20	WG544038
Acenaphthylene	mg/kg	0.0257	0.0288	78.0	43-106	11.3	20	WG544038
Anthracene	mg/kg	0.0278	0.0298	84.0	51-110	6.67	22	WG544038
Benzo(a)anthracene	mg/kg	0.0261	0.0278	79.0	38-126	6.16	20	WG544038

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Analyte	Units	Laboratory Control		Sample Duplicate		Limit	RPD	Limit	Batch
		Result	Ref	%Rec					
Benzo(a)pyrene	mg/kg	0.0288	0.0310	87.0		47-118	7.47	20	WG544038
Benzo(b)fluoranthene	mg/kg	0.0279	0.0321	84.0		47-118	14.1	29	WG544038
Benzo(g,h,i)perylene	mg/kg	0.0283	0.0303	86.0		40-125	6.75	20	WG544038
Benzo(k)fluoranthene	mg/kg	0.0301	0.0297	91.0		45-121	1.21	31	WG544038
Chrysene	mg/kg	0.0290	0.0311	88.0		35-135	6.98	20	WG544038
Dibenz(a,h)anthracene	mg/kg	0.0279	0.0296	85.0		41-124	5.77	20	WG544038
Fluoranthene	mg/kg	0.0292	0.0314	88.0		50-114	7.29	20	WG544038
Fluorene	mg/kg	0.0263	0.0291	80.0		49-109	10.2	19	WG544038
Indeno(1,2,3-cd)pyrene	mg/kg	0.0280	0.0301	85.0		40-126	7.21	20	WG544038
Naphthalene	mg/kg	0.0232	0.0276	70.0		36-100	17.5	24	WG544038
Phenanthrene	mg/kg	0.0271	0.0298	82.0		46-108	9.58	21	WG544038
Pyrene	mg/kg	0.0280	0.0294	85.0		30-136	4.93	20	WG544038
2-Fluorobiphenyl				79.03		33-114			WG544038
Nitrobenzene-d5				72.19		21-120			WG544038
p-Terphenyl-d14				85.89		18-142			WG544038
pH	su	6.30	6.30	100.		97.98-102.02	0	20	WG543965
Specific Conductance	umhos/	440.	440.	99.0		85-115	0	20	WG544228
TPH (GC/FID) High Fraction	ppm	46.0	48.3	77.0		50-150	4.81	25	WG543797
o-Terphenyl				76.05		50-150			WG543797
Chromium, Hexavalent	mg/kg	107.	90.6	81.0		50-150	16.6	20	WG543815

Analyte	Units	Matrix Spike		TV	% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res					
TPH (GC/FID) Low Fraction	mg/kg	23.1	0	5.5	83.9	55-109	L523954-01	WG543856
a,a,a-Trifluorotoluene(FID)					108.2	59-128		WG543856
Mercury	mg/kg	0.246	0	.25	98.4	70-130	L523905-01	WG543756
Arsenic	mg/kg	57.8	10.2	50	95.2	75-125	L523884-01	WG543894
Barium	mg/kg	80.6	40.0	50	81.2	75-125	L523884-01	WG543894
Chromium	mg/kg	55.2	9.29	50	91.8	75-125	L523884-01	WG543894
Copper	mg/kg	77.7	28.4	50	98.6	75-125	L523884-01	WG543894
Lead	mg/kg	103.	54.2	50	97.6	75-125	L523884-01	WG543894
Nickel	mg/kg	58.5	14.6	50	87.8	75-125	L523884-01	WG543894
Silver	mg/kg	51.3	0.0552	50	102.	75-125	L523884-01	WG543894
Zinc	mg/kg	82.4	51.4	50	62.0*	75-125	L523884-01	WG543894
Cadmium	mg/kg	50.6	0	10	101.	75-125	L523884-01	WG543894
Selenium	mg/kg	67.6	0	10	135.*	75-125	L523884-01	WG543894
Benzene	mg/kg	0.237	0	.05	94.8	32-137	L523954-01	WG543856
Ethylbenzene	mg/kg	0.227	0	.05	90.6	10-150	L523954-01	WG543856
Toluene	mg/kg	0.251	0	.05	100.	20-142	L523954-01	WG543856
Total Xylene	mg/kg	0.658	0	.15	87.7	16-141	L523954-01	WG543856
1-Methylnaphthalene	mg/kg	0.0268	0	.033	81.3	19-131	L523592-02	WG544038
2-Chloronaphthalene	mg/kg	0.0353	0	.033	107.	38-117	L523592-02	WG544038

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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
2-Methylnaphthalene	mg/kg	0.0312	0	.033	94.5	18-125	L523592-02	WG544038
Acenaphthene	mg/kg	0.0270	0	.033	81.9	31-120	L523592-02	WG544038
Acenaphthylene	mg/kg	0.0378	0	.033	115.	34-116	L523592-02	WG544038
Anthracene	mg/kg	0.0384	0	.033	116.	32-131	L523592-02	WG544038
Benzo(a)anthracene	mg/kg	0.0333	0	.033	101.	32-131	L523592-02	WG544038
Benzo(a)pyrene	mg/kg	0.0305	0	.033	92.3	28-130	L523592-02	WG544038
Benzo(b)fluoranthene	mg/kg	0.0337	0	.033	102.	37-130	L523592-02	WG544038
Benzo(g,h,i)perylene	mg/kg	0.0299	0	.033	90.7	10-134	L523592-02	WG544038
Benzo(k)fluoranthene	mg/kg	0.0289	0	.033	87.7	31-129	L523592-02	WG544038
Chrysene	mg/kg	0.0360	0	.033	109.	25-137	L523592-02	WG544038
Dibenz(a,h)anthracene	mg/kg	0.0290	0	.033	88.0	20-134	L523592-02	WG544038
Fluoranthene	mg/kg	0.0281	0.0210	.033	21.6*	27-138	L523592-02	WG544038
Fluorene	mg/kg	0.0370	0	.033	112.	26-136	L523592-02	WG544038
Indeno(1,2,3-cd)pyrene	mg/kg	0.0297	0	.033	90.2	16-135	L523592-02	WG544038
Naphthalene	mg/kg	0.0278	0	.033	84.4	22-121	L523592-02	WG544038
Phenanthrene	mg/kg	0.0363	0	.033	110.	27-133	L523592-02	WG544038
Pyrene	mg/kg	0.0922	0	.033	279.*	22-133	L523592-02	WG544038
2-Fluorobiphenyl					84.22	33-114		WG544038
Nitrobenzene-d5					95.25	21-120		WG544038
p-Terphenyl-d14					111.4	18-142		WG544038
TPH (GC/FID) High Fraction	ppm	46.9	0	60	78.2	50-150	L523376-06	WG543797
o-Terphenyl					73.25	50-150		WG543797
TPH (GC/FID) High Fraction	ppm	46.9	0	60	78.1	50-150	L523376-08	WG543797
o-Terphenyl					75.31	50-150		WG543797
Chromium,Hexavalent	mg/kg	11.7	0	20	58.5	50-150	L523669-05	WG543815

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
TPH (GC/FID) Low Fraction	mg/kg	19.6	23.1	71.4	55-109	16.0	20	L523954-01	WG543856
a,a,a-Trifluorotoluene(FID)				107.0	59-128				WG543856
Mercury	mg/kg	0.258	0.246	103.	70-130	4.76	20	L523905-01	WG543756
Arsenic	mg/kg	54.6	57.8	88.8	75-125	5.69	20	L523884-01	WG543894
Barium	mg/kg	79.8	80.6	79.6	75-125	0.998	20	L523884-01	WG543894
Chromium	mg/kg	54.9	55.2	91.2	75-125	0.545	20	L523884-01	WG543894
Copper	mg/kg	95.2	77.7	134.*	75-125	20.2*	20	L523884-01	WG543894
Lead	mg/kg	179.	103.	250.*	75-125	53.9*	20	L523884-01	WG543894
Nickel	mg/kg	58.1	58.5	87.0	75-125	0.686	20	L523884-01	WG543894
Silver	mg/kg	48.2	51.3	96.3	75-125	6.23	20	L523884-01	WG543894
Zinc	mg/kg	97.5	82.4	92.2	75-125	16.8	20	L523884-01	WG543894
Cadmium	mg/kg	51.6	50.6	103.	75-125	1.96	20	L523884-01	WG543894
Selenium	mg/kg	62.4	67.6	125.	75-125	8.00	20	L523884-01	WG543894
Benzene	mg/kg	0.236	0.237	94.3	32-137	0.560	39	L523954-01	WG543856
Ethylbenzene	mg/kg	0.228	0.227	91.4	10-150	0.850	44	L523954-01	WG543856
Toluene	mg/kg	0.249	0.251	99.6	20-142	0.620	42	L523954-01	WG543856
Total Xylene	mg/kg	0.660	0.658	87.9	16-141	0.280	46	L523954-01	WG543856
1-Methylnaphthalene	mg/kg	0.0244	0.0268	74.0	19-131	9.40	30	L523592-02	WG544038

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



YOUR LAB OF CHOICE

EnCana Oil & Gas Inc. - CO
Chris Hines
2717 County Road 215, Suite 100
Parachute, CO 81635

Quality Assurance Report
Level II

L523961

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

Tax I.D. 62-0814289

Est. 1970

July 07, 2011

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref	Samp	Batch
			Ref	%Rec						
2-Chloronaphthalene	mg/kg	0.0296	0.0353	89.6	38-117	17.8	26	L523592-02		WG544038
2-Methylnaphthalene	mg/kg	0.0263	0.0312	79.6	18-125	17.1	29	L523592-02		WG544038
Acenaphthene	mg/kg	0.0245	0.0270	74.1	31-120	10.0	30	L523592-02		WG544038
Acenaphthylene	mg/kg	0.0316	0.0378	95.7	34-116	18.0	29	L523592-02		WG544038
Anthracene	mg/kg	0.0326	0.0384	98.7	32-131	16.4	26	L523592-02		WG544038
Benzo(a)anthracene	mg/kg	0.0300	0.0333	91.0	32-131	10.3	31	L523592-02		WG544038
Benzo(a)pyrene	mg/kg	0.0279	0.0305	84.6	28-130	8.68	28	L523592-02		WG544038
Benzo(b)fluoranthene	mg/kg	0.0291	0.0337	88.2	37-130	14.5	41	L523592-02		WG544038
Benzo(g,h,i)perylene	mg/kg	0.0282	0.0299	85.4	10-134	5.99	26	L523592-02		WG544038
Benzo(k)fluoranthene	mg/kg	0.0279	0.0289	84.6	31-129	3.65	42	L523592-02		WG544038
Chrysene	mg/kg	0.0322	0.0360	97.5	25-137	11.3	22	L523592-02		WG544038
Dibenz(a,h)anthracene	mg/kg	0.0269	0.0290	81.6	20-134	7.50	25	L523592-02		WG544038
Fluoranthene	mg/kg	0.0258	0.0281	14.4*	27-138	8.83	35	L523592-02		WG544038
Fluorene	mg/kg	0.0306	0.0370	92.8	26-136	18.7	30	L523592-02		WG544038
Indeno(1,2,3-cd)pyrene	mg/kg	0.0269	0.0297	81.5	16-135	10.1	26	L523592-02		WG544038
Naphthalene	mg/kg	0.0258	0.0278	78.1	22-121	7.71	30	L523592-02		WG544038
Phenanthrene	mg/kg	0.0344	0.0363	104.	27-133	5.38	36	L523592-02		WG544038
Pyrene	mg/kg	0.0709	0.0922	215.*	22-133	26.0	33	L523592-02		WG544038
2-Fluorobiphenyl				81.00	33-114					WG544038
Nitrobenzene-d5				84.50	21-120					WG544038
p-Terphenyl-d14				98.80	18-142					WG544038
TPH (GC/FID) High Fraction	ppm	46.9	46.9	78.2	50-150	0.0137	25	L523376-06		WG543797
o-Terphenyl				77.42	50-150					WG543797
TPH (GC/FID) High Fraction	ppm	47.9	46.9	79.8	50-150	2.22	25	L523376-08		WG543797
o-Terphenyl				74.30	50-150					WG543797
Chromium,Hexavalent	mg/kg	10.8	11.7	54.0	50-150	8.00	20	L523669-05		WG543815

Batch number /Run number / Sample number cross reference

WG543856: R1748609: L523961-01
WG543756: R1749136: L523961-01
WG543894: R1749329: L523961-01
WG543924: R1749618: L523961-01
WG544078: R1749997: L523961-01
WG544038: R1750051: L523961-01
WG543965: R1750929: L523961-01
WG544228: R1751493: L523961-01
WG543797: R1751570: L523961-01
WG543815: R1751731: L523961-01

* * 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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July 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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Chris Hines
EnCana Oil & Gas - Parachute, CO
143 Diamond Avenue
Parachute, CO 81635

Report Summary

Tuesday June 24, 2014

Report Number: L705488


Samples Received: 06/19/14

Client Project: K28NW

Description: K28NW Cuttings

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, IA Lab #364, EPA - TN002

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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT01-01
Collected By : Chance White
Collection Date : 06/18/14 12:00

ESC Sample # : L705488-01
Site ID : K28NW
Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	06/23/14	1
Chromium, Trivalent	12.	2.0	mg/kg	Calc.	06/24/14	1
ORP	40.		mV	2580 B-2011	06/24/14	1
pH	9.3		su	9045D	06/20/14	1
Sodium Adsorption Ratio	18.			Calc.	06/23/14	1
Specific Conductance	1300		umhos/cm	9050AMod	06/24/14	1
Mercury	0.042	0.020	mg/kg	7471	06/20/14	1
Arsenic	4.5	2.0	mg/kg	6010B	06/21/14	1
Barium	9200	2.5	mg/kg	6010B	06/21/14	5
Cadmium	BDL	0.50	mg/kg	6010B	06/21/14	1
Chromium	12.	1.0	mg/kg	6010B	06/21/14	1
Copper	14.	2.0	mg/kg	6010B	06/21/14	1
Lead	6.7	0.50	mg/kg	6010B	06/21/14	1
Nickel	8.0	2.0	mg/kg	6010B	06/21/14	1
Selenium	2.5	2.0	mg/kg	6010B	06/21/14	1
Silver	BDL	1.0	mg/kg	6010B	06/21/14	1
Zinc	32.	3.0	mg/kg	6010B	06/21/14	1
Benzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Toluene	BDL	0.025	mg/kg	8021	06/23/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/23/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/23/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.9		% Rec.	8021/8015	06/23/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	06/23/14	5
TPH (GC/FID) High Fraction	4.5	4.0	mg/kg	8015D/DRO	06/23/14	1
Surrogate recovery(%)						
o-Terphenyl	34.3		% Rec.	8015D/DRO	06/23/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthene	0.0069	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L705488-01 (PH) - 9.3 @ 22.0c
L705488-01 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT01-01
Collected By : Chance White
Collection Date : 06/18/14 12:00

ESC Sample # : L705488-01

Site ID : K28NW

Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Chrysene	0.017	0.0060	mg/kg	8270C-SIM	06/22/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluorene	0.015	0.0060	mg/kg	8270C-SIM	06/22/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Naphthalene	0.089	0.020	mg/kg	8270C-SIM	06/22/14	1
Phenanthrene	0.062	0.0060	mg/kg	8270C-SIM	06/22/14	1
Pyrene	0.0083	0.0060	mg/kg	8270C-SIM	06/22/14	1
1-Methylnaphthalene	0.046	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Methylnaphthalene	0.15	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
Surrogate Recovery						
p-Terphenyl-d14	92.8		% Rec.	8270C-SIM	06/22/14	1
Nitrobenzene-d5	76.4		% Rec.	8270C-SIM	06/22/14	1
2-Fluorobiphenyl	82.4		% Rec.	8270C-SIM	06/22/14	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: 06/24/14 16:39 Printed: 06/24/14 16:40

L705488-01 (PH) - 9.3 @ 22.0c

L705488-01 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT01-02
Collected By : Chance White
Collection Date : 06/18/14 12:30

ESC Sample # : L705488-02
Site ID : K28NW
Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	06/23/14	1
Chromium, Trivalent	10.	2.0	mg/kg	Calc.	06/24/14	1
ORP	40.		mV	2580 B-2011	06/24/14	1
pH	9.2		su	9045D	06/20/14	1
Sodium Adsorption Ratio	20.			Calc.	06/23/14	1
Specific Conductance	1400		umhos/cm	9050AMod	06/24/14	1
Mercury	0.041	0.020	mg/kg	7471	06/20/14	1
Arsenic	3.8	2.0	mg/kg	6010B	06/21/14	1
Barium	9700	2.5	mg/kg	6010B	06/21/14	5
Cadmium	BDL	0.50	mg/kg	6010B	06/21/14	1
Chromium	10.	1.0	mg/kg	6010B	06/21/14	1
Copper	12.	2.0	mg/kg	6010B	06/21/14	1
Lead	5.8	0.50	mg/kg	6010B	06/21/14	1
Nickel	6.7	2.0	mg/kg	6010B	06/21/14	1
Selenium	3.2	2.0	mg/kg	6010B	06/21/14	1
Silver	BDL	1.0	mg/kg	6010B	06/21/14	1
Zinc	29.	3.0	mg/kg	6010B	06/21/14	1
Benzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Toluene	BDL	0.025	mg/kg	8021	06/23/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/23/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/23/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.0		% Rec.	8021/8015	06/23/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	06/23/14	5
TPH (GC/FID) High Fraction	7.6	4.0	mg/kg	8015D/DRO	06/23/14	1
Surrogate recovery(%)						
o-Terphenyl	26.2		% Rec.	8015D/DRO	06/23/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L705488-02 (PH) - 9.2 @ 22.0c
L705488-02 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT01-02
Collected By : Chance White
Collection Date : 06/18/14 12:30

ESC Sample # : L705488-02

Site ID : K28NW

Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Chrysene	0.0086	0.0060	mg/kg	8270C-SIM	06/22/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluorene	0.011	0.0060	mg/kg	8270C-SIM	06/22/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Naphthalene	0.074	0.020	mg/kg	8270C-SIM	06/22/14	1
Phenanthrene	0.044	0.0060	mg/kg	8270C-SIM	06/22/14	1
Pyrene	0.0061	0.0060	mg/kg	8270C-SIM	06/22/14	1
1-Methylnaphthalene	0.041	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Methylnaphthalene	0.14	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
Surrogate Recovery						
p-Terphenyl-d14	85.2		% Rec.	8270C-SIM	06/22/14	1
Nitrobenzene-d5	75.2		% Rec.	8270C-SIM	06/22/14	1
2-Fluorobiphenyl	78.3		% Rec.	8270C-SIM	06/22/14	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L705488-02 (PH) - 9.2 @ 22.0c

L705488-02 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT01-03
Collected By : Chance White
Collection Date : 06/18/14 13:00

ESC Sample # : L705488-03

Site ID : K28NW

Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	06/23/14	1
Chromium, Trivalent	12.	2.0	mg/kg	Calc.	06/24/14	1
ORP	40.		mV	2580 B-2011	06/24/14	1
pH	9.0		su	9045D	06/20/14	1
Sodium Adsorption Ratio	21.			Calc.	06/23/14	1
Specific Conductance	1500		umhos/cm	9050AMod	06/24/14	1
Mercury	0.036	0.020	mg/kg	7471	06/20/14	1
Arsenic	5.0	2.0	mg/kg	6010B	06/21/14	1
Barium	9000	2.5	mg/kg	6010B	06/21/14	5
Cadmium	BDL	0.50	mg/kg	6010B	06/21/14	1
Chromium	12.	1.0	mg/kg	6010B	06/21/14	1
Copper	14.	2.0	mg/kg	6010B	06/21/14	1
Lead	7.9	0.50	mg/kg	6010B	06/21/14	1
Nickel	10.	2.0	mg/kg	6010B	06/21/14	1
Selenium	2.8	2.0	mg/kg	6010B	06/21/14	1
Silver	BDL	1.0	mg/kg	6010B	06/21/14	1
Zinc	39.	3.0	mg/kg	6010B	06/21/14	1
Benzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Toluene	BDL	0.025	mg/kg	8021	06/23/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/23/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/23/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.0		% Rec.	8021/8015	06/23/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	06/23/14	5
TPH (GC/FID) High Fraction	18.	4.0	mg/kg	8015D/DRO	06/23/14	1
Surrogate recovery(%)						
o-Terphenyl	33.9		% Rec.	8015D/DRO	06/23/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L705488-03 (PH) - 9.0 @ 21.2c
L705488-03 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
 Description : K28NW Cuttings
 Sample ID : 20140618-K28NW-CUT01-03
 Collected By : Chance White
 Collection Date : 06/18/14 13:00

ESC Sample # : L705488-03
 Site ID : K28NW
 Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Chrysene	0.0065	0.0060	mg/kg	8270C-SIM	06/22/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluorene	0.0078	0.0060	mg/kg	8270C-SIM	06/22/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Naphthalene	0.051	0.020	mg/kg	8270C-SIM	06/22/14	1
Phenanthrene	0.030	0.0060	mg/kg	8270C-SIM	06/22/14	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
1-Methylnaphthalene	0.026	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Methylnaphthalene	0.094	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
Surrogate Recovery						
p-Terphenyl-d14	92.9		% Rec.	8270C-SIM	06/22/14	1
Nitrobenzene-d5	82.1		% Rec.	8270C-SIM	06/22/14	1
2-Fluorobiphenyl	83.0		% Rec.	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
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 L705488-03 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT02-01
Collected By : Chance White
Collection Date : 06/18/14 13:45

ESC Sample # : L705488-04
Site ID : K28NW
Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	06/23/14	1
Chromium, Trivalent	16.	2.0	mg/kg	Calc.	06/24/14	1
ORP	40.		mV	2580 B-2011	06/24/14	1
pH	8.7		su	9045D	06/20/14	1
Sodium Adsorption Ratio	17.			Calc.	06/23/14	1
Specific Conductance	1300		umhos/cm	9050AMod	06/24/14	1
Mercury	0.027	0.020	mg/kg	7471	06/20/14	1
Arsenic	6.8	2.0	mg/kg	6010B	06/21/14	1
Barium	9300	2.5	mg/kg	6010B	06/21/14	5
Cadmium	0.56	0.50	mg/kg	6010B	06/21/14	1
Chromium	16.	1.0	mg/kg	6010B	06/21/14	1
Copper	15.	2.0	mg/kg	6010B	06/21/14	1
Lead	9.1	0.50	mg/kg	6010B	06/21/14	1
Nickel	14.	2.0	mg/kg	6010B	06/21/14	1
Selenium	2.6	2.0	mg/kg	6010B	06/21/14	1
Silver	BDL	1.0	mg/kg	6010B	06/21/14	1
Zinc	45.	3.0	mg/kg	6010B	06/21/14	1
Benzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Toluene	BDL	0.025	mg/kg	8021	06/23/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/23/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/23/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.9		% Rec.	8021/8015	06/23/14	5
a,a,a-Trifluorotoluene(PID)	102.		% Rec.	8021/8015	06/23/14	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	8015D/DRO	06/23/14	1
Surrogate recovery(%)						
o-Terphenyl	28.9		% Rec.	8015D/DRO	06/23/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L705488-04 (PH) - 8.7 @ 21.9c
L705488-04 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
 Description : K28NW Cuttings
 Sample ID : 20140618-K28NW-CUT02-01
 Collected By : Chance White
 Collection Date : 06/18/14 13:45

ESC Sample # : L705488-04
 Site ID : K28NW
 Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Naphthalene	0.034	0.020	mg/kg	8270C-SIM	06/22/14	1
Phenanthrene	0.014	0.0060	mg/kg	8270C-SIM	06/22/14	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
1-Methylnaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Methylnaphthalene	0.055	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
Surrogate Recovery						
p-Terphenyl-d14	92.0		% Rec.	8270C-SIM	06/22/14	1
Nitrobenzene-d5	83.6		% Rec.	8270C-SIM	06/22/14	1
2-Fluorobiphenyl	83.3		% Rec.	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
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 L705488-04 (PH) - 8.7 @ 21.9c
 L705488-04 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT02-02
Collected By : Chance White
Collection Date : 06/18/14 14:30

ESC Sample # : L705488-05
Site ID : K28NW
Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	06/23/14	1
Chromium, Trivalent	15.	2.0	mg/kg	Calc.	06/24/14	1
ORP	60.		mV	2580 B-2011	06/24/14	1
pH	8.7		su	9045D	06/20/14	1
Sodium Adsorption Ratio	20.			Calc.	06/23/14	1
Specific Conductance	1500		umhos/cm	9050AMod	06/24/14	1
Mercury	0.024	0.020	mg/kg	7471	06/20/14	1
Arsenic	7.2	2.0	mg/kg	6010B	06/21/14	1
Barium	8200	2.5	mg/kg	6010B	06/21/14	5
Cadmium	0.62	0.50	mg/kg	6010B	06/21/14	1
Chromium	15.	1.0	mg/kg	6010B	06/21/14	1
Copper	16.	2.0	mg/kg	6010B	06/21/14	1
Lead	8.9	0.50	mg/kg	6010B	06/21/14	1
Nickel	14.	2.0	mg/kg	6010B	06/21/14	1
Selenium	3.0	2.0	mg/kg	6010B	06/21/14	1
Silver	BDL	1.0	mg/kg	6010B	06/21/14	1
Zinc	54.	3.0	mg/kg	6010B	06/21/14	1
Benzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Toluene	BDL	0.025	mg/kg	8021	06/23/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/23/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/23/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.8		% Rec.	8021/8015	06/23/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	06/23/14	5
TPH (GC/FID) High Fraction	16.	4.0	mg/kg	8015D/DRO	06/23/14	1
Surrogate recovery(%)						
o-Terphenyl	48.9		% Rec.	8015D/DRO	06/23/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L705488-05 (PH) - 8.7 @ 21.9c
L705488-05 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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

June 24, 2014

Date Received : June 19, 2014
 Description : K28NW Cuttings
 Sample ID : 20140618-K28NW-CUT02-02
 Collected By : Chance White
 Collection Date : 06/18/14 14:30

ESC Sample # : L705488-05
 Site ID : K28NW
 Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluorene	0.0066	0.0060	mg/kg	8270C-SIM	06/22/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Naphthalene	0.048	0.020	mg/kg	8270C-SIM	06/22/14	1
Phenanthrene	0.025	0.0060	mg/kg	8270C-SIM	06/22/14	1
Pyrene	0.0086	0.0060	mg/kg	8270C-SIM	06/22/14	1
1-Methylnaphthalene	0.027	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Methylnaphthalene	0.084	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
Surrogate Recovery						
p-Terphenyl-d14	87.5		% Rec.	8270C-SIM	06/22/14	1
Nitrobenzene-d5	81.8		% Rec.	8270C-SIM	06/22/14	1
2-Fluorobiphenyl	79.1		% Rec.	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
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 L705488-05 (PH) - 8.7 @ 21.9c
 L705488-05 (DRO) - Previous run also had low surrogate recovery



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REPORT OF ANALYSIS

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EnCana Oil & Gas - Parachute, CO
143 Diamond Avenue
Parachute, CO 81635

June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT02-03
Collected By : Chance White
Collection Date : 06/18/14 15:00

ESC Sample # : L705488-06

Site ID : K28NW

Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	06/23/14	1
Chromium, Trivalent	16.	2.0	mg/kg	Calc.	06/24/14	1
ORP	60.		mV	2580 B-2011	06/24/14	1
pH	8.6		su	9045D	06/20/14	1
Sodium Adsorption Ratio	14.			Calc.	06/23/14	1
Specific Conductance	1400		umhos/cm	9050AMod	06/24/14	1
Mercury	0.026	0.020	mg/kg	7471	06/20/14	1
Arsenic	7.7	2.0	mg/kg	6010B	06/21/14	1
Barium	8000	2.5	mg/kg	6010B	06/21/14	5
Cadmium	0.64	0.50	mg/kg	6010B	06/21/14	1
Chromium	16.	1.0	mg/kg	6010B	06/21/14	1
Copper	15.	2.0	mg/kg	6010B	06/21/14	1
Lead	9.7	0.50	mg/kg	6010B	06/21/14	1
Nickel	15.	2.0	mg/kg	6010B	06/21/14	1
Selenium	2.8	2.0	mg/kg	6010B	06/21/14	1
Silver	BDL	1.0	mg/kg	6010B	06/21/14	1
Zinc	50.	3.0	mg/kg	6010B	06/21/14	1
Benzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Toluene	BDL	0.025	mg/kg	8021	06/23/14	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/23/14	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/23/14	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/23/14	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.7		% Rec.	8021/8015	06/23/14	5
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021/8015	06/23/14	5
TPH (GC/FID) High Fraction	36.	4.0	mg/kg	8015D/DRO	06/23/14	1
Surrogate recovery(%)						
o-Terphenyl	53.8		% Rec.	8015D/DRO	06/23/14	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L705488-06 (PH) - 8.6 @ 22.0c



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REPORT OF ANALYSIS

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143 Diamond Avenue
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June 24, 2014

Date Received : June 19, 2014
Description : K28NW Cuttings
Sample ID : 20140618-K28NW-CUT02-03
Collected By : Chance White
Collection Date : 06/18/14 15:00

ESC Sample # : L705488-06

Site ID : K28NW

Project # : K28NW

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluoranthene	0.0061	0.0060	mg/kg	8270C-SIM	06/22/14	1
Fluorene	0.0092	0.0060	mg/kg	8270C-SIM	06/22/14	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	06/22/14	1
Naphthalene	0.061	0.020	mg/kg	8270C-SIM	06/22/14	1
Phenanthrene	0.036	0.0060	mg/kg	8270C-SIM	06/22/14	1
Pyrene	0.013	0.0060	mg/kg	8270C-SIM	06/22/14	1
1-Methylnaphthalene	0.041	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Methylnaphthalene	0.12	0.020	mg/kg	8270C-SIM	06/22/14	1
2-Chloronaphthalene	BDL	0.020	mg/kg	8270C-SIM	06/22/14	1
Surrogate Recovery						
p-Terphenyl-d14	78.8		% Rec.	8270C-SIM	06/22/14	1
Nitrobenzene-d5	68.1		% Rec.	8270C-SIM	06/22/14	1
2-Fluorobiphenyl	67.6		% Rec.	8270C-SIM	06/22/14	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L705488-06 (PH) - 8.6 @ 22.0c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L705488-01	WG728018	SAMP	o-Terphenyl	R2947248	J2
	WG727765	SAMP	Chromium,Hexavalent	R2947411	T9
L705488-02	WG728018	SAMP	o-Terphenyl	R2947248	J2
	WG727765	SAMP	Chromium,Hexavalent	R2947411	T9
L705488-03	WG728018	SAMP	o-Terphenyl	R2947248	J2
	WG727765	SAMP	Chromium,Hexavalent	R2947411	T9
L705488-04	WG728018	SAMP	o-Terphenyl	R2947248	J2
L705488-05	WG728018	SAMP	o-Terphenyl	R2947248	J2
	WG727765	SAMP	Chromium,Hexavalent	R2947411	T9

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits
T9	(ESC) - Additional method/sample information: The sample result represents blank correction

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
06/24/14 at 16:40:08

TSR Signing Reports: 358
R4 - Rush: Three Day

Log all PAHs as PAHSIM. Log all BTEX waters by 8260. Log ALL samples for EDD (COGCC EDD).

Sample: L705488-01 Account: ENCANACO Received: 06/19/14 09:00 Due Date: 06/24/14 00:00 RPT Date: 06/24/14 16:39

Sample: L705488-02 Account: ENCANACO Received: 06/19/14 09:00 Due Date: 06/24/14 00:00 RPT Date: 06/24/14 16:39

Sample: L705488-03 Account: ENCANACO Received: 06/19/14 09:00 Due Date: 06/24/14 00:00 RPT Date: 06/24/14 16:39

Sample: L705488-04 Account: ENCANACO Received: 06/19/14 09:00 Due Date: 06/24/14 00:00 RPT Date: 06/24/14 16:39

Sample: L705488-05 Account: ENCANACO Received: 06/19/14 09:00 Due Date: 06/24/14 00:00 RPT Date: 06/24/14 16:39

Sample: L705488-06 Account: ENCANACO Received: 06/19/14 09:00 Due Date: 06/24/14 00:00 RPT Date: 06/24/14 16:39