

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: 5/16/13

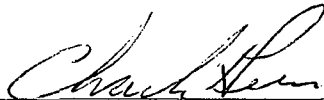
Well information;

Operator Encana, Well Name and Number Lybrook M27-2306 4H

API# 30-043-21151, Section 27, Township 23 N/S, Range 6 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
- ☐ 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


NMOCD Approved by Signature

10-4-2013 ca
Date

RECEIVED

Form 3160-3
(August 2007)

MAY 20 2013

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Farmington Field Office
Bureau of Land Management

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER		6. If Indian, Allottee or Tribe Name N/A	
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		7. If Unit or CA Agreement, Name and No. N/A	
2. Name of Operator Encana Oil & Gas (USA) Inc.		8. Lease Name and Well No. Lybrook M27-2306 04H	
3a. Address 370 17th Street, Suite 1700 Denver, CO 80202		9. API Well No. 30-043-21157	
3b. Phone No. (include area code) 720-876-3989		10. Field and Pool, or Exploratory Counselors Gallup-Dakota	
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 901' FSL and 173' FWL Section 27, T23N, R6W At proposed prod. zone 550' FSL and 330' FWL Section 28, T23N, R6W		11. Sec., T. R. M. or Blk. and Survey or Area Section 27, T23N, R6W NMMP	
14. Distance in miles and direction from nearest town or post office* +/- 54.4 miles southeast of the intersection of US Hwy 550 & 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 drig. unit line, if any) BHL is 330' from west lease line	16. No. of acres in lease NMNM 112953 - 1,760.0	17. Spacing Unit dedicated to this well 320.0 acres - S2 of Section 28 RCVD AUG 15 '13	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. Dome-Federal 28-23 1 is +/- 1320' NW of SHL	19. Proposed Depth 5,582' TVD/10,511' MD	20. BLM/BIA Bond No. on file COB-000235 OIL CONS. DIV. DIST. 3	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 7132' GL, 7145' KB	22. Approximate date work will start* 06/29/2014	23. Estimated duration 25 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:

- 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>Holly Hill</i>	Name (Printed/Typed) Holly Hill	Date 05/16/2013
Title Regulatory Analyst		
Approved by <i>[Signature]</i>	Name (Printed/Typed)	Date 8/6/13
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)

*(Instructions on page 2)

NMOC
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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

This action is subject to technical and procedural review pursuant to 43 CFR 3160.5 and appeal pursuant to 43 CFR 3160.4

DRILLING OPERATIONS AUTHORIZED AND SUBJECT TO COMPLIANCE WITH ATTACHED "GENERAL REQUIREMENTS".

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

OIL CONSERVATION DIVISION

1220 South St. Francis Drive
Santa Fe, NM 87505

Submit one copy to
Appropriate District Office

RECEIVED

MAY 20 2013

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number 30-043-21151	*Pool Code 13379	*Pool Name Bureau of Land Management COUNSELORS. GALLUP-DAKOTA
*Property Code 40082	*Property Name LYBROOK M27-2306	*Well Number 04H
*GRID No. 282327	*Operator Name ENCANA OIL & GAS (USA) INC.	*Elevation 7132'

¹⁰ Surface Location

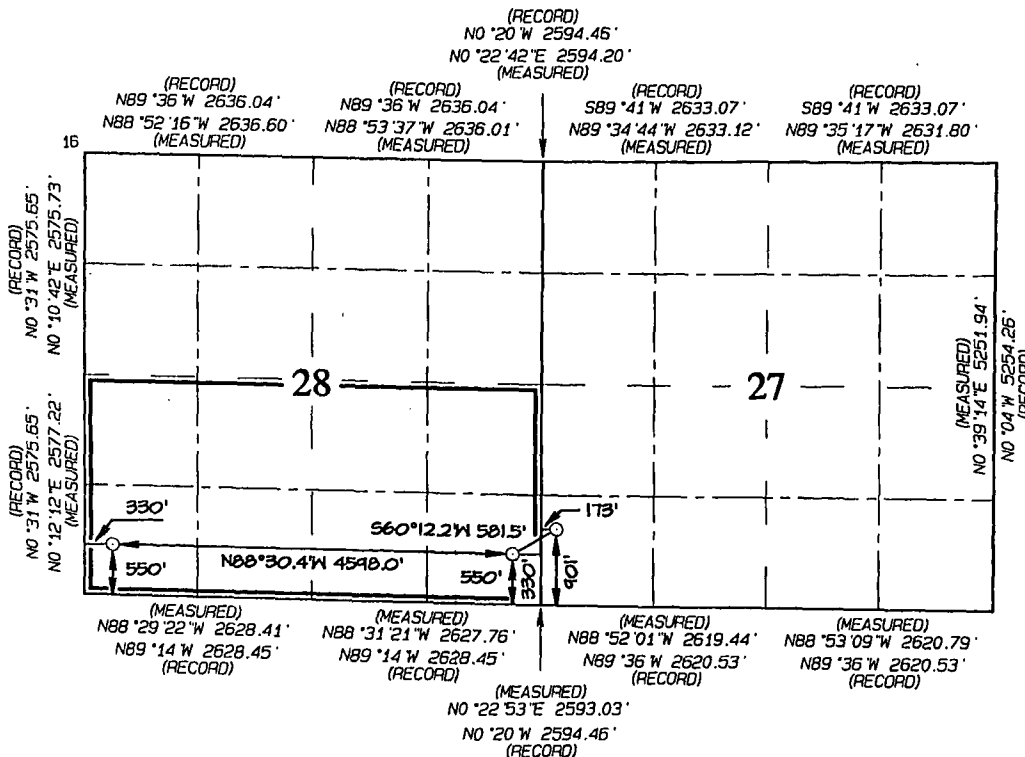
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	27	23N	6W		901	SOUTH	173	WEST	SANDOVAL

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
M	28	23N	6W		550	SOUTH	330	WEST	SANDOVAL

12 Dedicated Acres	320.00 Acres S/2 - Section 28	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



END-OF-LATERAL
550' FSL 330' FWL
SECTION 28, T23N, R6W
LAT: 36.19094°N
LONG: 107.48053°W
DATUM: NAD1927

LAT: 36.19095 °N
LONG: 107.48113 °W
DATUM: NAD1983

POINT-OF-ENTRY
550' FSL 330' FEL
SECTION 28, T23N, R6W
LAT: 36.19077°N
LONG: 107.46495°W
DATUM: NAD1927

LAT: 36.19078°N
LONG: 107.46555°W
DATUM: NAD1983

SURFACE LOCATION
901' FSL 173' FWL
SECTION 27, T23N, R6W
LAT: 36.19158°N
LONG: 107.46325°W
DATUM: NAD1927

LAT: 36.19160 °N
LONG: 107.46386 °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 the owner of such a mineral or working interest, or has a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Holly Hill Date 4/2/13
Holly Hill

Printed Name
holly.hill@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.

Survey Date: DECEMBER 5, 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 M27-2306 04H
901' FSL & 173' FWL, Section 27, T23N, R6W, N.M.P.M., Sandoval County, NM

Latitude: 36.19160°N Longitude: 107.46386°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 B.I.A. road #474 for 0.8 miles to proposed access on right hand side of existing roadway which continues for 3126' to staked Encana Lybrook M27-2306 04H location.

encana.

natural gas

**SANDOVAL COUNTY,
NEW MEXICO**

-  Abandoned
-  Abandoned Gas
-  Abandoned Oil
-  Dry Hole
-  GAS
-  Injection
-  OIL
-  Basin Mancos Gas Pool

1 inch = 2,167 feet

STATE 16 2
STATE 16 6

16

15

STATE 16 3

STATE 16 5

RITA COM 3

RITA COM.3

STATE 16 4

STATE 16 6

STATE 16 4

STATE 16 5

COUNSELORS GALLUP DAKOTA POOL

23N

6W

2-2

21

22

20

EMILY 2
EMILY 1

**LYBROOK
GALLUP
POOL**

CHAPMAN A-3

CHAPMAN 1

LYBROOK-A 1

LU-LU 1

CHAPMAN A-2

CHRISTA 1

Lybrook E29-2306 01H

Lybrook E29-2306 02H

Lybrook E29-2306 03H

Lybrook E29-2306 04H

CHAPMAN A-1

LU-LU 6

DOME-FEDERAL

28-23 2

Lybrook E27-2306 01H

Lybrook E27-2306 02H

Lybrook E27-2306 03H

Lybrook E27-2306 04H

29

28

27

LYBROOK-B 1

LU-LU 2

LU-LU 5

DOME ET AL

FED 28-1

Lybrook L29-2306 01H

Lybrook L29-2306 02H

Lybrook L29-2306 03H

Lybrook L29-2306 04H

LU-LU 3

LU-LU 4

DOME-FEDERAL

28-23 1

Lybrook M27-2306 01H

Lybrook M27-2306 02H

Lybrook M27-2306 03H

Lybrook M27-2306 04H

GUS YJ STATE 1

Lybrook A32-2306 01H

PINON TANK

ABZ FED 1

Lybrook H32-2306 01H

33

DOME ET AL

FED 33-1

34

32

Lybrook I32-2306 01H

Lybrook I32-2306 02H

**BASIN MANCOS
GAS POOL**

MADDOX F-A 1

Lybrook A03-2206 01H ●

0 0.125 0.25 0.5 Miles



5

4

3

Lybrook M27-2306 04H
SHL: SWSW Section 27, T23N, R6W
901 FSL and 173 FWL
BHL: SWSW Section 28, T23N, R6W
550 FSL and 330 FWL
Sandoval County, New Mexico
Lease Number: NMNM 112953 & NMNM 117564

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

1. ESTIMATED TOPS OF GEOLOGICAL MARKERS (TVD)

The estimated tops of important geologic markers are as follows:

<u>Formation</u>	<u>Depth (TVD)</u>
Ojo Alamo Ss.	1509'
Kirtland	1667'
Fruitland Coal	1894'
Pictured Cliffs	2067'
Lewis	2193'
Cliffhouse	2940'
Menefee	3610'
Point Lookout	4313'
Mancos Shale	4510'
Mancos Silt	5098'
Gallup	5346'

The referenced surface elevation is 7132', KB 7145'

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

<u>Substance</u>	<u>Formation</u>	<u>Depth (TVD)</u>
Gas	Fruitland Coal	1894'
Gas	Pictured Cliffs	2067'
Gas	Cliffhouse	2940'
Gas	Point Lookout	4313'
Oil/Gas	Mancos	4510'

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.
- 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.

Lybrook M27-2306 04H**SHL: SWSW Section 27, T23N, R6W
901 FSL and 173 FWL****BHL: SWSW Section 28, T23N, R6W
550 FSL and 330 FWL****Sandoval County, New Mexico****Lease Number: NMNM 112953 & NMNM 117564**

- 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'-5992'MD	8 3/4"	7"	26#	J55, LTC New
Production Liner	5792'-10511'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.

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.

Lybrook M27-2306 04H

SHL: SWSW Section 27, T23N, R6W
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550 FSL and 330 FWL

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 117564

Casing	Depth	Cement Volume (sacks)	Cement Type&Yield	Designed TOC	Centralizers
Conductor	60'	100sk	Type I Neat 14.8 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	5992'MD	30% open hole excess Stage 1 Lead: 249sks Stage 1 Tail: 171sks Stage 2 Lead: 188sks	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*	5792'-10511'	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 4832'. Directional plans are attached.

Description	Proposed Depth (TVD/MD)	Formation
Horizontal Lateral TD	5582'/10511'	Gallup

Lybrook M27-2306 04H
SHL: SWSW Section 27, T23N, R6W
901 FSL and 173 FWL
BHL: SWSW Section 28, T23N, R6W
550 FSL and 330 FWL
Sandoval County, New Mexico
Lease Number: NMNM 112953 & NMNM 117564

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- 5598'TVD/5992'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"	5992'-10511'	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

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2620 psi based on a 9.0 ppg at 5598' 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.

Lybrook M27-2306 04H

**SHL: SWSW Section 27, T23N, R6W
901 FSL and 173 FWL**

**BHL: SWSW Section 28, T23N, R6W
550 FSL and 330 FWL**

Sandoval County, New Mexico

Lease Number: NMNM 112953 & NMNM 117564

9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on June 29, 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.

LOC: Sec 27-T23N-R6W County: Sandoval WELL: Lybrook M27-2306 04H			Encana Natural Gas WELL SUMMARY			encana natural gas		ENG: J. Fox/ A. RIG: GLE: 7132 RKBE: 7145		3/5/13	
MWD LWD	OPEN HOLE LOGGING	FORM	DEPTH TVDMD			HOLE SIZE	CASING SPECS	MW MUD TYPE	DEVIATION INFORMATION		
			60	60'		30	20" 94# 100sx Type I Neat 48.8ppg cmt	Fresh wtr 8.3-9.2			
Surveys After csg is run	None		500	500		12 1/4	9 5/8" 36ppf J55 STC TOC @ surface 178 sks Type III Cmt	Fresh wtr 8.4-8.6	Vertical <1°		
Surveys every 500'	No OH logs	Ojo Alamo Kirtland Fruitland Coal Pictured Cliffs Ss Lewis Shale Cliffhouse Ss Menefee Fn	1509 1,667 1894 2067 2193 2940 3610		Stage tool @ 2120'	8 3/4	7" 26ppf J55 LTC TOC @ surface 30% OH excess: 607sksTotal. Stage 1 Lead: 249sks Stage 1 Tail: 171sks. Stage 2 Lead: 188sks	Fresh Wtr 8.5-8.8	Vertical <1°		
	Mud logger onsite	Point Lookout Ss Mancos Sh KICK OFF PT Mancos Silt Gallup Top	4313 4510 4832 5098 5346 5598	5992					KOP 4832 10 deg/100'		
Surveys every 500' Gyro at CP MWD Gamma Directional	No OH Logs	horz target Base Gallup	5598 5650	5992		6 1/8	200' overlap at liner top 4519' Lateral	8.6-9.0 OBM	.25deg updip 5582'TVD TD = 10511' MD		
							4 1/2" 11.6ppf SB80 LTC Running external swellable csg packers for isolation of prod string Plan on setting top packer within 100' of intermediate casing shoe	Switch to OBM 8.6-9.0			

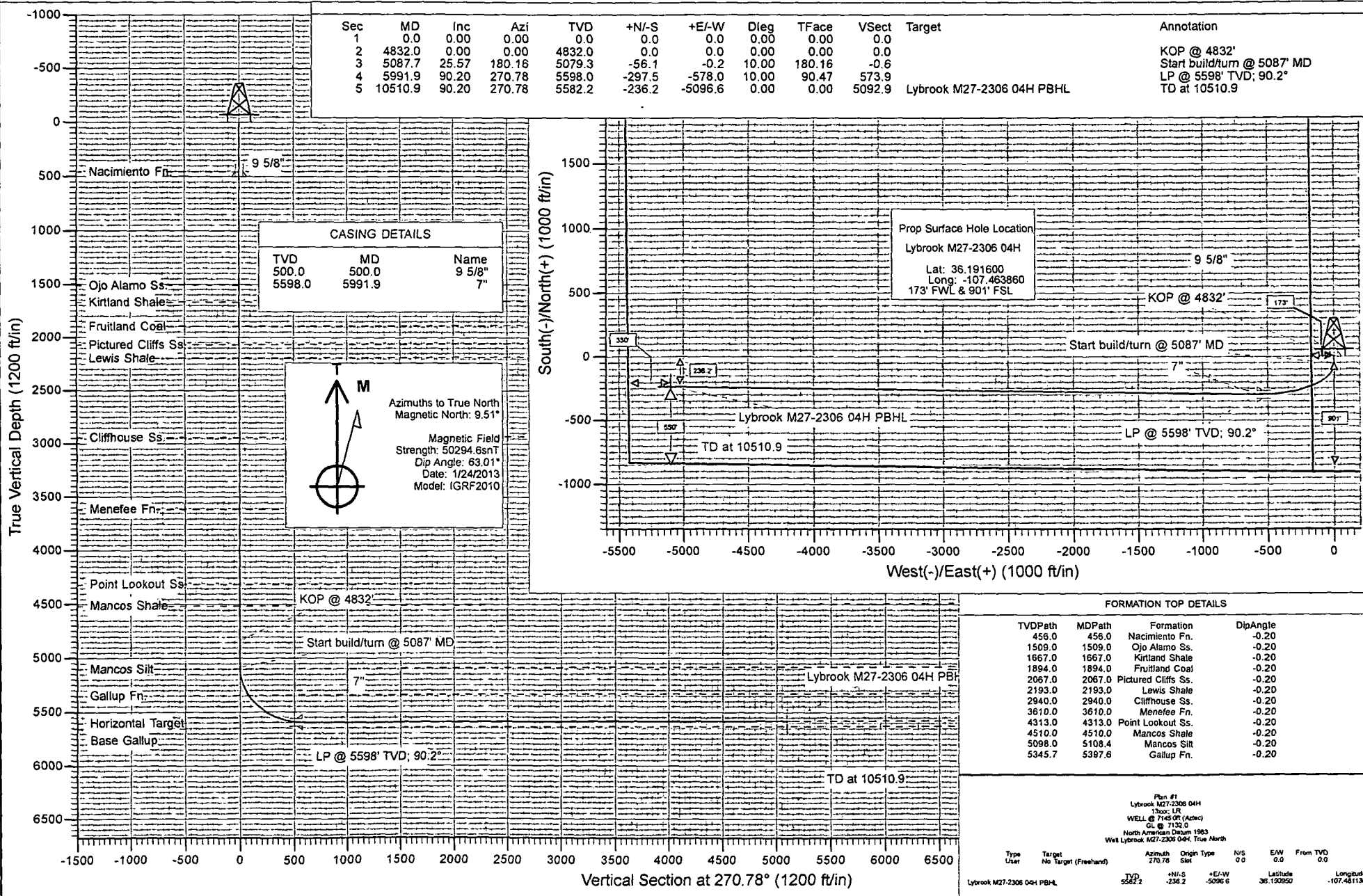
NOTES:

- 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 4832' , 8 3/4" hole size,
- 5) PU directional tools and start curve at 10deg/100' build rate
- 6) Drill to casing point of 5992' MD
- 7) R&C 7" casing, circ cmt to surface, switch to OBM
- 8) Land at 90deg, drill 4519' lateral to 10511', run 4 1/2" liner with external swellable csg packers

encana™

natural gas

Project: Sandoval County, NM
Site: Lybrook
Well: Lybrook M27-2306 04H
Wellbore: Hz
Design: Plan #1



Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7145.0ft (Aztec)
Project:	Sandoval County, NM	MD Reference:	WELL @ 7145.0ft (Aztec)
Site:	Lybrook	North Reference:	True
Well:	Lybrook M27-2306 04H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #1		

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	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 M27-2306 04H					
Well Position	+N/-S	0.0 ft	Northing:	1,891,252.56 ft	Latitude:	36.191600
	+E/-W	0.0 ft	Easting:	1,282,243.06 ft	Longitude:	-107.463860
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,132.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/24/2013	9.51	63.01	50,295

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	270.78

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	
4,832.0	0.00	0.00	4,832.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,087.7	25.57	180.16	5,079.3	-56.1	-0.2	10.00	10.00	0.00	180.16	
5,991.9	90.20	270.78	5,598.0	-297.5	-578.0	10.00	7.15	10.02	90.47	
10,510.9	90.20	270.78	5,582.2	-236.2	-5,096.6	0.00	0.00	0.00	0.00	Lybrook M27-2306 04

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7145.0ft (Aztec)
Project:	Sandoval County, NM	MD Reference:	WELL @ 7145.0ft (Aztec)
Site:	Lybrook	North Reference:	True
Well:	Lybrook M27-2306 04H	Survey Calculation Method:	Minimum Curvature
Wellbore:	H2		
Design:	Plan #1		

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	
456.0	0.00	0.00	456.0	0.0	0.0	0.0	0.00	0.00	Nacimiento Fn.
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	
1,509.0	0.00	0.00	1,509.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo Ss.
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,667.0	0.00	0.00	1,667.0	0.0	0.0	0.0	0.00	0.00	Kirtland 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	
1,894.0	0.00	0.00	1,894.0	0.0	0.0	0.0	0.00	0.00	Fruitland Coal
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	
2,067.0	0.00	0.00	2,067.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs Ss.
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,193.0	0.00	0.00	2,193.0	0.0	0.0	0.0	0.00	0.00	Lewis Shale
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	
2,400.0	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	
2,940.0	0.00	0.00	2,940.0	0.0	0.0	0.0	0.00	0.00	Cliffhouse Ss.
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	
3,200.0	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	
3,610.0	0.00	0.00	3,610.0	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	

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7145.0ft (Aztec)
Project:	Sandoval County, NM	MD Reference:	WELL @ 7145.0ft (Aztec)
Site:	Lybrook	North Reference:	True
Well:	Lybrook M27-2306 04H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #1		

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
4,313.0	0.00	0.00	4,313.0	0.0	0.0	0.0	0.00	0.00	Point Lookout Ss.
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	
4,510.0	0.00	0.00	4,510.0	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	
4,832.0	0.00	0.00	4,832.0	0.0	0.0	0.0	0.00	0.00	KOP @ 4832'
4,900.0	6.80	180.16	4,899.8	-4.0	0.0	0.0	10.00	10.00	
5,000.0	16.80	180.16	4,997.6	-24.5	-0.1	-0.3	10.00	10.00	
5,087.7	25.57	180.16	5,079.3	-56.1	-0.2	-0.6	10.00	10.00	Start build/turn @ 5087' MD
5,100.0	25.59	183.00	5,090.4	-61.4	-0.3	-0.5	10.00	0.14	
5,108.4	25.63	184.96	5,098.0	-65.1	-0.6	-0.3	10.00	0.52	Mancos Silt
5,200.0	27.69	204.94	5,180.0	-104.2	-11.3	9.8	10.00	2.25	
5,300.0	32.64	222.34	5,266.6	-145.3	-39.3	37.3	10.00	4.95	
5,397.6	39.19	234.75	5,345.7	-182.6	-82.3	79.8	10.00	6.71	Gallup Fn.
5,400.0	39.37	235.00	5,347.5	-183.5	-83.6	81.0	10.00	7.32	
5,500.0	47.11	244.29	5,420.4	-217.7	-142.7	139.7	10.00	7.74	
5,600.0	55.43	251.43	5,483.0	-246.7	-214.9	211.5	10.00	8.32	
5,700.0	64.09	257.24	5,533.3	-269.8	-298.0	294.3	10.00	8.66	
5,800.0	72.95	262.24	5,569.9	-286.3	-389.5	385.5	10.00	8.86	
5,900.0	81.92	266.78	5,591.7	-295.5	-486.5	482.4	10.00	8.97	
5,991.9	90.20	270.78	5,598.0	-297.5	-578.1	574.0	10.00	9.01	LP @ 5598' TVD; 90.2° - 7"
6,000.0	90.20	270.78	5,598.0	-297.3	-586.2	582.1	0.00	0.00	
6,100.0	90.20	270.78	5,597.6	-296.0	-686.2	682.1	0.00	0.00	
6,200.0	90.20	270.78	5,597.3	-294.6	-786.1	782.1	0.00	0.00	
6,300.0	90.20	270.78	5,596.9	-293.3	-886.1	882.1	0.00	0.00	
6,400.0	90.20	270.78	5,596.6	-291.9	-986.1	982.1	0.00	0.00	
6,500.0	90.20	270.78	5,596.2	-290.6	-1,086.1	1,082.1	0.00	0.00	
6,600.0	90.20	270.78	5,595.9	-289.2	-1,186.1	1,182.1	0.00	0.00	
6,700.0	90.20	270.78	5,595.5	-287.9	-1,286.1	1,282.1	0.00	0.00	
6,800.0	90.20	270.78	5,595.2	-286.5	-1,386.1	1,382.1	0.00	0.00	
6,900.0	90.20	270.78	5,594.8	-285.1	-1,486.1	1,482.1	0.00	0.00	
7,000.0	90.20	270.78	5,594.5	-283.8	-1,586.1	1,582.1	0.00	0.00	
7,100.0	90.20	270.78	5,594.1	-282.4	-1,686.1	1,682.1	0.00	0.00	
7,200.0	90.20	270.78	5,593.8	-281.1	-1,786.0	1,782.1	0.00	0.00	
7,300.0	90.20	270.78	5,593.4	-279.7	-1,886.0	1,882.1	0.00	0.00	
7,400.0	90.20	270.78	5,593.1	-278.4	-1,986.0	1,982.1	0.00	0.00	
7,500.0	90.20	270.78	5,592.7	-277.0	-2,086.0	2,082.1	0.00	0.00	
7,600.0	90.20	270.78	5,592.4	-275.7	-2,186.0	2,182.1	0.00	0.00	
7,700.0	90.20	270.78	5,592.0	-274.3	-2,286.0	2,282.1	0.00	0.00	
7,800.0	90.20	270.78	5,591.7	-272.9	-2,386.0	2,382.1	0.00	0.00	
7,900.0	90.20	270.78	5,591.3	-271.6	-2,486.0	2,482.1	0.00	0.00	
8,000.0	90.20	270.78	5,591.0	-270.2	-2,586.0	2,582.1	0.00	0.00	
8,100.0	90.20	270.78	5,590.6	-268.9	-2,686.0	2,682.0	0.00	0.00	
8,200.0	90.20	270.78	5,590.3	-267.5	-2,785.9	2,782.0	0.00	0.00	
8,300.0	90.20	270.78	5,589.9	-266.2	-2,885.9	2,882.0	0.00	0.00	
8,400.0	90.20	270.78	5,589.6	-264.8	-2,985.9	2,982.0	0.00	0.00	
8,500.0	90.20	270.78	5,589.2	-263.5	-3,085.9	3,082.0	0.00	0.00	
8,600.0	90.20	270.78	5,588.9	-262.1	-3,185.9	3,182.0	0.00	0.00	
8,700.0	90.20	270.78	5,588.5	-260.7	-3,285.9	3,282.0	0.00	0.00	
8,800.0	90.20	270.78	5,588.2	-259.4	-3,385.9	3,382.0	0.00	0.00	

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7145.0ft (Aztec)
Project:	Sandoval County, NM	MD Reference:	WELL @ 7145.0ft (Aztec)
Site:	Lybrook	North Reference:	True
Well:	Lybrook M27-2306 04H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #1		

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	270.78	5,587.8	-258.0	-3,485.9	3,482.0	0.00	0.00	
9,000.0	90.20	270.78	5,587.5	-256.7	-3,585.9	3,582.0	0.00	0.00	
9,100.0	90.20	270.78	5,587.1	-255.3	-3,685.9	3,682.0	0.00	0.00	
9,200.0	90.20	270.78	5,586.8	-254.0	-3,785.9	3,782.0	0.00	0.00	
9,300.0	90.20	270.78	5,586.4	-252.6	-3,885.8	3,882.0	0.00	0.00	
9,400.0	90.20	270.78	5,586.1	-251.3	-3,985.8	3,982.0	0.00	0.00	
9,500.0	90.20	270.78	5,585.7	-249.9	-4,085.8	4,082.0	0.00	0.00	
9,600.0	90.20	270.78	5,585.4	-248.5	-4,185.8	4,182.0	0.00	0.00	
9,700.0	90.20	270.78	5,585.0	-247.2	-4,285.8	4,282.0	0.00	0.00	
9,800.0	90.20	270.78	5,584.7	-245.8	-4,385.8	4,382.0	0.00	0.00	
9,900.0	90.20	270.78	5,584.3	-244.5	-4,485.8	4,482.0	0.00	0.00	
10,000.0	90.20	270.78	5,584.0	-243.1	-4,585.8	4,582.0	0.00	0.00	
10,100.0	90.20	270.78	5,583.6	-241.8	-4,685.8	4,682.0	0.00	0.00	
10,200.0	90.20	270.78	5,583.3	-240.4	-4,785.8	4,782.0	0.00	0.00	
10,300.0	90.20	270.78	5,582.9	-239.1	-4,885.7	4,882.0	0.00	0.00	
10,400.0	90.20	270.78	5,582.6	-237.7	-4,985.7	4,982.0	0.00	0.00	
10,500.0	90.20	270.78	5,582.2	-236.3	-5,085.7	5,082.0	0.00	0.00	
10,510.9	90.20	270.78	5,582.2	-236.2	-5,096.6	5,092.9	0.00	0.00	TD at 10510.9 - Lybrook M27-2306 04H PBHL

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Lybrook M27-2306 04H	0.00	0.00	5,582.2	-236.2	-5,096.6	1,891,080.15	1,277,143.91	36.190950	-107.481130
- plan hits target center									
- Point									

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	
5,991.9	5,598.0	7"	0.000	0.000	

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	WELL @ 7145.0ft (Aztec)
Project:	Sandoval County, NM	MD Reference:	WELL @ 7145.0ft (Aztec)
Site:	Lybrook	North Reference:	True
Well:	Lybrook M27-2306 04H	Survey Calculation Method:	Minimum Curvature
Wellbore:	H2		
Design:	Plan #1		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
456.0	456.0	Nacimiento Fn.		-0.20	270.78	
1,509.0	1,509.0	Ojo Alamo Ss.		-0.20	270.78	
1,667.0	1,667.0	Kirtland Shale		-0.20	270.78	
1,894.0	1,894.0	Fruitland Coal		-0.20	270.78	
2,067.0	2,067.0	Pictured Cliffs Ss.		-0.20	270.78	
2,193.0	2,193.0	Lewis Shale		-0.20	270.78	
2,940.0	2,940.0	Cliffhouse Ss.		-0.20	270.78	
3,610.0	3,610.0	Menefee Fn.		-0.20	270.78	
4,313.0	4,313.0	Point Lookout Ss.		-0.20	270.78	
4,510.0	4,510.0	Mancos Shale		-0.20	270.78	
5,108.4	5,098.0	Mancos Silt		-0.20	270.78	
5,397.6	5,346.0	Gallup Fn.		-0.20	270.78	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,832.0	4,832.0	0.0	0.0	KOP @ 4832'
5,087.7	5,079.3	-56.1	-0.2	Start build/turn @ 5087' MD
5,991.9	5,598.0	-297.5	-578.0	LP @ 5598' TVD; 90.2°
10,510.9	5,582.2	-236.2	-5,096.6	TD at 10510.9

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 500.0ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	Systematic Ellipse
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic

Survey Tool Program	Date	1/25/2013
From (ft)	To (ft)	Survey (Wellbore)
0.0	10,510.9	Plan #1 (Hz)
		Tool Name
		MWD
		Description
		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 M27-2306 01H - Hz - Plan #1	4,500.0	4,500.0	88.6	73.0	5.658	CC, ES, SF
Lybrook M27-2306 02H - Hz - Plan #1	4,800.0	4,800.0	58.9	42.2	3.526	CC, ES
Lybrook M27-2306 02H - Hz - Plan #1	4,808.6	4,808.6	59.0	42.2	3.522	SF
Lybrook M27-2306 03H - Hz - Plan #1	4,803.1	4,804.1	24.8	8.1	1.484	Level 3, CC, ES, SF

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

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
 Project: Sandoval County, NM
 Reference Site: Lybrook
 Site Error: 0.0ft
 Reference Well: Lybrook M27-2306 04H
 Well Error: 0.0ft
 Reference Wellbore: Hz
 Reference Design: Plan #1

Local Co-ordinate Reference: Well Lybrook M27-2306 04H
 TVD Reference: WELL @ 7145.0ft (Aztec)
 MD Reference: WELL @ 7145.0ft (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 M27-2306 01H - Hz - Plan #1														Offset Site Error: 0.0 ft
Survey Program: 0-MWD														Offset Well Error: 0.0 ft
Reference	Offset	Semi Major Axis		Distance		Total		Separation		Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis	Factor		
0.0	0.0	0.0	0.0	0.0	0.0	9.59	87.4	14.8	88.6					
100.0	100.0	100.0	100.0	0.2	0.2	9.59	87.4	14.8	88.6	88.3	0.30	291.791		
200.0	200.0	200.0	200.0	0.3	0.3	9.59	87.4	14.8	88.6	88.0	0.65	135.753		
300.0	300.0	300.0	300.0	0.5	0.5	9.59	87.4	14.8	88.6	87.6	1.00	88.452		
400.0	400.0	400.0	400.0	0.7	0.7	9.59	87.4	14.8	88.6	87.3	1.35	65.596		
500.0	500.0	500.0	500.0	0.8	0.8	9.59	87.4	14.8	88.6	86.9	1.70	52.127		
600.0	600.0	600.0	600.0	1.0	1.0	9.59	87.4	14.8	88.6	86.6	2.05	43.247		
700.0	700.0	700.0	700.0	1.2	1.2	9.59	87.4	14.8	88.6	86.2	2.40	36.952		
800.0	800.0	800.0	800.0	1.4	1.4	9.59	87.4	14.8	88.6	85.9	2.75	32.256		
900.0	900.0	900.0	900.0	1.5	1.5	9.59	87.4	14.8	88.6	85.5	3.10	28.620		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	9.59	87.4	14.8	88.6	85.2	3.45	25.720		
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	9.59	87.4	14.8	88.6	84.8	3.79	23.354		
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	9.59	87.4	14.8	88.6	84.5	4.14	21.387		
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	9.59	87.4	14.8	88.6	84.1	4.49	19.725		
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	9.59	87.4	14.8	88.6	83.8	4.84	18.303		
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	9.59	87.4	14.8	88.6	83.4	5.19	17.072		
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	9.59	87.4	14.8	88.6	83.1	5.54	15.996		
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	9.59	87.4	14.8	88.6	82.7	5.89	15.048		
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	9.59	87.4	14.8	88.6	82.4	6.24	14.206		
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	9.59	87.4	14.8	88.6	82.0	6.59	13.453		
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	9.59	87.4	14.8	88.6	81.7	6.94	12.776		
2,100.0	2,100.0	2,100.0	2,100.0	3.6	3.6	9.59	87.4	14.8	88.6	81.3	7.29	12.164		
2,200.0	2,200.0	2,200.0	2,200.0	3.8	3.8	9.59	87.4	14.8	88.6	81.0	7.63	11.608		
2,300.0	2,300.0	2,300.0	2,300.0	4.0	4.0	9.59	87.4	14.8	88.6	80.6	7.98	11.100		
2,400.0	2,400.0	2,400.0	2,400.0	4.2	4.2	9.59	87.4	14.8	88.6	80.3	8.33	10.635		
2,500.0	2,500.0	2,500.0	2,500.0	4.3	4.3	9.59	87.4	14.8	88.6	79.9	8.68	10.207		
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	9.59	87.4	14.8	88.6	79.6	9.03	9.813		
2,700.0	2,700.0	2,700.0	2,700.0	4.7	4.7	9.59	87.4	14.8	88.6	79.2	9.38	9.448		
2,800.0	2,800.0	2,800.0	2,800.0	4.9	4.9	9.59	87.4	14.8	88.6	78.9	9.73	9.109		
2,900.0	2,900.0	2,900.0	2,900.0	5.0	5.0	9.59	87.4	14.8	88.6	78.5	10.08	8.793		
3,000.0	3,000.0	3,000.0	3,000.0	5.2	5.2	9.59	87.4	14.8	88.6	78.2	10.43	8.499		
3,100.0	3,100.0	3,100.0	3,100.0	5.4	5.4	9.59	87.4	14.8	88.6	77.8	10.78	8.223		
3,200.0	3,200.0	3,200.0	3,200.0	5.6	5.6	9.59	87.4	14.8	88.6	77.5	11.12	7.965		
3,300.0	3,300.0	3,300.0	3,300.0	5.7	5.7	9.59	87.4	14.8	88.6	77.1	11.47	7.723		
3,400.0	3,400.0	3,400.0	3,400.0	5.9	5.9	9.59	87.4	14.8	88.6	76.8	11.82	7.495		
3,500.0	3,500.0	3,500.0	3,500.0	6.1	6.1	9.59	87.4	14.8	88.6	76.4	12.17	7.280		
3,600.0	3,600.0	3,600.0	3,600.0	6.3	6.3	9.59	87.4	14.8	88.6	76.1	12.52	7.077		
3,700.0	3,700.0	3,700.0	3,700.0	6.4	6.4	9.59	87.4	14.8	88.6	75.7	12.87	6.885		
3,800.0	3,800.0	3,800.0	3,800.0	6.6	6.6	9.59	87.4	14.8	88.6	75.4	13.22	6.703		
3,900.0	3,900.0	3,900.0	3,900.0	6.8	6.8	9.59	87.4	14.8	88.6	75.0	13.57	6.531		
4,000.0	4,000.0	4,000.0	4,000.0	7.0	7.0	9.59	87.4	14.8	88.6	74.7	13.92	6.367		
4,100.0	4,100.0	4,100.0	4,100.0	7.1	7.1	9.59	87.4	14.8	88.6	74.3	14.27	6.211		
4,200.0	4,200.0	4,200.0	4,200.0	7.3	7.3	9.59	87.4	14.8	88.6	74.0	14.62	6.063		
4,300.0	4,300.0	4,300.0	4,300.0	7.5	7.5	9.59	87.4	14.8	88.6	73.6	14.96	5.922		
4,400.0	4,400.0	4,400.0	4,400.0	7.7	7.7	9.59	87.4	14.8	88.6	73.3	15.31	5.787		
4,500.0	4,500.0	4,500.0	4,500.0	7.8	7.8	9.59	87.4	14.8	88.6	73.0	15.66	5.658 CC, ES, SF		
4,600.0	4,600.0	4,586.1	4,585.8	8.0	8.0	8.94	93.8	14.8	96.0	80.1	15.99	6.008		
4,700.0	4,700.0	4,668.5	4,666.1	8.2	8.1	7.50	112.0	14.7	117.9	101.6	16.31	7.232		
4,800.0	4,800.0	4,744.3	4,737.0	8.4	8.3	6.07	138.7	14.7	153.0	136.4	16.61	9.212		
4,900.0	4,899.8	4,810.4	4,795.4	8.5	8.5	-174.91	169.4	14.7	203.0	186.2	16.81	12.072		
5,000.0	4,997.6	4,860.0	4,836.8	8.7	8.7	-175.10	196.8	14.7	273.9	257.3	16.66	16.447		
5,100.0	5,090.4	4,900.0	4,868.3	9.0	8.9	-179.94	221.4	14.7	359.9	343.7	16.26	22.143		

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

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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

Offset Design Lybrook - Lybrook M27-2306 01H - Hz - Plan #1												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance							
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Between	Between	Total	Separation	Warning	
Depth	Depth	Depth	Depth			Toolface	+N/-S	+E/-W	Centres	Ellipses	Uncertainty	Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	Axis		
5,200.0	5,180.0	4,916.5	4,880.8	9.3	9.0	139.95	232.2	14.7	450.9	434.0	16.92	26.651	

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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

Offset Design Lybrook - Lybrook M27-2306 02H - Hz - Plan #1												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	8.64	58.3	8.9	58.9				
100.0	100.0	100.0	100.0	0.2	0.2	8.64	58.3	8.9	58.9	58.6	0.30	194.014	
200.0	200.0	200.0	200.0	0.3	0.3	8.64	58.3	8.9	58.9	58.3	0.65	90.263	
300.0	300.0	300.0	300.0	0.5	0.5	8.64	58.3	8.9	58.9	57.9	1.00	58.813	
400.0	400.0	400.0	400.0	0.7	0.7	8.64	58.3	8.9	58.9	57.6	1.35	43.616	
500.0	500.0	500.0	500.0	0.8	0.8	8.64	58.3	8.9	58.9	57.2	1.70	34.660	
600.0	600.0	600.0	600.0	1.0	1.0	8.64	58.3	8.9	58.9	56.9	2.05	28.755	
700.0	700.0	700.0	700.0	1.2	1.2	8.64	58.3	8.9	58.9	56.5	2.40	24.570	
800.0	800.0	800.0	800.0	1.4	1.4	8.64	58.3	8.9	58.9	56.2	2.75	21.448	
900.0	900.0	900.0	900.0	1.5	1.5	8.64	58.3	8.9	58.9	55.8	3.10	19.030	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	8.64	58.3	8.9	58.9	55.5	3.45	17.102	
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	8.64	58.3	8.9	58.9	55.1	3.79	15.528	
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	8.64	58.3	8.9	58.9	54.8	4.14	14.220	
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	8.64	58.3	8.9	58.9	54.4	4.49	13.115	
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	8.64	58.3	8.9	58.9	54.1	4.84	12.170	
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	8.64	58.3	8.9	58.9	53.7	5.19	11.351	
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	8.64	58.3	8.9	58.9	53.4	5.54	10.636	
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	8.64	58.3	8.9	58.9	53.0	5.89	10.005	
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	8.64	58.3	8.9	58.9	52.7	6.24	9.446	
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	8.64	58.3	8.9	58.9	52.3	6.59	8.945	
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	8.64	58.3	8.9	58.9	52.0	6.94	8.495	
2,100.0	2,100.0	2,100.0	2,100.0	3.6	3.6	8.64	58.3	8.9	58.9	51.6	7.29	8.088	
2,200.0	2,200.0	2,200.0	2,200.0	3.8	3.8	8.64	58.3	8.9	58.9	51.3	7.63	7.718	
2,300.0	2,300.0	2,300.0	2,300.0	4.0	4.0	8.64	58.3	8.9	58.9	50.9	7.98	7.381	
2,400.0	2,400.0	2,400.0	2,400.0	4.2	4.2	8.64	58.3	8.9	58.9	50.6	8.33	7.071	
2,500.0	2,500.0	2,500.0	2,500.0	4.3	4.3	8.64	58.3	8.9	58.9	50.2	8.68	6.787	
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	8.64	58.3	8.9	58.9	49.9	9.03	6.525	
2,700.0	2,700.0	2,700.0	2,700.0	4.7	4.7	8.64	58.3	8.9	58.9	49.5	9.38	6.282	
2,800.0	2,800.0	2,800.0	2,800.0	4.9	4.9	8.64	58.3	8.9	58.9	49.2	9.73	6.056	
2,900.0	2,900.0	2,900.0	2,900.0	5.0	5.0	8.64	58.3	8.9	58.9	48.8	10.08	5.847	
3,000.0	3,000.0	3,000.0	3,000.0	5.2	5.2	8.64	58.3	8.9	58.9	48.5	10.43	5.651	
3,100.0	3,100.0	3,100.0	3,100.0	5.4	5.4	8.64	58.3	8.9	58.9	48.1	10.78	5.468	
3,200.0	3,200.0	3,200.0	3,200.0	5.6	5.6	8.64	58.3	8.9	58.9	47.8	11.12	5.296	
3,300.0	3,300.0	3,300.0	3,300.0	5.7	5.7	8.64	58.3	8.9	58.9	47.4	11.47	5.135	
3,400.0	3,400.0	3,400.0	3,400.0	5.9	5.9	8.64	58.3	8.9	58.9	47.1	11.82	4.984	
3,500.0	3,500.0	3,500.0	3,500.0	6.1	6.1	8.64	58.3	8.9	58.9	46.7	12.17	4.841	
3,600.0	3,600.0	3,600.0	3,600.0	6.3	6.3	8.64	58.3	8.9	58.9	46.4	12.52	4.706	
3,700.0	3,700.0	3,700.0	3,700.0	6.4	6.4	8.64	58.3	8.9	58.9	46.0	12.87	4.578	
3,800.0	3,800.0	3,800.0	3,800.0	6.6	6.6	8.64	58.3	8.9	58.9	45.7	13.22	4.457	
3,900.0	3,900.0	3,900.0	3,900.0	6.8	6.8	8.64	58.3	8.9	58.9	45.4	13.57	4.342	
4,000.0	4,000.0	4,000.0	4,000.0	7.0	7.0	8.64	58.3	8.9	58.9	45.0	13.92	4.234	
4,100.0	4,100.0	4,100.0	4,100.0	7.1	7.1	8.64	58.3	8.9	58.9	44.7	14.27	4.130	
4,200.0	4,200.0	4,200.0	4,200.0	7.3	7.3	8.64	58.3	8.9	58.9	44.3	14.62	4.031	
4,300.0	4,300.0	4,300.0	4,300.0	7.5	7.5	8.64	58.3	8.9	58.9	44.0	14.96	3.937	
4,400.0	4,400.0	4,400.0	4,400.0	7.7	7.7	8.64	58.3	8.9	58.9	43.6	15.31	3.848	
4,500.0	4,500.0	4,500.0	4,500.0	7.8	7.8	8.64	58.3	8.9	58.9	43.3	15.66	3.762	
4,600.0	4,600.0	4,600.0	4,600.0	8.0	8.0	8.64	58.3	8.9	58.9	42.9	16.01	3.680	
4,700.0	4,700.0	4,700.0	4,700.0	8.2	8.2	8.64	58.3	8.9	58.9	42.6	16.36	3.601	
4,800.0	4,800.0	4,800.0	4,800.0	8.4	8.4	8.64	58.3	8.9	58.9	42.2	16.71	3.526 CC, ES	
4,808.6	4,808.6	4,808.6	4,808.6	8.4	8.4	-171.52	58.3	8.9	59.0	42.2	16.74	3.522 SF	
4,900.0	4,899.8	4,898.9	4,898.9	8.5	8.5	-172.00	58.3	8.9	63.0	46.0	16.98	3.710	
5,000.0	4,997.6	4,983.2	4,982.8	8.7	8.7	-173.95	65.8	8.9	91.9	75.0	16.90	5.440	

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

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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

Offset Design Lybrook - Lybrook M27-2306 02H - Hz - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (ft)	+E-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning	
5,100.0	5,090.4	5,050.0	5,047.9	9.0	8.8	-179.06	80.4	8.9	148.4	131.8	18.55	8.967		
5,200.0	5,180.0	5,100.0	5,095.3	9.3	8.9	152.89	96.3	9.0	218.5	201.6	16.91	12.921		
5,300.0	5,266.6	5,150.0	5,141.2	9.7	9.0	131.12	116.2	9.1	294.0	276.5	17.54	16.763		
5,400.0	5,347.5	5,183.1	5,170.5	10.2	9.1	112.79	131.6	9.2	373.1	354.7	18.45	20.224		
5,500.0	5,420.4	5,200.0	5,185.1	10.8	9.2	95.87	140.1	9.2	454.3	434.8	19.55	23.239		

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

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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

Offset Design Lybrook - Lybrook M27-2306 03H - Hz - Plan #1												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance		Total		Separation		Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Uncertainty Axis		
0.0	0.0	0.0	0.0	0.0	0.0	11.46	29.1	5.9	29.7				
100.0	100.0	100.0	100.0	0.2	0.2	11.46	29.1	5.9	29.7	29.4	0.30	97.855	
200.0	200.0	200.0	200.0	0.3	0.3	11.46	29.1	5.9	29.7	29.1	0.65	45.526	
300.0	300.0	300.0	300.0	0.5	0.5	11.46	29.1	5.9	29.7	28.7	1.00	29.663	
400.0	400.0	400.0	400.0	0.7	0.7	11.46	29.1	5.9	29.7	28.4	1.35	21.998	
500.0	500.0	500.0	500.0	0.8	0.8	11.46	29.1	5.9	29.7	28.0	1.70	17.481	
600.0	600.0	600.0	600.0	1.0	1.0	11.46	29.1	5.9	29.7	27.7	2.05	14.503	
700.0	700.0	700.0	700.0	1.2	1.2	11.46	29.1	5.9	29.7	27.3	2.40	12.392	
800.0	800.0	800.0	800.0	1.4	1.4	11.46	29.1	5.9	29.7	27.0	2.75	10.818	
900.0	900.0	900.0	900.0	1.5	1.5	11.46	29.1	5.9	29.7	26.6	3.10	9.598	
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	11.46	29.1	5.9	29.7	26.3	3.45	8.626	
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	11.46	29.1	5.9	29.7	25.9	3.79	7.832	
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	11.46	29.1	5.9	29.7	25.6	4.14	7.172	
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	11.46	29.1	5.9	29.7	25.2	4.49	6.615	
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	11.46	29.1	5.9	29.7	24.9	4.84	6.138	
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	11.46	29.1	5.9	29.7	24.5	5.19	5.725	
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	11.46	29.1	5.9	29.7	24.2	5.54	5.364	
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	11.46	29.1	5.9	29.7	23.8	5.89	5.046	
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	11.46	29.1	5.9	29.7	23.5	6.24	4.764	
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	11.46	29.1	5.9	29.7	23.1	6.59	4.512	
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	11.46	29.1	5.9	29.7	22.8	6.94	4.285	
2,100.0	2,100.0	2,100.0	2,100.0	3.6	3.6	11.46	29.1	5.9	29.7	22.4	7.29	4.079	
2,200.0	2,200.0	2,200.0	2,200.0	3.8	3.8	11.46	29.1	5.9	29.7	22.1	7.63	3.893	
2,300.0	2,300.0	2,300.0	2,300.0	4.0	4.0	11.46	29.1	5.9	29.7	21.7	7.98	3.723	
2,400.0	2,400.0	2,400.0	2,400.0	4.2	4.2	11.46	29.1	5.9	29.7	21.4	8.33	3.567	
2,500.0	2,500.0	2,500.0	2,500.0	4.3	4.3	11.46	29.1	5.9	29.7	21.0	8.68	3.423	
2,600.0	2,600.0	2,600.0	2,600.0	4.5	4.5	11.46	29.1	5.9	29.7	20.7	9.03	3.291	
2,700.0	2,700.0	2,700.0	2,700.0	4.7	4.7	11.46	29.1	5.9	29.7	20.3	9.38	3.168	
2,800.0	2,800.0	2,800.0	2,800.0	4.9	4.9	11.46	29.1	5.9	29.7	20.0	9.73	3.055	
2,900.0	2,900.0	2,900.0	2,900.0	5.0	5.0	11.46	29.1	5.9	29.7	19.6	10.08	2.949	
3,000.0	3,000.0	3,000.0	3,000.0	5.2	5.2	11.46	29.1	5.9	29.7	19.3	10.43	2.850	
3,100.0	3,100.0	3,100.0	3,100.0	5.4	5.4	11.46	29.1	5.9	29.7	18.9	10.78	2.758	
3,200.0	3,200.0	3,200.0	3,200.0	5.6	5.6	11.46	29.1	5.9	29.7	18.6	11.12	2.671	
3,300.0	3,300.0	3,300.0	3,300.0	5.7	5.7	11.46	29.1	5.9	29.7	18.2	11.47	2.590	
3,400.0	3,400.0	3,400.0	3,400.0	5.9	5.9	11.46	29.1	5.9	29.7	17.9	11.82	2.514	
3,500.0	3,500.0	3,500.0	3,500.0	6.1	6.1	11.46	29.1	5.9	29.7	17.5	12.17	2.441	
3,600.0	3,600.0	3,600.0	3,600.0	6.3	6.3	11.46	29.1	5.9	29.7	17.2	12.52	2.373	
3,700.0	3,700.0	3,700.0	3,700.0	6.4	6.4	11.46	29.1	5.9	29.7	16.8	12.87	2.309	
3,800.0	3,800.0	3,800.0	3,800.0	6.6	6.6	11.46	29.1	5.9	29.7	16.5	13.22	2.248	
3,900.0	3,900.0	3,900.0	3,900.0	6.8	6.8	11.46	29.1	5.9	29.7	16.1	13.57	2.190	
4,000.0	4,000.0	4,000.0	4,000.0	7.0	7.0	11.46	29.1	5.9	29.7	15.8	13.92	2.135	
4,100.0	4,100.0	4,100.0	4,100.0	7.1	7.1	11.46	29.1	5.9	29.7	15.5	14.27	2.083	
4,200.0	4,200.0	4,200.0	4,200.0	7.3	7.3	11.46	29.1	5.9	29.7	15.1	14.62	2.033	
4,300.0	4,300.0	4,300.0	4,300.0	7.5	7.5	11.46	29.1	5.9	29.7	14.8	14.96	1.986	
4,400.0	4,400.0	4,400.0	4,400.0	7.7	7.7	11.46	29.1	5.9	29.7	14.4	15.31	1.941	
4,500.0	4,500.0	4,500.0	4,500.0	7.8	7.8	11.46	29.1	5.9	29.7	14.1	15.66	1.897	
4,600.0	4,600.0	4,600.0	4,600.0	8.0	8.0	11.46	29.1	5.9	29.7	13.7	16.01	1.856	
4,700.0	4,700.0	4,700.0	4,700.0	8.2	8.2	10.90	28.9	5.6	29.5	13.1	16.36	1.802	
4,800.0	4,800.0	4,801.1	4,800.2	8.4	8.4	-12.98	24.2	-5.6	24.8	8.1	16.72	1.486 Level 3	
4,803.1	4,803.1	4,804.1	4,803.2	8.4	8.4	165.45	24.0	-6.2	24.8	8.1	16.73	1.484 Level 3, CC, ES, SF	
4,900.0	4,899.8	4,894.1	4,889.4	8.5	8.6	125.07	19.3	-31.0	40.2	23.1	17.04	2.358	
5,000.0	4,997.6	4,976.1	4,963.8	8.7	8.8	113.34	15.4	-65.3	83.5	66.2	17.34	4.817	

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

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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

Offset Design: Lybrook - Lybrook M27-2306 03H - Hz - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Total Uncertainty Axis	Separation Factor	Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)					
5,100.0	5,090.4	5,044.4	5,021.5	9.0	9.1	106.94	12.4	-101.6	143.0	125.3	17.69	8.085			
5,200.0	5,180.0	5,106.4	5,069.9	9.3	9.4	87.36	10.1	-140.3	204.6	186.3	18.28	11.191			
5,300.0	5,266.6	5,167.8	5,113.3	9.7	9.9	71.79	8.1	-183.6	260.5	241.7	18.75	13.894			
5,400.0	5,347.5	5,229.0	5,151.7	10.2	10.5	60.96	6.5	-231.1	310.2	291.0	19.16	16.192			
5,500.0	5,420.4	5,290.1	5,184.9	10.8	11.2	53.64	5.2	-282.4	353.1	333.5	19.59	18.027			
5,600.0	5,483.0	5,350.0	5,211.9	11.7	12.1	48.71	4.3	-335.8	388.7	368.6	20.12	19.319			
5,700.0	5,533.3	5,412.7	5,234.1	12.9	13.1	45.44	3.8	-394.4	416.8	395.9	20.88	19.957			
5,800.0	5,569.9	5,474.2	5,249.5	14.4	14.2	43.35	3.7	-454.0	436.9	415.1	21.85	19.992			
5,900.0	5,591.7	5,536.0	5,258.5	16.1	15.4	42.21	4.0	-515.0	448.9	425.9	23.02	19.504			
6,000.0	5,598.0	5,602.0	5,261.0	18.0	16.8	41.87	4.7	-580.9	452.6	428.2	24.42	18.532			
6,100.0	5,597.6	5,702.0	5,260.6	20.0	18.9	41.87	6.1	-680.9	452.6	425.4	27.21	16.631			
6,200.0	5,597.3	5,802.0	5,260.3	22.1	21.1	41.88	7.4	-780.9	452.6	422.5	30.11	15.031			
6,300.0	5,596.9	5,902.0	5,259.9	24.3	23.4	41.88	8.8	-880.9	452.6	419.5	33.09	13.679			
6,400.0	5,596.6	6,002.0	5,259.6	26.5	25.7	41.88	10.1	-980.9	452.6	416.5	36.12	12.529			
6,500.0	5,596.2	6,102.0	5,259.2	28.8	28.0	41.88	11.5	-1,080.8	452.6	413.4	39.20	11.545			
6,600.0	5,595.9	6,202.0	5,258.9	31.1	30.4	41.88	12.9	-1,180.8	452.6	410.3	42.32	10.694			
6,700.0	5,595.5	6,302.0	5,258.5	33.4	32.8	41.88	14.2	-1,280.8	452.6	407.1	45.47	9.955			
6,800.0	5,595.2	6,402.0	5,258.2	35.7	35.2	41.88	15.6	-1,380.8	452.6	404.0	48.63	9.306			
6,900.0	5,594.8	6,502.0	5,257.8	38.1	37.6	41.88	16.9	-1,480.8	452.6	400.8	51.82	8.734			
7,000.0	5,594.5	6,602.0	5,257.5	40.5	40.0	41.88	18.3	-1,580.8	452.6	397.6	55.02	8.226			
7,100.0	5,594.1	6,702.0	5,257.1	42.8	42.4	41.88	19.6	-1,680.8	452.6	394.4	58.23	7.772			
7,200.0	5,593.8	6,802.0	5,256.8	45.2	44.8	41.88	21.0	-1,780.8	452.6	391.1	61.46	7.364			
7,300.0	5,593.4	6,902.0	5,256.4	47.6	47.2	41.88	22.3	-1,880.8	452.6	387.9	64.69	6.996			
7,400.0	5,593.1	7,002.0	5,256.1	50.1	49.7	41.88	23.7	-1,980.8	452.6	384.6	67.94	6.662			
7,500.0	5,592.7	7,102.0	5,255.7	52.5	52.1	41.88	25.1	-2,080.7	452.6	381.4	71.19	6.358			
7,600.0	5,592.4	7,202.0	5,255.4	54.9	54.5	41.88	26.4	-2,180.7	452.6	378.1	74.44	6.080			
7,700.0	5,592.0	7,302.0	5,255.0	57.3	57.0	41.88	27.8	-2,280.7	452.6	374.9	77.70	5.825			
7,800.0	5,591.7	7,402.0	5,254.7	59.7	59.4	41.88	29.1	-2,380.7	452.6	371.6	80.97	5.590			
7,900.0	5,591.3	7,502.0	5,254.3	62.2	61.9	41.88	30.5	-2,480.7	452.6	368.4	84.23	5.373			
8,000.0	5,591.0	7,602.0	5,254.0	64.6	64.3	41.88	31.8	-2,580.7	452.6	365.1	87.51	5.172			
8,100.0	5,590.6	7,702.0	5,253.6	67.1	66.8	41.88	33.2	-2,680.7	452.6	361.8	90.78	4.985			
8,200.0	5,590.3	7,802.0	5,253.3	69.5	69.2	41.88	34.5	-2,780.7	452.6	358.5	94.06	4.812			
8,300.0	5,589.9	7,902.0	5,252.9	71.9	71.7	41.88	35.9	-2,880.7	452.6	355.2	97.34	4.649			
8,400.0	5,589.6	8,002.0	5,252.6	74.4	74.1	41.88	37.3	-2,980.7	452.6	352.0	100.62	4.498			
8,500.0	5,589.2	8,102.0	5,252.2	76.8	76.6	41.88	38.6	-3,080.6	452.6	348.7	103.91	4.356			
8,600.0	5,588.9	8,202.0	5,251.9	79.3	79.1	41.88	40.0	-3,180.6	452.6	345.4	107.20	4.222			
8,700.0	5,588.5	8,302.0	5,251.5	81.7	81.5	41.88	41.3	-3,280.6	452.6	342.1	110.49	4.096			
8,800.0	5,588.2	8,402.0	5,251.2	84.2	84.0	41.88	42.7	-3,380.6	452.6	338.8	113.78	3.978			
8,900.0	5,587.8	8,502.0	5,250.8	86.6	86.4	41.88	44.0	-3,480.6	452.6	335.5	117.07	3.866			
9,000.0	5,587.5	8,602.0	5,250.5	89.1	88.9	41.88	45.4	-3,580.6	452.6	332.2	120.36	3.760			
9,100.0	5,587.1	8,702.0	5,250.1	91.6	91.4	41.88	46.7	-3,680.6	452.6	328.9	123.66	3.660			
9,200.0	5,586.8	8,802.0	5,249.8	94.0	93.8	41.88	48.1	-3,780.6	452.6	325.6	126.95	3.565			
9,300.0	5,586.4	8,902.0	5,249.4	96.5	96.3	41.88	49.5	-3,880.6	452.6	322.3	130.25	3.475			
9,400.0	5,586.1	9,002.0	5,249.1	98.9	98.7	41.88	50.8	-3,980.6	452.6	319.0	133.55	3.389			
9,500.0	5,585.7	9,102.0	5,248.7	101.4	101.2	41.88	52.2	-4,080.5	452.6	315.7	136.84	3.307			
9,600.0	5,585.4	9,202.0	5,248.4	103.8	103.7	41.88	53.5	-4,180.5	452.6	312.4	140.14	3.229			
9,700.0	5,585.0	9,302.0	5,248.0	106.3	106.1	41.88	54.9	-4,280.5	452.6	309.1	143.44	3.155			
9,800.0	5,584.7	9,402.0	5,247.7	108.8	108.6	41.88	56.2	-4,380.5	452.6	305.8	146.75	3.084			
9,900.0	5,584.3	9,502.0	5,247.4	111.2	111.1	41.88	57.6	-4,480.5	452.6	302.5	150.05	3.016			
10,000.0	5,584.0	9,602.0	5,247.0	113.7	113.5	41.88	58.9	-4,580.5	452.6	299.2	153.35	2.951			
10,100.0	5,583.6	9,702.0	5,246.7	116.2	116.0	41.88	60.3	-4,680.5	452.6	295.9	156.65	2.889			
10,200.0	5,583.3	9,802.0	5,246.3	118.6	118.5	41.88	61.7	-4,780.5	452.6	292.6	159.96	2.829			

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

Anticollision Report

Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: Lybrook
Site Error: 0.0ft
Reference Well: Lybrook M27-2306 04H
Well Error: 0.0ft
Reference Wellbore: Hz
Reference Design: Plan #1

Local Co-ordinate Reference: Well Lybrook M27-2306 04H
TVD Reference: WELL @ 7145.0ft (Aztec)
MD Reference: WELL @ 7145.0ft (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

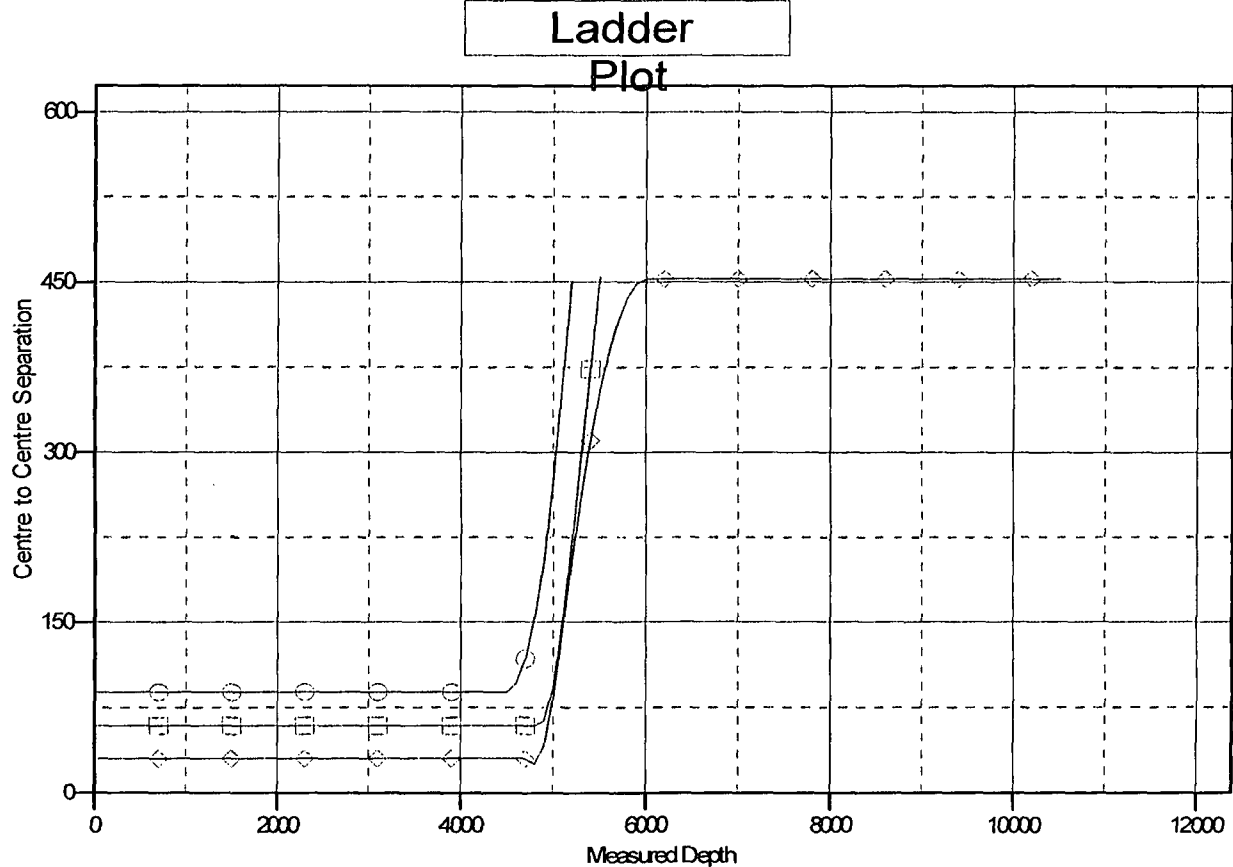
Offset Design Lybrook - Lybrook M27-2306 03H - Hz - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor		
10,300.0	5,582.9	9,902.0	5,246.0	121.1	120.9	41.88	63.0	-4,880.5	452.6	289.3	163.26	2.772		
10,400.0	5,582.6	10,002.0	5,245.6	123.5	123.4	41.88	64.4	-4,980.5	452.6	286.0	166.56	2.717		
10,500.0	5,582.2	10,102.0	5,245.3	126.0	125.9	41.88	65.7	-5,080.5	452.6	282.7	169.87	2.664		
10,511.4	5,582.2	10,113.4	5,245.2	126.3	126.2	41.88	65.9	-5,091.9	452.6	282.3	170.25	2.658		

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Lybrook M27-2306 04H
Project:	Sandoval County, NM	TVD Reference:	WELL @ 7145.0ft (Aztec)
Reference Site:	Lybrook	MD Reference:	WELL @ 7145.0ft (Aztec)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lybrook M27-2306 04H	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 Depths are relative to WELL @ 7145.0ft (Aztec)
Offset Depths are relative to Offset Datum
Central Meridian is -106.250000 °

Coordinates are relative to: Lybrook M27-2306 04H
Coordinate System is US State Plane 1983, New Mexico Central Zone
Grid Convergence at Surface is: -0.72°



LEGEND

■ Lybrook M27-2306 02H, Hz, Plan #1 V0
○ Lybrook M27-2306 01H, Hz, Plan #1 V0
◇ Lybrook M27-2306 03H, Hz, Plan #1 V0



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

WELLHEAD BLOWOUT CONTROL SYSTEM



Well name and number:

Lybrook M27-2306 04H

