

## Appendix 9: Waste Stream Sampling and Characterization

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March 12, 2013

Mr. Brett Middleton  
Encana Oil & Gas (USA)  
143 Diamond Avenue  
Parachute, CO 81635

**Re: Middle Fork Water Treatment Filter Press Waste Characterization**

Dear Mr. Middleton:

Rule Engineering, LLC has completed the Waste Profile Sampling requested by Encana Oil and Gas (USA), Inc. This report summarizes and documents the waste characterization activities.

Encana's Materials and Waste Coordinator determined the following waste stream to be characteristic of solid waste generated during Encana's operations that will be treated at the future Divide Road Water Facility.

The Middle Fork Water Treatment Filter Press was deemed representative of this waste stream and an analytical summary table is located at the end of the report. Field Notes are located in Appendix A, Analytical Data and Chain of Custody's (COC's) are located in Appendix B.

**Sampling Activities**

The waste profile sample was collected on March 6, 2013 from the discharge hopper on the Filter Press.

One multi-point (3 points) composite sample was collected from the Filter Press material. The sample was collected from six (6) inches to two (2) feet below the stockpile surface. The following sample ID was assigned: MFWT-FP-030613. Summary of analytical results can be found in Table 1.

***Sampling and Analytical Protocols***

The sample was taken from within hopper by removing overburden material, and sampling with nitrile gloves. The sample was composited by mixing the waste in a stainless steel bowl to comprise one analytical sample. Following sample collection each container was labeled with a waterproof marker and data was recorded in the sample documentation form, and chain of custody form. Samples were placed on ice in a cooler and shipped for laboratory analysis.

Mr. Brett Middleton  
Middle Fork Water Treatment Filter Press  
March 12, 2013  
Page 2 of 2

The soil sample was analyzed by ESC (Environmental Science Corporation) for the following parameters by the indicated analytical methods:

- Corrosivity (Method 9045D);
- Chromium-Hexavalent, Chromium-Trivalent (Method 3060A/7196A, Calculation respectively);
- Ignitability, Burn Rate (Method D93/1010A, 1030B respectively);
- ORP (Method 2580);
- pH (Method 9045D)
- Paint Filter Test (Method 9095B);
- Reactive CN (Method 9012B);
- Reactive Sulf (Method 9034/9030B);
- Sodium Adsorption Ratio (Method Calculation);
- Specific Conductance (Method 9050AMod);
- Standard Plate Count (Method 9215 B-2000);
- TKN (Method Calculation);
- Total Nitrogen (Method Calculation);
- Nitrate-Nitrite (Method 9056);
- Total Organic Carbon (Method USDA LOI)
- Metals: Hg, As, Ba, Cd, Cr, Cu, Pb, Ni, Se, Ag, Zn (Method 6010B)
- TPH (Method(s) GRO, 3546/DRO);
- Methanol, Ethanol (Method 8015M)
- VOC's, SVOC's (Method 8260B, 8270C respectively)
- TCLP Hg, As, Ba, Cd, Cr, Cu, Pb, Se, Ag (Method 7470B-Hg, 6010B)
- Naturally Occurring Radio Active Material (NORM) Gross Alpha, Gross Beta, Gross Gamma Scan (Method 901.1)

Samples were received in good condition, at appropriate temperatures, and analyzed within appropriate holding times.

Rule Engineering appreciates the opportunity to provide services to Encana Oil and Gas (USA) Inc. If you have any questions please contact me at 970-244-8500.

Sincerely,  
**Rule Engineering, LLC**

Scotty Mann  
Hydrogeologist/Project Manager

cc: Russell Knight – Rule

# Summary Table

Table 1									
Sample ID	MFWT-FP-030613								
Lab Sample ID	L623537, L623544								
Method	Parameter	Units	Value	Qual	Method	Parameter	Units	Value	Qual
9056	Nitrate-Nitrite	mg/kg	<2.0		8270C	Acenaphthene	mg/kg	<12	
9056	Phosphate as P	mg/kg	<1.0		8270C	Acenaphthylene	mg/kg	<12	
2580 B-2011	ORP	mV	-48	T8	8270C	Anthracene	mg/kg	<12	
3060A/7196A	Chromium,Hexavalent	mg/kg	<2.0		8270C	Benzidine	mg/kg	<120	J4
4500NOrg C-2011	Kjeldahl Nitrogen, TKN	mg/kg	870		8270C	Benzo(a)anthracene	mg/kg	<12	
8015D/DRO	TPH High Fraction (DRO)	mg/kg	17000		8270C	Benzo(b)fluoranthene	mg/kg	<12	
8015D/GRO	TPH Low Fraction (GRO)	mg/kg	5500		8270C	Benzo(k)fluoranthene	mg/kg	<12	
8015M	Ethanol	mg/kg	0.63	J6	8270C	Benzo(g,h,i)perylene	mg/kg	<12	
8015M	Methanol	mg/kg	<0.50	J6	8270C	Benzo(a)pyrene	mg/kg	<12	
8260B	Benzene	mg/kg	16		8270C	Bis(2-chlorethoxy)methane	mg/kg	<120	
8260B	Ethylbenzene	mg/kg	9.2		8270C	Bis(2-chloroethyl)ether	mg/kg	<120	
8260B	n-Hexane	mg/kg	<50		8270C	Bis(2-chloroisopropyl)ether	mg/kg	<120	
8260B	Toluene	mg/kg	88		8270C	4-Bromophenyl-phenylether	mg/kg	<120	
8260B	Xylenes, Total	mg/kg	140		8270C	2-Chloronaphthalene	mg/kg	<12	
9012B	Reactive CN (SW846 7.3.3.2)	mg/kg	<0.125		8270C	4-Chlorophenyl-phenylether	mg/kg	<120	
9034/9030B	Reactive Sulf.(SW846 7.3.4.1)	mg/kg	<25		8270C	Chrysene	mg/kg	<12	
9045D	Corrosivity		Non-Corrosive		8270C	Dibenz(a,h)anthracene	mg/kg	<12	
9045D	pH	su	7.2		8270C	3,3-Dichlorobenzidine	mg/kg	<120	
9050AMod	Specific Conductance	umhos/cm	8100		8270C	2,4-Dinitrotoluene	mg/kg	<120	
9215B	Standard Plate Count	col/g	6900	T8	8270C	2,6-Dinitrotoluene	mg/kg	<120	
Calc.	Chromium,Trivalent	mg/kg	5.3		8270C	Fluoranthene	mg/kg	<12	
Calc.	Sodium Adsorption Ratio		34		8270C	Fluorene	mg/kg	28	
D93/1010A	Ignitability	Deg. F	Did Not Ignite @ 170 F		8270C	Hexachlorobenzene	mg/kg	<120	
USDA LOI	TOC (Total Organic Carbon)	mg/kg	91000		8270C	Hexachloro-1,3-butadiene	mg/kg	<120	
	Total Nitrogen	mg/kg	870		8270C	Hexachlorocyclopentadiene	mg/kg	<120	
Metals					8270C	Hexachloroethane	mg/kg	<120	
6010B	Arsenic	mg/kg	2.1		8270C	Indeno(1,2,3-cd)pyrene	mg/kg	<12	
6010B	Barium	mg/kg	700		8270C	Isophorone	mg/kg	<120	
6010B	Cadmium	mg/kg	<0.25		8270C	Naphthalene	mg/kg	41	
6010B	Chromium	mg/kg	5.3		8270C	Nitrobenzene	mg/kg	<120	
6010B	Copper	mg/kg	13		8270C	n-Nitrosodimethylamine	mg/kg	<120	
6010B	Lead	mg/kg	1.4		8270C	n-Nitrosodiphenylamine	mg/kg	<120	
7471	Mercury	mg/kg	8.4		8270C	n-Nitrosodi-n-propylamine	mg/kg	<120	
6010B	Nickel	mg/kg	2.1		8270C	Phenanthrene	mg/kg	17	
6010B	Selenium	mg/kg	<1.0		8270C	Benzylbutyl phthalate	mg/kg	<120	
6010B	Silver	mg/kg	<0.50		8270C	Bis(2-ethylhexyl)phthalate	mg/kg	<120	
6010B	Zinc	mg/kg	36		8270C	Di-n-butyl phthalate	mg/kg	<120	
TCLP Metals					8270C	Diethyl phthalate	mg/kg	<120	
6010B	Arsenic	mg/l	<0.050		8270C	Dimethyl phthalate	mg/kg	<120	
6010B	Barium	mg/l	10		8270C	Di-n-octyl phthalate	mg/kg	<120	
6010B	Cadmium	mg/l	<0.050		8270C	Pyrene	mg/kg	<12	
6010B	Chromium	mg/l	<0.050		8270C	1,2,4-Trichlorobenzene	mg/kg	<120	
6010B	Lead	mg/l	<0.050		8270C	4-Chloro-3-methylphenol	mg/kg	<120	
7470A	Mercury	mg/l	<0.0010		8270C	2-Chlorophenol	mg/kg	<120	
6010B	Selenium	mg/l	<0.050		8270C	2,4-Dichlorophenol	mg/kg	<120	
6010B	Silver	mg/l	<0.050		8270C	2,4-Dimethylphenol	mg/kg	<120	
NORM					8270C	4,6-Dinitro-2-methylphenol	mg/kg	<120	
900	Gross Alpha	pCi/gram	4.7		8270C	2,4-Dinitrophenol	mg/kg	<120	
900	Gross Beta	pCi/gram	10.1		8270C	2-Nitrophenol	mg/kg	<120	
901.1	Actinium-228	pCi/gram	0.7		8270C	4-Nitrophenol	mg/kg	<120	
901.1	Bismuth-211	pCi/gram	<0.5		8270C	Pentachlorophenol	mg/kg	<120	
901.1	Bismuth-214	pCi/gram	0.4		8270C	Phenol	mg/kg	<120	
901.1	Lead-212	pCi/gram	0.4		8270C	2,4,6-Trichlorophenol	mg/kg	<120	
901.1	Lead-214	pCi/gram	0.3						
901.1	Potassium-40	pCi/gram	8.5						
901.1	Protactinium-234M	pCi/gram	<8.1						
901.1	Radium-226	pCi/gram	0.4						
901.1	Radium-228	pCi/gram	0.7						

T8 (ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

J7 Surrogate recovery cannot be used for control limit evaluation due to dilution.

J4 The associated batch QC was outside the established quality control range for accuracy.

J6 The sample matrix interfered with the ability to make any accurate determination; spike value is low

# **Appendix A**



**PICEANCE BASIN  
ENVIRONMENTAL COMPLIANCE GROUP  
FIELD SAMPLING DATA FORM**

Document No:  
ECG - F001.2  
Revised By - Date:  
C. Hines - 01/09/12  
Reviewed By - Date:  
B. Middleton - 01/09/12  
Approved By - Date:  
C. Hines - 01/09/12

**ALL soil samples collected on behalf of Encana's Parachute Field Office must be documented on the ECG Field Sample Data Form.**

**NAMING CONVENTION:** All "Sample IDs" used in this form, or with the lab's COC must conform with the following naming format: **Location - Sampling Matrix - Date**  
Sample Matrix types must include these base descriptions or listed abbreviations: (other notations/abbreviations may be used in addition):

PS (Pit Spoil) | MOI (Material of Interest) | S (Spill) | PB (Pit Bottom) | BG (Background) | CUT (Cuttings) | WC (Waste Characterization)

Multiple samples collected from the same sampling matrix on the same location should include a cardinal direction abbreviation as part of the sampling matrix:  
(e.g. PD30-BGNW-010312, PD30-BGS-010312, PD30-CUTW-010312)

Sampler: <i>Scotty Mann</i>		Location: <i>Middle Fork Filter Press</i>		Date of Sample: <i>3-6-17</i>	
Sample ID: <i>MEWT-FP-030613</i>	Time of Sample: <i>1130</i>	Lat: (WGS 84 - decimal degrees) <i>39 34.733</i>	Long: (WGS 84 - decimal degrees) <i>108 06.44</i>	# of containers: <i>10</i>	Composite or Grab: <i>Comp</i>

**Sample Documentation Procedure**

1. PHOTOS - An adequate number to provide sample location in the context of the pad and to illustrate depth and texture of collected material.
2. GPS - A track must be taken while driving to the sampling location and while sampling. Waypoints must be taken at every sample point (composite or grab).
3. NOTES - Prepare sampling notes and site sketch below (Include sample locations, media dimensions, other waste not previously identified, estimated volumes of all waste on location, color and texture of sampled material, and depth of sample collection).

**Sampling Notes / Site Sketch**

- on site @ 1122

- collect a sample from Filter Press @

*Middle Fork Water Park, 3 point composite from press out pit WP, 26, 27, 28*

*RD*

*00000000 ← 500 bbl tanks*

*RD*

*00000000 ← 500 bbl tanks*

*MEWT-FP-030613* ← *Filter Press*

*Middle Fork Water Treatment* ← *DATE*

- OFF-SITE @ 1145

*pond*

**Follow Up Procedures**

1. Create "FieldData" folder within the appropriate site folder in the WASTE/ONSITE directory. (If you don't know where this is...ASK!)
2. Scan form to PDF and save in FieldData folder, using the name convention **Location - Field Notes (Date)** [e.g. PD30 - Field Notes (01-03-2012)]
3. Create "Photos" folder within FieldData folder and insert all photos taken during sampling event. Do not create a second Photos folder if one already exists. Use the camera wizard for consistent naming of photos. [e.g. PD30 - Pit Sampling (01-03-2012)]
4. Create GDB (garmin format) file from collected GPS data. GDB file should include all samples collected on a given day in one file. Copy GDB file to identified "mapsource" file using established naming format. [e.g. Walsh Sampling (01-03-2012)]

## **Appendix B**





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 / Matt Kasten  
EnCana Oil & Gas Inc. - CO  
143 Diamond Avenue  
Parachute, CO 81635

## Report Summary

Tuesday March 12, 2013

Report Number: L623537


Samples Received: 03/07/13

Client Project: DIVIDE ROAD WATER FA

Description: Middle Fork Water Park Filter Press

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

Entire Report Reviewed By:

  
Jarred Willis , ESC Representative

### Laboratory Certification Numbers

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

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

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

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.



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# REPORT OF ANALYSIS

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

March 12, 2013

Date Received : March 07, 2013  
Description : Middle Fork Water Park Filter Press  
Sample ID : MFWT-FP-030613  
Collected By :  
Collection Date : 03/06/13 11:30

ESC Sample # : L623537-01

Site ID : DIVIDE ROAD WATER FA

Project # : DIVIDE ROAD WATER FA

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Standard Plate Count	6900		col/g	9215B	03/07/13	10000
Nitrate-Nitrite	BDL	2.0	mg/kg	9056	03/07/13	1
Phosphate as P	BDL	1.0	mg/kg	9056	03/07/13	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	03/12/13	1
Chromium, Trivalent	5.3	2.0	mg/kg	Calc.	03/08/13	1
Total Nitrogen	870	1.0	mg/kg	Calc.	03/12/13	1
ORP	-48.		mV	2580 B-2011	03/07/13	1
pH	7.2		su	9045D	03/08/13	1
Sodium Adsorption Ratio	34.			Calc.	03/09/13	1
Specific Conductance	8100		umhos/cm	9050AMod	03/08/13	1
Kjeldahl Nitrogen, TKN	870	40.	mg/kg	4500NOrg C-20	03/09/13	2
TOC (Total Organic Carbon)	91000	10.	mg/kg	USDA LOI	03/12/13	1
Mercury	8.4	0.80	mg/kg	7471	03/07/13	40
Arsenic	2.1	1.0	mg/kg	6010B	03/08/13	1
Barium	700	0.25	mg/kg	6010B	03/08/13	1
Cadmium	BDL	0.25	mg/kg	6010B	03/08/13	1
Chromium	5.3	0.50	mg/kg	6010B	03/08/13	1
Copper	13.	1.0	mg/kg	6010B	03/08/13	1
Lead	1.4	0.25	mg/kg	6010B	03/08/13	1
Nickel	2.1	1.0	mg/kg	6010B	03/08/13	1
Selenium	BDL	1.0	mg/kg	6010B	03/08/13	1
Silver	BDL	0.50	mg/kg	6010B	03/08/13	1
Zinc	36.	1.5	mg/kg	6010B	03/08/13	1
TPH (GC/FID) Low Fraction	5500	500	mg/kg	8015D/GRO	03/11/13	5000
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	108.		% Rec.	602/8015	03/11/13	5000
Methanol	BDL	0.50	mg/kg	8015M	03/11/13	5
Ethanol	0.63	0.50	mg/kg	8015M	03/11/13	5

## Volatile Organics

BDL - Below Detection Limit  
Det. Limit - Practical Quantitation Limit(PQL)  
L623537-01 (PH) - 7.2@22.1c



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# REPORT OF ANALYSIS

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

March 12, 2013

Date Received : March 07, 2013  
Description : Middle Fork Water Park Filter Press

ESC Sample # : L623537-01

Sample ID : MFWT-FP-030613

Site ID : DIVIDE ROAD WATER FA

Collected By :  
Collection Date : 03/06/13 11:30

Project # : DIVIDE ROAD WATER FA

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	16.	5.0	mg/kg	8260B	03/07/13	5000
Ethylbenzene	9.2	5.0	mg/kg	8260B	03/07/13	5000
n-Hexane	BDL	50.	mg/kg	8260B	03/07/13	5000
Toluene	88.	25.	mg/kg	8260B	03/07/13	5000
Xylenes, Total	140	15.	mg/kg	8260B	03/07/13	5000
Surrogate Recovery						
Toluene-d8	94.2		% Rec.	8260B	03/07/13	5000
Dibromofluoromethane	99.4		% Rec.	8260B	03/07/13	5000
a,a,a-Trifluorotoluene	102.		% Rec.	8260B	03/07/13	5000
4-Bromofluorobenzene	101.		% Rec.	8260B	03/07/13	5000
TPH (GC/FID) High Fraction	17000	400	mg/kg	8015D/DRO	03/11/13	100
Surrogate recovery(%)						
o-Terphenyl	0.00		% Rec.	8015D/DRO	03/11/13	100
Base/Neutral Extractables						
Acenaphthene	BDL	12.	mg/kg	8270C	03/12/13	375
Acenaphthylene	BDL	12.	mg/kg	8270C	03/12/13	375
Anthracene	BDL	12.	mg/kg	8270C	03/12/13	375
Benztidine	BDL	120	mg/kg	8270C	03/12/13	375
Benzo(a)anthracene	BDL	12.	mg/kg	8270C	03/12/13	375
Benzo(b)fluoranthene	BDL	12.	mg/kg	8270C	03/12/13	375
Benzo(k)fluoranthene	BDL	12.	mg/kg	8270C	03/12/13	375
Benzo(g,h,i)perylene	BDL	12.	mg/kg	8270C	03/12/13	375
Benzo(a)pyrene	BDL	12.	mg/kg	8270C	03/12/13	375
Bis(2-chlorethoxy)methane	BDL	120	mg/kg	8270C	03/12/13	375
Bis(2-chloroethyl)ether	BDL	120	mg/kg	8270C	03/12/13	375
Bis(2-chloroisopropyl)ether	BDL	120	mg/kg	8270C	03/12/13	375
4-Bromophenyl-phenylether	BDL	120	mg/kg	8270C	03/12/13	375
2-Chloronaphthalene	BDL	12.	mg/kg	8270C	03/12/13	375
4-Chlorophenyl-phenylether	BDL	120	mg/kg	8270C	03/12/13	375
Chrysene	BDL	12.	mg/kg	8270C	03/12/13	375
Dibenz(a,h)anthracene	BDL	12.	mg/kg	8270C	03/12/13	375
3,3-Dichlorobenzidine	BDL	120	mg/kg	8270C	03/12/13	375
2,4-Dinitrotoluene	BDL	120	mg/kg	8270C	03/12/13	375
2,6-Dinitrotoluene	BDL	120	mg/kg	8270C	03/12/13	375
Fluoranthene	BDL	12.	mg/kg	8270C	03/12/13	375
Fluorene	28.	12.	mg/kg	8270C	03/12/13	375
Hexachlorobenzene	BDL	120	mg/kg	8270C	03/12/13	375
Hexachloro-1,3-butadiene	BDL	120	mg/kg	8270C	03/12/13	375
Hexachlorocyclopentadiene	BDL	120	mg/kg	8270C	03/12/13	375
Hexachloroethane	BDL	120	mg/kg	8270C	03/12/13	375
Indeno(1,2,3-cd)pyrene	BDL	12.	mg/kg	8270C	03/12/13	375
Isophorone	BDL	120	mg/kg	8270C	03/12/13	375

BDL - Below Detection Limit  
Det. Limit - Practical Quantitation Limit(PQL)  
L623537-01 (PH) - 7.2@22.1c



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# REPORT OF ANALYSIS

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

March 12, 2013

Date Received : March 07, 2013  
Description : Middle Fork Water Park Filter Press

ESC Sample # : L623537-01

Sample ID : MFWT-FP-030613

Site ID : DIVIDE ROAD WATER FA

Collected By :  
Collection Date : 03/06/13 11:30

Project # : DIVIDE ROAD WATER FA

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Naphthalene	41.	12.	mg/kg	8270C	03/12/13	375
Nitrobenzene	BDL	120	mg/kg	8270C	03/12/13	375
n-Nitrosodimethylamine	BDL	120	mg/kg	8270C	03/12/13	375
n-Nitrosodiphenylamine	BDL	120	mg/kg	8270C	03/12/13	375
n-Nitrosodi-n-propylamine	BDL	120	mg/kg	8270C	03/12/13	375
Phenanthrene	17.	12.	mg/kg	8270C	03/12/13	375
Benzylbutyl phthalate	BDL	120	mg/kg	8270C	03/12/13	375
Bis(2-ethylhexyl)phthalate	BDL	120	mg/kg	8270C	03/12/13	375
Di-n-butyl phthalate	BDL	120	mg/kg	8270C	03/12/13	375
Diethyl phthalate	BDL	120	mg/kg	8270C	03/12/13	375
Dimethyl phthalate	BDL	120	mg/kg	8270C	03/12/13	375
Di-n-octyl phthalate	BDL	120	mg/kg	8270C	03/12/13	375
Pyrene	BDL	12.	mg/kg	8270C	03/12/13	375
1,2,4-Trichlorobenzene	BDL	120	mg/kg	8270C	03/12/13	375
Acid Extractables						
4-Chloro-3-methylphenol	BDL	120	mg/kg	8270C	03/12/13	375
2-Chlorophenol	BDL	120	mg/kg	8270C	03/12/13	375
2,4-Dichlorophenol	BDL	120	mg/kg	8270C	03/12/13	375
2,4-Dimethylphenol	BDL	120	mg/kg	8270C	03/12/13	375
4,6-Dinitro-2-methylphenol	BDL	120	mg/kg	8270C	03/12/13	375
2,4-Dinitrophenol	BDL	120	mg/kg	8270C	03/12/13	375
2-Nitrophenol	BDL	120	mg/kg	8270C	03/12/13	375
4-Nitrophenol	BDL	120	mg/kg	8270C	03/12/13	375
Pentachlorophenol	BDL	120	mg/kg	8270C	03/12/13	375
Phenol	BDL	120	mg/kg	8270C	03/12/13	375
2,4,6-Trichlorophenol	BDL	120	mg/kg	8270C	03/12/13	375
Surrogate Recovery						
2-Fluorophenol	45.1		% Rec.	8270C	03/12/13	375
Phenol-d5	59.7		% Rec.	8270C	03/12/13	375
Nitrobenzene-d5	528.		% Rec.	8270C	03/12/13	375
2-Fluorobiphenyl	94.2		% Rec.	8270C	03/12/13	375
2,4,6-Tribromophenol	54.4		% Rec.	8270C	03/12/13	375
p-Terphenyl-d14	58.3		% Rec.	8270C	03/12/13	375

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: 03/12/13 18:08 Printed: 03/12/13 18:09  
L623537-01 (PH) - 7.2@22.1c



12065 Lebanon Rd.  
Mt. Juliet, TN 37122  
(615) 758-5858  
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Est. 1970

# REPORT OF ANALYSIS

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

March 12, 2013

Date Received : March 07, 2013  
Description : Middle Fork Water Park Filter Press  
Sample ID : MFWT-FP-030613  
Collected By :  
Collection Date : 03/06/13 11:30

ESC Sample # : L623537-02

Site ID : DIVIDE ROAD WATER FA

Project : DIVIDE ROAD WATER FA

Parameter	Result	Det. Limit	Units	Limit	Method	Date/Time	By	Dil
Corrosivity	Non-Corrosiv				9045D	03/11/13 1512	ASK	1
Ignitability	See Footnote		Deg. F		D93/101	03/09/13 1411	MCG	1
Reactive CN (SW846 7.3.3.2)	BDL	0.125	mg/kg		9012B	03/11/13 1413	JAL	1
Reactive Sulf.(SW846 7.3.4.1)	BDL	25.	mg/kg		9034/90	03/11/13 1415	GWA	1
TCLP Extraction	-				1311	03/09/13 0722	MVE	1
Mercury	BDL	0.0010	mg/l	0.20	7470A	03/10/13 1109	CDC	1
Arsenic	BDL	0.050	mg/l	5.0	6010B	03/10/13 0024	WBD	1
Barium	10.	0.15	mg/l	100	6010B	03/10/13 0024	WBD	1
Cadmium	BDL	0.050	mg/l	1.0	6010B	03/10/13 0024	WBD	1
Chromium	BDL	0.050	mg/l	5.0	6010B	03/10/13 0024	WBD	1
Lead	BDL	0.050	mg/l	5.0	6010B	03/10/13 0024	WBD	1
Selenium	BDL	0.050	mg/l	1.0	6010B	03/10/13 0024	WBD	1
Silver	BDL	0.050	mg/l	5.0	6010B	03/10/13 0024	WBD	1

BDL - Below Detection Limit

Det. Limit - Estimated Quantitation Limit(EQL)

Limit - Maximum Contaminant Level as established by the US EPA

Note:

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Reported: 03/12/13 18:08 Printed: 03/12/13 18:09  
L623537-02 (IGNITABILITY) - Did Not Ignite @ 170 F

Attachment A  
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L623537-01	WG640042	SAMP	Benzidine	R2578158	J4
	WG640042	SAMP	2-Fluorophenol	R2578158	J7
	WG640042	SAMP	Phenol-d5	R2578158	J7
	WG640042	SAMP	Nitrobenzene-d5	R2578158	J7
	WG640042	SAMP	2-Fluorobiphenyl	R2578158	J7
	WG640042	SAMP	2,4,6-Tribromophenol	R2578158	J7
	WG640042	SAMP	p-Terphenyl-d14	R2578158	J7
	WG650345	SAMP	Methanol	R2576720	J6
	WG650345	SAMP	Ethanol	R2576720	J6
	WG639878	SAMP	ORP	R2573939	T8
	WG650273	SAMP	o-Terphenyl	R2576258	J7
	WG650334	SAMP	Standard Plate Count	R2576137	T8

Attachment B  
Explanation of QC Qualifier Codes

Qualifier	Meaning
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
J7	Surrogate recovery cannot be used for control limit evaluation due to 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.

Summary of Remarks For Samples Printed  
03/12/13 at 18:09:03

TSR Signing Reports: 358  
R4 - Rush: Three Day

Log ALL samples for EDD (COGCC EDD). Log all PAHs as PAHSIM. Try not to report benzene as BDL  
above a 250x dilution.

Sample: L623537-01 Account: ENCANACO Received: 03/07/13 09:30 Due Date: 03/12/13 00:00 RPT Date: 03/12/13 18:08

Sample: L623537-02 Account: ENCANACO Received: 03/07/13 09:30 Due Date: 03/12/13 00:00 RPT Date: 03/12/13 18:08





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

## Report Summary

Tuesday March 12, 2013

Report Number: L623544


Samples Received: 03/07/13

Client Project: DIVIDE ROAD WATER FA

Description: Middle Fork Water Park Filter Press

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

Entire Report Reviewed By:

  
Jarred Willis , ESC Representative

### Laboratory Certification Numbers

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

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

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

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.



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REPORT OF ANALYSIS

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

March 12, 2013

Date Received : March 07, 2013  
Description : Middle Fork Water Park Filter Press  
Sample ID : MFWT-FP-030613  
Collected By :  
Collection Date : 03/06/13 11:30

ESC Sample # : L623544-01

Site ID : DIVIDE ROAD WATER FA

Project # : DIVIDE ROAD WATER FA

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Miscellaneous	ATTACH TO COC				03/08/13	1
Gross Gamma Scan Miscellaneous	ATTACH TO COC			901.1	03/11/13	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: 03/12/13 13:54 Printed: 03/12/13 13:54

L623544-01 (MISC-SUB) - subcontracted to Radiation Safety Engr

L623544-01 (GROSS GAMMA SCAN) - subcontracted to Radiation Safety Engr

Summary of Remarks For Samples Printed  
03/12/13 at 13:54:49

TSR Signing Reports: 358  
R2 - Rush: Next Day

Log ALL samples for EDD (COGCC EDD). Log all PAHs as PAHSIM. Try not to report benzene as BDL  
above a 250x dilution.

Sample: L623544-01 Account: ENCANACO Received: 03/07/13 09:30 Due Date: 03/12/13 00:00 RPT Date: 03/12/13 13:54  
Subbed to Radsafcaz jlc 3/7/13 PO#S17792. Gamma Scan and GA/GB (MISC-SUB)



**YOUR LAB OF CHOICE**

EnCana Oil & Gas Inc. - CO  
Chris Hines / Matt Kasten  
143 Diamond Avenue

Parachute, CO 81635

Quality Assurance Report  
Level II

L623544

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

Tax I.D. 62-0814289

Est. 1970

March 12, 2013

---

Batch number /Run number / Sample number cross reference

WG639863: R2577418: L623544-01

\* \* 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.'



**YOUR LAB OF CHOICE**

EnCana Oil & Gas Inc. - CO  
Chris Hines / Matt Kasten  
143 Diamond Avenue

Parachute, CO 81635

Quality Assurance Report  
Level II

L623544

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Est. 1970

March 12, 2013

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.

Chain of Custody  
Page 1 of 1

12065 Lebanon Road  
Mt. Juliet, TN 37122

Phone: (800) 767-5859  
Phone: (615) 758-5858  
Fax: (615) 758-5859

UG2353

Account: **ENCRCO** (lab use only)  
Template/Prelogin: **T72326/P423407**  
Cooler #:   
Shipped Via: **FedEX Ground**

Remarks/Contaminant	Sample # (lab only)
---------------------	---------------------

Result 01

[illegible]

\*Matrix: **SS** - Soil **GW** - Groundwater **WW** - WasteWater **DW** - Drinking Water **OT** - Other\_\_\_\_\_

Remarks: WetChem = Corr, CR3, CR6SS, ReactCN, ReactS, SAR, SPCON, ph, SPC, TOC, Total Phos, Total Nitrogen  
Run SPC out of hold and qualify.

pH \_\_\_\_\_ Temp \_\_\_\_\_

Flow \_\_\_\_\_ Other \_\_\_\_\_

Relinquished by: (Signature) <i>Scott J. Munn</i>	Date: <i>3-6-13</i>	Time: <i>1530</i>	Received by: (Signature) <i>[Signature]</i>	Samples returned via: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Courier	Condition: <i>(lab use only)</i> <input checked="" type="checkbox"/> <i>NA</i>
Relinquished by: <i>[Signature]</i>	Date:	Time:	Received by: (Signature) <i>[Signature]</i>	Temp: <i>24</i> Bottles Received: <i>8</i>	COC Seal Intact: <i>Y</i> <i>N</i> <i>NA</i>
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) <i>Kevin Weller</i>	Date: <i>3/7/13</i> Time: <i>6930</i>	pH Checked: <i>NA</i> NCP: <i>NA</i>

## **Troy Dunlap**

---

**From:** Jarred Willis  
**Sent:** Wednesday, March 06, 2013 1:27 PM  
**To:** Login  
**Cc:** Subouts; Due VOC; Due SVOC; Extractions; Due Metals; Metals Prep; Due WetLab  
**Subject:** Rush samples from \*ENCRCO-WASTE\* arriving Thursday, 3/7

We should be receiving 1 rush SS from \***ENCRCO-WASTE**\* on Thursday, 3/7 for the analysis listed below.

**IN-HOUSE ANALYSIS:** T72326/P423407

Log as **R4 due Tuesday, 3/12** with a 1.25x rush multiplier.

CORR, PAINT, CR3, CR6SS, PT, TOC, TOTALNITROGEN, REACTCN, REACTS, IGN, SAR, SPC, SPCON, MRCRA8, CUICP, NIICP, ZNCP, SV8270, DRO, GRO, V8260HEX, MEETAC, TCLP Metals

**SUBOUTS:**

Log as **R2 due Wednesday, 3/13** with a 2x rush multiplier.

Log for MISC-SUB (Gross Alpha/Gross Beta)

Thanks,

**Jarred Willis**

Technical Service Representative (TSR)

E-mail: [jwillis@esclabsciences.com](mailto:jwillis@esclabsciences.com)

Phone: 800-767-5859 Ext. 9678

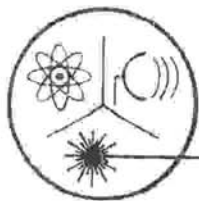
Direct: (615) 773-9678

[www.esclabsciences.com](http://www.esclabsciences.com)









## **Radiation Safety Engineering, Inc.**

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121  
Website: [www.radSAFE.com](http://www.radSAFE.com)

(480) 897-9459  
FAX (480) 892-5446

March 11, 2013

Janice Cozby  
Environmental Science Corp.  
12065 Lebanon Road  
Mt. Juliet, TN 37122

Dear Ms. Cozby:

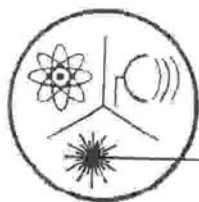
The analysis of your solid samples indicates that it has low levels of naturally occurring radionuclides from the uranium and thorium chains. There is no evidence of man-made radionuclides in the sample. The gross alpha and beta activities and the results of the gamma spectroscopy analysis is attached.

The material is not hazardous under NRC or other state rules, and should be acceptable in ordinary landfills. The levels are comparable to those found in the alluvial fill in the Phoenix area.

Please contact me at (480) 897-9459 if you have any questions or need further information.

Sincerely,

Robert L. Metzger, Ph.D.  
President.



## Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121  
Website: [www.radsafe.com](http://www.radsafe.com)

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FAX (480) 892-5446


### Gamma Emitters in Solid (pCi/gram)

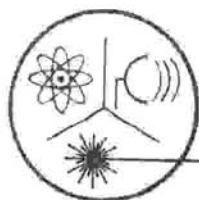
Environmental Science Corp.  
12065 Lebanon Road  
Mt. Juliet, TN 37122

Collection Date: March 6, 2013  
Sample Received: March 8, 2013  
Analysis Completed: March 11, 2013

Sample ID.: L623544-01

Nuclide	Activity Method 901.1 (pCi/gram)
Potassium-40	$8.5 \pm 0.5$
Bismuth-211	$< 0.5$
Lead-212	$0.4 \pm 0.1$
Bismuth-214	$0.4 \pm 0.1$
Lead-214	$0.3 \pm 0.1$
Radium-226	$0.4 \pm 0.1$
Radium-228	$0.7 \pm 0.1$
Actinium-228	$0.7 \pm 0.1$
Protactinium-234M	$< 8.1$

  
Robert L. Metzger, Ph.D., C.H.P.



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Website: [www.radsafe.com](http://www.radsafe.com)

(480) 897-9459  
FAX (480) 892-5446

### Radiochemical Activity in Solid (pCi/gram)

Environmental Science Corp.  
12065 Lebanon Road  
Mt. Juliet, TN 37122

Sampling Date: March 6, 2013  
Sample Received: March 8, 2013  
Analysis Completed: March 11, 2013

Sample ID	Gross Alpha Activity Method 900 (pCi/gram)	Gross Beta Activity Method 900 (pCi/gram)
L623544-01	$4.7 \pm 1.7$	$10.1 \pm 1.7$

Date of Analysis	3/8/2013	3/8/2013
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Robert L. Metzger, Ph.D., C.H.P.