

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary-Designate

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

Jami Bailey, 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: 9/25/13

Well information;

Operator Encana, Well Name and Number Lybrook P28-2306 1H

API# 30-043-21176, Section 28, Township 23 NS, Range 6 EW

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
- ☐ Spacing rule violation. Operator must follow up with change of status notification on other well to be shut in or abandoned
- ☐ 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
- ☐ 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
- ☐ 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

Charles R. ...
NMOCD Approved by Signature

1-10-14 ca
Date

CONFIDENTIAL
RECEIVED

FORM APPROVED
OMB No. 1004-0137
Expires July 31, 2010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

SEP 26 2013

1a. Type of work: <input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER		5. Lease Serial No. NMNM 112953 (NMNM 109386)	
1b. Type of Well: <input checked="" type="checkbox"/> Oil Well <input type="checkbox"/> Gas Well <input type="checkbox"/> Other <input checked="" type="checkbox"/> Single Zone <input type="checkbox"/> Multiple Zone		6. If Indian, Allottee or Tribe Name N/A	
2. Name of Operator Encana Oil & Gas (USA) Inc.		7. If Unit or CA Agreement, Name and No: PENDING	
3a. Address 370 17th Street, Suite 1700 Denver, CO 80202		8. Lease Name and Well No. Lybrook P28-2306 01H	
3b. Phone No. (include area code) 720-876-3989		9. API Well No. 30-043-21176	
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 336' FSL and 1280' FEL Section 28, T22N, R6W At proposed prod. zone 2330' FNL and 2060' FEL Section 4, T22N, R6W		10. Field and Pool, or Exploratory Lybrook Gallup	
11. Sec., T. R. M. or Blk. and Survey or Area S1/4 Section 28, T22N, R6W NMPM BHL Sec 4 T22N R6W		12. County or Parish Sandoval	
13. State NM		14. Distance in miles and direction from nearest town or post office* +/- 55.3 miles southeast of the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM	
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) BHL is 2,060' from east lease line Section 4, T22N, R6W		16. No. of acres in lease NMNM 112953-1,760 acres NMNM 109386-1,286 acres 1286.280	
17. Spacing Unit dedicated to this well 240 acres - W/2 E/2 Section 33, T22N, R6W W/2 NE/4 Section 4, T22N, R6W 240.81		18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. Dome Etal Fed-33 1 is +/- 421' east	
19. Proposed Depth 5,627' TVD/13,601' MD		20. BLM/BIA Bond No. on file COB-000235 RCVD JAN 8 '14	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 7,211' GL, 7,227' KB		22. Approximate date work will start* 12/10/2014	
23. Estimated duration 25 days		OIL CONS. DIV.	
24. Attachments		DIST. 3	

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

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

25. Signature <i>Pendra R. Linster</i>	Name (Printed/Typed) Pendra R. Linster	Date 09/25/13
Title Regulatory Lead		
Approved by (Signature) <i>[Signature]</i>	Name (Printed/Typed) AFM	Date 12/27/13
Title AFM	Office FFO	

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.

(Continued on page 2)

DRILLING OPERATIONS
AUTHORIZED ARE SUBJECT TO
COMPLIANCE WITH ATTACHED
"GENERAL REQUIREMENTS"

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

*(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

NMOCD

District I
1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

District II
811 S. First Street, 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 Drive, Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

Form C-102
Revised August 1, 2011

Submit one copy to
Appropriate District Office

OIL CONSERVATION DIVISION

1220 South St. Francis Drive
Santa Fe, NM 87505

AMENDED REPORT
RECEIVED

WELL LOCATION AND ACREAGE DEDICATION PLAT

SEP 26 2013

¹ API Number 30-043-21176	² Pool Code 42289	³ Pool Name LYBROOK GAS LUP
⁴ Property Code 40321	⁵ Property Name LYBROOK P28-2306	⁶ Well Number 0142
⁷ GRID No. 282327	⁸ Operator Name ENCANA OIL & GAS (USA) INC.	⁹ Elevation 7211'

¹⁰ Surface Location

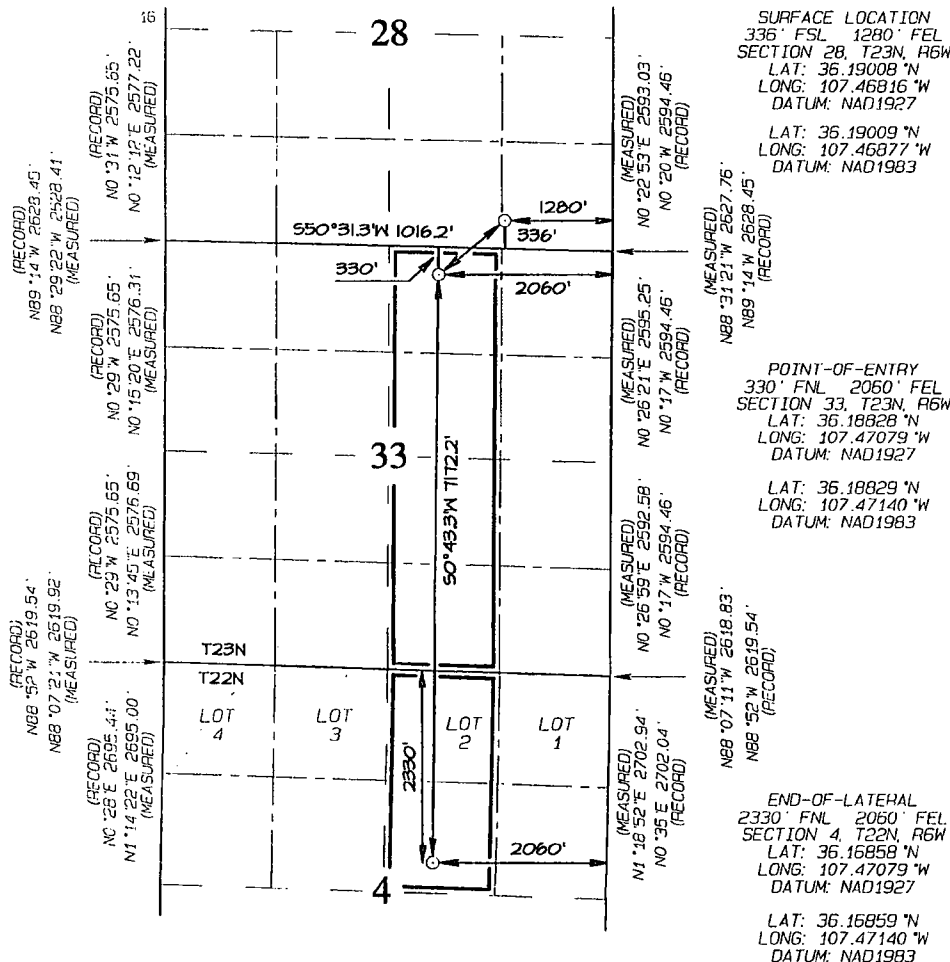
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	28	23N	6W		336	SOUTH	1280	EAST	SANDOVAL

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
G	4	22N	6W		2330	NORTH	2060	EAST	SANDOVAL

¹² Dedicated Acres W/2 E/2 - Section 33 240.81 Acres W/2 NE/4 - Section 4	¹³ Joint or Infill	¹⁴ Consolidation Code	¹⁵ Order No.
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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



SURFACE LOCATION
336' FSL 1280' FEL
SECTION 28, T23N, R6W
LAT: 36.19008°N
LONG: 107.46816°W
DATUM: NAD1927

LAT: 36.19009°N
LONG: 107.46877°W
DATUM: NAD1983

POINT-OF-ENTRY
330' FNL 2060' FEL
SECTION 33, T22N, R6W
LAT: 36.18828°N
LONG: 107.47079°W
DATUM: NAD1927

LAT: 36.18829°N
LONG: 107.47140°W
DATUM: NAD1983

END-OF-LATEHAL
2330' FNL 2060' FEL
SECTION 4, T22N, R6W
LAT: 36.16858°N
LONG: 107.47079°W
DATUM: NAD1927

LAT: 36.16859°N
LONG: 107.47140°W
DATUM: NAD1983

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 previously entered by the Division.

Signature: *Brenda R. Linster* Date: 09-25-13

Printed Name: *Brenda R. Linster*
brenda.linster@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.

Date Revised: AUGUST 1, 2013
Survey Date: OCTOBER 2, 2012

Signature and Seal of Professional Surveyor



JASON C. EDWARDS
Certificate Number 15269

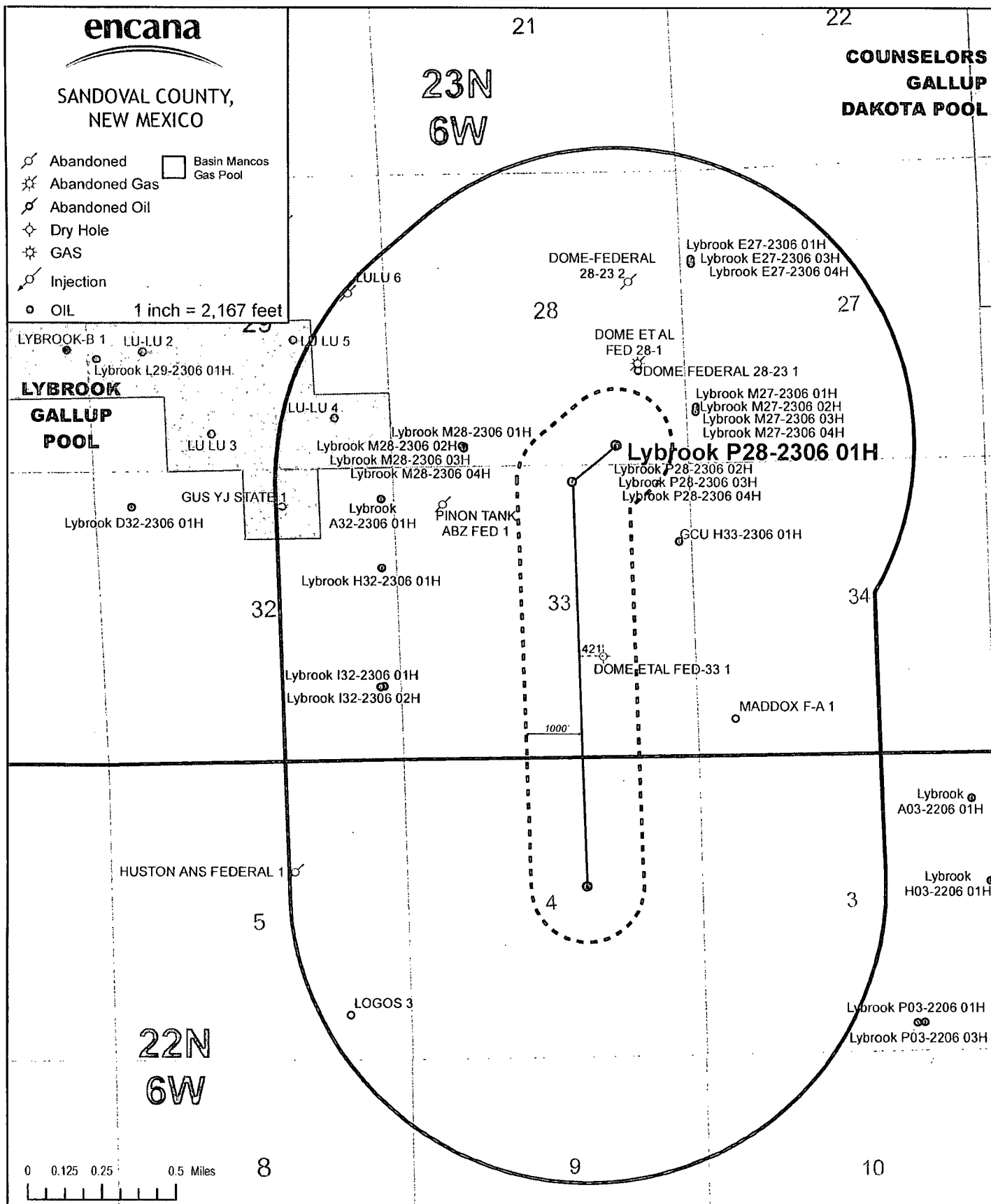
Directions from the Intersection of US Hwy 550 & US Hwy 64
in Bloomfield, NM to Encana Oil & Gas (USA) Inc. Lybrook P28-2306 01H
336' FSL & 1280' FEL, Section 28, T23N, R6W, N.M.P.M., Sandoval County, NM

Latitude: 36.19009°N Longitude: 107.46877°W Datum: NAD1983

From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM, travel Southerly on US Hwy 550 for 53.6 miles to Mile Marker 97.7;

Go right (South-easterly) on Indian Service Route #474 for 0.8 miles to an unimproved roadway on right-hand side which continues for 2484' to fork in proposed roadway;

Go right (Westerly) along proposed roadway for an additional 2324' to staked Encana Lybrook P28-2306 01H location.



Lybrook P28-2306 01H

SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL

BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

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
Ojo Alamo Ss.	1,579
Kirtland Shale	1,740
Fruitland Coal	1,970
Pictured Cliffs Ss.	2,140
Lewis Shale	2,269
Cliffhouse Ss.	3,027
Menefee Fn.	3,677
Point Lookout Ss.	4,388
Mancos Shale	4,536
Mancos Silt	5,163
Gallup Fn.	5,424

The referenced surface elevation is 7,211', KB 7,227'

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

Substance	Formation	Depth (TVD) units = feet
Water/Gas	Fruitland Coal	1,970
Oil/Gas	Pictured Cliffs Ss.	2,140
Oil/Gas	Cliffhouse Ss.	3,027
Gas	Menefee Fn.	3,677
Oil/Gas	Point Lookout Ss.	4,388
Oil/Gas	Mancos Shale	4,536
Oil/Gas	Mancos Silt	5,163
Oil/Gas	Gallup Fn.	5,424

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

3. PRESSURE CONTROL

- a) Pressure control 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.

Lybrook P28-2306 01H**SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL****BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL****Sandoval County, New Mexico****Lease Number: NMNM 112953 & NMNM 109386**

- 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	Hole Size	Csg Size	Weight	Grade
Conductor	0-60'	30"	20"	94#	H40, STC New
Surface	0'-500'	12 1/4"	9 5/8"	36#	J55, STC New
Intermediate	0'-6340'MD	8 3/4"	7"	26#	J55, LTC New
Production Liner	6140'-13601'MD	6 1/8"	4 1/2"	11.6#	B80*, LTC New

Casing String				Casing Strength Properties			Minimum Design Factors		
Size	Weight (lb/ft)	Grade	Connection	Collapse (psi)	Burst (psi)	Tensile (1000lb)	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 1/2"	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 P28-2306 01H

SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL

BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

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:

Top plugs shall be used to reduce contamination of cement by displacement fluid. A bottom plug or other acceptable technique, such as a pre-flush fluid, inner string cement method, etc. shall be utilized to help isolate the cement from contamination by the mud fluid being displaced ahead of the cement slurry.

Casing	Depth	Cement Volume (sacks)	Cement Type&Yield	Designed TOC	Centralizers
Conductor	60'	100sk	Type I Neat 16.0 ppg	Surface	None
Surface	500'	178sk	Type III Cement + 1% CaCl + 0.25lb/sk Cello Flake + 0.2% FL, 14.6ppg, 1.38cuf/sk	Surface	1 per joint on bottom 3 joints
Intermediate	6340'MD	30% open hole excess Stage 1 Lead: 266sks Stage 1 Tail: 183sks Stage 2 Lead: 194sks	Lead (Stages 1 and 2): PremLite + 3% CaCl + 0.25lb/sk CelloFlake + 5lb/sk LCM, 12.1ppg 2.13cuf/sk Tail (Stage 1): Type III Cmt + 1% CaCl + 0.25lb/sk Cello Flake 14.5ppg 1.38cuf/sk	Surface	1 per joint for bottom 3 joints, 1 every 3 joints for remaining joints
Production Liner*	6140'-13601'	None – External casing packers	N/A	N/A	N/A

*Production liner clarification: Utilizing external swell casing packer system for zonal isolation will not use cement in the production liner.

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 a 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 4964'. Directional plans are attached.

Lybrook P28-2306 01H

SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL

BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

Description	Proposed Depth (TVD/MD)	Formation
Horizontal Lateral TD	5627'/13601'	Gallup

6. DRILLING FLUIDS PROGRAM

a) Surface through Intermediate Casing Point:

Hole Size (in)	Depth (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
30"	0-60' TVD	Fresh Water	8.3-9.2	38-100	4-28
12 1/4"	0-500' TVD	Fresh Water	8.4-8.6	60-70	NC
8 3/4"	500'TVD- 5650'TVD/6340'MD	Fresh Water LSND	8.5-8.8	40-50	8-10

b) Intermediate Casing Point to TD:

Hole Size (in)	MD (ft)	Mud Type	Density (lb/gal)	Viscosity (sec/qt)	Fluid Loss (cc)
6 1/8"	6340'-13601'	Synthetic Oil Based Mud	8.6-9.0	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, including fresh water and oil-based operations. 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 and LOGGING

- a) Drill Stem Testing – None anticipated
- b) Coring – None anticipated.
- c) Mud 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

Lybrook P28-2306 01H

**SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL**

**BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL**

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2645 psi based on a 9.0 ppg at 5652' TVD of the landing point of the horizontal lateral. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if H₂S 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 December 10, 2014. 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 25 days.

NOTES:

- 1) Drill with 30" bit to 60', set 20" 94# 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 4964', 8 3/4" hole size,
- 5) PU directional tools and start curve at 10deg/100' build rate
- 6) Drill to casing point of 6340' MD
- 7) R&C 7" casing, circ cmt to surface, switch to OBM
- 8) Land at 90deg, drill 7172' lateral to 13601', run 4 1/2" liner with external swellable csg packers



Boomerang Tube LLC

CASING (OR) TUBING DESCRIPTION AND PERFORMANCE PROPERTIES

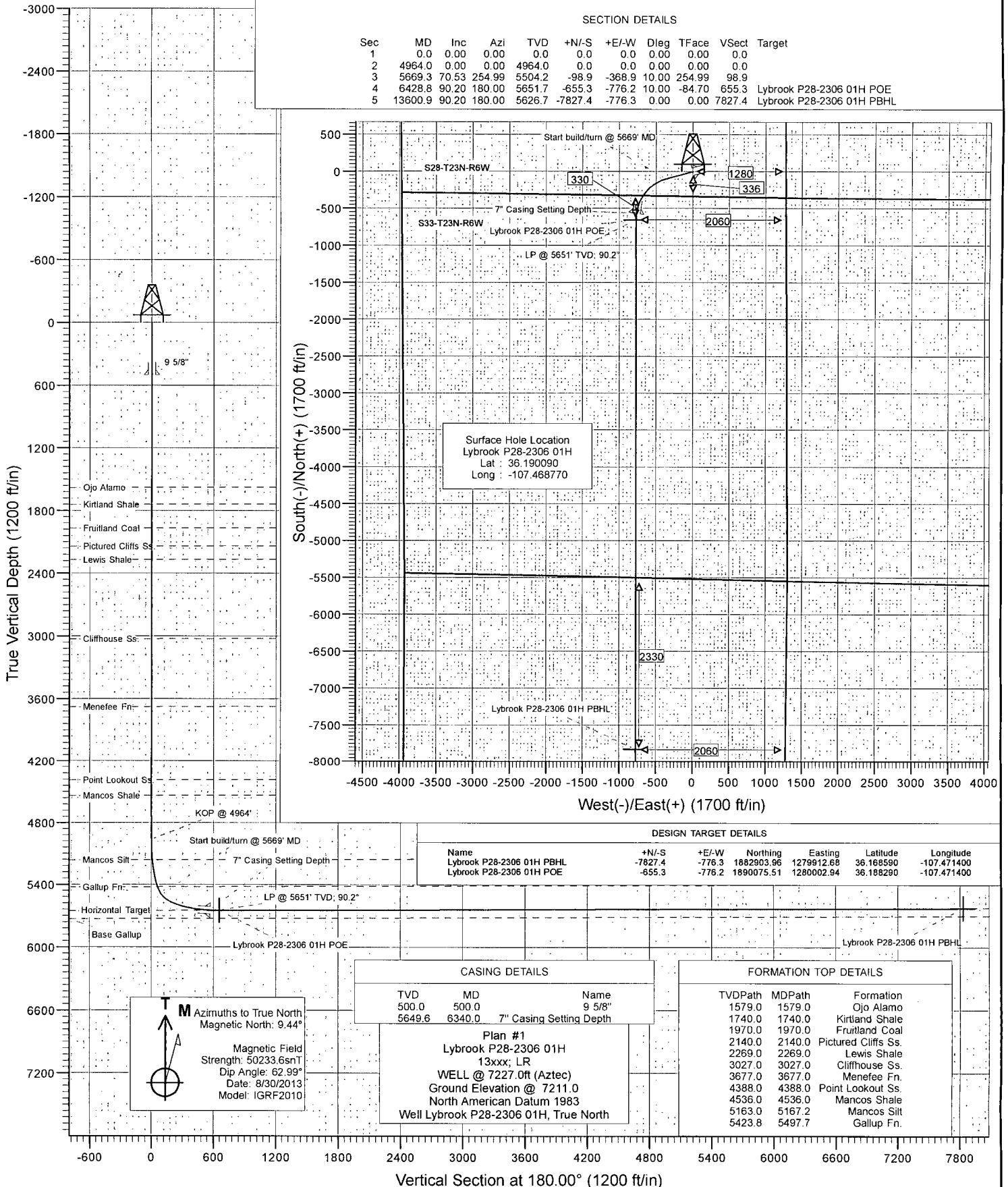
Pipe Outside Diameter (ins)	_____	4.500
Pipe Wall Thickness (ins)	_____	0.250
Nominal Weight Per Foot (lbs)	_____	11.60
Thread Name	_____	Long Thread CSG
Grade Name	_____	SB-80
Pipe Minimum Yield (psi)	_____	80,000
Pipe Minimum Ultimate (psi)	_____	90,000
Coupling Minimum Yield (psi)	_____	80,000
Coupling Minimum Ultimate (psi)	_____	100,000
Coupling or Joint Outside Diameter (ins)	_____	5.000
Drift Diameter (ins)	_____	3.875
Plain End Weight per Foot (lbs)	_____	11.36
Joint Strength (lbs)	_____	201,000
Internal Yield (psi)	_____	7,780
Collapse Rating (psi)	_____	6,350

MAXIMUM DEPTH/LENGTH BASED ON MUD WTS & SAFETY FACTORS

Drilling Mud Weight (ppg)	_____	9.625
Tension Safety Factor	_____	1.80
Maximum Tension Length (ft)	_____	9,630
Internal Yield Safety Factor	_____	1.10
Maximum Depth for Internal Yield (ft)	_____	14,150
Collapse Safety Factor	_____	1.125
Maximum Collapse Depth (ft)	_____	11,290

API RELATED VALUES and INTERMEDIATE CALCULATION RESULTS

Coupling Thread Fracture Strength	_____	464,000
Pipe Thread Fracture Strength (lbs)	_____	201,000
Pipe Body Plain End Yield (lbs)	_____	267,000
Round Thread Pull-Out (lbs)	_____	219,000
Minimum Make-up Torque (ft-lbs)	_____	1,640
Nominal Make-up Torque (ft-lbs)	_____	2,190
Maximum Make-up Torque (ft-lbs)	_____	2,740
Coupling Internal Yield (psi)	_____	10,660
Pipe Body Internal Yield (psi)	_____	7,780
Leak @ E1 or E7 plane (psi)	_____	17,920
Pipe Hydrostatic Test Pressure @ 80 % SMYS	_____	7,100



Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Site: Lybrook
Well: Lybrook P28-2306 01H
Wellbore: Hz
Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature

Project	Sandoval County, NM
Map System:	US State Plane 1983
Geo Datum:	North American Datum 1983
Map Zone:	New Mexico Central Zone
System Datum:	Mean Sea Level

Site	Lybrook				
Site Position:		Northing:	1,882,676.45 ft	Latitude:	36.168210
From:	Lat/Long	Easting:	1,287,068.90 ft	Longitude:	-107.447150
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-0.71 °

Well	Lybrook P28-2306 01H					
Well Position	+N/-S	0.0 ft	Northing:	1,890,721.03 ft	Latitude:	36.190090
	+E/-W	0.0 ft	Easting:	1,280,787.28 ft	Longitude:	-107.468770
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,211.0 ft	

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/30/2013	9.43	62.99	50,234

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	180.00

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	
4,964.0	0.00	0.00	4,964.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,669.3	70.53	254.99	5,504.2	-98.9	-368.9	10.00	10.00	0.00	254.99	
6,428.8	90.20	180.00	5,651.7	-655.3	-776.2	10.00	2.59	-9.87	-84.70	Lybrook P28-2306 01
13,600.9	90.20	180.00	5,626.7	-7,827.4	-776.3	0.00	0.00	0.00	0.00	Lybrook P28-2306 01

Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Site: Lybrook
Well: Lybrook P28-2306 01H
Wellbore: Hz
Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature

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	
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	
1,200.0	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	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,579.0	0.00	0.00	1,579.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,740.0	0.00	0.00	1,740.0	0.0	0.0	0.0	0.00	0.00	Kirtland Shale
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	
1,970.0	0.00	0.00	1,970.0	0.0	0.0	0.0	0.00	0.00	Fruitland Coal
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	
2,140.0	0.00	0.00	2,140.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs Ss.
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,269.0	0.00	0.00	2,269.0	0.0	0.0	0.0	0.00	0.00	Lewis Shale
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
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	
3,027.0	0.00	0.00	3,027.0	0.0	0.0	0.0	0.00	0.00	Cliffhouse Ss.
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	
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	
3,677.0	0.00	0.00	3,677.0	0.0	0.0	0.0	0.00	0.00	Menefee Fn.
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	
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	
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
4,388.0	0.00	0.00	4,388.0	0.0	0.0	0.0	0.00	0.00	Point Lookout Ss.

Cathedral Energy Services

Planning Report

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Project: Sandoval County, NM
Site: Lybrook
Well: Lybrook P28-2306 01H
Wellbore: Hz
Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature

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
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	
4,536.0	0.00	0.00	4,536.0	0.0	0.0	0.0	0.00	0.00	Mancos Shale
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	
4,964.0	0.00	0.00	4,964.0	0.0	0.0	0.0	0.00	0.00	KOP @ 4964'
5,000.0	3.60	254.99	5,000.0	-0.3	-1.1	0.3	10.00	10.00	
5,100.0	13.60	254.99	5,098.7	-4.2	-15.5	4.2	10.00	10.00	
5,167.2	20.32	254.99	5,163.0	-9.2	-34.4	9.2	10.00	10.00	Mancos Silt
5,200.0	23.60	254.99	5,193.4	-12.4	-46.3	12.4	10.00	10.00	
5,300.0	33.60	254.99	5,281.1	-24.8	-92.5	24.8	10.00	10.00	
5,400.0	43.60	254.99	5,359.1	-40.9	-152.6	40.9	10.00	10.00	
5,497.7	53.37	254.99	5,423.8	-59.9	-223.2	59.9	10.00	10.00	Gallup Fn.
5,500.0	53.60	254.99	5,425.2	-60.3	-225.0	60.3	10.00	10.00	
5,600.0	63.60	254.99	5,477.2	-82.4	-307.3	82.4	10.00	10.00	
5,669.3	70.53	254.99	5,504.2	-98.9	-368.9	98.9	10.00	10.00	Start build/turn @ 5669' MD
5,700.0	70.84	251.75	5,514.4	-107.2	-396.7	107.2	10.00	1.02	
5,800.0	72.24	241.31	5,546.1	-145.0	-483.6	145.0	10.00	1.40	
5,900.0	74.18	231.07	5,575.0	-198.2	-562.9	198.2	10.00	1.94	
6,000.0	76.60	221.04	5,600.3	-265.3	-632.5	265.3	10.00	2.41	
6,100.0	79.39	211.22	5,621.2	-344.2	-690.0	344.2	10.00	2.80	
6,200.0	82.49	201.60	5,637.0	-432.5	-733.9	432.5	10.00	3.10	
6,300.0	85.79	192.11	5,647.2	-527.6	-762.6	527.6	10.00	3.30	
6,340.0	87.15	188.34	5,649.6	-566.9	-769.7	566.9	10.00	3.40	7" Casing Setting Depth
6,400.0	89.21	182.70	5,651.6	-626.6	-775.5	626.6	10.00	3.43	
6,428.8	90.20	180.00	5,651.7	-655.3	-776.2	655.3	10.00	3.44	LP @ 5651' TVD; 90.2° - Lybrook P28-2306 01H
6,500.0	90.20	180.00	5,651.5	-726.6	-776.2	726.6	0.00	0.00	
6,600.0	90.20	180.00	5,651.1	-826.6	-776.2	826.6	0.00	0.00	
6,700.0	90.20	180.00	5,650.8	-926.6	-776.2	926.6	0.00	0.00	
6,800.0	90.20	180.00	5,650.4	-1,026.6	-776.2	1,026.6	0.00	0.00	
6,900.0	90.20	180.00	5,650.1	-1,126.6	-776.2	1,126.6	0.00	0.00	
7,000.0	90.20	180.00	5,649.7	-1,226.6	-776.2	1,226.6	0.00	0.00	
7,100.0	90.20	180.00	5,649.4	-1,326.6	-776.2	1,326.6	0.00	0.00	
7,200.0	90.20	180.00	5,649.0	-1,426.6	-776.2	1,426.6	0.00	0.00	
7,300.0	90.20	180.00	5,648.7	-1,526.6	-776.2	1,526.6	0.00	0.00	
7,400.0	90.20	180.00	5,648.3	-1,626.5	-776.2	1,626.5	0.00	0.00	
7,500.0	90.20	180.00	5,648.0	-1,726.5	-776.2	1,726.5	0.00	0.00	
7,600.0	90.20	180.00	5,647.6	-1,826.5	-776.2	1,826.5	0.00	0.00	
7,700.0	90.20	180.00	5,647.3	-1,926.5	-776.2	1,926.5	0.00	0.00	
7,800.0	90.20	180.00	5,646.9	-2,026.5	-776.2	2,026.5	0.00	0.00	
7,900.0	90.20	180.00	5,646.6	-2,126.5	-776.2	2,126.5	0.00	0.00	
8,000.0	90.20	180.00	5,646.2	-2,226.5	-776.2	2,226.5	0.00	0.00	
8,100.0	90.20	180.00	5,645.9	-2,326.5	-776.2	2,326.5	0.00	0.00	
8,200.0	90.20	180.00	5,645.5	-2,426.5	-776.2	2,426.5	0.00	0.00	
8,300.0	90.20	180.00	5,645.2	-2,526.5	-776.2	2,526.5	0.00	0.00	
8,400.0	90.20	180.00	5,644.8	-2,626.5	-776.2	2,626.5	0.00	0.00	
8,500.0	90.20	180.00	5,644.5	-2,726.5	-776.2	2,726.5	0.00	0.00	
8,600.0	90.20	180.00	5,644.1	-2,826.5	-776.2	2,826.5	0.00	0.00	
8,700.0	90.20	180.00	5,643.8	-2,926.5	-776.2	2,926.5	0.00	0.00	
8,800.0	90.20	180.00	5,643.4	-3,026.5	-776.2	3,026.5	0.00	0.00	

Cathedral Energy Services

Planning Report

Database: USA EDM 5000 Multi Users DB
 Company: EnCana Oil & Gas (USA) Inc
 Project: Sandoval County, NM
 Site: Lybrook
 Well: Lybrook P28-2306 01H
 Wellbore: Hz
 Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
 TVD Reference: WELL @ 7227.0ft (Aztec)
 MD Reference: WELL @ 7227.0ft (Aztec)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

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
8,900.0	90.20	180.00	5,643.1	-3,126.5	-776.2	3,126.5	0.00	0.00	
9,000.0	90.20	180.00	5,642.7	-3,226.5	-776.2	3,226.5	0.00	0.00	
9,100.0	90.20	180.00	5,642.4	-3,326.5	-776.2	3,326.5	0.00	0.00	
9,200.0	90.20	180.00	5,642.0	-3,426.5	-776.2	3,426.5	0.00	0.00	
9,300.0	90.20	180.00	5,641.7	-3,526.5	-776.2	3,526.5	0.00	0.00	
9,400.0	90.20	180.00	5,641.3	-3,626.5	-776.2	3,626.5	0.00	0.00	
9,500.0	90.20	180.00	5,641.0	-3,726.5	-776.2	3,726.5	0.00	0.00	
9,600.0	90.20	180.00	5,640.6	-3,826.5	-776.2	3,826.5	0.00	0.00	
9,700.0	90.20	180.00	5,640.3	-3,926.5	-776.2	3,926.5	0.00	0.00	
9,800.0	90.20	180.00	5,639.9	-4,026.5	-776.2	4,026.5	0.00	0.00	
9,900.0	90.20	180.00	5,639.6	-4,126.5	-776.2	4,126.5	0.00	0.00	
10,000.0	90.20	180.00	5,639.2	-4,226.5	-776.3	4,226.5	0.00	0.00	
10,100.0	90.20	180.00	5,638.9	-4,326.5	-776.3	4,326.5	0.00	0.00	
10,200.0	90.20	180.00	5,638.5	-4,426.5	-776.3	4,426.5	0.00	0.00	
10,300.0	90.20	180.00	5,638.2	-4,526.5	-776.3	4,526.5	0.00	0.00	
10,400.0	90.20	180.00	5,637.8	-4,626.5	-776.3	4,626.5	0.00	0.00	
10,500.0	90.20	180.00	5,637.5	-4,726.5	-776.3	4,726.5	0.00	0.00	
10,600.0	90.20	180.00	5,637.1	-4,826.5	-776.3	4,826.5	0.00	0.00	
10,700.0	90.20	180.00	5,636.8	-4,926.5	-776.3	4,926.5	0.00	0.00	
10,800.0	90.20	180.00	5,636.4	-5,026.5	-776.3	5,026.5	0.00	0.00	
10,900.0	90.20	180.00	5,636.1	-5,126.5	-776.3	5,126.5	0.00	0.00	
11,000.0	90.20	180.00	5,635.7	-5,226.5	-776.3	5,226.5	0.00	0.00	
11,100.0	90.20	180.00	5,635.4	-5,326.5	-776.3	5,326.5	0.00	0.00	
11,200.0	90.20	180.00	5,635.0	-5,426.5	-776.3	5,426.5	0.00	0.00	
11,300.0	90.20	180.00	5,634.7	-5,526.5	-776.3	5,526.5	0.00	0.00	
11,400.0	90.20	180.00	5,634.4	-5,626.5	-776.3	5,626.5	0.00	0.00	
11,500.0	90.20	180.00	5,634.0	-5,726.5	-776.3	5,726.5	0.00	0.00	
11,600.0	90.20	180.00	5,633.7	-5,826.5	-776.3	5,826.5	0.00	0.00	
11,700.0	90.20	180.00	5,633.3	-5,926.5	-776.3	5,926.5	0.00	0.00	
11,800.0	90.20	180.00	5,633.0	-6,026.5	-776.3	6,026.5	0.00	0.00	
11,900.0	90.20	180.00	5,632.6	-6,126.5	-776.3	6,126.5	0.00	0.00	
12,000.0	90.20	180.00	5,632.3	-6,226.5	-776.3	6,226.5	0.00	0.00	
12,100.0	90.20	180.00	5,631.9	-6,326.5	-776.3	6,326.5	0.00	0.00	
12,200.0	90.20	180.00	5,631.6	-6,426.5	-776.3	6,426.5	0.00	0.00	
12,300.0	90.20	180.00	5,631.2	-6,526.5	-776.3	6,526.5	0.00	0.00	
12,400.0	90.20	180.00	5,630.9	-6,626.5	-776.3	6,626.5	0.00	0.00	
12,500.0	90.20	180.00	5,630.5	-6,726.5	-776.3	6,726.5	0.00	0.00	
12,600.0	90.20	180.00	5,630.2	-6,826.5	-776.3	6,826.5	0.00	0.00	
12,700.0	90.20	180.00	5,629.8	-6,926.5	-776.3	6,926.5	0.00	0.00	
12,800.0	90.20	180.00	5,629.5	-7,026.5	-776.3	7,026.5	0.00	0.00	
12,900.0	90.20	180.00	5,629.1	-7,126.5	-776.3	7,126.5	0.00	0.00	
13,000.0	90.20	180.00	5,628.8	-7,226.5	-776.3	7,226.5	0.00	0.00	
13,100.0	90.20	180.00	5,628.4	-7,326.5	-776.3	7,326.5	0.00	0.00	
13,200.0	90.20	180.00	5,628.1	-7,426.5	-776.3	7,426.5	0.00	0.00	
13,300.0	90.20	180.00	5,627.7	-7,526.5	-776.3	7,526.5	0.00	0.00	
13,400.0	90.20	180.00	5,627.4	-7,626.5	-776.3	7,626.5	0.00	0.00	
13,500.0	90.20	180.00	5,627.0	-7,726.5	-776.3	7,726.5	0.00	0.00	
13,600.0	90.20	180.00	5,626.7	-7,826.5	-776.3	7,826.5	0.00	0.00	
13,600.9	90.20	180.00	5,626.7	-7,827.4	-776.3	7,827.4	0.00	0.00	TD at 13600.9 - Lybrook P28-2306 01H PBHL

Cathedral Energy Services

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Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
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Well: Lybrook P28-2306 01H
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Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature

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 P28-2306 01H f - plan hits target center - Point	0.00	0.00	5,651.7	-655.3	-776.2	1,890,075.51	1,280,002.94	36.188290	-107.471400
Lybrook P28-2306 01H f - plan hits target center - Point	0.00	0.00	5,626.7	-7,827.4	-776.3	1,882,903.96	1,279,912.68	36.168590	-107.471400

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
6,340.0	5,649.6	7" Casing Setting Depth	0.000	0.000

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,579.0	1,579.0	Ojo Alamo		-0.20	180.00
1,740.0	1,740.0	Kirtland Shale		-0.20	180.00
1,970.0	1,970.0	Fruitland Coal		-0.20	180.00
2,140.0	2,140.0	Pictured Cliffs Ss.		-0.20	180.00
2,269.0	2,269.0	Lewis Shale		-0.20	180.00
3,027.0	3,027.0	Cliffhouse Ss.		-0.20	180.00
3,677.0	3,677.0	Menefee Fn.		-0.20	180.00
4,388.0	4,388.0	Point Lookout Ss.		-0.20	180.00
4,536.0	4,536.0	Mancos Shale		-0.20	180.00
5,167.2	5,163.0	Mancos Silt		-0.20	180.00
5,497.7	5,424.0	Gallup Fn.		-0.20	180.00
1,227.0	5,654.0	Horizontal Target		-0.20	180.00
1,227.0	5,730.0	Base Gallup		-0.20	180.00

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,964.0	4,964.0	0.0	0.0	KOP @ 4964'
5,669.3	5,504.2	-98.9	-368.9	Start build/turn @ 5669' MD
6,428.8	5,651.7	-655.3	-776.2	LP @ 5651' TVD; 90.2°
13,600.9	5,626.7	-7,827.4	-776.3	TD at 13600.9

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook P28-2306 01H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7227.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7227.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook P28-2306 01H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	HZ	Database:	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	Offset TVD Reference:	Offset Datum

Reference	Plan #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	Systematic Ellipse
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,536.2ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date 8/30/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	13,600.1	Plan #1 (Hz)	Geolink MWD	Geolink MWD

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Lybrook						
Lybrook P28-2306 02H - Hz - Plan #1	4,900.0	4,568.0	32.9	16.4	1.998	CC, ES, SF

Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
 Project: Sandoval County, NM
 Reference Site: Lybrook
 Site Error: 0.0ft
 Reference Well: Lybrook P28-2306 01H
 Well Error: 0.0ft
 Reference Wellbore: Hz
 Reference Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
 TVD Reference: WELL @ 7227.0ft (Aztec)
 MD Reference: WELL @ 7227.0ft (Aztec)
 North Reference: True
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA EDM 5000 Multi Users DB
 Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook P28-2306 02H - Hz - Plan #1												Offset Site Error:	0.0 ft
Survey Program: O-Geolink MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Total Uncertainty Axis	Separation Factor	Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)					
0.0	0.0	0.0	0.0	0.0	0.0	63.74	14.6	29.5	333.6				
100.0	100.0	0.0	0.0	0.1	0.0	63.74	14.6	29.5	234.3	234.2	0.15	1,598.294	
200.0	200.0	0.0	0.0	0.3	0.0	63.74	14.6	29.5	136.0	135.7	0.32	423.616	
300.0	300.0	0.0	0.0	0.5	0.0	63.74	14.6	29.5	45.9	45.4	0.50	92.605	
350.3	350.3	18.3	18.3	0.6	0.0	63.74	14.6	29.5	32.9	32.3	0.61	53.933	
400.0	400.0	68.0	68.0	0.7	0.1	63.74	14.6	29.5	32.9	32.1	0.77	42.745	
500.0	500.0	168.0	168.0	0.8	0.3	63.74	14.6	29.5	32.9	31.8	1.11	29.647	
600.0	600.0	268.0	268.0	1.0	0.4	63.74	14.6	29.5	32.9	31.4	1.46	22.554	
700.0	700.0	368.0	368.0	1.2	0.6	63.74	14.6	29.5	32.9	31.1	1.81	18.200	
800.0	800.0	468.0	468.0	1.4	0.8	63.74	14.6	29.5	32.9	30.8	2.16	15.255	
900.0	900.0	568.0	568.0	1.5	1.0	63.74	14.6	29.5	32.9	30.4	2.51	13.131	
1,000.0	1,000.0	668.0	668.0	1.7	1.1	63.74	14.6	29.5	32.9	30.1	2.86	11.525	
1,100.0	1,100.0	768.0	768.0	1.9	1.3	63.74	14.6	29.5	32.9	29.7	3.20	10.270	
1,200.0	1,200.0	868.0	868.0	2.1	1.5	63.74	14.6	29.5	32.9	29.4	3.55	9.261	
1,300.0	1,300.0	968.0	968.0	2.2	1.7	63.74	14.6	29.5	32.9	29.0	3.90	8.433	
1,400.0	1,400.0	1,068.0	1,068.0	2.4	1.8	63.74	14.6	29.5	32.9	28.7	4.25	7.740	
1,500.0	1,500.0	1,168.0	1,168.0	2.6	2.0	63.74	14.6	29.5	32.9	28.3	4.60	7.153	
1,600.0	1,600.0	1,268.0	1,268.0	2.8	2.2	63.74	14.6	29.5	32.9	28.0	4.95	6.649	
1,700.0	1,700.0	1,368.0	1,368.0	2.9	2.4	63.74	14.6	29.5	32.9	27.6	5.30	6.211	
1,800.0	1,800.0	1,468.0	1,468.0	3.1	2.5	63.74	14.6	29.5	32.9	27.3	5.65	5.827	
1,900.0	1,900.0	1,568.0	1,568.0	3.3	2.7	63.74	14.6	29.5	32.9	26.9	6.00	5.488	
2,000.0	2,000.0	1,668.0	1,668.0	3.5	2.9	63.74	14.6	29.5	32.9	26.6	6.35	5.186	
2,100.0	2,100.0	1,768.0	1,768.0	3.6	3.1	63.74	14.6	29.5	32.9	26.2	6.70	4.915	
2,200.0	2,200.0	1,868.0	1,868.0	3.8	3.2	63.74	14.6	29.5	32.9	25.9	7.04	4.672	
2,300.0	2,300.0	1,968.0	1,968.0	4.0	3.4	63.74	14.6	29.5	32.9	25.5	7.39	4.451	
2,400.0	2,400.0	2,068.0	2,068.0	4.2	3.6	63.74	14.6	29.5	32.9	25.2	7.74	4.251	
2,500.0	2,500.0	2,168.0	2,168.0	4.3	3.8	63.74	14.6	29.5	32.9	24.8	8.09	4.067	
2,600.0	2,600.0	2,268.0	2,268.0	4.5	3.9	63.74	14.6	29.5	32.9	24.5	8.44	3.899	
2,700.0	2,700.0	2,368.0	2,368.0	4.7	4.1	63.74	14.6	29.5	32.9	24.1	8.79	3.744	
2,800.0	2,800.0	2,468.0	2,468.0	4.9	4.3	63.74	14.6	29.5	32.9	23.8	9.14	3.601	
2,900.0	2,900.0	2,568.0	2,568.0	5.0	4.5	63.74	14.6	29.5	32.9	23.4	9.49	3.469	
3,000.0	3,000.0	2,668.0	2,668.0	5.2	4.6	63.74	14.6	29.5	32.9	23.1	9.84	3.346	
3,100.0	3,100.0	2,768.0	2,768.0	5.4	4.8	63.74	14.6	29.5	32.9	22.7	10.19	3.231	
3,200.0	3,200.0	2,868.0	2,868.0	5.6	5.0	63.74	14.6	29.5	32.9	22.4	10.53	3.124	
3,300.0	3,300.0	2,968.0	2,968.0	5.7	5.2	63.74	14.6	29.5	32.9	22.0	10.88	3.024	
3,400.0	3,400.0	3,068.0	3,068.0	5.9	5.3	63.74	14.6	29.5	32.9	21.7	11.23	2.930	
3,500.0	3,500.0	3,168.0	3,168.0	6.1	5.5	63.74	14.6	29.5	32.9	21.3	11.58	2.841	
3,600.0	3,600.0	3,268.0	3,268.0	6.3	5.7	63.74	14.6	29.5	32.9	21.0	11.93	2.758	
3,700.0	3,700.0	3,368.0	3,368.0	6.4	5.9	63.74	14.6	29.5	32.9	20.6	12.28	2.680	
3,800.0	3,800.0	3,468.0	3,468.0	6.6	6.0	63.74	14.6	29.5	32.9	20.3	12.63	2.606	
3,900.0	3,900.0	3,568.0	3,568.0	6.8	6.2	63.74	14.6	29.5	32.9	19.9	12.98	2.536	
4,000.0	4,000.0	3,668.0	3,668.0	7.0	6.4	63.74	14.6	29.5	32.9	19.6	13.33	2.469	
4,100.0	4,100.0	3,768.0	3,768.0	7.1	6.5	63.74	14.6	29.5	32.9	19.2	13.68	2.406	
4,200.0	4,200.0	3,868.0	3,868.0	7.3	6.7	63.74	14.6	29.5	32.9	18.9	14.03	2.346	
4,300.0	4,300.0	3,968.0	3,968.0	7.5	6.9	63.74	14.6	29.5	32.9	18.5	14.37	2.289	
4,400.0	4,400.0	4,068.0	4,068.0	7.7	7.1	63.74	14.6	29.5	32.9	18.2	14.72	2.235	
4,500.0	4,500.0	4,168.0	4,168.0	7.8	7.2	63.74	14.6	29.5	32.9	17.8	15.07	2.183	
4,600.0	4,600.0	4,268.0	4,268.0	8.0	7.4	63.74	14.6	29.5	32.9	17.5	15.42	2.134	
4,700.0	4,700.0	4,368.0	4,368.0	8.2	7.6	63.74	14.6	29.5	32.9	17.1	15.77	2.087	
4,800.0	4,800.0	4,468.0	4,468.0	8.3	7.8	63.74	14.6	29.5	32.9	16.8	16.12	2.042	
4,900.0	4,900.0	4,568.0	4,568.0	8.5	7.9	63.74	14.6	29.5	32.9	16.4	16.47	1.998 CC, ES, SF	
4,942.4	4,942.4	4,610.4	4,610.4	8.6	8.0	168.93	14.6	29.5	33.5	16.8	16.61	2.014	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Cathedral Energy Services

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 01H
Well Error: 0.0ft
Reference Wellbore: Hz
Reference Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Offset Design Lybrook - Lybrook P28-2306 02H - Hz - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Total Uncertainty Axis	Separation Factor	Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)				Between Centres (ft)	Between Ellipses (ft)		
5,000.0	5,000.0	4,668.0	4,668.0	8.7	8.1	169.10	14.6	29.5	34.0	17.2	16.80	2.025			
5,100.0	5,098.7	4,762.5	4,762.4	8.9	8.3	174.71	13.4	32.7	51.5	34.7	16.84	3.060			
5,200.0	5,193.4	4,842.5	4,841.0	9.1	8.4	-177.46	8.8	46.1	97.0	80.5	16.52	5.870			
5,300.0	5,281.1	4,900.0	4,896.0	9.4	8.6	-172.66	3.2	62.1	165.8	149.9	15.90	10.428			
5,400.0	5,359.1	4,942.4	4,935.2	10.0	8.7	-168.14	-2.1	77.2	250.6	235.4	15.12	16.568			
5,500.0	5,425.2	4,965.0	4,955.7	10.8	8.7	-160.21	-5.3	86.3	344.8	330.2	14.63	23.570			
5,600.0	5,477.2	4,974.0	4,963.7	12.0	8.8	-119.53	-6.6	90.2	443.5	424.4	19.10	23.221			
5,700.0	5,514.4	4,972.8	4,962.7	13.5	8.8	-51.15	-6.4	89.7	543.1	524.1	19.07	28.484			
5,800.0	5,546.1	4,971.0	4,961.0	15.2	8.8	-66.18	-6.1	88.9	641.1	618.6	22.48	28.515			
5,900.0	5,575.0	4,970.8	4,960.8	16.9	8.8	-68.89	-6.1	88.8	735.7	711.7	24.05	30.597			
6,000.0	5,600.3	4,972.0	4,961.9	18.5	8.8	-69.11	-6.3	89.3	825.8	800.8	25.03	32.995			
6,100.0	5,621.2	4,974.5	4,964.1	19.9	8.8	-68.71	-6.7	90.4	910.3	884.8	25.54	35.639			
6,200.0	5,637.0	4,978.2	4,967.4	21.3	8.8	-68.31	-7.2	92.0	988.4	962.8	25.61	38.590			
6,300.0	5,647.2	4,983.1	4,971.7	22.4	8.8	-68.16	-8.0	94.2	1,059.3	1,034.0	25.27	41.913			
6,400.0	5,651.6	5,000.0	4,986.5	23.4	8.9	-69.08	-10.7	102.0	1,122.6	1,097.9	24.71	45.426			
6,500.0	5,651.5	5,000.0	4,986.5	24.3	8.9	-69.09	-10.7	102.0	1,180.9	1,155.5	25.36	46.567			
6,600.0	5,651.1	5,000.0	4,986.5	25.3	8.9	-69.09	-10.7	102.0	1,243.9	1,217.3	26.68	46.633			
6,700.0	5,650.8	5,000.0	4,986.5	26.4	8.9	-69.09	-10.7	102.0	1,311.6	1,283.6	28.04	46.775			
6,800.0	5,650.4	5,019.7	5,003.4	27.6	8.9	-70.26	-14.0	111.5	1,382.9	1,353.3	29.67	46.613			
6,900.0	5,650.1	5,028.3	5,010.6	28.8	9.0	-70.76	-15.6	115.9	1,457.6	1,426.4	31.21	46.698			
7,000.0	5,649.7	5,037.4	5,018.2	30.0	9.0	-71.29	-17.2	120.6	1,535.1	1,502.3	32.80	46.806			

Cathedral Energy Services

Anticollision Report

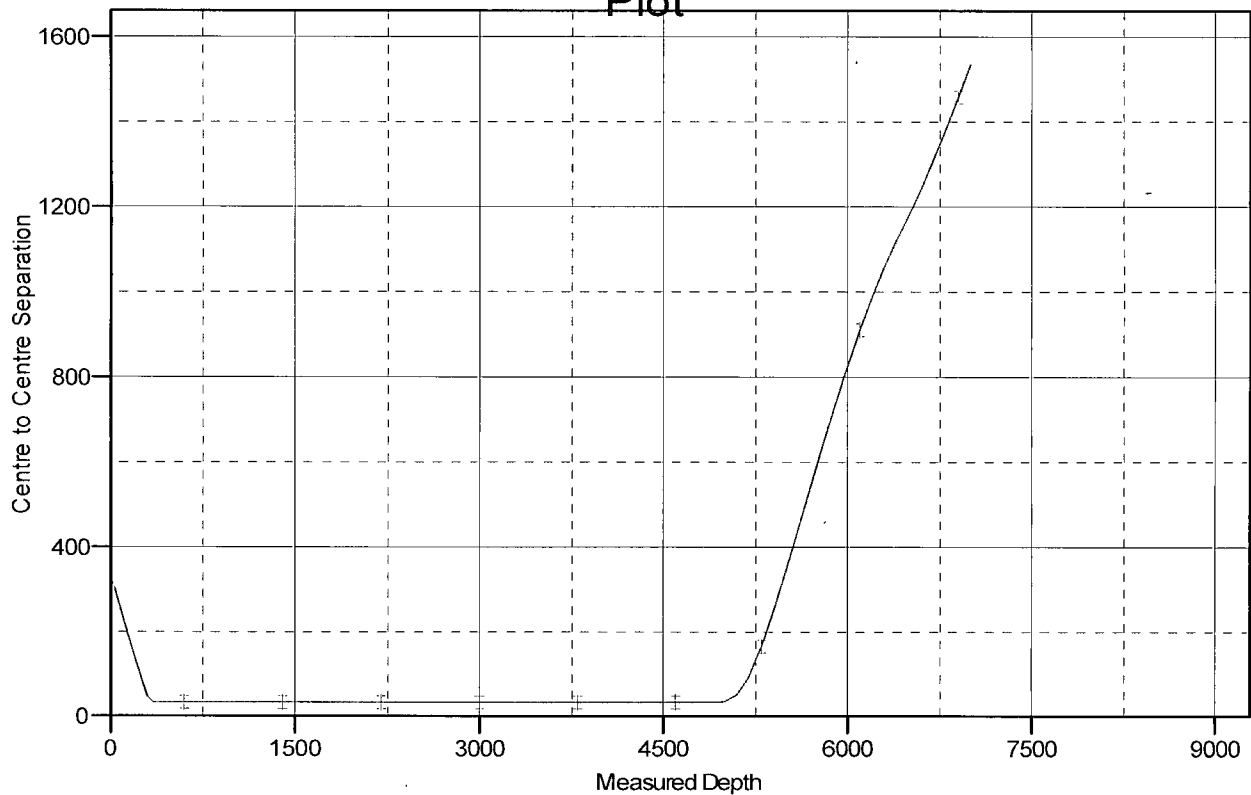
Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook P28-2306 01H
Well Error: 0.0ft
Reference Wellbore: Hz
Reference Design: Plan #1

Local Co-ordinate Reference: Well Lybrook P28-2306 01H
TVD Reference: WELL @ 7227.0ft (Aztec)
MD Reference: WELL @ 7227.0ft (Aztec)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Reference Depths are relative to WELL @ 7227.0ft (Aztec)
Offset Depths are relative to Offset Datum
Central Meridian is -106.250000 °

Coordinates are relative to: Lybrook P28-2306 01H
Coordinate System is US State Plane 1983, New Mexico Central Zone
Grid Convergence at Surface is: -0.72°

Ladder Plot



LEGEND

— Lybrook P28-2306 02H, Hz, Plan #1 V0

Lybrook P28-2306 01H

SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL

BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

2. After removal of vegetation, topsoil will be segregated and windrowed on the edge of the. Topsoil will be defined as the top six (6) inches of soil. The stockpiled topsoil will be free of brush and tree limbs, trunks and root balls, but may include chipped or mulched material so long as it is incorporated into the topsoil stockpile.

Topsoil will be stockpiled separate from subsoil with a noticeable gap left between the stockpiles. Vehicle/equipment traffic will be prevented from crossing topsoil stockpiles.

Topsoil will not be stripped when soils are moisture-saturated or frozen below the stripping depth.

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 11 feet on the northwest corner of the pad at corner 2 and the maximum fill will be approximately 15 feet on the northeast edge of pad at corner 3.

4. As determined during the onsite on July 31 2013, the following best management practices will be implemented:
 - a. The northeast corner (corner 3) of the well pad will be rounded.
 - b. Water will be diverted around the pad and silt traps installed as needed upon interim reclamation.
 - c. Pipeline will be at least 4'-5' below the drainage on the north side of the pad.
 - d. A tree screen will be maintained on the east side of the pad.
 - e. A fence will be installed on the south side of the pad to protect an arch site.
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 to 4 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 2,592 foot, up to 6-inch 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

Lybrook P28-2306 01H

**SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL**

**BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL**

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

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 practical. Residual fluids will be vacuumed from the storage tanks and disposed of at Basin Disposal, 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. The closed-loop system storage tanks will be placed in bermed secondary containment sized to accommodate a minimum of 110 percent of the volume of the largest storage tank.
 4. A 20-mil liner will be installed under tanks, pumps, ancillary facilities, and truck loading/unloading areas associated with the closed-loop system.
- C. Flowback Water
1. The water-based solution that flows back to the surface during and after completion operations will be placed in storage tanks on the location.
 2. Flowback water will be confined to a storage tank for a period not to exceed 90 days after initial production and will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.
- D. Spills – any spills of non-freshwater fluids will be immediately cleaned up and removed to an approved disposal site.
- E. Sewage – self-contained, chemical toilets will be provided for human waste disposal. The toilet holding tanks will be pumped, as needed, and the contents thereof disposed of in an approved sewage disposal facility. The toilets will be onsite during all operations.
- F. Garbage and other waste material – garbage, trash and other waste materials will be collected in a portable, self-contained and fully-enclosed trash container during drilling and completion operations. The accumulated trash will be removed, as needed, and will be disposed of at an authorized sanitary landfill. No trash will be buried or burned on location.
- G. Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash container will be cleaned up and removed from the well location.
- H. No chemicals subject to reporting under SARA Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed of annually in association with the drilling, testing or completing of this well.

Lybrook P28-2306 01H

**SHL: SESE Section 28, T23N, R6W
336 FSL and 1280 FEL**

**BHL: SWNE Section 4, T22N, R6W
2330 FNL and 2060 FEL**

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 109386

- I. No extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities, will be used, produced, stored, transported, or disposed of in association with the drilling, testing, or completing of this well.

8. ANCILLARY FACILITIES

- A. Standard drilling operation equipment that will be on location includes: drilling rig with associated equipment, temporary office trailers equipped with sleeping quarters for essential company personnel, toilet facilities, and trash containers.

9. WELL SITE LAYOUT

- A. The proposed well pad layout is shown on Sheets F-1, F-2, G-1, and G-2. Cross sections have been drafted to visualize the planned cuts and fills across the location. Refer to Item 6 for construction materials and methods.
- B. No permanent living facilities are planned. Office trailers equipped with living quarters will be provided on location during drilling and completions operations.
- C. The production facility layout is being deferred until the Facility and Reclamation onsite with the BLM Representative. Production

10. PLANS FOR SURFACE RECLAMATION

The project falls within the Pinyon-Juniper Vegetation Community. During the onsite on July 31, 2013, plant species were picked from the Pinyon-Juniper Community Seed List. These species will be used in the revegetation seed mixture. Please see Reclamation Plan (Appendix A).

The well pad, road and pipeline will fall under the BLM Vegetation Reclamation Procedure B. A site-specific Reclamation Plan is located in Appendix A. The BLM will be contacted 48 hours prior to construction and reclamation.

11. SURFACE OWNERSHIP

Bureau of Land Management

12. OTHER INFORMATION

- A. A Standard Form SF-299 Application for authorization to construct, operate, maintain and terminate a 30-foot overall right-of-way access road with a 14-foot road running surface was submitted to the Bureau of Land Management on June 26, 2013. A Surface Use Plan of Operation was submitted to the Bureau of Land Management concurrently with the APD reflecting a 2,324' access road. Issued Serial Number NMNM 130749.
- B. Well Pad is on-lease, no Right-of-Way required.
- C. A final Standard Form 299 Application and Plan of Development for authorization to construct, operate, maintain and terminate a 2,592 foot, up to 6-inch buried, steel well connect pipeline was submitted to the Bureau of Land Management concurrently with the APD. Issued Serial Number NMNM 130750.
- D. A Class III Cultural Resource Inventory of the proposed well pad, access road, and pipeline route will be conducted and filed with the BLM-Farmington Field Office.
- E. Construction contractors will call New Mexico One-Call (or equivalent) to identify the location of any marked or unmarked pipelines or cables located in proximity to the proposed well pad, access road, and pipeline at least two working days prior to ground disturbance.

Lybrook P28-2306 01H

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- F. All operations will be conducted in such a manner that full compliance is made with the applicable laws and regulations, the approved Application for Permit to Drill, and applicable Notice(s) to Lessees.
- G. Encana will be fully responsible for the actions of its subcontractors. A complete copy of the approved Application for Permit to Drill will be furnished to the field representatives and will be on location during all construction, drilling, and completions operations.

WELLHEAD BLOWOUT CONTROL SYSTEM

encana

Well name and number:

Lybrook P28-2306 01H

