State of New Mexico
Energy, Minerals and Natural Resources Department

**Susana Martinez**
Governor

**David Martin**
Cabinet Secretary

**Brett F. Woods, Ph.D.**
Deputy Cabinet Secretary

**David R. Catanach, Division Director**
Oil Conservation Division

New Mexico Oil Conservation Division approval and conditions listed below are made in accordance with OCD Rule 19.15.7.11 and are in addition to the actions approved by BLM on the following 3160-3 APD form.

Operator Signature Date: 2-25-15
Well information;
Operator Encana, Well Name and Number Lybrook 030 2307 #3H
API# 30-043-21267, Section 30, Township 23 (N)/S, Range 7 E/(W)

Conditions of Approval:
(See the below checked and handwritten conditions)

- Notify Aztec OCD 24hrs prior to casing & cement.
- Hold C-104 for directional survey & "As Drilled" Plat
- Hold C-104 for (NSL), NSP, (DHC)
- o Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- o Regarding the use of a pit, closed loop system or below grade tank, the operator must comply with the following as applicable:
  - A pit requires a complete C-144 be submitted and approved prior to the construction or use of the pit, pursuant to 19.15.17.8.A
  - A closed loop system requires notification prior to use, pursuant to 19.15.17.9.A
  - A below grade tank requires a registration be filed prior to the construction or use of the below grade tank, pursuant to 19.15.17.8.C
- o Once the well is spud, to prevent ground water contamination through whole or partial conduits from the surface, the operator shall drill without interruption through the fresh water zone or zones and shall immediately set in cement the water protection string
- ✓ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ✓ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ✓ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.

Chad Harris
NMOCD Approved by Signature

4-24-2015
Date KC

Form 3160-3
(March 2012)

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

# APPLICATION FOR PERMIT TO DRILL OR REENTER

5. Lease Serial No.
NM 6681

FEB 26 2015

6. If Indian, Allotee or Tribe Name
N/A

1a. Type of work: ☑ DRILL ☐ REENTER

7. If Unit or CA Agreement, Name and No.
N/A

1b. Type of Well: ☐ Oil Well ☑ Gas Well ☐ Other ☑ Single Zone ☐ Multiple Zone

8. Lease Name and Well No.
Lybrook O30-2307 03H

2. Name of Operator Encana Oil & Gas (USA) Inc.

9. API Well No.
30-043-21267

3a. Address 370 17th Street, Suite 1700 Denver, CO 80202

3b. Phone No. *(include area code)*
(720) 876-5994

10. Field and Pool, or Exploratory
Basin Mancos/ Alamito-Gallup

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*

At surface O 393' FSL and 1342' FEL in Section 30, T23N, R7W SWSE

At proposed prod. zone P 330' FSL 970' FEL in Section 31, T23N, R7W SESE

11. Sec., T. R. M. or Blk. and Survey or Area
SHL: Section 30, T23N, R7W NMPM
BHL Sec 31, T23N, R7W

14. Distance in miles and direction from nearest town or post office*
+/- 46.8 miles south of intersection of US Hwy 550 and US Hwy 64 in Bloomfield, NM

12. County or Parish
Sandoval

13. State
NM

| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drlg. unit line, if any) | 16. No. of acres in lease | 17. Spacing Unit dedicated to this well |
|---|---|---|
| BHL is 330' from south lease line of Sec 31, T23N, R7W | NM 6681 - 642.56 acres | 160 acres |

OIL CONS. DIV DIST. 3

APR 21 2015

| 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. | 19. Proposed Depth | 20. BLM/BIA Bond No. on file |
|---|---|---|
| Lybrook O30-2307 02H SHL is +/- 30' SW | 5114' TVD/10346' MD | COB-000235 |

| 21. Elevations (Show whether DF, KDB, RT, GL, etc.) | 22. Approximate date work will start* | 23. Estimated duration |
|---|---|---|
| 7028' GL, KB 7044' | 11/05/2015 | 20 days |

## 24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, must be attached to this form:

1. Well plat certified by a registered surveyor.
2. A Drilling Plan.
3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office).
4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification
6. Such other site specific information and/or plans as may be required by the BLM.

| 25. Signature | Name *(Printed Typed)* | Date |
|---|---|---|
| | Shawn Turk | 02/25/2015 |

Title
Regulatory Analyst

| Approved by *(Signature)* | Name *(Printed Typed)* | Date |
|---|---|---|
| AFM | FFO | 4/17/15 |

Title

Office

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

DRILLING OPERATIONS
(Continued on page 2)
SUBJECT TO COMPLIANCE WITH ATTACHED "GENERAL REQUIREMENTS"

BLM'S APPROVAL OR ACCEPTANCE OF THIS ACTION DOES NOT RELIEVE THE LESSEE AND OPERATOR FROM OBTAINING ANY OTHER AUTHORIZATION REQUIRED FOR OPERATIONS ON FEDERAL AND INDIAN LANDS

NMOCD

*(Instructions on page 2)

This action is subject to technical and procedural review pursuant to 43 CFR 3165.3 and appeal pursuant to 43 CFR 3165.4

District I
1625 N. French Dr., Hobbs, NM 88240
Phone (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S St. Francis Dr., Santa Fe, NM 87505
Phone (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

FEB 26 2015

# WELL LOCATION AND ACREAGE DEDICATION PLAT

| [1] API Number | [2] Pool Code | [3] Pool Name |
|---|---|---|
| 30-043-21267 | 97232/1039 | BASIN MANCOS / ALAMITO – GALLUP |

| [4] Property Code | [5] Property Name | [6] Well Number |
|---|---|---|
| 313257 | LYBROOK 030-2307 | 03H |

| [7] OGRID No. | [8] Operator Name | [9] Elevation |
|---|---|---|
| 282327 | ENCANA OIL & GAS (USA) INC. | 7028' |

## [10] Surface Location

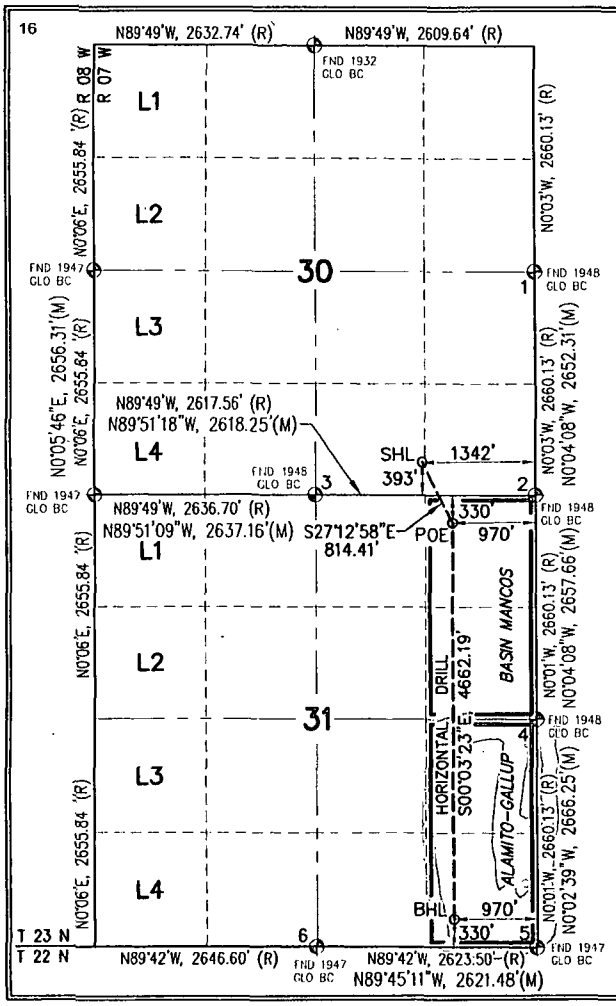
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West Line | County |
|---|---|---|---|---|---|---|---|---|---|
| O | 30 | 23N | 7W | | 393 | SOUTH | 1342 | EAST | SANDOVAL |

## [11] Bottom Hole Location If Different From Surface

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West Line | County |
|---|---|---|---|---|---|---|---|---|---|
| P | 31 | 23N | 7W | | 330 | SOUTH | 970 | EAST | SANDOVAL |

| [12] Dedicated Acres | PROJECT AREA | [13] Joint or Infill | [14] Consolidation Code | [15] Order No. |
|---|---|---|---|---|
| 160 ACRES | E/2 NE/4 SEC 31 BASIN MANCOS/ E/2 SE/4 SEC 31 ALAMITO-GALLUP | | | |

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.




**LYBROOK 030-2307 03H WELL**

**SHL (WELL FLAG)**
LAT. 36.191683°N (NAD83)
LONG. 107.611076°W (NAD83)
LAT. 36.191669°N (NAD27)
LONG. 107.610468°W (NAD27)

**POE (POINT OF ENTRY)**
LAT. 36.189694°N (NAD83)
LONG. 107.609815°W (NAD83)
LAT. 36.189680°N (NAD27)
LONG. 107.609206°W (NAD27)

**BHL (BOTTOM HOLE LOCATION)**
LAT. 36.176891°N (NAD83)
LONG. 107.609802°W (NAD83)
LAT. 36.176877°N (NAD27)
LONG. 107.609193°W (NAD27)

**SECTION CORNERS**

1 LAT. 36.197876 °N (NAD83)
LONG. 107.606539 °W (NAD83)
LAT. 36.197862 °N (NAD27)
LONG. 107.605931 °W (NAD27)

2 LAT. 36.190593 °N (NAD83)
LONG. 107.606530 °W (NAD83)
LAT. 36.190579 °N (NAD27)
LONG. 107.605922 °W (NAD27)

3 LAT. 36.190612 °N (NAD83)
LONG. 107.615400 °W (NAD83)
LAT. 36.190598 °N (NAD27)
LONG. 107.614791 °W (NAD27)

4 LAT. 36.183295 °N (NAD83)
LONG. 107.606521 °W (NAD83)
LAT. 36.183281 °N (NAD27)
LONG. 107.605913 °W (NAD27)

5 LAT. 36.175973 °N (NAD83)
LONG. 107.606516 °W (NAD83)
LAT. 36.175959 °N (NAD27)
LONG. 107.605907 °W (NAD27)

6 LAT. 36.176005 °N (NAD83)
LONG. 107.615395 °W (NAD83)
LAT. 36.175991 °N (NAD27)
LONG. 107.614786 °W (NAD27)

## [17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date: 2/23/15

Shawn Turk
Printed Name

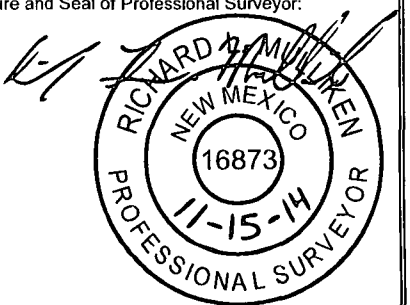
shawn.turk@encana.com
E-mail Address

## [18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

October 10, 2014
Date of Survey

Signature and Seal of Professional Surveyor:




RICHARD L. MULLIKEN
Certificate Number 16873

Sheet A

**Lybrook O30-2307 03H**
**SHL: 393' FSL, 1342' FEL Sec 30 23N 07W**
**BHL: 330' FSL, 970' FEL Sec 31 23N 07W**
**Sandoval, New Mexico**

# Encana Oil & Gas (USA) Inc.
# Drilling Plan

## 1. ESTIMATED TOPS OF GEOLOGICAL MARKERS (TVD)

The estimated tops of important geologic markers are as follows:

| Formation | Depth (TVD) units = feet |
|---|---|
| San Jose Fn. | n/a |
| Nacimiento Fn. | surface |
| Ojo Alamo Ss. | 993 |
| Kirtland Shale | 1,188 |
| Fruitland Coal | 1,454 |
| Pictured Cliffs Ss. | 1,578 |
| Lewis Shale | 1,694 |
| Cliffhouse Ss. | 2,347 |
| Menefee Fn. | 3,137 |
| Point Lookout Ss. | 3,962 |
| Mancos Shale | 4,144 |
| Mancos Silt | 4,674 |
| Gallup Fn. | 4,932 |
| Base Gallup | 5,273 |

The referenced surface elevation is 7028', KB 7044'

## 2. ESTIMATED DEPTH OF POTENTIAL WATER, OIL, GAS,
& OTHER MINERAL BEARING FORMATIONS

| Substance | Formation | Depth (TVD) units = feet |
|---|---|---|
| Water/Gas | Fruitland Coal | 1,454 |
| Oil/Gas | Pictured Cliffs Ss. | 1,578 |
| Oil/Gas | Cliffhouse Ss. | 2,347 |
| Gas | Menefee Fn. | 3,137 |
| Oil/Gas | Point Lookout Ss. | 3,962 |
| Oil/Gas | Mancos Shale | 4,144 |
| Oil/Gas | Mancos Silt | 4,674 |
| Oil/Gas | Gallup Fn. | 4,932 |

All shows of fresh water and minerals will be reported and protected.

**Lybrook O30-2307 03H**
**SHL: 393' FSL, 1342' FEL Sec 30 23N 07W**
**BHL: 330' FSL, 970' FEL Sec 31 23N 07W**
**Sandoval, New Mexico**

## 3. PRESSURE CONTROL

a) Pressure contol equipment and configuration will be designed to meet 2M standards.
b) Working pressure on rams and BOPE will be 3,000 psi.
c) Function test and visual inspection of the BOP will be conducted daily and noted in the IADC Daily Drilling Report.
d) The Annular BOP will be pressure tested to a minimum of 50 percent of its rated working pressure.
e) Blind and Pipe Rams/BOP will be tested against a test plug to 100 percent of rated working pressure.
f) Pressure tests are required before drilling out from under all casing strings set and cemented in place.
g) BOP controls must be installed prior to drilling the surface casing plug and will remain in use until the well is completed or abandoned.
h) BOP testing procedures and testing frequency will conform to Onshore Order No. 2.
i) BOP remote controls shall be located on the rig floor at a location readily accessible to the driller. Master controls shall be on the ground at the accumulator and shall have the capability to function all preventers.
j) The kill line shall be 2-inch minimum and contain two kill line valves, one of which shall be a check valve.
k) The choke line shall be a 2-inch minimum and contain two choke line valves (2-inch minimum).
l) The choke and manifold shall contain two adjustable chokes.
m) Hand wheels shall be installed on all ram preventers.
n) Safety valves and wrenches (with subs for drill string connections) shall be available on the rig floor at all times.
o) Inside BOP or float sub shall also be available on the rig floor at all times.

Proposed BOP and choke manifold arrangements are attached.

## 4. CASING & CEMENTING PROGRAM

The proposed casing and cementing program has been designed to protect and/or isolate all usable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, and any prospectively valuable deposits of minerals. Any isolating medium other than cement shall receive approval prior to use. The casing setting depth shall be calculated to position the casing seat opposite a competent formation which will contain the maximum pressure to which it will be exposed during normal drilling operations. All indications of useable water shall be reported.

a) The proposed casing design is as follows:

| Casing | Depth (MD) | Hole Size | Csg Size | Weight | Grade |
|---|---|---|---|---|---|
| Conductor | 0'-60' | 26" | 16" | 42.09# | |
| Surface | 0'-500' | 12 1/4" | 9 5/8" | 36# | J55, STC New |
| Intermediate | 0'-5182' | 8 3/4" | 7" | 26# | J55, LTC New |
| Production Liner | 5082'-10346' | 6 1/8" | 4 1/2" | 11.6# | B80*, LTC New |

| Casing String | | | | Casing Strength Properties | | | Minimum Design Factors | | |
|---|---|---|---|---|---|---|---|---|---|
| Size | Weight (ppf) | Grade | Connection | Collapse (psi) | Burst (psi) | Tensile (1000lbs) | Collapse | Burst | Tension |
| 9 5/8" | 36 | J55 | STC | 2020 | 3520 | 394 | 1.125 | 1.1 | 1.5 |
| 7" | 26 | J55 | LTC | 4320 | 4980 | 367 | 1.125 | 1.1 | 1.5 |
| 4.5" | 11.6 | B80 | LTC | 6350 | 7780 | 201 | 1.125 | 1.1 | 1.5 |

*B80 pipe specifications are attached

Casing design is subject to revision based on geologic conditions encountered

**Lybrook O30-2307 03H**
**SHL: 393' FSL, 1342' FEL Sec 30 23N 07W**
**BHL: 330' FSL, 970' FEL Sec 31 23N 07W**
**Sandoval, New Mexico**

All casing strings below the conductor shall be pressure tested to 0.22 psi per foot of casing string length or 1,500 psi, whichever is greater, but not to exceed 70 percent of the minimum internal yield. If pressure declines more than 10 percent in 30 minutes, corrective action shall be taken.

b) The proposed cementing program is as follows:

| Casing | Depth (MD) | Cement Volume (sacks) | Cement Type & Yield | Designed TOC | Centralizers |
|---|---|---|---|---|---|
| Conductor | 0'-60' | 100 sks | Type I Neat 16 ppg | Surface | None |
| Surface | 0'-500' | 228 sks | Type III Cement + 1% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.2% bwoc FL-52A + 58.9% Fresh Water | Surface | 1 per joint on bottom 3 joints |
| Intermediate | 0'-5182' | 100% open hole excess Stage 1 Lead: 481 sks Stage 1 Tail: 370 sks | Lead: PremLite + 3% CaCl + 0.25lb/sk CelloFlake + 5lb/sk LCM, 12.1ppg 2.13cuft/sk Tail: Type III Cmt + 1% CaCl + 0.25lb/sk Cello Flake 14.5ppg 1.38cuft/sk | Surface | 1 every 3 joints through water bearing zones |
| Production Liner | 5082'-10346' | 50% OH excess Stage 1 Blend Total: 298sks | Blend: Premium Lite High Strength FM + 0.7% bwoc R-3 + 3% bwow Potassium Chloride + 0.25lbs/sack Cello Flake + 0.5% bwoc CD-32 + 1.15% bwoc FL-52A + 60 lbs/sack Calcium Carbonate + 124.4% Fresh Water. Yield 2.63 cuft/sk | Liner Hanger | N/A |

Actual volumes will be calculated and determined by conditions onsite. All cement slurries will meet or exceed minimum BLM and New Mexico Oil Conservation Division requirements. Slurries used will be the slurries listed above or equivalent slurries depending on service provider selected. Cement yields may change depending on slurries selected

All waiting on cement times shall be a minimum of 8 hours or adequate to achieve minimum of 500 psi compressive strength at the casing shoe prior to drilling out.

## 5. WELL PLAN & DIRECTIONAL DRILLING PROGRAM

The proposed horizontal well will have a kick off point of 4232'. Directional plans are attached.

| Description | Proposed Depth (TVD/MD) | Formation |
|---|---|---|
| Horizontal Lateral TD | 5114'/10346' | Gallup |

**Lybrook O30-2307 03H**
**SHL: 393' FSL, 1342' FEL Sec 30 23N 07W**
**BHL: 330' FSL, 970' FEL Sec 31 23N 07W**
**Sandoval, New Mexico**

## 6. DRILLING FLUIDS PROGRAM

a) Surface through Intermediate Casing Point:

| Hole Size (in) | Depth (TVD/MD) | Mud Type | Density (ppg) | Viscosity (sec/qt) | Fluid Loss (cc) |
|---|---|---|---|---|---|
| 30" | 0-60'/60' | Fresh Water | 8.3-9.2 | 38-100 | 4-28 |
| 12 1/4" | 0'-500'/500' | Fresh Water | 8.3-10 | 60-70 | NC |
| 8 3/4" | 500'/500'-5041'/5182 | Fresh Water LSND | 8.3-10 | 40-50 | 8-10 |

b) Intermediate Casing Point to TD:

| Hole Size (in) | Depth (TVD/MD) | Mud Type | Density (ppg) | Viscosity (sec/qt) | Fluid Loss (cc) |
|---|---|---|---|---|---|
| 6 1/8" | 5041'/5182'-5114'/10346' | Fresh Water LSND | 8.3-10 | 15-25 | <15 |

c) There will be sufficient mud on location to control a blowout should one occur. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers. Mud tests shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

√d) A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystems, Inc. The location will be lined in accordance with the Surface Use Plan of Operations.

## 7. TESTING, CORING, & LOGGING

a) Drill Stem Testing - None anticipated.
b) Coring - None anticipated.
c) Mudd Logging - Mud loggers will be on location from kick off point to TD.
d) Logging - See below

Cased Hole:
CBL/CCL/GR/VDL will be run as needed for perforating control

## 8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2433 psi based on a 9.0 ppg at 5199' TVD of the horizontal lateral target. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if $H_2S$ is encountered, the guidelines in Onshore Order No. 6 will be followed.

## 9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on November 5, 2015. It is anticipated that completion operations will begin within 30 days after the well has been drilled depending on fracture treatment schedules with various pumping service companies.

It is anticipated that the drilling of this well will take approximately 20 days.

LOC: 393' FSL, 1342' FEL Sec 30 23N 07W
County: Sandoval
WELL: Lybrook O30-2307 03H

# Encana Natural Gas

## WELL SUMMARY

ENG: Michael Sanch 2-23-15
RIG: Unassigned
GLE: 7028
RKBE: 7044

| MWD LWD | OPEN HOLE LOGGING | FORM | DEPTH TVD | DEPTH MD | HOLE SIZE | CASING SPECS | MW MUD TYPE | DEVIATION INFORMATION |
|---|---|---|---|---|---|---|---|---|
| | | | 60 | 60' | 26 | 16" 42.09# 100sx Type I Neat 16.0ppg cmt | Fresh wtr 8.3-9.2 | |
| Multi-Well pad - take survey every stand and run anti-collision report prior to spud | None | San Jose Fn. | 0 | | 12 1/4 | 9 5/8" 36ppf J55 STC<br>TOC Surface with 100% OH Excess: 228 sks Type III Cement + 1% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.2% bwoc FL-52A + 58.9% Fresh Water. | Fresh wtr<br>8.3-10 | Vertical<br><1° |
| | | Nacimiento Fn. | surface | | | | | |
| | | 9 5/8" Csg | 500 | 500.00 | | | | |
| | | Ojo Alamo Ss. | 993 | | | | | |
| | | Kirtland Shale | 1,188 | | | | | |
| | No OH logs | Fruitland Coal | 1,454 | | | 7" 26ppf J55 LTC | Fresh Wtr | |
| Survey Every 60'-120', updating anticollision report after surveys. Stop operations and contact drilling engineer if separation factor approaches 1.5 | | Pictured Cliffs Ss. | 1,578 | | 8 3/4 | TOC @ surface (100% OH excess - 70% Lead 30% Tail)<br>Stage 1 Total: 851sks | 8.3-10 | Vertical<br><1° |
| | | Lewis Shale | 1,694 | | | | | |
| | | Cliffhouse Ss. | 2,347 | | | Stage 1 Lead: 481 sks Premium Lite FM + 3% CaCl2 + 0.25/sk Cello Flake + 5#/sk LCM-1 + 8% Bentonite + 0.4% FL-52A + 0.4% Sodium Metasilicate. Mixed at 12.1 ppg. Yield 2.13 cuft/sk. | | |
| | | Menefee Fn. | 3,137 | | | | | |
| | | Point Lookout Ss. | 3,962 | | | | | |
| | | Mancos Shale | 4,144 | | | | | |
| | Mud logger onsite | KOP | 4,232 | 4,232 | | Stage 1 Tail: 370 sks Type III Cement + 1% CaCl2 + 0.25#/sk Cello Flake + 0.2% FL-52A. Mixed at 14.6 ppg. Yield 1.38 cuft/sk. | | |
| Surveys every 30' through the curve | | Mancos Silt | 4,674 | | | | | |
| | | Gallup Fn. | 4,932 | | | | | |
| | | 7" Csg | 5,041 | 5,182' | | | | |
| | | | | | 6 1/8 | 100' overlap at liner top | | Horz Inc/TVD 90.9deg/5199ft |
| Surveys every stand to TD unless directed otherwise by Geologist | | Horizontal Target | 5,199 | | | | | |
| | | TD | 5,114 | 10,346 | | 5164' Drilled Lateral | | TD = 10346.3 MD |
| | No OH Logs | Base Gallup | 5,273 | | | 4 1/2" 11.6ppf SB80 LTC<br>TOC @ hanger (50% OH excess)<br>Stage 1 Total: 298sks | WBM<br>8.3-10 | |
| MWD Gamma Directional | | | | | | Stage 1 Blend: 298 sks Premium Lite High Strength FM + 0.7% bwoc R-3 + 3% bwow Potassium Chloride + 0.25lbs/sack Cello Flake + 0.5% bwoc CD-32 + 1.15% bwoc FL-52A + 60 lbs/sack Calcium Carbonate + 124.4% Fresh Water. Yield 2.63 cuft/sk. | | |

**NOTES:**

1) Drill with 26" bit to 60', set 16" 42.09ppf conductor pipe
2) Drill surface to 500', R&C 9 5/8" casing
3) N/U BOP and surface equipment
4) Drill to KOP of 4232', 8 3/4 inch holesize
5) Start curve at 10deg/100' build rate
6) Drill to csg point of 5182' MD
7) R&C 7" csg, circ cmt to surface
8) Land at ~90 deg, drill lateral to 10346' run 4 1/2 inch cemented liner

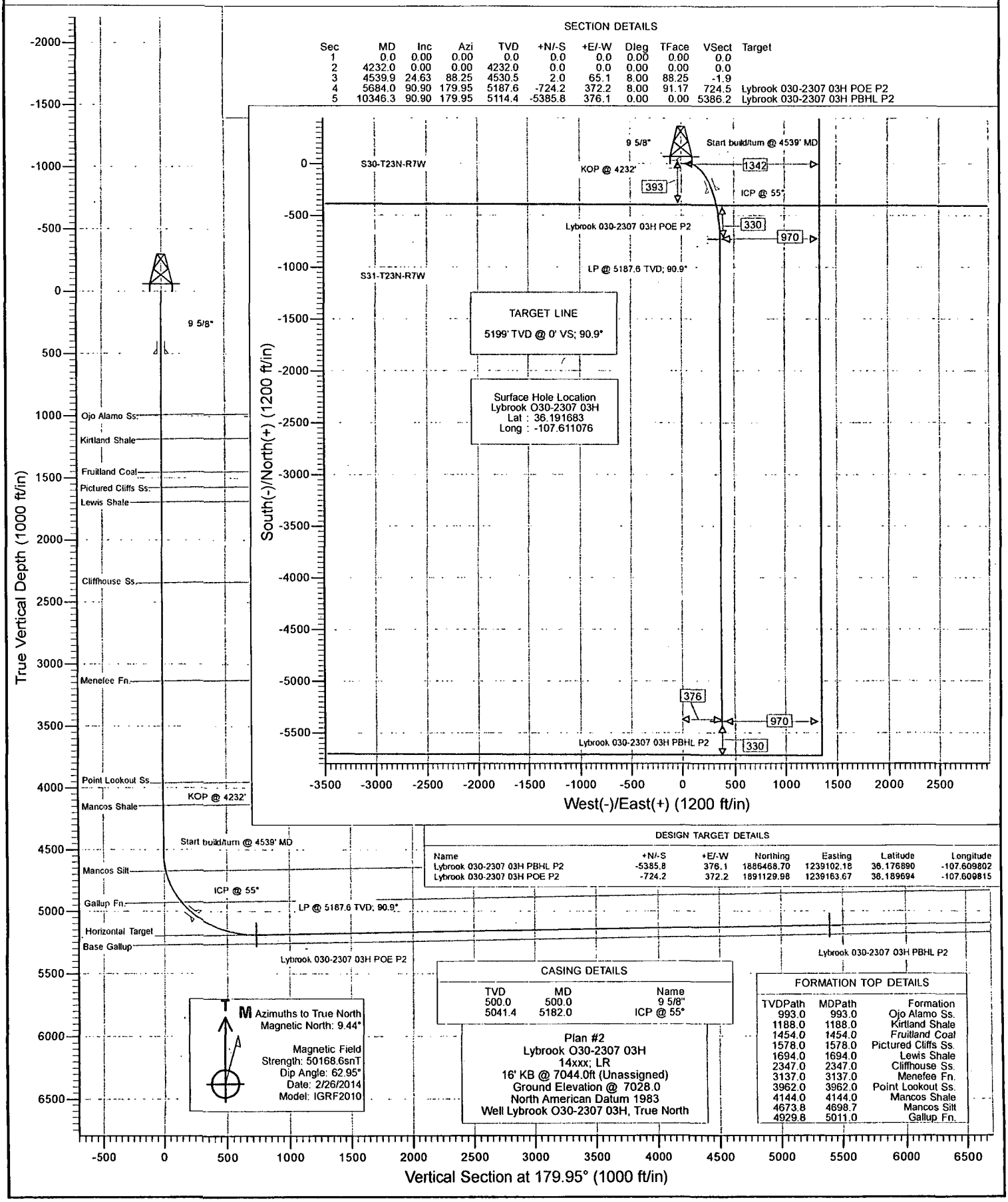
encana. natural gas

Project: Sandoval County, NM
Site: S30-T23N-R7W
Well: Lybrook O30-2307 03H
Wellbore: Hz
Design: Plan #2

CATHEDRAL

SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | Dleg | TFace | VSect | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 2 | 4232.0 | 0.00 | 0.00 | 4232.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 3 | 4539.9 | 24.63 | 88.25 | 4530.5 | 2.0 | 65.1 | 8.00 | 88.25 | -1.9 | |
| 4 | 5684.0 | 90.90 | 179.95 | 5187.6 | -724.2 | 372.2 | 8.00 | 91.17 | 724.5 | Lybrook 030-2307 03H POE P2 |
| 5 | 10346.3 | 90.90 | 179.95 | 5114.4 | -5385.8 | 376.1 | 0.00 | 0.00 | 5386.2 | Lybrook 030-2307 03H PBHL P2 |




DESIGN TARGET DETAILS

| Name | +N/-S | +E/-W | Northing | Easting | Latitude | Longitude |
|---|---|---|---|---|---|---|
| Lybrook 030-2307 03H PBHL P2 | -5385.8 | 376.1 | 1886468.70 | 1239102.18 | 36.176890 | -107.609802 |
| Lybrook 030-2307 03H POE P2 | -724.2 | 372.2 | 1891129.98 | 1239163.67 | 36.189694 | -107.609815 |

CASING DETAILS

| TVD | MD | Name |
|---|---|---|
| 500.0 | 500.0 | 9 5/8" |
| 5041.4 | 5182.0 | ICP @ 55° |

FORMATION TOP DETAILS

| TVDPath | MDPath | Formation |
|---|---|---|
| 993.0 | 993.0 | Ojo Alamo Ss. |
| 1188.0 | 1188.0 | Kirtland Shale |
| 1454.0 | 1454.0 | Fruitland Coal |
| 1578.0 | 1578.0 | Pictured Cliffs Ss. |
| 1694.0 | 1694.0 | Lewis Shale |
| 2347.0 | 2347.0 | Cliffhouse Ss. |
| 3137.0 | 3137.0 | Menefee Fn. |
| 3962.0 | 3962.0 | Point Lookout Ss. |
| 4144.0 | 4144.0 | Mancos Shale |
| 4673.8 | 4698.7 | Mancos Silt |
| 4929.8 | 5011.0 | Gallup Fn. |

Azimuths to True North
Magnetic North: 9.44°

Magnetic Field
Strength: 50168.6snT
Dip Angle: 62.95°
Date: 2/26/2014
Model: IGRF2010

Plan #2
Lybrook O30-2307 03H
14xxx; LR
16' KB @ 7044.0ft (Unassigned)
Ground Elevation @ 7028.0
North American Datum 1983
Well Lybrook O30-2307 03H, True North

# Cathedral Energy Services

Planning Report

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Lybrook O30-2307 03H |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Project:** | Sandoval County, NM | **MD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Site:** | S30-T23N-R7W | **North Reference:** | True |
| **Well:** | Lybrook O30-2307 03H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | Plan #2 | | |

**Project** Sandoval County, NM

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane 1983 | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | North American Datum 1983 | | |
| **Map Zone:** | New Mexico Central Zone | | |

**Site** S30-T23N-R7W

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,891,883.94 ft | **Latitude:** | 36.191750 |
| **From:** | Lat/Long | **Easting:** | 1,238,783.16 ft | **Longitude:** | -107.611140 |
| **Position Uncertainty:** | 0.0 ft | **Slot Radius:** | 13.200 in | **Grid Convergence:** | -0.80 ° |

**Well** Lybrook O30-2307 03H

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 ft | **Northing:** | 1,891,859.28 ft | **Latitude:** | 36.191683 |
| | **+E/-W** | 0.0 ft | **Easting:** | 1,238,801.71 ft | **Longitude:** | -107.611076 |
| **Position Uncertainty** | | 0.0 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 7,028.0 ft |

**Wellbore** Hz

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 2/26/2014 | 9.44 | 62.95 | 50,169 |

**Design** Plan #2

**Audit Notes:**

| | | | | |
|---|---|---|---|---|
| **Version:** | **Phase:** | PLAN | **Tie On Depth:** | 0.0 |

| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 179.95 |

**Plan Sections**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | TFO (°) | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4,232.0 | 0.00 | 0.00 | 4,232.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4,539.9 | 24.63 | 88.25 | 4,530.5 | 2.0 | 65.1 | 8.00 | 8.00 | 0.00 | 88.25 | |
| 5,684.0 | 90.90 | 179.95 | 5,187.6 | -724.2 | 372.2 | 8.00 | 5.79 | 8.01 | 91.17 | Lybrook 030-2307 03I |
| 10,346.3 | 90.90 | 179.95 | 5,114.4 | -5,385.8 | 376.1 | 0.00 | 0.00 | 0.00 | 0.00 | Lybrook 030-2307 03I |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Lybrook O30-2307 03H |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Project:** | Sandoval County, NM | **MD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Site:** | S30-T23N-R7W | **North Reference:** | True |
| **Well:** | Lybrook O30-2307 03H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | Plan #2 | | |

**Planned Survey**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 100.0 | 0.00 | 0.00 | 100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 200.0 | 0.00 | 0.00 | 200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 300.0 | 0.00 | 0.00 | 300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 500.0 | 0.00 | 0.00 | 500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 9 5/8" |
| 600.0 | 0.00 | 0.00 | 600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 700.0 | 0.00 | 0.00 | 700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 800.0 | 0.00 | 0.00 | 800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 900.0 | 0.00 | 0.00 | 900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 993.0 | 0.00 | 0.00 | 993.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Ojo Alamo Ss. |
| 1,000.0 | 0.00 | 0.00 | 1,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,100.0 | 0.00 | 0.00 | 1,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,188.0 | 0.00 | 0.00 | 1,188.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Kirtland Shale |
| 1,200.0 | 0.00 | 0.00 | 1,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,300.0 | 0.00 | 0.00 | 1,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,400.0 | 0.00 | 0.00 | 1,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,454.0 | 0.00 | 0.00 | 1,454.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Fruitland Coal |
| 1,500.0 | 0.00 | 0.00 | 1,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,578.0 | 0.00 | 0.00 | 1,578.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Pictured Cliffs Ss. |
| 1,600.0 | 0.00 | 0.00 | 1,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,694.0 | 0.00 | 0.00 | 1,694.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Lewis Shale |
| 1,700.0 | 0.00 | 0.00 | 1,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,800.0 | 0.00 | 0.00 | 1,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 1,900.0 | 0.00 | 0.00 | 1,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,000.0 | 0.00 | 0.00 | 2,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,100.0 | 0.00 | 0.00 | 2,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,200.0 | 0.00 | 0.00 | 2,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,300.0 | 0.00 | 0.00 | 2,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,347.0 | 0.00 | 0.00 | 2,347.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Cliffhouse Ss. |
| 2,400.0 | 0.00 | 0.00 | 2,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,500.0 | 0.00 | 0.00 | 2,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,600.0 | 0.00 | 0.00 | 2,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,700.0 | 0.00 | 0.00 | 2,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,800.0 | 0.00 | 0.00 | 2,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 2,900.0 | 0.00 | 0.00 | 2,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,000.0 | 0.00 | 0.00 | 3,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,100.0 | 0.00 | 0.00 | 3,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,137.0 | 0.00 | 0.00 | 3,137.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Menefee Fn. |
| 3,200.0 | 0.00 | 0.00 | 3,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,300.0 | 0.00 | 0.00 | 3,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,400.0 | 0.00 | 0.00 | 3,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,500.0 | 0.00 | 0.00 | 3,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,600.0 | 0.00 | 0.00 | 3,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,700.0 | 0.00 | 0.00 | 3,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,800.0 | 0.00 | 0.00 | 3,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,900.0 | 0.00 | 0.00 | 3,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 3,962.0 | 0.00 | 0.00 | 3,962.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Point Lookout Ss. |
| 4,000.0 | 0.00 | 0.00 | 4,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 4,100.0 | 0.00 | 0.00 | 4,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |
| 4,144.0 | 0.00 | 0.00 | 4,144.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | Mancos Shale |
| 4,200.0 | 0.00 | 0.00 | 4,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | |

# Cathedral Energy Services

Planning Report

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Lybrook O30-2307 03H |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Project:** | Sandoval County, NM | **MD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Site:** | S30-T23N-R7W | **North Reference:** | True |
| **Well:** | Lybrook O30-2307 03H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | Plan #2 | | |

**Planned Survey**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations |
|---|---|---|---|---|---|---|---|---|---|
| 4,232.0 | 0.00 | 0.00 | 4,232.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | KOP @ 4232' |
| 4,300.0 | 5.44 | 88.25 | 4,299.9 | 0.1 | 3.2 | -0.1 | 8.00 | 8.00 | |
| 4,400.0 | 13.44 | 88.25 | 4,398.5 | 0.6 | 19.6 | -0.6 | 8.00 | 8.00 | |
| 4,500.0 | 21.44 | 88.25 | 4,493.8 | 1.5 | 49.5 | -1.5 | 8.00 | 8.00 | |
| 4,539.9 | 24.63 | 88.25 | 4,530.5 | 2.0 | 65.1 | -1.9 | 8.00 | 8.00 | Start build/turn @ 4539' MD |
| 4,600.0 | 24.97 | 99.71 | 4,585.1 | 0.2 | 90.2 | -0.2 | 8.00 | 0.56 | |
| 4,699.1 | 27.31 | 116.97 | 4,674.2 | -13.6 | 131.1 | 13.7 | 8.00 | 2.36 | Mancos Silt |
| 4,700.0 | 27.34 | 117.11 | 4,675.0 | -13.8 | 131.5 | 13.9 | 8.00 | 3.36 | |
| 4,800.0 | 31.49 | 131.10 | 4,762.2 | -41.5 | 171.7 | 41.6 | 8.00 | 4.15 | |
| 4,900.0 | 36.81 | 141.77 | 4,845.0 | -82.3 | 210.0 | 82.4 | 8.00 | 5.32 | |
| 5,000.0 | 42.87 | 149.95 | 4,921.8 | -135.3 | 245.6 | 135.5 | 8.00 | 6.06 | |
| 5,017.2 | 43.96 | 151.17 | 4,934.3 | -145.6 | 251.4 | 145.8 | 8.00 | 6.36 | Gallup Fn. |
| 5,100.0 | 49.39 | 156.40 | 4,991.1 | -199.6 | 277.9 | 199.9 | 8.00 | 6.55 | |
| 5,182.0 | 54.96 | 160.79 | 5,041.4 | -259.9 | 301.4 | 260.2 | 8.00 | 6.79 | ICP @ 55° |
| 5,200.0 | 56.20 | 161.67 | 5,051.5 | -274.0 | 306.2 | 274.3 | 8.00 | 6.90 | |
| 5,300.0 | 63.20 | 166.15 | 5,102.0 | -356.9 | 330.0 | 357.2 | 8.00 | 7.00 | |
| 5,400.0 | 70.33 | 170.11 | 5,141.4 | -446.8 | 348.8 | 447.1 | 8.00 | 7.13 | |
| 5,500.0 | 77.54 | 173.73 | 5,169.1 | -541.8 | 362.2 | 542.1 | 8.00 | 7.21 | |
| 5,600.0 | 84.79 | 177.14 | 5,184.4 | -640.2 | 370.0 | 640.6 | 8.00 | 7.25 | |
| 5,684.0 | 90.90 | 179.95 | 5,187.6 | -724.2 | 372.2 | 724.5 | 8.00 | 7.27 | LP @ 5187.6 TVD; 90.9° - Lybrook 030-2307 0 |
| 5,685.9 | 90.90 | 179.95 | 5,187.6 | -726.0 | 372.2 | 726.4 | 0.00 | 0.00 | Lybrook O30-2307 03H POE |
| 5,700.0 | 90.90 | 179.95 | 5,187.3 | -740.1 | 372.2 | 740.4 | 0.00 | 0.00 | |
| 5,800.0 | 90.90 | 179.95 | 5,185.8 | -840.1 | 372.3 | 840.4 | 0.00 | 0.00 | |
| 5,900.0 | 90.90 | 179.95 | 5,184.2 | -940.1 | 372.3 | 940.4 | 0.00 | 0.00 | |
| 6,000.0 | 90.90 | 179.95 | 5,182.6 | -1,040.1 | 372.4 | 1,040.4 | 0.00 | 0.00 | |
| 6,100.0 | 90.90 | 179.95 | 5,181.1 | -1,140.1 | 372.5 | 1,140.4 | 0.00 | 0.00 | |
| 6,200.0 | 90.90 | 179.95 | 5,179.5 | -1,240.1 | 372.6 | 1,240.4 | 0.00 | 0.00 | |
| 6,300.0 | 90.90 | 179.95 | 5,177.9 | -1,340.0 | 372.7 | 1,340.4 | 0.00 | 0.00 | |
| 6,400.0 | 90.90 | 179.95 | 5,176.4 | -1,440.0 | 372.8 | 1,440.4 | 0.00 | 0.00 | |
| 6,500.0 | 90.90 | 179.95 | 5,174.8 | -1,540.0 | 372.8 | 1,540.3 | 0.00 | 0.00 | |
| 6,600.0 | 90.90 | 179.95 | 5,173.2 | -1,640.0 | 372.9 | 1,640.3 | 0.00 | 0.00 | |
| 6,700.0 | 90.90 | 179.95 | 5,171.6 | -1,740.0 | 373.0 | 1,740.3 | 0.00 | 0.00 | |
| 6,800.0 | 90.90 | 179.95 | 5,170.1 | -1,840.0 | 373.1 | 1,840.3 | 0.00 | 0.00 | |
| 6,900.0 | 90.90 | 179.95 | 5,168.5 | -1,940.0 | 373.2 | 1,940.3 | 0.00 | 0.00 | |
| 7,000.0 | 90.90 | 179.95 | 5,166.9 | -2,040.0 | 373.3 | 2,040.3 | 0.00 | 0.00 | |
| 7,100.0 | 90.90 | 179.95 | 5,165.4 | -2,139.9 | 373.3 | 2,140.3 | 0.00 | 0.00 | |
| 7,200.0 | 90.90 | 179.95 | 5,163.8 | -2,239.9 | 373.4 | 2,240.3 | 0.00 | 0.00 | |
| 7,300.0 | 90.90 | 179.95 | 5,162.2 | -2,339.9 | 373.5 | 2,340.2 | 0.00 | 0.00 | |
| 7,400.0 | 90.90 | 179.95 | 5,160.7 | -2,439.9 | 373.6 | 2,440.2 | 0.00 | 0.00 | |
| 7,500.0 | 90.90 | 179.95 | 5,159.1 | -2,539.9 | 373.7 | 2,540.2 | 0.00 | 0.00 | |
| 7,600.0 | 90.90 | 179.95 | 5,157.5 | -2,639.9 | 373.8 | 2,640.2 | 0.00 | 0.00 | |
| 7,700.0 | 90.90 | 179.95 | 5,155.9 | -2,739.9 | 373.8 | 2,740.2 | 0.00 | 0.00 | |
| 7,800.0 | 90.90 | 179.95 | 5,154.4 | -2,839.9 | 373.9 | 2,840.2 | 0.00 | 0.00 | |
| 7,900.0 | 90.90 | 179.95 | 5,152.8 | -2,939.8 | 374.0 | 2,940.2 | 0.00 | 0.00 | |
| 8,000.0 | 90.90 | 179.95 | 5,151.2 | -3,039.8 | 374.1 | 3,040.2 | 0.00 | 0.00 | |
| 8,100.0 | 90.90 | 179.95 | 5,149.7 | -3,139.8 | 374.2 | 3,140.1 | 0.00 | 0.00 | |
| 8,200.0 | 90.90 | 179.95 | 5,148.1 | -3,239.8 | 374.3 | 3,240.1 | 0.00 | 0.00 | |
| 8,300.0 | 90.90 | 179.95 | 5,146.5 | -3,339.8 | 374.4 | 3,340.1 | 0.00 | 0.00 | |
| 8,400.0 | 90.90 | 179.95 | 5,144.9 | -3,439.8 | 374.4 | 3,440.1 | 0.00 | 0.00 | |
| 8,500.0 | 90.90 | 179.95 | 5,143.4 | -3,539.8 | 374.5 | 3,540.1 | 0.00 | 0.00 | |
| 8,600.0 | 90.90 | 179.95 | 5,141.8 | -3,639.8 | 374.6 | 3,640.1 | 0.00 | 0.00 | |
| 8,700.0 | 90.90 | 179.95 | 5,140.2 | -3,739.7 | 374.7 | 3,740.1 | 0.00 | 0.00 | |

| | | | |
|---|---|---|---|
| Database: | USA EDM 5000 Multi Users DB | Local Co-ordinate Reference: | Well Lybrook O30-2307 03H |
| Company: | EnCana Oil & Gas (USA) Inc | TVD Reference: | 16' KB @ 7044.0ft (Unassigned) |
| Project: | Sandoval County, NM | MD Reference: | 16' KB @ 7044.0ft (Unassigned) |
| Site: | S30-T23N-R7W | North Reference: | True |
| Well: | Lybrook O30-2307 03H | Survey Calculation Method: | Minimum Curvature |
| Wellbore: | Hz | | |
| Design: | Plan #2 | | |

Planned Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Comments / Formations |
|---|---|---|---|---|---|---|---|---|---|
| 8,800.0 | 90.90 | 179.95 | 5,138.7 | -3,839.7 | 374.8 | 3,840.1 | 0.00 | 0.00 | |
| 8,900.0 | 90.90 | 179.95 | 5,137.1 | -3,939.7 | 374.9 | 3,940.0 | 0.00 | 0.00 | |
| 9,000.0 | 90.90 | 179.95 | 5,135.5 | -4,039.7 | 374.9 | 4,040.0 | 0.00 | 0.00 | |
| 9,100.0 | 90.90 | 179.95 | 5,134.0 | -4,139.7 | 375.0 | 4,140.0 | 0.00 | 0.00 | |
| 9,200.0 | 90.90 | 179.95 | 5,132.4 | -4,239.7 | 375.1 | 4,240.0 | 0.00 | 0.00 | |
| 9,300.0 | 90.90 | 179.95 | 5,130.8 | -4,339.7 | 375.2 | 4,340.0 | 0.00 | 0.00 | |
| 9,400.0 | 90.90 | 179.95 | 5,129.2 | -4,439.7 | 375.3 | 4,440.0 | 0.00 | 0.00 | |
| 9,500.0 | 90.90 | 179.95 | 5,127.7 | -4,539.6 | 375.4 | 4,540.0 | 0.00 | 0.00 | |
| 9,600.0 | 90.90 | 179.95 | 5,126.1 | -4,639.6 | 375.4 | 4,640.0 | 0.00 | 0.00 | |
| 9,700.0 | 90.90 | 179.95 | 5,124.5 | -4,739.6 | 375.5 | 4,739.9 | 0.00 | 0.00 | |
| 9,800.0 | 90.90 | 179.95 | 5,123.0 | -4,839.6 | 375.6 | 4,839.9 | 0.00 | 0.00 | |
| 9,900.0 | 90.90 | 179.95 | 5,121.4 | -4,939.6 | 375.7 | 4,939.9 | 0.00 | 0.00 | |
| 10,000.0 | 90.90 | 179.95 | 5,119.8 | -5,039.6 | 375.8 | 5,039.9 | 0.00 | 0.00 | |
| 10,100.0 | 90.90 | 179.95 | 5,118.2 | -5,139.6 | 375.9 | 5,139.9 | 0.00 | 0.00 | |
| 10,200.0 | 90.90 | 179.95 | 5,116.7 | -5,239.6 | 375.9 | 5,239.9 | 0.00 | 0.00 | |
| 10,300.0 | 90.90 | 179.95 | 5,115.1 | -5,339.5 | 376.0 | 5,339.9 | 0.00 | 0.00 | |
| 10,346.3 | 90.90 | 179.95 | 5,114.4 | -5,385.8 | 376.1 | 5,386.2 | 0.00 | 0.00 | TD at 10346.3 - Lybrook 030-2307 03H PBHL P |

Targets

| Target Name - hit/miss target - Shape | Dip Angle (°) | Dip Dir. (°) | TVD (ft) | +N/-S (ft) | +E/-W (ft) | Northing (ft) | Easting (ft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| Lybrook 030-2307 03H F<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 5,114.4 | -5,385.8 | 376.1 | 1,886,468.70 | 1,239,102.18 | 36.176890 | -107.609802 |
| Lybrook O30-2307 03H I<br>- plan misses target center by 568.1ft at 5685.9ft MD (5187.6 TVD, -726.0 N, 372.2 E)<br>- Point | 0.00 | 0.00 | 5,189.2 | -725.6 | 940.3 | 1,891,120.57 | 1,239,731.71 | 36.189690 | -107.607890 |
| Lybrook 030-2307 03H F<br>- plan hits target center<br>- Point | 0.00 | 0.00 | 5,187.6 | -724.2 | 372.2 | 1,891,129.98 | 1,239,163.67 | 36.189694 | -107.609815 |
| Lybrook O30-2307 03H I<br>- plan misses target center by 570.3ft at 10346.3ft MD (5114.4 TVD, -5385.8 N, 376.1 E)<br>- Point | 0.00 | 0.00 | 5,116.0 | -5,385.8 | 946.4 | 1,886,460.71 | 1,239,672.40 | 36.176890 | -107.607870 |

Casing Points

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (in) | Hole Diameter (in) |
|---|---|---|---|---|
| 500.0 | 500.0 | 9 5/8" | 0.000 | 0.000 |
| 5,182.0 | 5,041.4 | ICP @ 55° | 0.000 | 0.000 |

| | | | |
|---|---|---|---|
| **Database:** | USA EDM 5000 Multi Users DB | **Local Co-ordinate Reference:** | Well Lybrook O30-2307 03H |
| **Company:** | EnCana Oil & Gas (USA) Inc | **TVD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Project:** | Sandoval County, NM | **MD Reference:** | 16' KB @ 7044.0ft (Unassigned) |
| **Site:** | S30-T23N-R7W | **North Reference:** | True |
| **Well:** | Lybrook O30-2307 03H | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Hz | | |
| **Design:** | Plan #2 | | |

**Formations**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Lithology | Dip (°) | Dip Direction (°) |
|---|---|---|---|---|---|
| 993.0 | 993.0 | Ojo Alamo Ss. | | 0.90 | -179.95 |
| 1,188.0 | 1,188.0 | Kirtland Shale | | 0.90 | -179.95 |
| 1,454.0 | 1,454.0 | Fruitland Coal | | 0.90 | -179.95 |
| 1,578.0 | 1,578.0 | Pictured Cliffs Ss. | | 0.90 | -179.95 |
| 1,694.0 | 1,694.0 | Lewis Shale | | 0.90 | -179.95 |
| 2,347.0 | 2,347.0 | Cliffhouse Ss. | | 0.90 | -179.95 |
| 3,137.0 | 3,137.0 | Menefee Fn. | | 0.90 | -179.95 |
| 3,962.0 | 3,962.0 | Point Lookout Ss. | | 0.90 | -179.95 |
| 4,144.0 | 4,144.0 | Mancos Shale | | 0.90 | -179.95 |
| 4,699.1 | 4,674.0 | Mancos Silt | | 0.90 | -179.95 |
| 5,017.2 | 4,932.0 | Gallup Fn. | | 0.90 | -179.95 |

**Plan Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 4,232.0 | 4,232.0 | 0.0 | 0.0 | KOP @ 4232' |
| 4,539.9 | 4,530.5 | 2.0 | 65.1 | Start build/turn @ 4539' MD |
| 5,684.0 | 5,187.6 | -724.2 | 372.2 | LP @ 5187.6 TVD; 90.9° |
| 10,346.3 | 5,114.4 | -5,385.8 | 376.1 | TD at 10346.3 |

If the location becomes prone to wind or water erosion, Encana will take appropriate measures to prevent topsoil loss from wind. Such measures may include using tackifiers or water to wet the topsoil stockpile so that a crust is created across the exposed soil to prevent soil loss.

3. All construction materials for the well pad will consist of native borrow and subsoil accumulated during well pad construction. If additional fill or surfacing material is required, it will be obtained from existing permitted or private sources and will be hauled in by trucks over existing access roads.

   The maximum cut will be approximately 4 feet on the north corner (Corner 3) and the maximum fill will be approximately 4 feet on the south corner (Corner 6).

4. As determined during the onsite on January 7, 2014, the following best management practices will be implemented:
   a. A water diversion is required from Corner 3 to Corner 2.
   b. Silt traps will be installed as needed upon interim reclamation.
   c. The material borrow source for this location will be the proposed Encana Lybrook G30-2307.
   d. An archeological site was identified along the access road. A 200' foot fence will be required during construction.
   e. Burrowing owl stipulations will be applicable.

5. Construction equipment may include chain saws, a brush hog, scraper, maintainer, excavator, and dozer. Construction for the access road and well pad will take approximately 2 weeks.

C. Pipeline
See the Plan of Development submitted with the final Standard SF-299 Application for authorization to construct, operate, maintain and terminate a 777.6 foot, up to 6-inch outside diameter, buried steel well connect pipeline that was submitted to the BLM concurrently with the APD.

**7. METHODS FOR HANDLING WASTE**

A. Cuttings
1. A closed-loop system will be used. Cuttings will be moved through a shaker system on the drill rig that separates drilling fluids from the cuttings. Cuttings will be stored onsite in above-ground storage tanks. Cuttings will be pulled from the storage tanks, mixed with saw dust or similar absorbent material, and disposed of at the Envirotech, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.

2. The closed-loop system storage tanks will be adequately sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.

3. A 20-mil liner will be installed under tanks, pumps, ancillary facilities, and truck loading/unloading areas associated with the closed-loop system.

B. Drilling Fluids
1. A closed-loop system will be used. Drilling fluids will be stored onsite in above-ground storage tanks. Upon termination of drilling operations, the drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as

## ENCANA OIL & GAS (USA) INC.

LYBROOK 030-2307 #03H
393' FSL & 1342' FEL
LOCATED IN THE SW/4 SE/4 OF SECTION 30
T23N, R07W, N.M.P.M.
SANDOVAL COUNTY, NEW MEXICO
511 +/- OF NEW ACCESS ACROSS BLM LANDS

## DIRECTIONS

1) FROM THE INTERSECTION OF HWY 550 & US HWY 64 IN BLOOMFIELD, NEW MEXICO, TRAVEL SOUTH ON HWY 550 FOR 39.0 MILES TO MILE POST 112.7.

2) GO RIGHT (SOUTHERLY) ON CR 7900 FOR 5.2 MILES.

3) TURN LEFT (NORTHEASTERLY) EXITING CR 7900 FOR 2.8 MILES TO A THREE WAY INTERSECTION

4) GO LEFT (NORTHEASTERLY) ALONG EXISTING ROAD FOR 2.0 MILES TO THE ENCANA LYBROOK O30-2307 PROPOSED ACCESS.

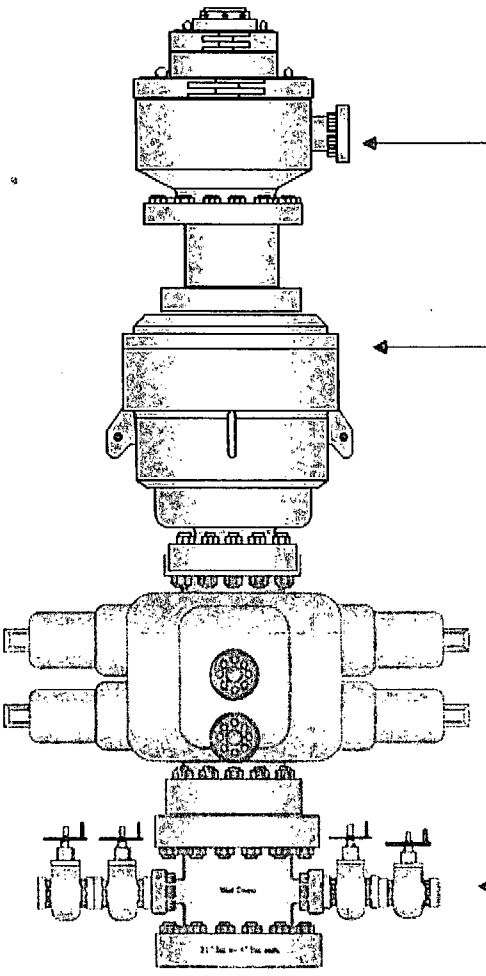
5) CONTINUE 511' ALONG THE STAKED ROAD TO STAKED ENCANA LYBROOK O30-2307 LOCATION.

6) WELL FLAG LOCATED AT : LATITUDE: 36.191683° N, LONGITUDE: 107.611076° W ( NAD 83)

**WELLHEAD BLOWOUT CONTROL SYSTEM**

encana

Well Name and Number:
Lybrook O30-2307 03H



11" 3K Rotating Head

11" 3K Annular

3K Double Ram
Top: Pipe Ram
Bottom: Blind Ram
3" Outlets Below Ram

3K Mud Cross 3" gate valves