DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF AIR QUALITY
Permit Application Analysis
AP-13400

June 7, 2012

NAME OF FIRM:	EnCana Oil & Gas (USA) Inc.
MAILING ADDRESS:	370 17th Street, Suite 1700 Denver, CO 80202
RESPONSIBLE OFFICIAL:	Michael Shaffron EHS Lead – Air & Climate
TELEPHONE NUMBER:	(720) 876-5155
TYPE OF OPERATION:	multiple well, gas/condensate central production facility
FACILITY NAME:	**Cabrito 2-31 Central Facility**
FACILITY LOCATION:	NE¼ NE¼ Section 31, T29N, R107W Latitude: 42.44437° Longitude: 109.63901° Sublette County, Wyoming
DATE FACILITY BECAME OPERATIONAL:	7/17/2004, startup of Cabrito 2-31 Central Facility 3/3/2012, addition of Cabrito 18-31
REVIEWER:	Heather Bleile, Air Quality Engineer

PURPOSE OF APPLICATION: EnCana Oil & Gas (USA) Inc. has filed this application to modify the Cabrito 2-31 Central Facility, with the addition of production and equipment associated with the new well, the Cabrito 18-31.

Production and equipment for the five wells are co-located and/or shared and all associated air emissions are aggregated for permitting determinations.

PERMIT HISTORY: The Cabrito 2-31 Central Facility currently operates under Air Quality Permit, MD-9282, issued January 14, 2010. A smokeless combustion device was required to control volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions associated with the condensate tanks, dehydration unit and pneumatic pumps.

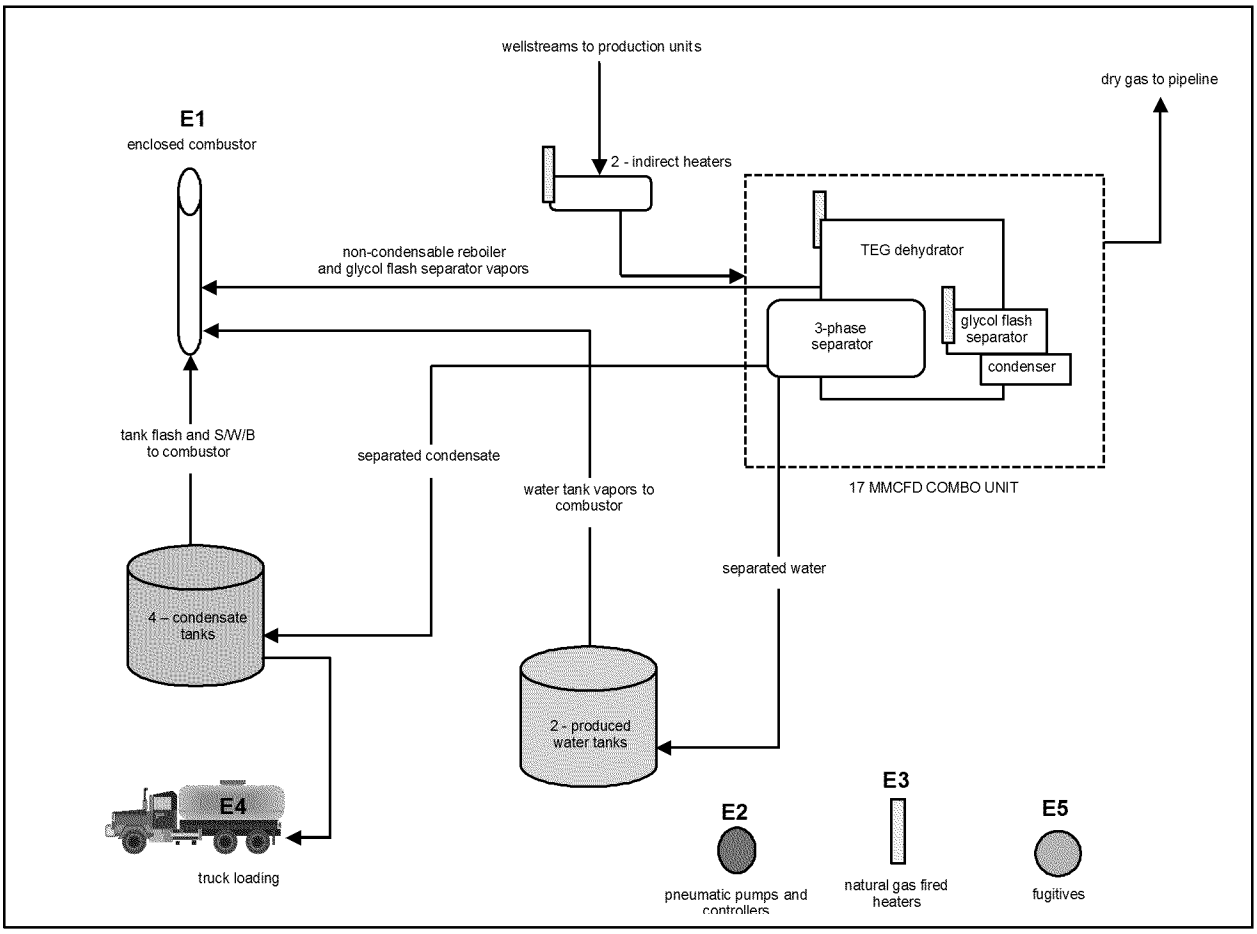
This permit shall supersede MD-9282 for the Stud Horse Butte 12-36 Central Facility.

The following equipment operates at the Cabrito 2-31 Central Facility:

- one (1) three-phase high pressure (HP) separator
- one (1) three-phase low pressure (LP) separator
- one (1) 17.0 million cubic feet per day (MMCFD) tri-ethylene glycol (TEG) dehydration unit w/ (2) Kimray Model 10015SC glycol pumps, 0.25 million Btu per hour (MMBtu/hr) reboiler heater, TEG flash tank separator w/ 0.085 MMBtu/hr heater and reboiler overheads condenser
- one (1) 1.0 MMBtu/hr indirect heater
- one (1) 0.5 MMBtu/hr indirect heater
- four (4) 400-barrel (bbl) condensate tanks
- two (2) 400-bbl produced water tanks
- two (2) pneumatic heat trace circulation pumps
- one (1) pneumatic methanol injection pump
- seven (7) Wellmark 6900 low-bleed pneumatic liquid level controllers
- one (1) 42-inch x 30-foot combination smokeless combustion device w/ continuous pilot monitoring (controls tank emissions, TEG flash tank emissions, non-condensable reboiler and pneumatic pump emissions)

For future modifications at the Cabrito 2-31 Central Facility, involving the installation of equipment associated with a new well or the tying in of production associated with wells at separate locations, the permitting and emission control guidance which is specific to oil and gas production facilities in the Jonah and Pinedale Anticline Fields, revised March 2010, applies.

PROCESS DESCRIPTION: The following is a schematic representation of the production process at the facility. A complete process description is found in the permit application.



ESTIMATED EMISSIONS: (summarized in the attached tables)

condensate storage tanks:

flashing losses:

Uncontrolled VOC and HAP emissions are estimated using HYSYS process simulation software based on the average extended hydrocarbon composition of condensate from area wells and the daily condensate production rate projected by EnCana.

standing/working/breathing (S/W/B) losses:

Uncontrolled VOC emissions are estimated using EPA Tanks 4.0 software

Controlled VOC and HAP emissions associated with flashing and S/W/B losses (**Emission Source E1, Process Flow Diagram**) are based on the reported 98% destruction efficiency of the common combustion device. Nitrogen oxide (NO_x) and carbon monoxide (CO) emissions from combustion of the vapors are based on AP-42 Emission Factors (EF) for flares and the volume of vapors calculated with the HYSYS software.

dehydration unit:

reboiler still vent:

Potential uncontrolled VOC and HAP emissions are estimated using GRI -GLYCalc V4.0 software based on the maximum glycol circulation rate s of the Kimray Model 10015SC pumps, reported equipment operating parameters, average extended hydrocarbon composition of wet gas from area wells and the daily gas production rate projected by EnCana.

Controlled VOC and HAP emissions (**Emission Source E1, Process Flow Diagram**) were estimated in the same fashion except a condenser was added to the reboiler still vent and a common combustion device was added to the non-condensable reboiler still vent stream The condenser is proposed to operate at 130°F and 12 psia. The combustion device is reported to have 98% destruction efficiency. NO_X and CO emissions from the combustion of non - condensable reboiler vapors and glycol flash separator v apors are based on AP -42 EF for flares and the estimated volume of vapors.

active produced water tanks: (Emission Source E1, Process Flow Diagram)

The Division is currently not requiring emission calculations for active produced water tanks. Vapors from the active produced water tanks are routed to the common combustion device for 98% control.

pneumatic pump and controllers: **(Emission Source E2, Process Flow Diagram)**

Uncontrolled emissions from the pneumatic pumps are based on estimated gas consumption rates for the pumps, the VOC and HAP content of the instrument gas used and vented by the pumps and 4380 annual operating hours.

Uncontrolled emissions from pneumatic controllers are based on the manufacturer's bleed rate for each controller, the VOC and HAP content of the gas used and 8760 annual operating hours.

Controlled emissions from the pneumatic pumps are based on the reported 98% destruction efficiency of the common combustion device. Emissions from the pneumatic controllers are vented to the atmosphere.

natural gas fired heaters: **(Emission Source E3, Process Flow Diagram)**

NO_X and CO emissions are based on AP-42 EF for fuel boilers and heaters.

truck loading: **(Emission Source E4, Process Flow Diagram)**

VOC and HAP emissions are based on AP-42 EF and the projected condensate production rate.

fugitive sources: **(Emission Source E5, Process Flow Diagram)**

VOC and HAP emissions are based on EPA and API EF and the number of fugitive sources at the well sites.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT): The following table summarizes Presumptive BACT notice and control installation requirements under the 2010 Chapter 6, Section 2 Oil and Gas Production Facilities Permitting Guidance (C6 S2 Guidance).

Application, Emissions Controls, Monitoring	Date Due	Date Filed/Installed
Application	5/3/2012 (within 60-days of modification)	5/15/2012
Tank Emissions Control	3/3/2012 (upon modification)	6/11/2008
Dehy Emissions Control	3/3/2012 (upon modification)	6/11/2008
Pneumatic Heat Trace Pump Emissions Control	3/3/2012 (upon modification)	6/11/2008
Continuous Monitoring	3/3/2012 (upon modification)	6/11/2008
Water Tank Emission Control	5/3/2012 (within 60-days of modification)	3/3/2012
Low-Bleed Controllers	5/3/2012 (within 60-days of modification)	3/3/2012

The emission control, reporting and monitoring requirements under the 2010 C6 S2 Guidance have been met.

Periodic site evaluations of air pollution control equipment, institution of an annual equipment maintenance program and operator training on the proper operation of pollution control equipment have been incorporated in the conditions of this permit to ensure pollution control equipment operates effectively and meets the BACT requirements of the C6 S2 Guidance.

NEW SOURCE PERFORMANCE STANDARDS (NSPS): The condensate storage tanks at this facility are not subject to Subpart K, K_a or K_b since they are operated prior to custody transfer.

PREVENTION OF SIGNIFICANT DETERIORATION (PSD): Emissions from this facility are less than the major source levels defined in WAQSR Chapter 6, Section 4.

CHAPTER 6, SECTION 3 (Operating Permit): Under the federally enforceable conditions of this permit, emissions from this facility are less than the major source levels defined in WAQSR Chapter 6, Section 3.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (MACT): Under the federally enforceable conditions of this permit, emissions from this facility are less than the major source levels of 10 TPY of any individual HAP and 25 TPY of any combination of HAPs; therefore this facility is not subject to 40 CFR part 63, subpart HH requirements for oil and gas production facilities which are major sources of HAP emissions.

EnCana operates a glycol dehydration unit which is an affected area source under 40 CFR part 63, subpart HH. Based on the information in the application, the glycol dehydration unit(s) are exempt from the control requirements of 40 CFR part 63, subpart HH for glycol dehydration units because the actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters (3.0 MMSCFD) or the actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagrams per year (1.0 tons per year). EnCana shall maintain records of the actual annual average flowrate of natural gas to the glycol dehydration unit or actual average emissions of benzene from the glycol de hydration unit process vent for each year of operation in accordance with 63.774(d)(1). The procedures in 63.772(b) shall be used to determine the glycol dehydration unit flowrate or benzene emissions. EnCana shall comply with all applicable requirements of 40 CFR part 63, subpart HH.

CHAPTER 6, SECTION 2(c)(ii) DEMONSTRATION: Under the Wyoming Air Quality Standards and Regulations (WAQSR), applicants for permits are required to demonstrate to the Administrator of the Air Quality Division (AQD), that "the proposed facility will not prevent the attainment or maintenance of any ambient air quality standard." [WAQSR Chapter 6, Section 2(c)(ii)].

Options for the Chapter 6, Section 2(c)(ii) Demonstration include:

a. Ambient ozone modeling for any applica tion requesting increases in VOCs and/or NO_x emissions.
b. Emission reductions for VOCs and/or NO_X emissions.
c. Applicants may propose alternate innovative Demonstrations to the AQD.

A Chapter 6, Section 2(c)(ii) demonstration in accordance with the Division's Interim Policy has been conducted. Emission offset requirements, if applicable, have been applied to this permitting action at a ratio of 1.5:1.0 for VOCs and 1.1:1.0 for NOx.

EnCana has chosen to offset VOC emissions by consolidating previous ly uncontrolled wells into Central Facilities and controlling previously uncontrolled equipment at existing facilities that are being modified under current permitting actions. EnCana has chosen to offset NO_X emissions by reducing emissions associated with their drill rig fleet. Permit conditions have been established to make the commitments to control emissions federally enforceable.

To ensure offsets are not being double counted and credits are available for future applications, EnCana's offset bank is being tracked via the Division's database.

Permitting actions to date have resulted in a decrease in actual VOC emissions of 1760.1 tpy and a decrease in actual NO_X emissions of 124.6 tpy. Therefore, EnCana has met the offset requirements for VOCs and NO_X.

Based on EnCana's Demonstration, the Division is satisfied that the proposed permitting actions will not prevent the attainment or maintenance of any ambient air quality standard as required by WAQSR Chapter 6, Section 2(c)(ii).

PROPOSED PERMIT CONDITIONS: The Division proposes to issue an Air Quality Permit to EnCana Oil & Gas (USA) Inc. for the Cabrito 2-31 Central Facility with the following conditions:

1. Authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rule, regulation, standard, permit or order.

2. All substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as a condition of this permit.

3. A permit to operate in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR is required after a 120-day start-up period in order to operate this facility.

4. All notifications, reports and correspondence required by this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 510 Meadowview Dr., Lander, WY 82520.

5. All records required under this permit shall be kept for a period of at least five (5) years and shall be made available to the Division upon request.

6. Effective upon permit issuance, this permit shall supersede Air Quality Permit MD-12697 for the Stud Horse Butte 12-36 Central Facility.

7. Periodic training on the proper operation of equipment, systems and devices used to contain, control, eliminate or reduce pollution shall be provided to company personnel whose primary job is to regularly ensure that facility production equipment is functional. The training shall provide these personnel with the ability to recognize, correct and report all instances of malfunctioning equipment, systems and devices associated with air pollution control. These equipment, systems and devices include, but are not limited to combustion units, reboiler overheads condensers, hydrocarbons liquids storage tanks, drip tanks, vent lines, connectors, fittings, valves, relief valves, hatches and any other appurtenance employed to, or involved with, eliminating, reducing, containing or collecting vapors and transporting them to a pollution control system or device.

8. Trained personnel shall perform, at a minimum, a quarterly site evaluation of the operation of the air pollution control equipment, systems and devices under Condition 7. The first quarterly site evaluation shall be conducted within the second quarter after issuance of this permit.

9. At least one of the quarterly evaluations per calendar year under Condition 8 shall include an evaluation of the facility for leaks from the equipment, systems and devices under Condition 7 using a FLIR camera.

10. Notification shall be provided to the Division at least fifteen (15) days prior to each quarterly evaluation under Condition 8.

11. An annual preventative maintenance program shall be instituted to inspect and replace equipment, systems and devices under Condition 7 as necessary to ensure their proper operation.

12. Results of all inspections, evaluations and periodic monitoring shall be documented and maintained for review by the Division upon request. Digital files of any FLIR camera evaluations need not be maintained.

13. Vapors from all condensate tanks and all active produced water tanks, including flashing and S/W/B losses, shall be routed to the common combustion device to reduce the mass content of total HAP and VOC emissions in the tank vapors by at least ninety-eight percent (98%) by weight.

14. For the TEG dehydration unit with condenser, reboiler still vent vapors shall be routed to the condenser. Condensed reboiler still vent liquids shall be collected and routed to liquids storage tank. The non-condensable reboiler still vent vapors and glycol flash separator vapors shall be routed to the common combustion device. The condenser and common combustion device shall reduce the mass content of total HAP and VOC emissions in the reboiler still vent and glycol flash separator vapors by at least ninety-eight percent (98%) by weight.

15. The motive gas discharge line on each pneumatic pump shall be routed into a fuel gas supply line or any gas or liquid collection line which is ultimately routed into a closed system or emission control system or each pump shall be replaced with an electric, solar or air-operated pump or other device in order to reduce VOC emissions associated with the pump discharge gas stream by at least ninety-eight percent (98%) by weight.

16. All natural gas-operated pneumatic process controllers (temperature control, pressure control, level control, flow control, etc.) shall be low or no-bleed controllers, with low bleed defined as less than six (6) cubic feet per hour vent or bleed rate, or the controller discharge streams shall be routed into a closed loop system so there are no volatile organic compound or hazardous air pollutants emitted to the atmosphere.

17. The presence of the combustion device pilot flame shall be monitored using a thermocouple and continuous recording device or any other equivalent device to detect and record the presence of the flame. Records shall be maintained noting periods during active well site operation when the pilot flame is not present. The records shall contain a description of the reason(s) for absence of the pilot flame and steps taken to return the pilot flame to proper operation.

18. Emission control equipment, including the VOC and HAP emission control systems or devices, reboiler overheads condensers and all vent lines, connections, fittings, valves, relief valves, hatches or any other appurtenance employed to contain and collect vapors and transport them to the emission control system or device, shall be maintained and operated during any time the wells are producing such that the emissions are controlled at all times. Records shall be maintained noting dates and durations of times during such operation when any VOC or HAP emissions control system or device or the associated containment and collection equipment is not functioning to control emissions as required by this permit.

19. All combustion devices shall be designed, constructed, operated and maintained to be smokeless, per Chapter 3, Section 6(b)(i) of the WAQSR, with no visible emissions except for periods not to exceed a total of five (5) minutes during any two (2) consecutive hours as determined by 40 CFR part 60, appendix A, Method 22.

20. EnCana Oil & Gas (USA) Inc. shall provide notification to the Division of additional equipment or emissions and provide certification of control and monitoring installation dat es, on the appropriate form provided by the Division. (Form AQD -Pinedale 1, currently available on the DEQ website) . When modifying this facility, EnCana shall follow the emission control, reporting and monitoring requirements under the active guidance at the time of modification.

21. Emissions from this facility shall not exceed 100 TPY or more of any regulated air pollutant, 10 TPY or more of any individual Hazardous Air Pollutant or 25 TPY or more of any combination of Hazardous Air Pollutants.

22. EnCana Oil & Gas (USA) Inc. shal l comply with all applicable requirements of 40 CFR part 63, subpart HH.

EQUIPMENT LIST

- one (1) three-phase HP separator
- one (1) three-phase LP separator
- one (1) 17.0 MMCFD TEG dehydration unit w/ (2) Kimray Model 10015SC glycol pumps, 0.25 MMBtu/hr reboiler heater, TEG flash tank separator w/ 0.085 MMBtu/hr heater and reboiler overheads condenser
- one (1) 1.0 MMBtu/hr indirect heater
- one (1) 0.5 MMBtu/hr indirect heater
- four (4) 400-bbl condensate tanks
- two (2) 400-bbl produced water tanks
- two (2) pneumatic heat trace circulation pumps
- one (1) pneumatic methanol injection pump
- seven (7) Wellmark 6900 low-bleed pneumatic liquid level controllers
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EMISSIONS SUMMARY

Cabrito 2-31 Central Facility
90 BPD total condensate and 5.1 MMCFD total gas [1]

five wells: Cabrito 1-31, 2-31, 19-31, 29-31 and 18-31

SOURCE	EMISSIONS (TPY) [2]			
	VOC	HAP	NO_X	CO
Dehydration Unit				
POTENTIAL	77.9	37.0		
CONTROLLED	0.7	0.2	0.3	0.1
Condensate Tanks				
UNCONTROLLED	89.5	3.2		
CONTROLLED	1.8	0.1	0.5	0.1
Pneumatic Pumps				
UNCONTROLLED	12.2	0.4		
CONTROLLED	0.2	insig	0.4	0.1
Process Heaters	insig	insig	0.9	0.7
Truck Loading	1.4	0.1		
Fugitives	2.2	0.2		
Pneumatic Liquid Level Controllers	0.8	insig		
Total Uncontrolled Facility Emissions	**184.0**	**40.9**	**0.9**	**0.7**
Total Controlled Facility Emissions	**7.1**	**0.6**	**2.1**	**1.0**

[1] projected rates reported by EnCana
[2] rounded to the nearest 0.1 ton

Offset Requirements [1]

Emissions / Production	VOC (TPY)	NO_X (TPY)
Current Actual Emissions (90 BPD and 5.1 MMCFD)	7.1	2.1
Baseline Emissions (180 BPD and 17 MMCFD)	8.6	1.9
Difference	-1.5	+0.2
Offset Required	**none**	**0.2*1.1 = +0.2**

[1] application received after August 1, 2008; therefore, offsets required are 1.5*VOC and 1.1*NO_X