

State of Colorado  
Oil and Gas Conservation Commission1120 Lincoln Street, Suite 801, Denver, Colorado 80203  
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DE	ET	OE	ES
Document Number: <b>400780525</b>			
Date Received: <b>02/04/2015</b>			

## 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

Complete the Attachment  
Checklist

OP OGCC

API Number :	05- 045 00	OGCC Facility ID Number:	335824
Well/Facility Name:	N.PARACHUTE-65S95W		Well/Facility Number: 27NENW
Location QtrQtr:	NENW	Section:	27 Township: 5S Range: 95W Meridian: 6
County:	GARFIELD	Field Name:	GRAND VALLEY
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:Change of **Surface** Footage **To** Exterior Section Lines:Current **Surface** Location **From** QtrQtr **NENW** Sec **27**New **Surface** Location **To** QtrQtr \_\_\_\_\_ Sec \_\_\_\_\_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 \_\_\_\_\_New **Top of Productive Zone** Location **To** Sec \_\_\_\_\_Change of **Bottomhole** Footage **From** Exterior Section Lines:Change of **Bottomhole** Footage **To** Exterior Section Lines:Current **Bottomhole** Location Sec \_\_\_\_\_ Twp \_\_\_\_\_New **Bottomhole** Location Sec \_\_\_\_\_ Twp \_\_\_\_\_

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 \_\_\_\_\_

FNL/FSL		FEL/FWL	
1214	FNL	2104	FWL
Twp 5S	Range 95W	Meridian 6	
Twp	Range	Meridian	
			**
Twp	Range		
Twp	Range		
			**
			** attach deviated drilling plan

## 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 N.PARACHUTE-65S95W Number 27NENW 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 03/31/2011

- |   |   |  |
|---|---|--|
| <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>Close? Rem7744, 7746</u> | <input type="checkbox"/> Status Update/Change of Remediation Plans for Spills and Releases          |  |

## COMMENTS:

This form has been prepared as a notification of completion and request for closure of two pit facilities and remediation projects on the C27A 595 well pad:

- West Pit (Facility ID: 425568) (Rem: 7744)
- East Pit (Facility ID: 425570) (Rem: 7746)

## 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:

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**

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Total: 0 comment(s)

### **Attachment Check List**

**Att Doc Num**

**Name**

400780568	FORM 4 SUBMITTED
400780571	TOPO MAP
400780572	OTHER

Total Attach: 3 Files



**C27A 595 (Location: 335824)**  
**East Pit (Facility: 425570)**  
**West Pit (Facility: 425568)**  
**Encana Oil & Gas (USA) Inc. (Operator: 100185)**

#### **REPORT OF WORK COMPLETED**

- East Pit – Form 27 (Doc: 2232900) (Rem: 7746)
- West Pit – Form 27 (Doc: 2232898) (Rem: 7744)
- West Pit – Form 19 (Doc: 400780269)

Encana Oil & Gas (USA) Inc. (Encana) is submitting this Form 4 (Report of Work Completed and Notification of Completion) to document closure of two lined earthen pits on the C27A 595 well pad in the North Parachute area of operation in Garfield County.

Pit closure activities for the pits on this location were carried out between June, 2010 and March, 2011. The pits were drained, and the liner and above liner solids were removed for offsite disposal. A composite sample of below-liner soil from both pits was collected in June, 2010. Due to the incomplete laboratory analysis of the original composite sample for TPH, subsequent composite samples were collected from both pits in July, 2010 and analyzed for TPH. A review of these sampling events, led to the conclusion that below-liner impacts were present in the west pit, but did not appear in the east pit. A Form 19 was submitted to document exceedences of COGCC Table 910-1 allowable limits for the organic constituents TPH and PAH in the western pit.

Based on the relatively light exceedences identified in the west pit, a decision was made to allow natural attenuation of the impacts through the remainder of 2010 and early 2011. Samples were collected in March, 2011 and analyzed for TPH and PAH. See the attached summary table and lab reports for analytical results.

#### **NOTIFICATION OF COMPLETION**

Samples collected from both pits after allowing the pit excavations to attenuate, yielded compliant results for TPH and PAH constituents. The arsenic concentration is above the allowable concentration in Table 910-1, but is within the range of background values for 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 values as the allowable concentration for this constituent. With regards to inorganic constituents (SAR, EC, pH), the soils represented by these samples are within the former pit footprint, are greater than five feet below the current working surface, and will be at an even greater depth below the final reclaimed working surface where the constituents will have no effect on revegetation efforts.

After receipt of laboratory results demonstrating compliance for the pit bottoms, the pits were backfilled and reclaimed.

If the information provided here is satisfactory, please close the associated remediation projects, and pit facilities, and provide documentation of these record closures.

#### **ATTACHMENTS**

1. Topographic Location Map
2. Laboratory Results Summary Table
3. Laboratory Reports



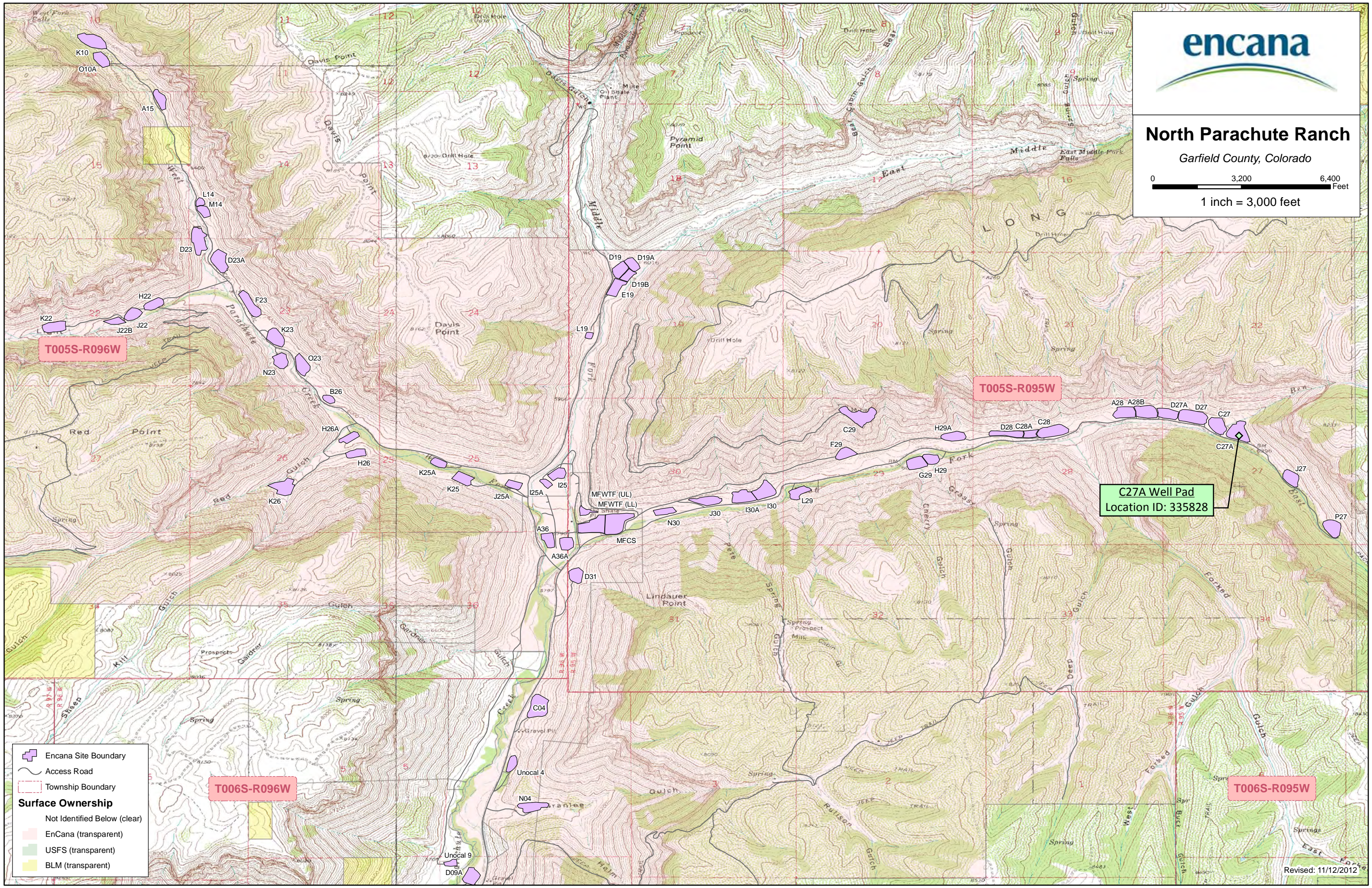


# North Parachute Ranch

Garfield County, Colorado

0 3,200 6,400 Feet

1 inch = 3,000 feet



- Encana Site Boundary
- Access Road
- Township Boundary
- Surface Ownership**
- Not Identified Below (clear)
- EnCana (transparent)
- USFS (transparent)
- BLM (transparent)

C27A Well Pad  
Location ID: 335828





Laboratory Results Summary Table

01/26/2015

Analytes (BDL = Below Detection Limit; ND = Non Detect)

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	TPH-GRO (C6-C10) Low Fraction	TPH-DRO (C10-C36) High Fraction	0.17	85	100	175	1000	1000	0.22	0.22	2.2	0.022	22	0.022	1000	1000	0.22	23	1000	EC (<4 mmhos/cm or 2x background)	SAR (calculation)	pH	Asentc	Barium - EPA Total Barium	Cadmium	Chromium (III)	Chromium (VI)	Copper	Lead (inorganic)	Mercury	Nickel (soluble salts)	Selenium	Silver	Zinc																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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07/14/10

## Technical Report for

**EnCana**

**C27A Pit Closure**

**Accutest Job Number: D14746**

**Sampling Date: 06/28/10**

**Report to:**

**EnCana**

**christopher.hines@encana.com**

**ATTN: Chris Hines**

**Total number of pages in report: 99**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

**Jesse L. Smith**  
**Laboratory Director**

**Client Service contact: Amanda Kissell 303-425-6021**

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.  
Test results relate only to samples analyzed.



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Sample Summary

EnCana

Job No: D14746

C27A Pit Closure

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
D14746-1	06/28/10	11:00 BR	06/29/10	SO	Soil	C27A-PIT BOTTOM-062810
D14746-1A	06/28/10	11:00 BR	06/29/10	SO	Soil	C27A-PIT BOTTOM-062810
D14746-2	06/28/10	11:30 BR	06/29/10	SO	Soil	C27A-STS-062810
D14746-2A	06/28/10	11:30 BR	06/29/10	SO	Soil	C27A-STS-062810
D14746-3	06/28/10	10:20 BR	06/29/10	SO	Soil	C27A-NE BACK-062810
D14746-4	06/28/10	10:45 BR	06/29/10	SO	Soil	C72A-SE BACK-062810
D14746-4A	06/28/10	10:45 BR	06/29/10	SO	Soil	C72A-SE BACK-062810

Soil samples reported on a dry weight basis unless otherwise indicated on result page.



## CASE NARRATIVE / CONFORMANCE SUMMARY

**Client:** EnCana

**Job No** D14746

**Site:** C27A Pit Closure

**Report Dat** 7/14/2010 2:29:30 PM

On 06/29/2010, 4 sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 20 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D14746 was assigned to the project. The lab sample IDs, client sample IDs, and dates of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

### Volatiles by GCMS By Method SW846 8260B

**Matrix** SO

**Batch ID:** V3V283

- All samples were analyzed within the recommended method holding time.
- Samples D14850-1MS and D14850-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

**Matrix** SO

**Batch ID:** V3V284

- All samples were analyzed within the recommended method holding time.
- Samples D14746-2MS and D14746-2MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

### Extractables by GCMS By Method SW846 8270C BY SIM

**Matrix** SO

**Batch ID:** OP2096

- All samples were extracted and analyzed within the recommended method holding time.
- Samples D14744-1MS and D14744-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The RPDs for MSD for several are outside control limits for sample OP2096-MSD. High RPD due to possible sample nonhomogeneity.
- D14746-4: Dilution required due to matrix interference.

### Extractables by GC By Method SW846 8015B M

**Matrix** SO

**Batch ID:** C:OP2341

- The data for SW846 8015B M meets quality control requirements.
- D14746-1: Analysis performed at Accutest Laboratories, San Jose, CA.

**Matrix** SO

**Batch ID:** C:OP2345

- The data for SW846 8015B M meets quality control requirements.
- D14746-2: Reporting Limit increased due to high moisture in the sample. 5grams prepared instead of the standard 10grams. Analysis performed at Accutest Laboratories, San Jose, CA.
- D14746-4: Analysis performed at Accutest Laboratories, San Jose, CA.

## Metals By Method SW846 6010B

**Matrix** AQ

**Batch ID:** MP2240

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D14745-1AMS and D14745-1AMSD were used as the QC samples for metals.

**Matrix** AQ

**Batch ID:** MP2252

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Samples D14444-1MS and D14444-1MSD were used as the QC samples for metals.
- The matrix spike (MS) recovery(s) for Sodium are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

**Matrix** SO

**Batch ID:** MP2228

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike Duplicate Recovery(s) for Barium are outside control limits. Probable cause due to matrix interference.
- RPD(s) for Serial Dilution for Selenium, Silver, Barium, Chromium, Copper, Lead, Nickel, Zinc are outside control limits for sample MP2228-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

## Metals By Method SW846 6020

**Matrix** SO

**Batch ID:** MP2229

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- RPD(s) for Serial Dilution for Arsenic are outside control limits for sample MP2229-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

## Metals By Method SW846 7471A

**Matrix** SO

**Batch ID:** MP2235

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike and Matrix Spike Duplicate Recovery(s) for Mercury are outside control limits. Probable cause due to matrix interference.

## Wet Chemistry By Method ASTM E1498-76M

**Matrix** SO

**Batch ID:** M:GN32313

- The data for ASTM E1498-76M meets quality control requirements.
- The following samples were run outside of holding time for method ASTM E1498-76M: D14746-1, D14746-2, D14746-4.
- Redox Potential Vs H2: Analysis performed at Accutest Laboratories, Marlborough, MA.

## Wet Chemistry By Method LADNR29B

**Matrix** SO

**Batch ID:** R3067

- The data for LADNR29B meets quality control requirements.
- Sodium Adsorption Ratio: Calculated as:  $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$



### Wet Chemistry By Method SM19 2540B M

**Matrix** SO

**Batch ID:** GN5140

- The data for SM19 2540B M meets quality control requirements.

### Wet Chemistry By Method SW846 3060/7196A M

**Matrix** SO

**Batch ID:** R3104

- The data for SW846 3060/7196A M meets quality control requirements.
- Chromium, Trivalent: Calculated as: (Chromium) - (Chromium, Hexavalent)

### Wet Chemistry By Method SW846 3060A/7196A

**Matrix** SO

**Batch ID:** M:GP11780

- The data for SW846 3060A/7196A meets quality control requirements.
- Chromium, Hexavalent: Analysis performed at Accutest Laboratories, Marlborough, MA.

### Wet Chemistry By Method SW846 9045C

**Matrix** SO

**Batch ID:** GN5124

- The following samples were run outside of holding time for method SW846 9045C: D14746-1, D14746-2, D14746-4.

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

## SAMPLE DELIVERY GROUP CASE NARRATIVE

**Client:** Accutest Mountain States

**Job No** D14746

**Site:** ENCACOP: C27A Pit Closure

**Report Date** 7/7/2010 4:28:39 PM

3 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were collected on 06/28/2010 and were received at Accutest on 06/29/2010 properly preserved and intact, unless noted below. These Samples received an Accutest job number of D14746. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

### Extractables by GC By Method SW846 8015B M

**Matrix** SO

**Batch ID:** OP2341

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

**Matrix** SO

**Batch ID:** OP2345

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D14746-4MS, D14746-4MSD were used as the QC samples indicated.
- RPD for MSD for TPH (C10-C28) is outside control limits for sample OP2345-MSD1.
- D14746-2: Reporting Limit increased due to high moisture in the sample. 5 grams prepared instead of the standard 10 grams.

Accutest Laboratories Northern California (ALNCA) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALNCA and as stated on the COC. ALNCA certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the ALNCA Quality Manual except as noted above. This report is to be used in its entirety. ALNCA is not responsible for any assumptions of data quality if partial data packages are used



## SAMPLE DELIVERY GROUP CASE NARRATIVE

**Client:** Accutest Mountain States**Job No** D14746**Site:** ENCACOP: C27A Pit Closure**Report Date** 7/7/2010 4:02:53 PM

3 Sample(s) were collected on 06/28/2010 and were received at Accutest on 06/29/2010 properly preserved, at 3.7 Deg. C and intact. These Samples received an Accutest job number of D14746. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

### Wet Chemistry By Method ASTM E1498-76M

**Matrix** SO**Batch ID:** GN32313

- Sample(s) D14702-1DUP were used as the QC samples for Redox Potential Vs H2.

### Wet Chemistry By Method SW846 3060A/7196A

**Matrix** SO**Batch ID:** GP11780

- All samples were distilled within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D14817-3DUP, D14817-3MS were used as the QC samples for Chromium, Hexavalent.

The Accutest Laboratories of New England certifies that all analysis were performed within method specification. It is further recommended that this report to be used in its entirety. The Accutest Laboratories of NE, Laboratory Director or assignee as verified by the signature on the cover page has authorized the release of this report(D14746).



## Sample Results

## Report of Analysis



## Report of Analysis

**Client Sample ID:** C27A-PIT BOTTOM-062810**Lab Sample ID:** D14746-1**Date Sampled:** 06/28/10**Matrix:** SO - Soil**Date Received:** 06/29/10**Method:** SW846 8260B**Percent Solids:** 83.5**Project:** C27A Pit Closure

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3V05585.D	1	07/04/10	DC	n/a	n/a	V3V283
Run #2							

**Initial Weight**

Run #1 1.00 g

Run #2

**Purgeable Aromatics**

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	6.0	1.8	ug/kg	
108-88-3	Toluene	ND	12	6.0	ug/kg	
100-41-4	Ethylbenzene	ND	12	2.4	ug/kg	
	m,p-Xylene	ND	24	4.2	ug/kg	
95-47-6	o-Xylene	ND	12	4.2	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	90%		70-130%
460-00-4	4-Bromofluorobenzene	80%		70-130%
17060-07-0	1,2-Dichloroethane-D4	93%		70-130%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b>	C27A-PIT BOTTOM-062810	<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-1	<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	83.5
<b>Method:</b>	SW846 8270C BY SIM SW846 3540C		
<b>Project:</b>	C27A Pit Closure		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01271.D	5	07/01/10	TMB	06/30/10	OP2096	E3G32
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

## BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	200	190	ug/kg	
208-96-8	Acenaphthylene	ND	1000	210	ug/kg	
120-12-7	Anthracene	ND	200	130	ug/kg	
56-55-3	Benzo(a)anthracene	ND	200	200	ug/kg	
50-32-8	Benzo(a)pyrene	168	200	130	ug/kg	J
205-99-2	Benzo(b)fluoranthene	246	200	140	ug/kg	
191-24-2	Benzo(g,h,i)perylene	162	200	120	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	200	130	ug/kg	
218-01-9	Chrysene	119	200	100	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	200	150	ug/kg	
206-44-0	Fluoranthene	127	200	120	ug/kg	J
86-73-7	Fluorene	ND	200	200	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	200	130	ug/kg	
90-12-0	1-Methylnaphthalene	ND	200	180	ug/kg	
91-57-6	2-Methylnaphthalene	ND	1000	300	ug/kg	
91-20-3	Naphthalene	ND	1000	220	ug/kg	
85-01-8	Phenanthrene	ND	200	160	ug/kg	
129-00-0	Pyrene	ND	200	130	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	101%		10-193%
321-60-8	2-Fluorobiphenyl	110%		20-138%
1718-51-0	Terphenyl-d14	119%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b>	C27A-PIT BOTTOM-062810			<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-1			<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil			<b>Percent Solids:</b>	83.5
<b>Method:</b>	SW846 8015B M SW846 3545A				
<b>Project:</b>	C27A Pit Closure				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	GG15641.D	4	07/03/10	ANC	07/01/10	C:OP2341	C:GGG470
Run #2							

	Initial Weight	Final Volume
Run #1	10.1 g	1.0 ml
Run #2		

## TPH Extractable

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH (C10-C28)	255	47	24	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
630-01-3	Hexacosane	70%		45-140%

(a) Analysis performed at Accutest Laboratories, San Jose, CA.

ND = Not detected      MDL - Method Detection Limit  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



## Report of Analysis

**Client Sample ID:** C27A-PIT BOTTOM-062810**Lab Sample ID:** D14746-1**Matrix:** SO - Soil**Project:** C27A Pit Closure**Date Sampled:** 06/28/10**Date Received:** 06/29/10**Percent Solids:** 83.5**Metals Analysis**

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	17.0	0.35	mg/kg	5	07/01/10	07/01/10 SH	SW846 6020 <sup>3</sup>	SW846 3050B <sup>6</sup>
Barium	3710	4.4	mg/kg	5	07/01/10	07/03/10 SH	SW846 6010B <sup>4</sup>	SW846 3050B <sup>5</sup>
Cadmium	< 0.89	0.89	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Chromium	20.4	0.89	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Copper	21.3	0.44	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Lead	12.5	4.4	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Mercury	< 0.11	0.11	mg/kg	1	07/01/10	07/01/10 RN	SW846 7471A <sup>2</sup>	SW846 7471A <sup>7</sup>
Nickel	15.2	2.7	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Selenium	< 4.4	4.4	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Silver	< 2.7	2.7	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Zinc	46.1	2.7	mg/kg	1	07/01/10	07/02/10 SH	SW846 6010B <sup>4</sup>	SW846 3050B <sup>5</sup>

(1) Instrument QC Batch: MA791

(2) Instrument QC Batch: MA792

(3) Instrument QC Batch: MA793

(4) Instrument QC Batch: MA798

(5) Prep QC Batch: MP2228

(6) Prep QC Batch: MP2229

(7) Prep QC Batch: MP2235

RL = Reporting Limit

## Report of Analysis

**Client Sample ID:** C27A-PIT BOTTOM-062810**Lab Sample ID:** D14746-1**Matrix:** SO - Soil**Project:** C27A Pit Closure**Date Sampled:** 06/28/10**Date Received:** 06/29/10**Percent Solids:** 83.5

## General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent <sup>a</sup>	< 2.4	2.4	mg/kg	1	07/07/10 12:04	AMA	SW846 3060A/7196A
Chromium, Trivalent <sup>b</sup>	20.4	3.3	mg/kg	1	07/07/10 12:04	AMA	SW846 3060/7196A M
Redox Potential Vs H2 <sup>a</sup>	349		mv	1	07/02/10	AMA	ASTM E1498-76M
Solids, Percent	83.5		%	1	06/30/10	JD	SM19 2540B M
Specific Conductivity	2280	1.0	umhos/cm	1	07/06/10	JD	DEPT.OF AG, BOOK N9
pH	9.45		su	1	06/30/10 08:15	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	C27A-PIT BOTTOM-062810	<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-1A	<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	83.5
<b>Project:</b>	C27A Pit Closure		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	146	2.0	mg/l	1	07/02/10	07/03/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>
Magnesium	78.3	1.0	mg/l	1	07/02/10	07/03/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>
Sodium	247	2.0	mg/l	1	07/02/10	07/03/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>

- (1) Instrument QC Batch: MA798  
(2) Prep QC Batch: MP2240

RL = Reporting Limit



Report of Analysis

<b>Client Sample ID:</b>	C27A-PIT BOTTOM-062810		
<b>Lab Sample ID:</b>	D14746-1A	<b>Date Sampled:</b>	06/28/10
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b>	06/29/10
		<b>Percent Solids:</b>	83.5
<b>Project:</b>	C27A Pit Closure		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	4.10		ratio	1	07/03/10 00:12	SH	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

## Report of Analysis

**Client Sample ID:** C27A-ST5-062810  
**Lab Sample ID:** D14746-2  
**Matrix:** SO - Soil  
**Method:** SW846 8260B  
**Project:** C27A Pit Closure

**Date Sampled:** 06/28/10  
**Date Received:** 06/29/10  
**Percent Solids:** 40.2

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3V05600.D	1	07/05/10	DC	n/a	n/a	V3V284
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.00 g	10.0 ml	100 ul
Run #2			

## Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	254	320	97	ug/kg	J
108-88-3	Toluene	925	650	320	ug/kg	
100-41-4	Ethylbenzene	353	650	130	ug/kg	J
	m,p-Xylene	2260	1300	230	ug/kg	
95-47-6	o-Xylene	800	650	230	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	88%		70-130%
460-00-4	4-Bromofluorobenzene	101%		70-130%
17060-07-0	1,2-Dichloroethane-D4	87%		70-130%

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b>	C27A-ST5-062810		
<b>Lab Sample ID:</b>	D14746-2	<b>Date Sampled:</b>	06/28/10
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b>	06/29/10
<b>Method:</b>	SW846 8270C BY SIM SW846 3540C	<b>Percent Solids:</b>	40.2
<b>Project:</b>	C27A Pit Closure		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G01272.D	5	07/02/10	TMB	06/30/10	OP2096	E3G32
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

## BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	410	390	ug/kg	
208-96-8	Acenaphthylene	ND	2100	430	ug/kg	
120-12-7	Anthracene	ND	410	270	ug/kg	
56-55-3	Benzo(a)anthracene	701	410	400	ug/kg	
50-32-8	Benzo(a)pyrene	541	410	260	ug/kg	
205-99-2	Benzo(b)fluoranthene	1170	410	300	ug/kg	
191-24-2	Benzo(g,h,i)perylene	591	410	260	ug/kg	
207-08-9	Benzo(k)fluoranthene	320	410	260	ug/kg	J
218-01-9	Chrysene	812	410	210	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	514	410	310	ug/kg	
206-44-0	Fluoranthene	1500	410	250	ug/kg	
86-73-7	Fluorene	413	410	400	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	724	410	270	ug/kg	
90-12-0	1-Methylnaphthalene	680	410	370	ug/kg	
91-57-6	2-Methylnaphthalene	1150	2100	630	ug/kg	J
91-20-3	Naphthalene	582	2100	460	ug/kg	J
85-01-8	Phenanthrene	1030	410	330	ug/kg	
129-00-0	Pyrene	447	410	280	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	122%		10-193%
321-60-8	2-Fluorobiphenyl	110%		20-138%
1718-51-0	Terphenyl-d14	104%		17-174%

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b>	C27A-ST5-062810		
<b>Lab Sample ID:</b>	D14746-2	<b>Date Sampled:</b>	06/28/10
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b>	06/29/10
<b>Method:</b>	SW846 8015B M SW846 3545A	<b>Percent Solids:</b>	40.2
<b>Project:</b>	C27A Pit Closure		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	GG15629.D	10	07/03/10	ANC	07/02/10	C:OP2345	C:GGG470
Run #2							

	Initial Weight	Final Volume
Run #1	5.00 g	1.0 ml
Run #2		

## TPH Extractable

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH (C10-C28)	2790	500	250	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
630-01-3	Hexacosane	109%		45-140%

(a) Reporting Limit increased due to high moisture in the sample. 5grams prepared instead of the standard 10grams.  
Analysis performed at Accutest Laboratories, San Jose, CA.

ND = Not detected      MDL - Method Detection Limit  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

**Client Sample ID:** C27A-ST5-062810**Lab Sample ID:** D14746-2**Matrix:** SO - Soil**Project:** C27A Pit Closure**Date Sampled:** 06/28/10**Date Received:** 06/29/10**Percent Solids:** 40.2**Metals Analysis**

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	4.1	0.82	mg/kg	5	07/01/10	07/02/10 SH	SW846 6020 <sup>3</sup>	SW846 3050B <sup>6</sup>
Barium	14700	10	mg/kg	5	07/01/10	07/03/10 SH	SW846 6010B <sup>4</sup>	SW846 3050B <sup>5</sup>
Cadmium	< 2.0	2.0	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Chromium	26.3	2.0	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Copper	34.8	1.0	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Lead	13.7	10	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Mercury	< 0.24	0.24	mg/kg	1	07/01/10	07/01/10 RN	SW846 7471A <sup>2</sup>	SW846 7471A <sup>7</sup>
Nickel	18.9	6.1	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Selenium	< 10	10	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Silver	< 6.1	6.1	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Zinc	53.8	6.1	mg/kg	1	07/01/10	07/02/10 SH	SW846 6010B <sup>4</sup>	SW846 3050B <sup>5</sup>

(1) Instrument QC Batch: MA791

(2) Instrument QC Batch: MA792

(3) Instrument QC Batch: MA793

(4) Instrument QC Batch: MA798

(5) Prep QC Batch: MP2228

(6) Prep QC Batch: MP2229

(7) Prep QC Batch: MP2235

RL = Reporting Limit

## Report of Analysis

**Client Sample ID:** C27A-ST5-062810**Lab Sample ID:** D14746-2**Matrix:** SO - Soil**Project:** C27A Pit Closure**Date Sampled:** 06/28/10**Date Received:** 06/29/10**Percent Solids:** 40.2**General Chemistry**

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent <sup>a</sup>	< 4.1	4.1	mg/kg	1	07/07/10 12:04	AMA	SW846 3060A/7196A
Chromium, Trivalent <sup>b</sup>	24.2	6.1	mg/kg	1	07/07/10 12:04	AMA	SW846 3060/7196A M
Redox Potential Vs H2 <sup>a</sup>	234		mv	1	07/02/10	AMA	ASTM E1498-76M
Solids, Percent	40.2		%	1	06/30/10	JD	SM19 2540B M
Specific Conductivity	2600	1.0	umhos/cm	1	07/06/10	JD	DEPT.OF AG, BOOK N9
pH	8.29		su	1	06/30/10 08:15	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit



Report of Analysis

<b>Client Sample ID:</b>	C27A-ST5-062810	<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-2A	<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	40.2
<b>Project:</b>	C27A Pit Closure		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	28.8	2.0	mg/l	1	07/02/10	07/03/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>
Magnesium	5.88	1.0	mg/l	1	07/02/10	07/03/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>
Sodium	558	2.0	mg/l	1	07/02/10	07/03/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>

- (1) Instrument QC Batch: MA798  
(2) Prep QC Batch: MP2240

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	C27A-ST5-062810	<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-2A	<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	40.2
<b>Project:</b>	C27A Pit Closure		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	24.7		ratio	1	07/03/10 00:18	SH	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	C27A-NE BACK-062810		
<b>Lab Sample ID:</b>	D14746-3	<b>Date Sampled:</b>	06/28/10
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b>	06/29/10
		<b>Percent Solids:</b>	87.4
<b>Project:</b>	C27A Pit Closure		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	26.0	0.33	mg/kg	5	07/01/10	07/02/10 SH	SW846 6020 <sup>1</sup>	SW846 3050B <sup>2</sup>

(1) Instrument QC Batch: MA793  
(2) Prep QC Batch: MP2229

RL = Reporting Limit

## Report of Analysis

<b>Client Sample ID:</b>	C72A-SE BACK-062810	<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-4	<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	90.5
<b>Method:</b>	SW846 8260B		
<b>Project:</b>	C27A Pit Closure		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3V05586.D	1	07/04/10	DC	n/a	n/a	V3V283
Run #2							

	Initial Weight
Run #1	1.00 g
Run #2	

## Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.5	1.7	ug/kg	
108-88-3	Toluene	ND	11	5.5	ug/kg	
100-41-4	Ethylbenzene	ND	11	2.2	ug/kg	
	m,p-Xylene	ND	22	3.9	ug/kg	
95-47-6	o-Xylene	ND	11	3.9	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
2037-26-5	Toluene-D8	88%		70-130%
460-00-4	4-Bromofluorobenzene	83%		70-130%
17060-07-0	1,2-Dichloroethane-D4	92%		70-130%

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b>	C72A-SE BACK-062810	
<b>Lab Sample ID:</b>	D14746-4	<b>Date Sampled:</b> 06/28/10
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b> 06/29/10
<b>Method:</b>	SW846 8270C BY SIM SW846 3540C	<b>Percent Solids:</b> 90.5
<b>Project:</b>	C27A Pit Closure	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	3G01273.D	5	07/02/10	TMB	06/30/10	OP2096	E3G32
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

## BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	180	170	ug/kg	
208-96-8	Acenaphthylene	ND	920	190	ug/kg	
120-12-7	Anthracene	ND	180	120	ug/kg	
56-55-3	Benzo(a)anthracene	ND	180	180	ug/kg	
50-32-8	Benzo(a)pyrene	ND	180	120	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	180	130	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	180	110	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	180	120	ug/kg	
218-01-9	Chrysene	ND	180	92	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	180	140	ug/kg	
206-44-0	Fluoranthene	ND	180	110	ug/kg	
86-73-7	Fluorene	ND	180	180	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	180	120	ug/kg	
90-12-0	1-Methylnaphthalene	ND	180	160	ug/kg	
91-57-6	2-Methylnaphthalene	ND	920	280	ug/kg	
91-20-3	Naphthalene	ND	920	200	ug/kg	
85-01-8	Phenanthrene	ND	180	150	ug/kg	
129-00-0	Pyrene	ND	180	120	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	90%		10-193%
321-60-8	2-Fluorobiphenyl	101%		20-138%
1718-51-0	Terphenyl-d14	103%		17-174%

(a) Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

**Client Sample ID:** C72A-SE BACK-062810**Lab Sample ID:** D14746-4**Date Sampled:** 06/28/10**Matrix:** SO - Soil**Date Received:** 06/29/10**Method:** SW846 8015B M SW846 3545A**Percent Solids:** 90.5**Project:** C27A Pit Closure

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	GG15630.D	5	07/03/10	ANC	07/02/10	C:OP2345	C:GGG470
Run #2							

	Initial Weight	Final Volume
Run #1	10.0 g	1.0 ml
Run #2		

## TPH Extractable

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH (C10-C28)	65.7	55	28	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
630-01-3	Hexacosane	64%		45-140%		

(a) Analysis performed at Accutest Laboratories, San Jose, CA.

ND = Not detected MDL - Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

**Client Sample ID:** C72A-SE BACK-062810**Lab Sample ID:** D14746-4**Matrix:** SO - Soil**Project:** C27A Pit Closure**Date Sampled:** 06/28/10**Date Received:** 06/29/10**Percent Solids:** 90.5**Metals Analysis**

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Arsenic	12.7	0.35	mg/kg	5	07/01/10	07/02/10 SH	SW846 6020 <sup>3</sup>	SW846 3050B <sup>6</sup>
Barium	265	0.88	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Cadmium	< 0.88	0.88	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Chromium	22.4	0.88	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Copper	20.4	0.44	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Lead	12.0	4.4	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Mercury	< 0.11	0.11	mg/kg	1	07/01/10	07/01/10 RN	SW846 7471A <sup>2</sup>	SW846 7471A <sup>7</sup>
Nickel	14.0	2.7	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Selenium	< 4.4	4.4	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Silver	< 2.7	2.7	mg/kg	1	07/01/10	07/01/10 JM	SW846 6010B <sup>1</sup>	SW846 3050B <sup>5</sup>
Zinc	45.2	2.7	mg/kg	1	07/01/10	07/02/10 SH	SW846 6010B <sup>4</sup>	SW846 3050B <sup>5</sup>

(1) Instrument QC Batch: MA791

(2) Instrument QC Batch: MA792

(3) Instrument QC Batch: MA793

(4) Instrument QC Batch: MA798

(5) Prep QC Batch: MP2228

(6) Prep QC Batch: MP2229

(7) Prep QC Batch: MP2235

RL = Reporting Limit

## Report of Analysis

**Client Sample ID:** C72A-SE BACK-062810**Lab Sample ID:** D14746-4**Date Sampled:** 06/28/10**Matrix:** SO - Soil**Date Received:** 06/29/10**Percent Solids:** 90.5**Project:** C27A Pit Closure

## General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Chromium, Hexavalent <sup>a</sup>	< 2.2	2.2	mg/kg	1	07/07/10 12:04	AMA	SW846 3060A/7196A
Chromium, Trivalent <sup>b</sup>	22.4	3.1	mg/kg	1	07/07/10 12:04	AMA	SW846 3060/7196A M
Redox Potential Vs H2 <sup>a</sup>	375		mv	1	07/02/10	AMA	ASTM E1498-76M
Solids, Percent	90.5		%	1	06/30/10	JD	SM19 2540B M
Specific Conductivity	445	1.0	umhos/cm	1	07/06/10	JD	DEPT.OF AG, BOOK N9
pH	9.44		su	1	06/30/10 08:15	JK	SW846 9045C

(a) Analysis performed at Accutest Laboratories, Marlborough, MA.

(b) Calculated as: (Chromium) - (Chromium, Hexavalent)

RL = Reporting Limit

Report of Analysis

<b>Client Sample ID:</b>	C72A-SE BACK-062810		
<b>Lab Sample ID:</b>	D14746-4A	<b>Date Sampled:</b>	06/28/10
<b>Matrix:</b>	SO - Soil	<b>Date Received:</b>	06/29/10
		<b>Percent Solids:</b>	90.5
<b>Project:</b>	C27A Pit Closure		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	11.3	2.0	mg/l	1	07/06/10	07/06/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>
Magnesium	12.8	1.0	mg/l	1	07/06/10	07/06/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>
Sodium	61.2	2.0	mg/l	1	07/06/10	07/06/10 SH	SW846 6010B <sup>1</sup>	EPA 200.7 <sup>2</sup>

(1) Instrument QC Batch: MA800  
(2) Prep QC Batch: MP2252

RL = Reporting Limit



Report of Analysis

<b>Client Sample ID:</b>	C72A-SE BACK-062810	<b>Date Sampled:</b>	06/28/10
<b>Lab Sample ID:</b>	D14746-4A	<b>Date Received:</b>	06/29/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	90.5
<b>Project:</b>	C27A Pit Closure		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio <sup>a</sup>	2.96		ratio	1	07/06/10 18:07	SH	LADNR29B

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit



## Misc. Forms

### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody



D14746

## 4.1

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## GC/MS Volatiles

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### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries



## Method Blank Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V3V283-MB1	3V05570.D	1	07/03/10	DC	n/a	n/a	V3V283

The QC reported here applies to the following samples:

Method: SW846 8260B

D14746-1, D14746-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	5.0	1.5	ug/kg	
100-41-4	Ethylbenzene	ND	10	2.0	ug/kg	
108-88-3	Toluene	ND	10	5.0	ug/kg	
	m,p-Xylene	ND	20	3.5	ug/kg	
95-47-6	o-Xylene	ND	10	3.5	ug/kg	

CAS No.	Surrogate Recoveries	Limits
2037-26-5	Toluene-D8	88% 70-130%
460-00-4	4-Bromofluorobenzene	81% 70-130%
17060-07-0	1,2-Dichloroethane-D4	84% 70-130%

## Method Blank Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V3V284-MB1	3V05593.D	1	07/05/10	DC	n/a	n/a	V3V284

The QC reported here applies to the following samples:

Method: SW846 8260B

D14746-2

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	100	30	ug/kg	
100-41-4	Ethylbenzene	ND	200	40	ug/kg	
108-88-3	Toluene	ND	200	100	ug/kg	
	m,p-Xylene	ND	400	70	ug/kg	
95-47-6	o-Xylene	ND	200	70	ug/kg	

CAS No.	Surrogate Recoveries	Limits
2037-26-5	Toluene-D8	88% 70-130%
460-00-4	4-Bromofluorobenzene	81% 70-130%
17060-07-0	1,2-Dichloroethane-D4	89% 70-130%

## Blank Spike Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V3V283-BS1	3V05571.D	1	07/03/10	DC	n/a	n/a	V3V283

The QC reported here applies to the following samples:

Method: SW846 8260B

D14746-1, D14746-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	48.2	96	68-130
100-41-4	Ethylbenzene	50	53.8	108	70-130
108-88-3	Toluene	50	53.5	107	70-130
	m,p-Xylene	50	45.9	92	53-130
95-47-6	o-Xylene	50	47.8	96	61-130

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	89%	70-130%
460-00-4	4-Bromofluorobenzene	88%	70-130%
17060-07-0	1,2-Dichloroethane-D4	85%	70-130%

## Blank Spike Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V3V284-BS1	3V05594.D	1	07/05/10	DC	n/a	n/a	V3V284

The QC reported here applies to the following samples:

Method: SW846 8260B

D14746-2

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	48.6	97	68-130
100-41-4	Ethylbenzene	50	54.0	108	70-130
108-88-3	Toluene	50	52.1	104	70-130
	m,p-Xylene	50	45.9	92	53-130
95-47-6	o-Xylene	50	47.3	95	61-130

CAS No.	Surrogate Recoveries	BSP	Limits
2037-26-5	Toluene-D8	89%	70-130%
460-00-4	4-Bromofluorobenzene	87%	70-130%
17060-07-0	1,2-Dichloroethane-D4	85%	70-130%

# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D14850-1MS	3V05573.D	1	07/03/10	DC	n/a	n/a	V3V283
D14850-1MSD	3V05574.D	1	07/03/10	DC	n/a	n/a	V3V283
D14850-1	3V05572.D	1	07/03/10	DC	n/a	n/a	V3V283

The QC reported here applies to the following samples:

Method: SW846 8260B

D14746-1, D14746-4

CAS No.	Compound	D14850-1 ug/kg	Spike Q	ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND		290	273	94	282	97	3	55-140/30
100-41-4	Ethylbenzene	ND		290	294	101	303	104	3	56-139/30
108-88-3	Toluene	ND		290	302	104	318	110	5	57-144/30
	m,p-Xylene	ND		290	254	88	255	88	0	47-130/30
95-47-6	o-Xylene	ND		290	263	91	266	92	1	51-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D14850-1	Limits
2037-26-5	Toluene-D8	90%	91%	92%	70-130%
460-00-4	4-Bromofluorobenzene	84%	85%	80%	70-130%
17060-07-0	1,2-Dichloroethane-D4	88%	84%	89%	70-130%



# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D14746-2MS	3V05601.D	1	07/05/10	DC	n/a	n/a	V3V284
D14746-2MSD	3V05602.D	1	07/05/10	DC	n/a	n/a	V3V284
D14746-2	3V05600.D	1	07/05/10	DC	n/a	n/a	V3V284

The QC reported here applies to the following samples:

Method: SW846 8260B

D14746-2

CAS No.	Compound	D14746-2 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	254	J	16200	15000	91	15000	91	0	55-140/30
100-41-4	Ethylbenzene	353	J	16200	17600	107	17800	108	1	56-139/30
108-88-3	Toluene	925		16200	16900	99	17600	103	4	57-144/30
	m,p-Xylene	2260		16200	16900	91	17100	92	1	47-130/30
95-47-6	o-Xylene	800		16200	16100	95	16300	96	1	51-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D14746-2	Limits
2037-26-5	Toluene-D8	85%	86%	88%	70-130%
460-00-4	4-Bromofluorobenzene	100%	101%	101%	70-130%
17060-07-0	1,2-Dichloroethane-D4	76%	77%	87%	70-130%



## GC/MS Semi-volatiles

### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

## Method Blank Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2096-MB	3G01265.D	1	07/01/10	TMB	06/30/10	OP2096	E3G32

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D14746-1, D14746-2, D14746-4

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	6.7	6.2	ug/kg	
208-96-8	Acenaphthylene	ND	33	6.9	ug/kg	
120-12-7	Anthracene	ND	6.7	4.3	ug/kg	
56-55-3	Benzo(a)anthracene	ND	6.7	6.5	ug/kg	
50-32-8	Benzo(a)pyrene	ND	6.7	4.2	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	6.7	4.8	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	6.7	4.2	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	6.7	4.2	ug/kg	
218-01-9	Chrysene	ND	6.7	3.3	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	6.7	4.9	ug/kg	
206-44-0	Fluoranthene	ND	6.7	4.1	ug/kg	
86-73-7	Fluorene	ND	6.7	6.5	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	6.7	4.4	ug/kg	
90-12-0	1-Methylnaphthalene	ND	6.7	5.9	ug/kg	
91-57-6	2-Methylnaphthalene	ND	33	10	ug/kg	
91-20-3	Naphthalene	ND	33	7.4	ug/kg	
85-01-8	Phenanthrene	ND	6.7	5.3	ug/kg	
129-00-0	Pyrene	ND	6.7	4.5	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	72% 10-193%
321-60-8	2-Fluorobiphenyl	70% 20-138%
1718-51-0	Terphenyl-d14	88% 17-174%

## Blank Spike Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2096-BS	3G01266.D	1	07/01/10	TMB	06/30/10	OP2096	E3G32

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D14746-1, D14746-2, D14746-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	58.7	70	40-136
208-96-8	Acenaphthylene	83.3	57.2	69	42-139
120-12-7	Anthracene	83.3	60.1	72	40-141
56-55-3	Benzo(a)anthracene	83.3	65.5	79	38-143
50-32-8	Benzo(a)pyrene	83.3	60.6	73	39-145
205-99-2	Benzo(b)fluoranthene	83.3	60.0	72	38-151
191-24-2	Benzo(g,h,i)perylene	83.3	60.9	73	35-136
207-08-9	Benzo(k)fluoranthene	83.3	59.1	71	38-147
218-01-9	Chrysene	83.3	61.2	73	39-137
53-70-3	Dibenzo(a,h)anthracene	83.3	61.4	74	35-139
206-44-0	Fluoranthene	83.3	63.4	76	34-132
86-73-7	Fluorene	83.3	59.0	71	41-136
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	54.1	65	31-144
90-12-0	1-Methylnaphthalene	83.3	61.3	74	36-130
91-57-6	2-Methylnaphthalene	83.3	61.4	74	40-131
91-20-3	Naphthalene	83.3	58.8	71	36-130
85-01-8	Phenanthrene	83.3	60.1	72	40-135
129-00-0	Pyrene	83.3	59.1	71	29-157

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	76%	10-193%
321-60-8	2-Fluorobiphenyl	71%	20-138%
1718-51-0	Terphenyl-d14	73%	17-174%

# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D14746  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2096-MS	3G01268.D	2	07/01/10	TMB	06/30/10	OP2096	E3G32
OP2096-MSD	3G01269.D	2	07/01/10	TMB	06/30/10	OP2096	E3G32
D14744-1 <sup>a</sup>	3G01267.D	2	07/01/10	TMB	06/30/10	OP2096	E3G32

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

D14746-1, D14746-2, D14746-4

CAS No.	Compound	D14744-1 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		91.8	48.5	53	66.1	72	31* <sup>b</sup>	20-151/30
208-96-8	Acenaphthylene	ND		91.8	49.9	54	67.7	74	30	23-156/30
120-12-7	Anthracene	ND		91.8	48.2	52	68.0	74	34* <sup>b</sup>	25-149/30
56-55-3	Benzo(a)anthracene	ND		91.8	57.5	63	78.9	86	31* <sup>b</sup>	22-157/30
50-32-8	Benzo(a)pyrene	ND		91.8	55.1	60	73.3	80	28	23-153/30
205-99-2	Benzo(b)fluoranthene	ND		91.8	57.0	62	75.9	83	28	22-161/30
191-24-2	Benzo(g,h,i)perylene	ND		91.8	53.6	58	73.6	80	31* <sup>b</sup>	20-158/30
207-08-9	Benzo(k)fluoranthene	ND		91.8	46.3	50	64.3	70	33* <sup>b</sup>	17-161/30
218-01-9	Chrysene	ND		91.8	47.1	51	65.8	72	33* <sup>b</sup>	16-159/30
53-70-3	Dibenzo(a,h)anthracene	ND		91.8	59.6	65	78.8	86	28	21-154/30
206-44-0	Fluoranthene	ND		91.8	56.3	61	81.8	89	37* <sup>b</sup>	16-140/30
86-73-7	Fluorene	ND		91.8	50.5	55	69.5	76	32* <sup>b</sup>	15-153/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		91.8	62.7	68	85.3	93	31* <sup>b</sup>	21-159/30
90-12-0	1-Methylnaphthalene	ND		91.8	50.0	54	67.5	73	30	10-148/30
91-57-6	2-Methylnaphthalene	ND		91.8	52.4	57	67.1	73	25	10-181/30
91-20-3	Naphthalene	ND		91.8	49.7	54	59.1	64	17	10-176/30
85-01-8	Phenanthrene	ND		91.8	48.0	52	67.7	74	34* <sup>b</sup>	22-152/30
129-00-0	Pyrene	ND		91.8	51.3	56	72.9	79	35* <sup>b</sup>	10-200/30

CAS No.	Surrogate Recoveries	MS	MSD	D14744-1	Limits
4165-60-0	Nitrobenzene-d5	56%	66%	64%	10-193%
321-60-8	2-Fluorobiphenyl	54%	73%	67%	20-138%
1718-51-0	Terphenyl-d14	55%	76%	71%	17-174%

(a) Dilution required due to matrix interference.

(b) High RPD due to possible sample nonhomogeneity.





## Metals Analysis

### QC Data Summaries

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Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date: 07/01/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	10	.7	2		
Antimony	3.0	.17	.5		
Arsenic	2.5	.28	.72		
Barium	1.0	.014	.05	0.090	<1.0
Beryllium	1.0	.14	.21		
Boron	5.0	.35	.91		
Cadmium	1.0	.022	.12	0.050	<1.0
Calcium	40	1.7	2.7		
Chromium	1.0	.027	.18	0.090	<1.0
Cobalt	0.50	.048	.058		
Copper	0.50	.16	.38	-0.040	<0.50
Iron	7.0	.77	.91		
Lead	5.0	.13	.24	-0.10	<5.0
Lithium	0.20	.076	.09		
Magnesium	20	.58	.93		
Manganese	0.50	.021	.028		
Molybdenum	1.0	.041	.16		
Nickel	3.0	.038	.075	0.0	<3.0
Phosphorus	10	1.5	3.5		
Potassium	200	38	130		
Selenium	5.0	.28	.54	-0.020	<5.0
Silicon	5.0	1.2	.68		
Silver	3.0	.098	.068	-0.10	<3.0
Sodium	40	23	6.3		
Strontium	5.0	.0091	.02		
Thallium	1.0	.31	.21		
Tin	5.0	1.4	.56		
Titanium	1.0	.0098	.041		
Uranium	5.0	.22	.53		
Vanadium	1.0	.027	.034		
Zinc	3.0	.076	.49	0.10	<3.0

Associated samples MP2228: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date: 07/01/10

Metal	D14510-1 Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	anr				
Barium	139	276	166	82.8	75-125
Beryllium					
Boron	anr				
Cadmium	0.35	34.0	41.4	81.3	75-125
Calcium					
Chromium	18.4	54.4	41.4	87.0	75-125
Cobalt					
Copper	47.5	83.2	41.4	86.3	75-125
Iron					
Lead	15.5	83.4	82.8	82.0	75-125
Lithium					
Magnesium					
Manganese					
Molybdenum					
Nickel	22.2	57.2	41.4	84.6	75-125
Phosphorus					
Potassium					
Selenium	3.1	69.5	82.8	80.2	75-125
Silicon					
Silver	0.33	14.8	16.6	87.4	75-125
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc	99.1	133	41.4	81.9	75-125

Associated samples MP2228: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date: 07/01/10

Metal	D14510-1 Original	MSD	Spikelot MPICPALL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	anr					
Barium	139	254	166	69.5N(a)	8.3	20
Beryllium						
Boron	anr					
Cadmium	0.35	33.5	41.4	80.1	1.5	20
Calcium						
Chromium	18.4	54.1	41.4	86.3	0.6	20
Cobalt						
Copper	47.5	82.9	41.4	85.6	0.4	20
Iron						
Lead	15.5	81.8	82.8	80.1	1.9	20
Lithium						
Magnesium						
Manganese						
Molybdenum						
Nickel	22.2	55.4	41.4	80.2	3.2	20
Phosphorus						
Potassium						
Selenium	3.1	67.8	82.8	78.2	2.5	20
Silicon						
Silver	0.33	14.6	16.6	86.2	1.4	20
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	99.1	133	41.4	81.9	0.0	20

Associated samples MP2228: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested  
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date: 07/01/10

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	197	200	98.5	80-120
Beryllium				
Boron	anr			
Cadmium	46.7	50	93.4	80-120
Calcium				
Chromium	50.8	50	101.6	80-120
Cobalt				
Copper	49.5	50	99.0	80-120
Iron				
Lead	96.7	100	96.7	80-120
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	48.8	50	97.6	80-120
Phosphorus				
Potassium				
Selenium	93.3	100	93.3	80-120
Silicon				
Silver	19.4	20	97.0	80-120
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	47.1	50	94.2	80-120

Associated samples MP2228: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: mg/kg

Prep Date:

Metal

(anr) Analyte not requested

# SERIAL DILUTION RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/01/10

Metal	D14510-1 Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	1680	2010	19.7*(a)	0-10
Beryllium				
Boron	anr			
Cadmium	4.20	4.50	7.1	0-10
Calcium				
Chromium	222	267	20.3*(a)	0-10
Cobalt				
Copper	574	634	10.4*(a)	0-10
Iron				
Lead	187	224	19.5*(a)	0-10
Lithium				
Magnesium				
Manganese				
Molybdenum				
Nickel	269	332	23.5*(a)	0-10
Phosphorus				
Potassium				
Selenium	37.9	60.5	59.6 (b)	0-10
Silicon				
Silver	4.00	5.00	25.0 (b)	0-10
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	1200	1530	27.7*(a)	0-10

Associated samples MP2228: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2228  
Matrix Type: SOLID

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

- (anr) Analyte not requested  
(a) Serial dilution indicates possible matrix interference.  
(b) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

7.1.4

7

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2229  
Matrix Type: SOLID

Methods: SW846 6020  
Units: mg/kg

Prep Date: 07/01/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	25	.14	.89		
Antimony	0.20	.001	.045		
Arsenic	0.40	.049	.26	0.041	<0.40
Barium	1.0	.0035	.17		
Beryllium	0.10	.0075	.014		
Boron	20	.97	2		
Cadmium	0.050	.023	.048		
Calcium	200	1.8	6.1		
Chromium	1.0	.021	.23		
Cobalt	0.10	.0033	.088		
Copper	1.0	.011	.14		
Iron	20	.81	6.1		
Lead	0.25	.0012	.18		
Magnesium	50	.067	1.3		
Manganese	0.50	.007	.089		
Molybdenum	0.50	.0044	.2		
Nickel	1.0	.0029	.074		
Phosphorus	30	1.8	5.6		
Potassium	100	2	9.1		
Selenium	0.20	.075	.14		
Silver	0.050	.0008	.029		
Sodium	250	.8	1.8		
Strontium	10	.004	.047		
Thallium	0.10	.015	.071		
Tin	5.0	.006	.17		
Titanium	1.0	.035	.071		
Uranium	0.25	.00038	.12		
Vanadium	2.0	.052	.99		
Zinc	5.0	.039	.53		

Associated samples MP2229: D14746-1, D14746-2, D14746-3, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2229  
Matrix Type: SOLID

Methods: SW846 6020  
Units: mg/kg

Prep Date: 07/01/10

Metal	D14510-1 Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic	1.7	73.1	82.8	86.3	60-119
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2229: D14746-1, D14746-2, D14746-3, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2229  
Matrix Type: SOLID

Methods: SW846 6020  
Units: mg/kg

Prep Date: 07/01/10

Metal	D14510-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	1.7	75.5	82.8	89.2	3.2	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP2229: D14746-1, D14746-2, D14746-3, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2229  
Matrix Type: SOLID

Methods: SW846 6020  
Units: mg/kg

Prep Date: 07/01/10

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	100	100	100.0	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2229: D14746-1, D14746-2, D14746-3, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

7.2.3  
7

SERIAL DILUTION RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2229  
Matrix Type: SOLID

Methods: SW846 6020  
Units: ug/l

Prep Date: 07/01/10

Metal	D14510-1			QC	
	Original	SDL 5:25	%DIF	Limits	
Aluminum					
Antimony					
Arsenic	20.7	24.6	18.8 (a)	0-10	
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Magnesium					
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2229: D14746-1, D14746-2, D14746-3, D14746-4

Results < IDL are shown as zero for calculation purposes

(\*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2235  
Matrix Type: SOLID

Methods: SW846 7471A  
Units: mg/kg

Prep Date: 07/01/10

Metal	RL	IDL	MDL	MB	
				raw	final
Mercury	0.10	.0011	.0012	0.00027	<0.10

Associated samples MP2235: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested

7.3.1

7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2235  
Matrix Type: SOLID

Methods: SW846 7471A  
Units: mg/kg

Prep Date: 07/01/10

Metal	D14510-1 Original MS	Spikelot HGWSR1	% Rec	QC Limits
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Mercury	0.035	0.39	0.409	79.5N(a)	85-115
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Associated samples MP2235: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested  
(a) Spike recovery indicates possible matrix interference.

7.3.2  
7

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2235  
Matrix Type: SOLID

Methods: SW846 7471A  
Units: mg/kg

Prep Date: 07/01/10

Metal	D14510-1 Original MSD	Spikelot HGWSR1	% Rec	MSD RPD	QC Limit
Mercury	0.035	0.38	0.401	78.5N(a) 2.6	20

Associated samples MP2235: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested  
(a) Spike recovery indicates possible matrix interference.

7.3.2  
7

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2235  
Matrix Type: SOLID

Methods: SW846 7471A  
Units: mg/kg

Prep Date: 07/01/10

Metal	BSP Result	Spikelot HGWSR1	% Rec	QC Limits
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Mercury 0.35 0.4 87.5 80-120

Associated samples MP2235: D14746-1, D14746-2, D14746-4

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits  
(anr) Analyte not requested



BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/02/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	35	250		
Antimony	150	8.5	65		
Arsenic	130	14	33		
Barium	50	.7	12		
Beryllium	50	7	22		
Boron	250	18	93		
Cadmium	50	1.1	6		
Calcium	2000	85	46	432	<2000
Chromium	50	1.4	8		
Cobalt	25	2.4	1.5		
Copper	25	8	14		
Iron	350	39	50		
Lead	250	6.5	16		
Lithium	10	3.8	8		
Magnesium	1000	29	62	206	<1000
Manganese	25	1.1	3.5		
Molybdenum	50	2.1	6		
Nickel	150	1.9	3		
Phosphorus	500	75	270		
Potassium	5000	1900	2700		
Selenium	250	14	36		
Silicon	250	60	100		
Silver	150	4.9	1.5		
Sodium	2000	1200	110	-470	<2000
Strontium	25	.46	17		
Thallium	50	16	11		
Tin	250	70	22		
Titanium	50	.49	3.5		
Uranium	250	11	20		
Vanadium	50	1.4	1.5		
Zinc	150	3.8	8.5		

Associated samples MP2240: D14746-1A, D14746-2A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/02/10

Metal	D14745-1A Original MS		Spikelot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	21100	152000	125000	104.7	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	6970	132000	125000	100.0	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	20900	148000	125000	101.7	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2240: D14746-1A, D14746-2A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/02/10

Metal	D14745-1A Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	21100	151000	125000	103.9
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	6970	131000	125000	99.2
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	20900	148000	125000	101.7
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2240: D14746-1A, D14746-2A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/02/10

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	134000	125000	107.2	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	118000	125000	94.4	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	120000	125000	96.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2240: D14746-1A, D14746-2A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits



SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2240  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/06/10

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	35	250		
Antimony	150	8.5	65		
Arsenic	130	14	33		
Barium	50	.7	12		
Beryllium	50	7	22		
Boron	250	18	93		
Cadmium	50	1.1	6		
Calcium	2000	85	46	22.5	<2000
Chromium	50	1.4	8		
Cobalt	25	2.4	1.5		
Copper	25	8	14		
Iron	350	39	50		
Lead	250	6.5	16		
Lithium	10	3.8	8		
Magnesium	1000	29	62	12.5	<1000
Manganese	25	1.1	3.5		
Molybdenum	50	2.1	6		
Nickel	150	1.9	3		
Phosphorus	500	75	270		
Potassium	5000	1900	2700		
Selenium	250	14	36		
Silicon	250	60	100		
Silver	150	4.9	1.5		
Sodium	2000	1200	110	91.0	<2000
Strontium	25	.46	17		
Thallium	50	16	11		
Tin	250	70	22		
Titanium	50	.49	3.5		
Uranium	250	11	20		
Vanadium	50	1.4	1.5		
Zinc	150	3.8	8.5		

Associated samples MP2252: D14746-4A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

BLANK RESULTS SUMMARY  
Part 2 - Method Blanks

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/06/10

Metal	D14444-1 Original MS		SpikeLot MPICPALL % Rec		QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	851000	981000	125000	104.8	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	126000	244000	125000	84.8	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	14500000	14800000	125000	240.0(a)	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP2252: D14746-4A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested  
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/06/10

Metal	D14444-1 Original	MSD	Spikelot MPICPAL	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	851000	964000	125000	91.2	3.7	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	126000	240000	125000	81.6	4.1	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	14500000	14600000	125000	80.0	1.4	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP2252: D14746-4A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits  
(anr) Analyte not requested

## SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date: 07/06/10

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	123000	125000	98.4	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	120000	125000	96.0	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	125000	125000	100.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP2252: D14746-4A

Results < IDL are shown as zero for calculation purposes  
(\*) Outside of QC limits



SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

QC Batch ID: MP2252  
Matrix Type: AQUEOUS

Methods: SW846 6010B  
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested



## General Chemistry

### QC Data Summaries

∞

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D14746  
Account: ENCACOP - EnCana  
Project: C27A Pit Closure

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP2292/GN5202			umhos/cm	9970	9970	93.3	90-110%
pH	GN5124			su	8.00	8.03	100.4	99.3-100.7%
pH	GN5124			su	8.00	8.03	100.4	99.3-100.7%

Associated Samples:  
Batch GN5124: D14746-1, D14746-2, D14746-4  
Batch GP2292: D14746-1, D14746-2, D14746-4  
(\*) Outside of QC limits



## Misc. Forms

### Custody Documents and Other Forms

(Accutest Northern California, Inc.)

Includes the following where applicable:

- Chain of Custody

## CHAIN OF CUSTODY

4036 Youngfield St., Wheat Ridge, CO 80033  
303-425-6021 FAX: 303-425-6854

Accutest Job #:	D14746
Accutest Quote #:	0
AMS P.O. #:	
Project No.:	

[illegible]

## D14746: Chain of Custody

Page 1 of 2

**Accutest Northern California, Inc.**

# **Accutest Mountain States Laboratory (AMS)** **Subcontractor Order**

**Date/Time:** 6/30/10 9:31 AM  
**Accutest Job No.** D14746  
**Client Project:**  
**CSR:** Amanda Kissell

**Sub Lab:** Accutest - Northern California  
**Address:** 2105 Lundy Ave.  
 San Jose CA 95131  
**Contact:** Sample Management  
**Phone:** (408) 588-0200

Sample #:	Analyses
D14746 - 1	B8015DRO
2	B8015DRO
4	B8015DRO
0	
0	
0	
Turn Around 3 - 5 Business Day Rush	

**Sample Management receipt:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
*(Print form and sign/date. Submit this form to Login Dept. with the SUB COC.)*

e/sop\_new/subform



## GC Semi-volatiles

### QC Data Summaries

(Accutest Northern California, Inc.)

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Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D14746  
Account: ALMS Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2341-MB	GG15559.D	1	07/02/10	JH	07/01/10	OP2341	GGG469

The QC reported here applies to the following samples: Method: SW846 8015B M

D14746-1

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH (C10-C28)	ND	10	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
630-01-3	Hexacosane	83% 45-140%

10.1.1  
10



Method Blank Summary

Job Number: D14746  
Account: ALMS Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2345-MB	HH7149.D	1	07/02/10	JH	07/02/10	OP2345	GHH308

The QC reported here applies to the following samples: Method: SW846 8015B M  
D14746-2, D14746-4

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH (C10-C28)	ND	10	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
630-01-3	Hexacosane	65% 45-140%

10.1.2  
10

Blank Spike/Blank Spike Duplicate Summary

Job Number: D14746  
Account: ALMS Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2341-BS	GG15560.D	1	07/02/10	JH	07/01/10	OP2341	GGG469
OP2341-BSD	GG15561.D	1	07/02/10	JH	07/01/10	OP2341	GGG469

The QC reported here applies to the following samples: Method: SW846 8015B M

D14746-1

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	BSD mg/kg	BSD %	RPD	Limits Rec/RPD
	TPH (C10-C28)	100	70.4	70	79.4	79	12	45-140/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
630-01-3	Hexacosane	88%	91%	45-140%

10.2.1  
10

Blank Spike/Blank Spike Duplicate Summary

Job Number: D14746  
Account: ALMS Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2345-BS	HH7150.D	1	07/02/10	JH	07/02/10	OP2345	GHH308
OP2345-BSD	HH7151.D	1	07/02/10	JH	07/02/10	OP2345	GHH308

The QC reported here applies to the following samples: Method: SW846 8015B M

D14746-2, D14746-4

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	BSD mg/kg	BSD %	RPD	Limits Rec/RPD
	TPH (C10-C28)	100	60.8	61	54.5	55	11	45-140/30

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
630-01-3	Hexacosane	79%	71%	45-140%

10.2.2  
10

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D14746  
Account: ALMS Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2345-MS1	GG15633.D	5	07/03/10	JH	07/02/10	OP2345	GGG470
OP2345-MSD1	GG15634.D	5	07/03/10	JH	07/02/10	OP2345	GGG470
D14746-4	GG15630.D	5	07/03/10	JH	07/02/10	OP2345	GGG470

The QC reported here applies to the following samples: Method: SW846 8015B M

D14746-2, D14746-4

CAS No.	Compound	D14746-4 mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH (C10-C28)	65.7	110	143	70	198	120	32*	45-140/30

CAS No.	Surrogate Recoveries	MS	MSD	D14746-4	Limits
630-01-3	Hexacosane	69%	97%	64%	45-140%

10.3.1  
10



## Misc. Forms

### Custody Documents and Other Forms

(Accutest Labs of New England, Inc.)

---

Includes the following where applicable:

- Chain of Custody

Accutest Job #: D14746

Accutest Quote #:

AMS P.O. #:

Project No.:

Client Information						Subcontract Laboratory Information							Analytical Information														
Name <b>Accutest Mountain States (AMS)</b>						Name Accutest - New England																					
Address <b>4036 Youngfield St.</b>						Address 495 Technology Center West, BLDG O																					
City <b>Wheat Ridge,</b>		State <b>CO</b>		Zip <b>80033</b>		City Marlborough		State MA		Zip 01752																	
Send Report to: Tiffany Pham						Contact:																					
Any questions contact: Amanda Kissell						Sample Management																					
Phone/Fax #: (303) 425-6021; (303) 425-6854						Phone: (508) 481-6200																					
Field ID / Point of Collection						Collection			Matrix	# of bottles	Preservation						Xcra	eh				Comments					
						Date	Time				HCL	NaOH	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	None												
D14746 -1						6/28/10	11:00 AM		Soil	1						X	X										
-2							11:30 AM		Soil	1						X	X										
-4							10:45 AM		Soil	1						X	X										
-																											
-																											
-																											
-																											
-																											
-																											
-																											
-																											
Turnaround Information						Data Deliverable Information										Comments / Remarks											
<input checked="" type="checkbox"/> 3 - 5 Business Day Rush      Approved By: _____						<input type="checkbox"/> Commercial "A"						<input type="checkbox"/> PDF						Please use Colorado regulations and RLs.  146									
<input type="checkbox"/> Other _____ (Days)						<input type="checkbox"/> Commercial "B"						<input type="checkbox"/> Compact Disk Deliverable															
						<input type="checkbox"/> Commercial "BN"						<input type="checkbox"/> Electronic Delivery: _____															
						<input type="checkbox"/> Reduced Tier 1						<input type="checkbox"/> State Forms															
						<input type="checkbox"/> Full Tier 1						<input type="checkbox"/> Other (Specify) _____															
Sample Custody must be documented below each time samples change possession, including courier delivery.																				For Subcontract Laboratory Use Only							
Relinquished by:		Date & Time:		Received By:		Date & Time:		Seal #:		Headspace:																	
1		[Signature] 9/30/10		1 FedEx						Yes <input type="checkbox"/> No <input type="checkbox"/> NA <input type="checkbox"/>																	
2		FedEx [Signature]		2 [Signature] 7/1/10 10:10						Preserved where applicable:																	
3				3						Temperature °C 3.7		On Ice <input checked="" type="checkbox"/>															

## D14746: Chain of Custody

Page 1 of 2

**Accutest Labs of New England, Inc.**



## Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D14746

Client: AMS

Immediate Client Services Action Required: No

Date / Time Received: 7/1/2010 10:10:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: N/A

Airbill #'s: N/A

### Cooler Security

Y or N

Y or N

- |                           |                                     |                          |                       |                                     |                          |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present:       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact:  | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Cooler Temperature

Y or N

- |                              |                                     |                          |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved:   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | Infrared gun                        |                          |
| 3. Cooler media:             | Ice (bag)                           |                          |

### Quality Control Preservation

Y or N

N/A

- |                                 |                                     |                          |                                     |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/>            | <input type="checkbox"/> |                                     |
| 2. Trip Blank listed on COC:    | <input type="checkbox"/>            | <input type="checkbox"/> |                                     |
| 3. Samples preserved properly:  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |                                     |
| 4. VOCs headspace free:         | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

### Sample Integrity - Documentation

Y or N

- |  |                                     |                          |
|--|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles:   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete:        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

### Sample Integrity - Condition

Y or N

- |                                  |                                     |                          |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT:       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample:          | Intact                              |                          |

### Sample Integrity - Instructions

Y or N N/A

- |   |                                     |                                     |                                     |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear:           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 2. Bottles received for unspecified tests | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                     |
| 3. Sufficient volume rec'd for analysis:  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 4. Compositing instructions clear:        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear:          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Comments

Accutest Laboratories  
V:508.481.6200

495 Technology Center West, Bldg One  
F: 508.481.7753

Marlborough, MA  
www.accutest.com

D14746: Chain of Custody

Page 2 of 2



## General Chemistry

### QC Data Summaries

(Accutest Labs of New England, Inc.)

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Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries



METHOD BLANK AND SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D14746  
Account: ALMS - Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Chromium, Hexavalent	GP11780/GN32325	2.0	0.0	mg/kg	40	36.9	92.3	80-120%
Chromium, Hexavalent	GP11780/GN32325			mg/kg	844	818	96.9	80-120%

Associated Samples:  
Batch GP11780: D14746-1, D14746-2, D14746-4  
(\*) Outside of QC limits

DUPLICATE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D14746  
Account: ALMS - Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chromium, Hexavalent	GP11780/GN32325	D14817-3	mg/kg	0.0	0.0	0.0	0-20%
Redox Potential Vs H2	GN32313	D14702-1	mv	321	310	3.5	0-20%

Associated Samples:  
Batch GN32313: D14746-1, D14746-2, D14746-4  
Batch GP11780: D14746-1, D14746-2, D14746-4  
(\*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY  
GENERAL CHEMISTRY

Login Number: D14746  
Account: ALMS - Accutest Mountain States  
Project: ENCACOP: C27A Pit Closure

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chromium, Hexavalent	GP11780/GN32325	D14817-3	mg/kg	0.0	45.5	39.1	86.0	75-125%
Chromium, Hexavalent	GP11780/GN32325	D14817-3	mg/kg	0.0	988	1020	103.3	75-125%

Associated Samples:

Batch GP11780: D14746-1, D14746-2, D14746-4

(\*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits



IT'S ALL IN THE CHEMISTRY

07/30/10

## Technical Report for

EnCana

C27A Pit Closure

Accutest Job Number: D15556

Sampling Date: 07/22/10

Report to:

EnCana

christopher.hines@encana.com

ATTN: Chris Hines

Total number of pages in report: **24**



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Jesse L. Smith  
Laboratory Director

Client Service contact: Amanda Kissell 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.  
Test results relate only to samples analyzed.

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Sample Summary

EnCana  
C27A Pit Closure

Job No: D15556

Sample Number	Collected			Received	Matrix		Client Sample ID
	Date	Time	By		Code	Type	
D15556-1	07/22/10	14:00	BR	07/23/10	SO	Soil	C27A-W PIT-072210
D15556-2	07/22/10	14:15	BR	07/23/10	SO	Soil	C27A-E PIT-072210
D15556-3	07/22/10	14:30	BR	07/23/10	SO	Soil	C27A-STs-072210

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

## CASE NARRATIVE / CONFORMANCE SUMMARY

**Client:** EnCana

**Job No** D15556

**Site:** C27A Pit Closure

**Report Dat** 7/30/2010 3:38:17 PM

On 07/23/2010, 3 sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 5.8 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D15556 was assigned to the project. The lab sample IDs, client sample IDs, and dates of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

### Volatiles by GC By Method SW846 8015B

**Matrix** SO

**Batch ID:** GGA464

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15446-1MS, D15446-1MSD were used as the QC samples indicated.
- Matrix Spike and Matrix Spike Duplicate Recovery(s) for TPH-GRO (C6-C10) are outside control limits. Outside control limits due to matrix interference.
- Sample(s) D15446-1MS, D15446-1MSD, D15556-3 have surrogates outside control limits. Surrogate recovery is outside of control limits due to matrix interference.

**Matrix** SO

**Batch ID:** GGA465

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15536-1MS, D15536-1MSD were used as the QC samples indicated.

### Extractables by GC By Method SW846-8015B

**Matrix** SO

**Batch ID:** OP2222

- All samples were extracted within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D15557-7MS, D15557-7MSD were used as the QC samples indicated.

### Wet Chemistry By Method SM19 2540B M

**Matrix** SO

**Batch ID:** GN5534

- The data for SM19 2540B M meets quality control requirements.

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.



## Sample Results

## Report of Analysis



## Report of Analysis

<b>Client Sample ID:</b>	C27A-W PIT-072210	<b>Date Sampled:</b>	07/22/10
<b>Lab Sample ID:</b>	D15556-1	<b>Date Received:</b>	07/23/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	84.9
<b>Method:</b>	SW846 8015B		
<b>Project:</b>	C27A Pit Closure		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA7925.D	1	07/28/10	CK	n/a	n/a	GGA464
Run #2							

	Initial Weight
Run #1	1.0 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	1.2	1.2	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	68%		60-140%		

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

**Client Sample ID:** C27A-W PIT-072210**Lab Sample ID:** D15556-1**Date Sampled:** 07/22/10**Matrix:** SO - Soil**Date Received:** 07/23/10**Method:** SW846-8015B SW846 3550B**Percent Solids:** 84.9**Project:** C27A Pit Closure

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2975.D	1	07/27/10	CP	07/26/10	OP2222	GFD143
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	519	16	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	69%		63-130%	

ND = Not detected

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b>	C27A-E PIT-072210	<b>Date Sampled:</b>	07/22/10
<b>Lab Sample ID:</b>	D15556-2	<b>Date Received:</b>	07/23/10
<b>Matrix:</b>	SO - Soil	<b>Percent Solids:</b>	86.7
<b>Method:</b>	SW846 8015B		
<b>Project:</b>	C27A Pit Closure		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA7926.D	1	07/28/10	CK	n/a	n/a	GGA464
Run #2							

	Initial Weight
Run #1	1.0 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	1.2	1.2	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	81%		60-140%		

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

Report of Analysis

32  
3

<b>Client Sample ID:</b>	C27A-E PIT-072210		<b>Date Sampled:</b>	07/22/10	
<b>Lab Sample ID:</b>	D15556-2		<b>Date Received:</b>	07/23/10	
<b>Matrix:</b>	SO - Soil		<b>Percent Solids:</b>	86.7	
<b>Method:</b>	SW846-8015B SW846 3550B				
<b>Project:</b>	C27A Pit Closure				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2976.D	5	07/27/10	CP	07/26/10	OP2222	GFD143
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	215	77	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	68%		63-130%	

ND = Not detected  
RL = Reporting Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

**Client Sample ID:** C27A-ST5-072210  
**Lab Sample ID:** D15556-3  
**Matrix:** SO - Soil  
**Method:** SW846 8015B  
**Project:** C27A Pit Closure

**Date Sampled:** 07/22/10  
**Date Received:** 07/23/10  
**Percent Solids:** 64.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA7936.D	1	07/29/10	CK	n/a	n/a	GGA465
Run #2							

	Initial Weight
Run #1	1.0 g
Run #2	

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	7.89	1.5	1.5	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	226% <sup>a</sup>		60-140%		

(a) Surrogate recovery is outside of control limits due to matrix interference.

ND = Not detected      MDL - Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

**Client Sample ID:** C27A-ST5-072210**Lab Sample ID:** D15556-3**Date Sampled:** 07/22/10**Matrix:** SO - Soil**Date Received:** 07/23/10**Method:** SW846-8015B SW846 3550B**Percent Solids:** 64.6**Project:** C27A Pit Closure

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FD2977.D	5	07/27/10	CP	07/26/10	OP2222	GFD143
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	1220	100	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	83%		63-130%	

ND = Not detected

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound



## Misc. Forms

### Custody Documents and Other Forms

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Includes the following where applicable:

- Chain of Custody

## CHAIN OF CUSTODY

~~DIS5560P~~ DIS556

**10165 Harwin, Suite 150 - Houston, TX 77036 - 713-271-4700 fax: 713-271-4770**

[illegible]

## D15556: Chain of Custody

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## GC Volatiles

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### QC Data Summaries

---

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D15556  
Account: ENCACOP EnCana  
Project: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA464-MB	GA7920.D	1	07/28/10	CK	n/a	n/a	GGA464

The QC reported here applies to the following samples:

Method: SW846 8015B

D15556-1, D15556-2

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	1.0	1.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	100% 60-140%

## Method Blank Summary

Page 1 of 1

**Job Number:** D15556  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA465-MB	GA7934.D	1	07/29/10	CK	n/a	n/a	GGA465

The QC reported here applies to the following samples:

Method: SW846 8015B

D15556-3

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	1.0	1.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	96% 60-140%

Blank Spike Summary

Job Number: D15556  
Account: ENCACOP EnCana  
Project: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA464-BS	GA7921.D	1	07/28/10	CK	n/a	n/a	GGA464

The QC reported here applies to the following samples:

Method: SW846 8015B

D15556-1, D15556-2

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	11	9.39	85	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	112%	60-140%

Blank Spike Summary

Job Number: D15556  
Account: ENCACOP EnCana  
Project: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA465-BS	GA7935.D	1	07/29/10	CK	n/a	n/a	GGA465

The QC reported here applies to the following samples:

Method: SW846 8015B

D15556-3

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	11	10.2	93	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	116%	60-140%

# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D15556  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15446-1MS	GA7922.D	1	07/28/10	CK	n/a	n/a	GGA464
D15446-1MSD	GA7923.D	1	07/28/10	CK	n/a	n/a	GGA464
D15446-1	GA7924.D	1	07/28/10	CK	n/a	n/a	GGA464

The QC reported here applies to the following samples:

Method: SW846 8015B

D15556-1, D15556-2

CAS No.	Compound	D15446-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	16.6		15.3	20.9	28* a	25.1	56* a	18	62-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15446-1	Limits
120-82-1	1,2,4-Trichlorobenzene	283% * a	263% * a	298% * a	60-140%

(a) Outside control limits due to matrix interference.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D15556  
Account: ENCACOP EnCana  
Project: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D15536-1MS	GA7938.D	1	07/29/10	CK	n/a	n/a	GGA465
D15536-1MSD	GA7939.D	1	07/29/10	CK	n/a	n/a	GGA465
D15536-1	GA7940.D	1	07/29/10	CK	n/a	n/a	GGA465

The QC reported here applies to the following samples:

Method: SW846 8015B

D15556-3

CAS No.	Compound	D15536-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	ND		12	11.0	92	10.2	85	8	62-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15536-1	Limits
120-82-1	1,2,4-Trichlorobenzene	100%	104%	101%	60-140%



## GC Semi-volatiles

### QC Data Summaries

---

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries



## Method Blank Summary

Page 1 of 1

**Job Number:** D15556  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2222-MB	FD2971.D	1	07/26/10	CP	07/26/10	OP2222	GFD143

The QC reported here applies to the following samples:

Method: SW846-8015B

D15556-1, D15556-2, D15556-3

CAS No.	Compound	Result	RL	Units	Q
	TPH-DRO (C10-C28)	ND	13	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	77% 63-130%

Blank Spike Summary

Job Number: D15556  
Account: ENCACOP EnCana  
Project: C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2222-BS	FD2972.D	1	07/26/10	CP	07/26/10	OP2222	GFD143

The QC reported here applies to the following samples: Method: SW846-8015B

D15556-1, D15556-2, D15556-3

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	667	586	88	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	89%	63-130%

# Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

**Job Number:** D15556  
**Account:** ENCACOP EnCana  
**Project:** C27A Pit Closure

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2222-MS	FD2973.D	1	07/26/10	CP	07/26/10	OP2222	GFD143
OP2222-MSD	FD2974.D	1	07/27/10	CP	07/26/10	OP2222	GFD143
D15557-7	FD2985.D	1	07/27/10	CP	07/26/10	OP2222	GFD143

The QC reported here applies to the following samples:

Method: SW846-8015B

D15556-1, D15556-2, D15556-3

CAS No.	Compound	D15557-7 mg/kg	Spike mg/kg	MS mg/kg	MS %	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	39.8	739	599	76	603	76	1	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D15557-7	Limits
84-15-1	o-Terphenyl	70%	72%	72%	63-130%



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Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

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

## Report Summary

Tuesday April 05, 2011

Report Number: L509013

Samples Received: 04/01/11

Client Project:

Description: C27A

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  
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TX - T104704245, OK-9915

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

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REPORT OF ANALYSIS

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

April 05, 2011

Date Received : April 01, 2011  
Description : C27A

Sample ID : C27A-PBE-033111

Collected By : Jake Harris  
Collection Date : 03/31/11 09:00

ESC Sample # : L509013-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.033	mg/kg	8270C	04/04/11	1
Acenaphthene	BDL	0.033	mg/kg	8270C	04/04/11	1
Acenaphthylene	BDL	0.033	mg/kg	8270C	04/04/11	1
Benzo(a)anthracene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(a)pyrene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(b)fluoranthene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(g,h,i)perylene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(k)fluoranthene	BDL	0.33	mg/kg	8270C	04/05/11	10
Chrysene	BDL	0.33	mg/kg	8270C	04/05/11	10
Dibenz(a,h)anthracene	BDL	0.33	mg/kg	8270C	04/05/11	10
Fluoranthene	BDL	0.033	mg/kg	8270C	04/04/11	1
Fluorene	BDL	0.033	mg/kg	8270C	04/04/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.33	mg/kg	8270C	04/05/11	10
Naphthalene	BDL	0.033	mg/kg	8270C	04/04/11	1
Phenanthrene	0.036	0.033	mg/kg	8270C	04/04/11	1
Pyrene	BDL	0.33	mg/kg	8270C	04/05/11	10
Surrogate Recovery						
Nitrobenzene-d5	44.9		% Rec.	8270C	04/04/11	1
2-Fluorobiphenyl	46.3		% Rec.	8270C	04/04/11	1
p-Terphenyl-d14	58.8		% Rec.	8270C	04/05/11	10

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: 04/05/11 17:58 Printed: 04/05/11 18:34

REPORT OF ANALYSIS

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

April 05, 2011

Date Received : April 01, 2011  
Description : C27A

Sample ID : C27A-PBW-033111

Collected By : Jake Harris  
Collection Date : 03/31/11 09:10

ESC Sample # : L509013-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015D/GRO	04/01/11	5
Surrogate Recovery (70-130) a,a,a-Trifluorotoluene(FID)	104.		% Rec.	602/8015	04/01/11	5
TPH (GC/FID) High Fraction	32.	4.0	mg/kg	3546/DRO	04/04/11	1
Surrogate recovery(%) o-Terphenyl	62.8		% Rec.	3546/DRO	04/04/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.033	mg/kg	8270C	04/04/11	1
Acenaphthene	BDL	0.033	mg/kg	8270C	04/04/11	1
Acenaphthylene	BDL	0.033	mg/kg	8270C	04/04/11	1
Benzo(a)anthracene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(a)pyrene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(b)fluoranthene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(g,h,i)perylene	BDL	0.33	mg/kg	8270C	04/05/11	10
Benzo(k)fluoranthene	BDL	0.33	mg/kg	8270C	04/05/11	10
Chrysene	BDL	0.33	mg/kg	8270C	04/05/11	10
Dibenz(a,h)anthracene	BDL	0.33	mg/kg	8270C	04/05/11	10
Fluoranthene	BDL	0.033	mg/kg	8270C	04/04/11	1
Fluorene	BDL	0.033	mg/kg	8270C	04/04/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.33	mg/kg	8270C	04/05/11	10
Naphthalene	BDL	0.033	mg/kg	8270C	04/04/11	1
Phenanthrene	BDL	0.033	mg/kg	8270C	04/04/11	1
Pyrene	BDL	0.33	mg/kg	8270C	04/05/11	10
Surrogate Recovery						
Nitrobenzene-d5	58.8		% Rec.	8270C	04/04/11	1
2-Fluorobiphenyl	72.3		% Rec.	8270C	04/04/11	1
p-Terphenyl-d14	88.8		% Rec.	8270C	04/05/11	10

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Attachment A  
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L509013-01	WG529017	SAMP	Benzo(a)anthracene	R1634530	O
	WG529017	SAMP	Benzo(a)pyrene	R1634530	O
	WG529017	SAMP	Benzo(b)fluoranthene	R1634530	O
	WG529017	SAMP	Benzo(g,h,i)perylene	R1634530	O
	WG529017	SAMP	Benzo(k)fluoranthene	R1634530	O
	WG529017	SAMP	Chrysene	R1634530	O
	WG529017	SAMP	Dibenz(a,h)anthracene	R1634530	O
	WG529017	SAMP	Indeno(1,2,3-cd)pyrene	R1634530	O
	WG529017	SAMP	Pyrene	R1634530	O
	WG529017	SAMP	Benzo(a)anthracene	R1634530	O
L509013-02	WG529017	SAMP	Benzo(a)pyrene	R1634530	O
	WG529017	SAMP	Benzo(b)fluoranthene	R1634530	O
	WG529017	SAMP	Benzo(g,h,i)perylene	R1634530	O
	WG529017	SAMP	Benzo(k)fluoranthene	R1634530	O
	WG529017	SAMP	Chrysene	R1634530	O
	WG529017	SAMP	Dibenz(a,h)anthracene	R1634530	O
	WG529017	SAMP	Indeno(1,2,3-cd)pyrene	R1634530	O
	WG529017	SAMP	Pyrene	R1634530	O
	WG529017	SAMP	Benzo(a)anthracene	R1634530	O
	WG529017	SAMP	Benzo(a)pyrene	R1634530	O

Attachment B  
Explanation of QC Qualifier Codes

Qualifier	Meaning
O	(ESC) Sample diluted due to matrix interferences that impaired the ability to make an accurate analytical determination. The detection limit is elevated in order to reflect the necessary dilution.

Qualifier Report Information

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

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.





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Tax I.D. 62-0814289

Est. 1970

April 05, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Acenaphthene	< .033	mg/kg			WG529017	04/02/11 07:52
Acenaphthylene	< .033	mg/kg			WG529017	04/02/11 07:52
Anthracene	< .033	mg/kg			WG529017	04/02/11 07:52
Benzo(a)anthracene	< .033	mg/kg			WG529017	04/02/11 07:52
Benzo(a)pyrene	< .033	mg/kg			WG529017	04/02/11 07:52
Benzo(b)fluoranthene	< .033	mg/kg			WG529017	04/02/11 07:52
Benzo(g,h,i)perylene	< .033	mg/kg			WG529017	04/02/11 07:52
Benzo(k)fluoranthene	< .033	mg/kg			WG529017	04/02/11 07:52
Chrysene	< .033	mg/kg			WG529017	04/02/11 07:52
Dibenz(a,h)anthracene	< .033	mg/kg			WG529017	04/02/11 07:52
Fluoranthene	< .033	mg/kg			WG529017	04/02/11 07:52
Fluorene	< .033	mg/kg			WG529017	04/02/11 07:52
Indeno(1,2,3-cd)pyrene	< .033	mg/kg			WG529017	04/02/11 07:52
Naphthalene	< .033	mg/kg			WG529017	04/02/11 07:52
Phenanthrene	< .033	mg/kg			WG529017	04/02/11 07:52
Pyrene	< .033	mg/kg			WG529017	04/02/11 07:52
2-Fluorobiphenyl		% Rec.	67.72	37-123	WG529017	04/02/11 07:52
Nitrobenzene-d5		% Rec.	72.75	19-129	WG529017	04/02/11 07:52
p-Terphenyl-d14		% Rec.	66.97	34-149	WG529017	04/02/11 07:52
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG529101	04/01/11 18:49
a,a,a-Trifluorotoluene(FID)		% Rec.	106.3	59-128	WG529101	04/01/11 18:49
TPH (GC/FID) High Fraction	< 4	ppm			WG529149	04/04/11 13:41
o-Terphenyl		% Rec.	73.07	50-150	WG529149	04/04/11 13:41

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Acenaphthene	mg/kg	.167	0.119	71.1	44-117	WG529017
Acenaphthylene	mg/kg	.167	0.117	70.0	43-118	WG529017
Anthracene	mg/kg	.167	0.116	69.5	42-127	WG529017
Benzo(a)anthracene	mg/kg	.167	0.111	66.4	45-127	WG529017
Benzo(a)pyrene	mg/kg	.167	0.125	74.8	46-123	WG529017
Benzo(b)fluoranthene	mg/kg	.167	0.122	73.1	43-126	WG529017
Benzo(g,h,i)perylene	mg/kg	.167	0.137	82.3	43-128	WG529017
Benzo(k)fluoranthene	mg/kg	.167	0.128	76.9	40-126	WG529017
Chrysene	mg/kg	.167	0.123	73.9	44-129	WG529017
Dibenz(a,h)anthracene	mg/kg	.167	0.138	82.6	43-127	WG529017
Fluoranthene	mg/kg	.167	0.122	72.8	44-125	WG529017
Fluorene	mg/kg	.167	0.120	72.1	45-121	WG529017
Indeno(1,2,3-cd)pyrene	mg/kg	.167	0.140	83.7	43-127	WG529017
Naphthalene	mg/kg	.167	0.107	64.2	32-113	WG529017
Phenanthrene	mg/kg	.167	0.115	69.1	43-124	WG529017
Pyrene	mg/kg	.167	0.115	68.8	47-128	WG529017
2-Fluorobiphenyl				71.58	37-123	WG529017
Nitrobenzene-d5				71.44	19-129	WG529017
p-Terphenyl-d14				65.92	34-149	WG529017
TPH (GC/FID) Low Fraction	mg/kg	5.5	6.97	127.	67-135	WG529101
a,a,a-Trifluorotoluene(FID)				95.46	59-128	WG529101
TPH (GC/FID) High Fraction	ppm	60	44.8	74.6	50-150	WG529149
o-Terphenyl				72.53	50-150	WG529149

\* 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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April 05, 2011

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Acenaphthene	mg/kg	0.120	0.119	72.0	44-117	0.745	21	WG529017
Acenaphthylene	mg/kg	0.115	0.117	69.0	43-118	1.30	20	WG529017
Anthracene	mg/kg	0.117	0.116	70.0	42-127	0.862	21	WG529017
Benzo(a)anthracene	mg/kg	0.117	0.111	70.0	45-127	5.17	21	WG529017
Benzo(a)pyrene	mg/kg	0.130	0.125	78.0	46-123	3.91	20	WG529017
Benzo(b)fluoranthene	mg/kg	0.128	0.122	77.0	43-126	4.78	27	WG529017
Benzo(g,h,i)perylene	mg/kg	0.149	0.137	89.0	43-128	8.16	20	WG529017
Benzo(k)fluoranthene	mg/kg	0.134	0.128	80.0	40-126	4.10	32	WG529017
Chrysene	mg/kg	0.123	0.123	74.0	44-129	0.0715	22	WG529017
Dibenz(a,h)anthracene	mg/kg	0.137	0.138	82.0	43-127	0.858	20	WG529017
Fluoranthene	mg/kg	0.120	0.122	72.0	44-125	1.13	22	WG529017
Fluorene	mg/kg	0.122	0.120	73.0	45-121	1.60	20	WG529017
Indeno(1,2,3-cd)pyrene	mg/kg	0.149	0.140	89.0	43-127	6.23	21	WG529017
Naphthalene	mg/kg	0.109	0.107	65.0	32-113	1.75	26	WG529017
Phenanthrene	mg/kg	0.113	0.115	67.0	43-124	2.47	21	WG529017
Pyrene	mg/kg	0.119	0.115	71.0	47-128	3.81	20	WG529017
2-Fluorobiphenyl				71.94	37-123			WG529017
Nitrobenzene-d5				73.22	19-129			WG529017
p-Terphenyl-d14				70.87	34-149			WG529017
TPH (GC/FID) Low Fraction	mg/kg	7.10	6.97	129.	67-135	1.89	20	WG529101
a,a,a-Trifluorotoluene(FID)				94.75	59-128			WG529101
TPH (GC/FID) High Fraction	ppm	41.7	44.8	69.0	50-150	7.08	25	WG529149
o-Terphenyl				68.27	50-150			WG529149

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
Acenaphthene	mg/kg	0.143	0	.167	85.8	38-121	L509016-01	WG529017
Acenaphthylene	mg/kg	0.139	0	.167	83.4	39-120	L509016-01	WG529017
Anthracene	mg/kg	0.141	0	.167	84.7	35-133	L509016-01	WG529017
Benzo(a)anthracene	mg/kg	0.144	0	.167	86.3	35-136	L509016-01	WG529017
Benzo(a)pyrene	mg/kg	0.147	0	.167	88.0	37-131	L509016-01	WG529017
Benzo(b)fluoranthene	mg/kg	0.144	0	.167	86.1	29-145	L509016-01	WG529017
Benzo(g,h,i)perylene	mg/kg	0.154	0	.167	92.2	10-139	L509016-01	WG529017
Benzo(k)fluoranthene	mg/kg	0.166	0	.167	99.2	31-140	L509016-01	WG529017
Chrysene	mg/kg	0.145	0	.167	86.7	34-137	L509016-01	WG529017
Dibenz(a,h)anthracene	mg/kg	0.145	0	.167	86.9	21-132	L509016-01	WG529017
Fluoranthene	mg/kg	0.146	0	.167	87.7	34-132	L509016-01	WG529017
Fluorene	mg/kg	0.145	0	.167	87.0	38-126	L509016-01	WG529017
Indeno(1,2,3-cd)pyrene	mg/kg	0.156	0	.167	93.4	17-134	L509016-01	WG529017
Naphthalene	mg/kg	0.131	0	.167	78.7	24-122	L509016-01	WG529017
Phenanthrene	mg/kg	0.141	0	.167	84.6	38-128	L509016-01	WG529017
Pyrene	mg/kg	0.154	0	.167	92.1	35-141	L509016-01	WG529017
2-Fluorobiphenyl					85.75	37-123		WG529017
Nitrobenzene-d5					83.84	19-129		WG529017
p-Terphenyl-d14					86.21	34-149		WG529017
TPH (GC/FID) Low Fraction	mg/kg	29.9	0	5.5	108.	55-109	L509013-02	WG529101
a,a,a-Trifluorotoluene(FID)					96.28	59-128		WG529101
TPH (GC/FID) High Fraction	ppm	199.	190.	60	15.7*	50-150	L509268-02	WG529149
o-Terphenyl					65.61	50-150		WG529149

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



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Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref	Samp	Batch
			Ref	%Rec						
Acenaphthene	mg/kg	0.136	0.143	81.3	38-121	5.39	23	L509016-01	WG529017	
Acenaphthylene	mg/kg	0.137	0.139	82.0	39-120	1.71	22	L509016-01	WG529017	
Anthracene	mg/kg	0.135	0.141	80.9	35-133	4.54	23	L509016-01	WG529017	
Benzo(a)anthracene	mg/kg	0.138	0.144	82.7	35-136	4.26	23	L509016-01	WG529017	
Benzo(a)pyrene	mg/kg	0.150	0.147	89.7	37-131	1.91	22	L509016-01	WG529017	
Benzo(b)fluoranthene	mg/kg	0.141	0.144	84.7	29-145	1.63	33	L509016-01	WG529017	
Benzo(g,h,i)perylene	mg/kg	0.162	0.154	96.8	10-139	4.86	26	L509016-01	WG529017	
Benzo(k)fluoranthene	mg/kg	0.155	0.166	92.6	31-140	6.99	34	L509016-01	WG529017	
Chrysene	mg/kg	0.145	0.145	87.0	34-137	0.272	23	L509016-01	WG529017	
Dibenz(a,h)anthracene	mg/kg	0.156	0.145	93.3	21-132	7.09	25	L509016-01	WG529017	
Fluoranthene	mg/kg	0.144	0.146	85.9	34-132	2.04	24	L509016-01	WG529017	
Fluorene	mg/kg	0.138	0.145	82.7	38-126	5.02	23	L509016-01	WG529017	
Indeno(1,2,3-cd)pyrene	mg/kg	0.156	0.156	93.6	17-134	0.255	25	L509016-01	WG529017	
Naphthalene	mg/kg	0.129	0.131	77.5	24-122	1.50	29	L509016-01	WG529017	
Phenanthrene	mg/kg	0.137	0.141	82.3	38-128	2.68	25	L509016-01	WG529017	
Pyrene	mg/kg	0.143	0.154	85.9	35-141	6.96	25	L509016-01	WG529017	
2-Fluorobiphenyl				85.72	37-123				WG529017	
Nitrobenzene-d5				89.50	19-129				WG529017	
p-Terphenyl-d14				83.87	34-149				WG529017	
TPH (GC/FID) Low Fraction	mg/kg	26.7	29.9	97.0	55-109	11.2	20	L509013-02	WG529101	
a,a,a-Trifluorotoluene(FID)				97.66	59-128				WG529101	
TPH (GC/FID) High Fraction	ppm	260.	199.	116.	50-150	26.3*	25	L509268-02	WG529149	
o-Terphenyl				83.96	50-150				WG529149	

Batch number /Run number / Sample number cross reference

WG529017: R1634530: L509013-01 02  
WG529101: R1634670: L509013-02  
WG529149: R1636211: L509013-02

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



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

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

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

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