

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: 12/28/12

Well information;

Operator Encana, Well Name and Number Lybrook A01-2206 1H

API# 30-043-21137, Section 1, Township 22 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
- ☒ A complete C-144 must be submitted to and approved by the NMOCD for: a pit, closed loop system, below grade tank, or proposed alternative method, pursuant to NMOCD PART 19.15.17 prior to the use or construction of the above applications
- ☐ 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

Charlie Herrera
NMOCD Approved by Signature

6-20-2013
Date

JUN 21 2013 *ea*

NOS: 3-13-12
AFOP: N/A
Form 3160-34P
(August 2007)
BOND: COB-000235
CA/PA: N/A

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

JAN 02 2013

5. Lease Serial No.
NMNM 109385

7. If Indian, Allottee or Tribe Name
N/A

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

8. Lease Name and Well No.
Lybrook A01-2206 01H

9. API Well No.
30-043-21137

10. Field and Pool, or Exploratory
Wildcat (Gallup)

11. Sec., T. R. M. or Blk. and Survey or Area
Section 1, T22N, R6W NMPM

12. County or Parish
Sandoval

13. State
NM

1a. Type of work: ☒ DRILL ☐ REENTER

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

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

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

3b. Phone No. (include area code)
720-876-3989

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

At surface 1126' FNL and 546' FEL Section 1, T22N, R6W

At proposed prod. zone 660' FNL and 330' FWL Section 1, T22N, R6W

14. Distance in miles and direction from nearest town or post office*
+/- 60.7 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 330' from west lease line

16. No. of acres in lease
NMNM 109385 - 1,761.4

17. Spacing Unit dedicated to this well
161.4 acres - Lots 1-4 (aka N2N2) Sec 1, T22N
R6W

18. Distance from proposed location*
to nearest well, drilling, completed,
applied for, on this lease, ft.
Lybrook H01-2206 01H
is +/- 1300' south of SHL

19. Proposed Depth
5342' TVD/9631' MD

20. BLM/BIA Bond No. on file
COB-000235

RCVD JUN 17 '13

21. Elevations (Show whether DF, KDB, RT, GL, etc.)
6880' GL, 6893' KB

22. Approximate date work will start*
06/28/2013

23. Estimated duration
25 days

CONS. DIV.
DIST. 3

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 *Brenda R. Linster* Name (Printed Typed) Brenda R. Linster Date 12-28-12
Title Regulatory Lead

Approved by (Signature) *[Signature]* Name (Printed Typed) Office FFO Date 6/10/13
Title AFD

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, or to make any material within its jurisdiction.

(Continued on page 2)

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

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)

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

NMOC
A

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

JAN 02 2013

API Number 30-043-21137	Pool Code 42289	Pool Name Lybrook, GALEUP
Property Code 39971	Property Name LYBROOK A01-2206	Well Number 01H
GRID No. 282327	Operator Name ENCANA OIL & GAS (USA) INC.	Elevation 6880'

10 Surface Location

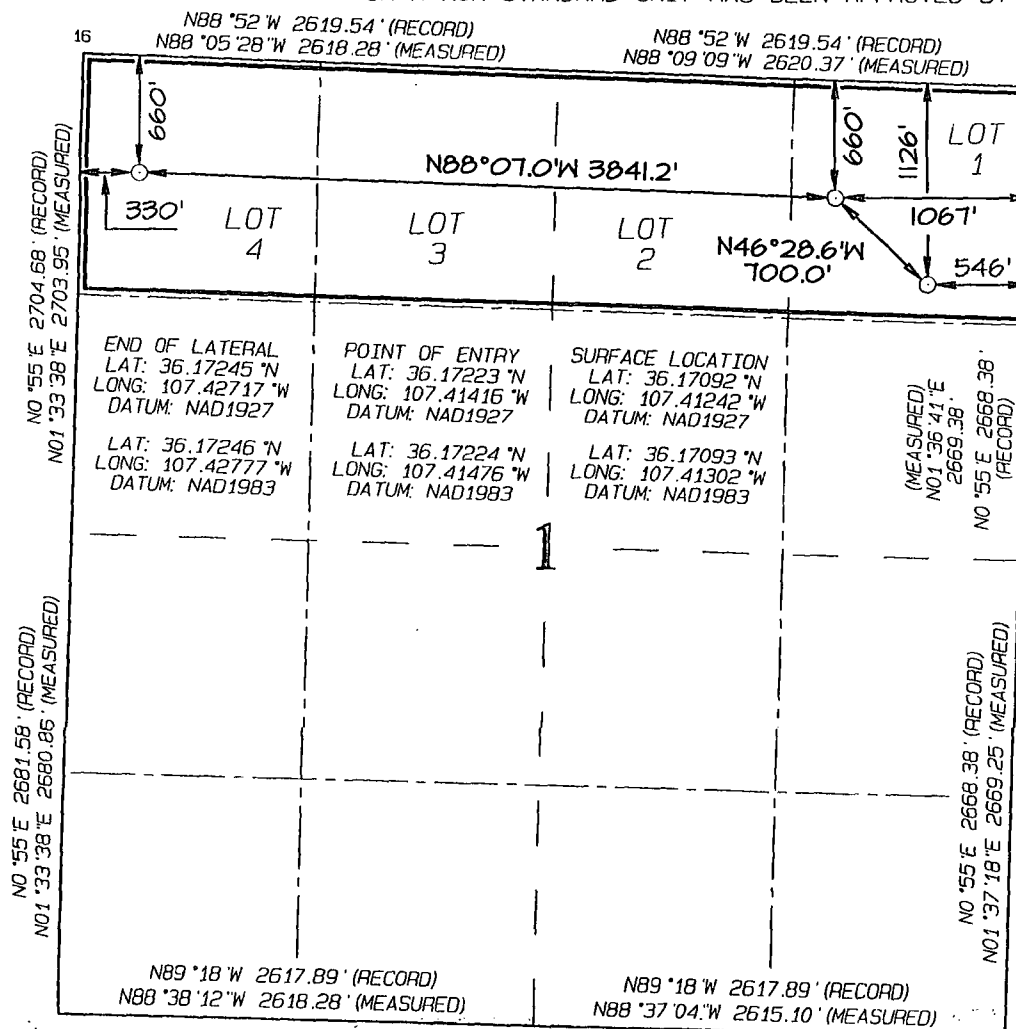
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	1	22N	6W	1	1126	NORTH	546	EAST	SANDOVAL

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
D	1	22N	6W	4	660	NORTH	330	WEST	SANDOVAL

Dedicated Acres 161.40 Acres - (N/2 N/2)	Joint or Infill	Consolidation Code	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



17 OPERATOR CERTIFICATION

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

Signature *Brenda R. Linster* Date **12-28-11**

Printed Name **Brenda R. Linster**

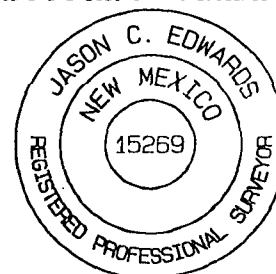
E-mail Address **brenda.linster@encana.com**

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 of Survey: **AUGUST 24, 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 A01-2206 01H

1126' FNL & 546' FEL, Section 1, T22N, R6W, N.M.P.M., Sandoval County, NM

Latitude: 36.17093°N Longitude: 107.41302°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) for 3.3 miles to an unimproved roadway;

Go left (South-easterly) along Lybrook Access Road #1 for 12,155' to "T" intersection in proposed roadway;

Go left (Northerly) along unimproved roadway for Encana Lybrook H01-2206 01H location for an additional 7,162' to another fork in proposed roadway;

Go straight (Northerly) for an additional 787' to staked Encana Lybrook A01-2206 01H location.

Lybrook A01-2206 01H

SHL: NENE Section 1, T22N, R6W
1126 FNL and 546 FEL

BHL: NWNW Section 1, T22N, R6W
660 FNL and 330 FWL

Sandoval County, New Mexico

Lease Number: NMNM 109385

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.	1318'
Kirtland	1457'
Fruitland Coal	1558'
Pictured Cliffs	1840'
Lewis	1958'
Cliffhouse	2680'
Menefee	3391'
Point Lookout	4086'
Mancos Shale	4293'
Mancos Silt	4855'
Gallup	5128'

The referenced surface elevation is 6880', KB 6893'

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	1558'
Gas	Pictured Cliffs	1840'
Gas	Cliffhouse	2680'
Gas	Point Lookout	4086'
Oil/Gas	Mancos	4293'

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 A01-2206 01H

SHL: NENE Section 1, T22N, R6W
1126 FNL and 546 FEL

BHL: NWNW Section 1, T22N, R6W
660 FNL and 330 FWL

Sandoval County, New Mexico

Lease Number: NMNM 109385

- 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'-5609'MD	8 1/2"	7"	26#	J55, LTC New
Production Liner	5409'-9631'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 A01-2206 01H

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1126 FNL and 546 FEL

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660 FNL and 330 FWL

Sandoval County, New Mexico

Lease Number: NMNM 109385

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	5231'MD	30% open hole excess 488 sk total Stage 1 Lead:201sk Stage 1 Tail: 139sk Stage 2 Lead: 147sk	Lead: PremLite + 3% CaCl + 0.25lb/sk CelloFlake + 5lb/sk LCM, 12.1ppg 2.13cuf/sk Tail: 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*	5031'-9291'	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 4568'. Directional plans are attached.

Description	Proposed Depth (TVD/MD)	Formation
Horizontal Lateral TD	5342'/9631'	Gallup

Lybrook A01-2206 01H

SHL: NENE Section 1, T22N, R6W
1126 FNL and 546 FEL

BHL: NWNW Section 1, T22N, R6W
660 FNL and 330 FWL

Sandoval County, New Mexico

Lease Number: NMNM 109385

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 1/2"	500'TVD- 5369'TVD/5843'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"	5843'-9631'	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 +/- 2515 psi based on a 9.0 ppg at 5373' 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 A01-2206 01H

**SHL: NENE Section 1, T22N, R6W
1126 FNL and 546 FEL**

**BHL: NWNW Section 1, T22N, R6W
660 FNL and 330 FWL**

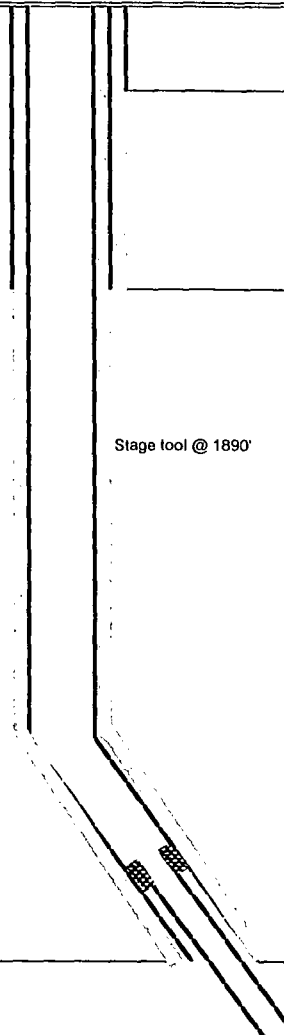
Sandoval County, New Mexico

Lease Number: NMNM 109385

9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on June 28, 2013. 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 1-T22N-R6W County: Sandoval WELL: Lybrook A01-2206 01H			Encana Natural Gas WELL SUMMARY			encana. natural gas		ENG: J. Fox/ A. 12/28/12 RIG: GLE: 6880 RKBE: 6893	
MWD LWD	OPEN HOLE LOGGING	FORM	DEPTH			HOLE SIZE	CASING SPECS	MW MUD TYPE	DEVIATION INFORMATION
			TVD	MD					
			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 Point Lookout Ss Mancos Sh	1318 1457 1558 1840 1958 2680 3391 4086 4293			8 1/2	7" 26ppf J55 LTC TOC @ surface 30% OH excess: 488 sks total Stage 1 Lead: 201sks Stage 1 Tail: 139sks Stage 2 Lead: 147sks	Fresh Wtr 8.5-8.8	Vertical <1°
	Mud logger onsite	KICK OFF PT Mancos Silt Top Mancos Silt Base Gallup Top	4568 4855 5033 5128						KOP 4568 10 deg/100'
			5333	5609		6 1/8	200' overlap at liner top		
		horz target Base Gallup	5373 5438	5843			3788' Lateral	8.6-9.0 OBM	.25deg updip 5342'TVD TD = 9631' MD
Surveys every 500' Gyro at CP MWD Gamma Directional	No OH Logs						4 1/2" 11.6ppf SB80 LTC Running external swellable csg packers for isolation of prod string	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 4568', 8 1/2" hole size,
- 5) PU directional tools and start curve at 10deg/100' build rate
- 6) Drill to casing point of 5609' MD
- 7) R&C 7" casing, circ cmt to surface, switch to OBM
- 8) Land at 90deg, drill 3788' lateral to 9631', 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

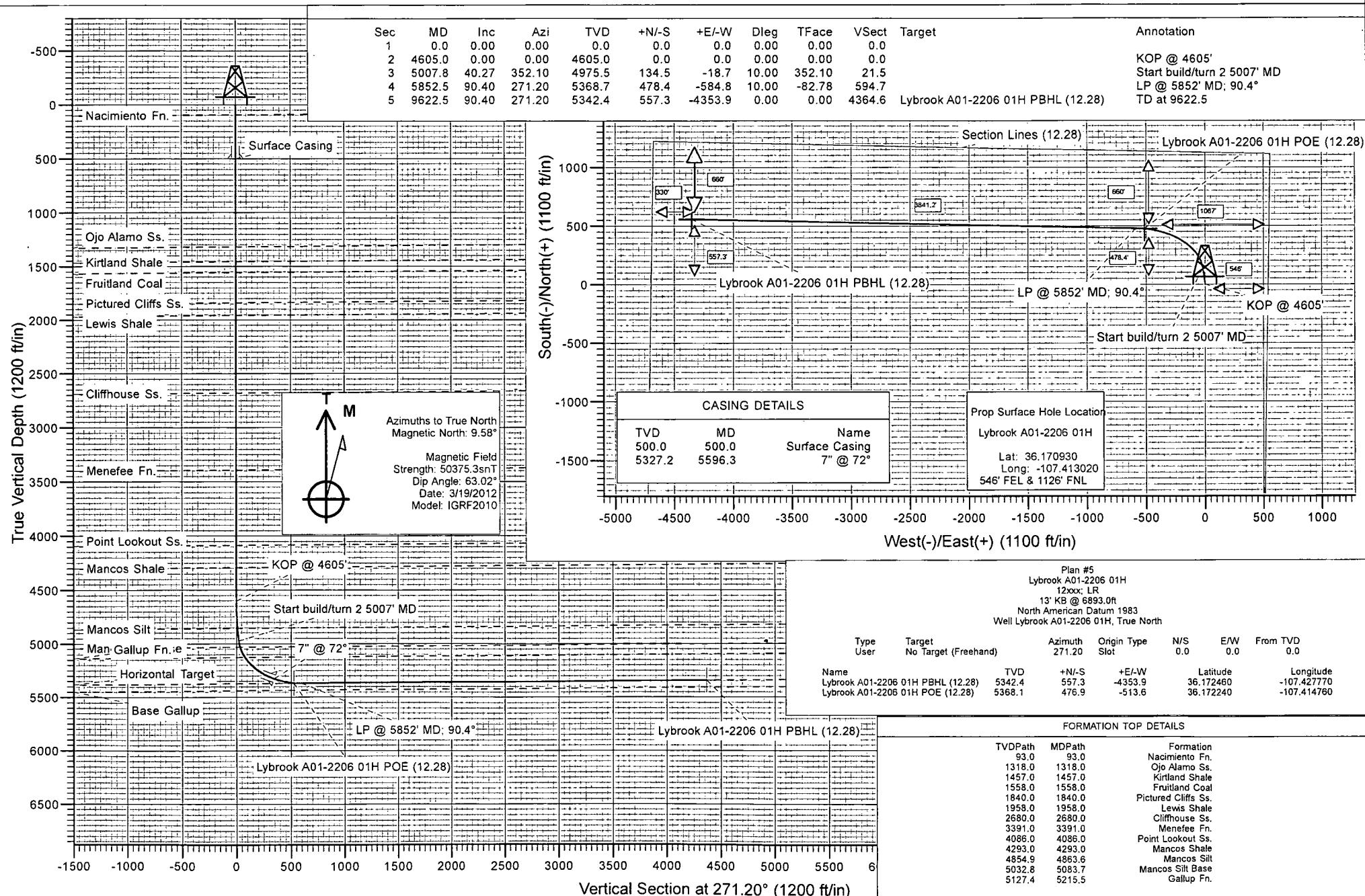
API RELATED VALUES and INTERMEDIATE CALCULATION RESULTS

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

encana™

natural gas

Project: Sandoval County, NM
Site: Lybrook
Well: Lybrook A01-2206 01H
Wellbore: Hz
Design: Plan #5



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well: Lybrook A01-2206 01H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	13' KB @ 6893.0ft
Project:	Sandoval County, NM	MD Reference:	13' KB @ 6893.0ft
Site:	Lybrook	North Reference:	True
Well:	Lybrook A01-2206 01H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #5		

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 A01-2206 01H					
Well Position	+N/-S	0.0 ft	Northing:	1,883,544.16 ft	Latitude:	36.170930
	+E/-W	0.0 ft	Easting:	1,297,155.01 ft	Longitude:	-107.413020
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,880.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/19/2012	9.58	63.02	50,375

Design	Plan #5			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	271.20

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	
4,605.0	0.00	0.00	4,605.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,007.8	40.27	352.10	4,975.5	134.5	-18.7	10.00	10.00	0.00	352.10	
5,852.5	90.40	271.20	5,368.7	478.4	-584.8	10.00	5.93	-9.58	-82.78	
9,622.5	90.40	271.20	5,342.4	557.3	-4,353.9	0.00	0.00	0.00	0.00	Lybrook A01-2206 01H

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook A01-2206 01H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	13' KB @ 6893.0ft
Project:	Sandoval County, NM	MD Reference:	13' KB @ 6893.0ft
Site:	Lybrook	North Reference:	True
Well:	Lybrook A01-2206 01H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #5		

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	
93.0	0.00	0.00	93.0	0.0	0.0	0.0	0.00	0.00	Nacimiento Fn.
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	Surface Casing
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	
1,318.0	0.00	0.00	1,318.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo Ss.
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,457.0	0.00	0.00	1,457.0	0.0	0.0	0.0	0.00	0.00	Kirtland Shale
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,558.0	0.00	0.00	1,558.0	0.0	0.0	0.0	0.00	0.00	Fruitland Coal
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	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,840.0	0.00	0.00	1,840.0	0.0	0.0	0.0	0.00	0.00	Pictured Cliffs Ss.
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
1,958.0	0.00	0.00	1,958.0	0.0	0.0	0.0	0.00	0.00	Lewis Shale
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	
2,400.0	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	
2,680.0	0.00	0.00	2,680.0	0.0	0.0	0.0	0.00	0.00	Cliffhouse Ss.
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	
3,200.0	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	
3,391.0	0.00	0.00	3,391.0	0.0	0.0	0.0	0.00	0.00	Menefee Fn.
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	
4,086.0	0.00	0.00	4,086.0	0.0	0.0	0.0	0.00	0.00	Point Lookout Ss.
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	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook A01-2206 01H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	13' KB @ 6893.0ft
Project:	Sandoval County, NM	MD Reference:	13' KB @ 6893.0ft
Site:	Lybrook	North Reference:	True
Well:	Lybrook A01-2206 01H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #5		

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
4,293.0	0.00	0.00	4,293.0	0.0	0.0	0.0	0.00	0.00	Mancos Shale
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
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	
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	KOP @ 4605'
4,605.0	0.00	0.00	4,605.0	0.0	0.0	0.0	0.00	0.00	
4,700.0	9.50	352.10	4,699.6	7.8	-1.1	1.2	10.00	10.00	
4,800.0	19.49	352.10	4,796.3	32.5	-4.5	5.2	10.00	10.00	
4,863.6	25.85	352.10	4,854.9	56.8	-7.9	9.1	10.00	10.00	Mancos Silt
4,900.0	29.49	352.10	4,887.1	73.6	-10.2	11.7	10.00	10.00	
5,000.0	39.49	352.10	4,969.5	129.6	-18.0	20.7	10.00	10.00	
5,007.8	40.27	352.10	4,975.5	134.5	-18.7	21.5	10.00	10.00	
5,083.7	41.79	340.77	5,032.8	182.7	-30.4	34.2	10.00	2.00	Start build/turn 2 5007' MD Mancos Silt Base
5,100.0	42.25	338.44	5,044.9	193.0	-34.2	38.2	10.00	2.87	Gallup Fn.
5,200.0	46.07	325.15	5,116.8	254.0	-67.2	72.5	10.00	3.81	
5,215.5	46.79	323.26	5,127.4	263.1	-73.8	79.2	10.00	4.65	
5,300.0	51.22	313.71	5,183.0	310.6	-116.1	122.5	10.00	5.24	
5,400.0	57.32	303.94	5,241.4	361.2	-179.3	186.8	10.00	6.11	7" @ 72°
5,500.0	64.09	295.49	5,290.4	404.1	-255.0	263.4	10.00	6.76	
5,596.3	71.01	288.25	5,327.2	437.1	-337.5	346.6	10.00	7.19	
5,600.0	71.28	287.98	5,328.4	438.2	-340.9	350.0	10.00	7.35	
5,700.0	78.75	281.10	5,354.2	462.3	-434.3	443.9	10.00	7.47	Lybrook A01-2206 01H POE
5,734.4	81.36	278.83	5,360.2	468.2	-467.6	477.3	10.00	7.59	
5,781.7	84.97	275.75	5,365.8	474.1	-514.2	524.0	10.00	7.63	
5,800.0	86.37	274.57	5,367.2	475.8	-532.4	542.2	10.00	7.66	
5,852.5	90.40	271.20	5,368.7	478.4	-584.8	594.7	10.00	7.67	LP @ 5852' MD; 90.4°
5,900.0	90.40	271.20	5,368.3	479.4	-632.3	642.2	0.00	0.00	
6,000.0	90.40	271.20	5,367.6	481.5	-732.2	742.2	0.00	0.00	
6,100.0	90.40	271.20	5,366.9	483.6	-832.2	842.2	0.00	0.00	
6,200.0	90.40	271.20	5,366.2	485.7	-932.2	942.2	0.00	0.00	
6,300.0	90.40	271.20	5,365.5	487.8	-1,032.2	1,042.2	0.00	0.00	
6,400.0	90.40	271.20	5,364.8	489.9	-1,132.1	1,142.2	0.00	0.00	
6,500.0	90.40	271.20	5,364.1	492.0	-1,232.1	1,242.2	0.00	0.00	
6,600.0	90.40	271.20	5,363.5	494.0	-1,332.1	1,342.2	0.00	0.00	
6,700.0	90.40	271.20	5,362.8	496.1	-1,432.1	1,442.2	0.00	0.00	
6,800.0	90.40	271.20	5,362.1	498.2	-1,532.1	1,542.2	0.00	0.00	
6,900.0	90.40	271.20	5,361.4	500.3	-1,632.0	1,642.1	0.00	0.00	
7,000.0	90.40	271.20	5,360.7	502.4	-1,732.0	1,742.1	0.00	0.00	
7,100.0	90.40	271.20	5,360.0	504.5	-1,832.0	1,842.1	0.00	0.00	
7,200.0	90.40	271.20	5,359.3	506.6	-1,932.0	1,942.1	0.00	0.00	
7,300.0	90.40	271.20	5,358.6	508.7	-2,031.9	2,042.1	0.00	0.00	
7,400.0	90.40	271.20	5,357.9	510.8	-2,131.9	2,142.1	0.00	0.00	
7,500.0	90.40	271.20	5,357.2	512.9	-2,231.9	2,242.1	0.00	0.00	
7,600.0	90.40	271.20	5,356.5	515.0	-2,331.9	2,342.1	0.00	0.00	
7,700.0	90.40	271.20	5,355.8	517.1	-2,431.8	2,442.1	0.00	0.00	
7,800.0	90.40	271.20	5,355.1	519.2	-2,531.8	2,542.1	0.00	0.00	
7,900.0	90.40	271.20	5,354.4	521.3	-2,631.8	2,642.1	0.00	0.00	
8,000.0	90.40	271.20	5,353.7	523.4	-2,731.8	2,742.1	0.00	0.00	
8,100.0	90.40	271.20	5,353.0	525.5	-2,831.7	2,842.1	0.00	0.00	
8,200.0	90.40	271.20	5,352.3	527.6	-2,931.7	2,942.1	0.00	0.00	
8,300.0	90.40	271.20	5,351.6	529.6	-3,031.7	3,042.1	0.00	0.00	
8,400.0	90.40	271.20	5,350.9	531.7	-3,131.7	3,142.1	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook A01-2206 01H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	13' KB @ 6893.0ft
Project:	Sandoval County, NM	MD Reference:	13' KB @ 6893.0ft
Site:	Lybrook	North Reference:	True
Well:	Lybrook A01-2206 01H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #5		

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
8,500.0	90.40	271.20	5,350.2	533.8	-3,231.6	3,242.1	0.00	0.00	
8,600.0	90.40	271.20	5,349.5	535.9	-3,331.6	3,342.1	0.00	0.00	
8,700.0	90.40	271.20	5,348.8	538.0	-3,431.6	3,442.1	0.00	0.00	
8,800.0	90.40	271.20	5,348.1	540.1	-3,531.6	3,542.1	0.00	0.00	
8,900.0	90.40	271.20	5,347.4	542.2	-3,631.5	3,642.1	0.00	0.00	
9,000.0	90.40	271.20	5,346.7	544.3	-3,731.5	3,742.1	0.00	0.00	
9,100.0	90.40	271.20	5,346.0	546.4	-3,831.5	3,842.1	0.00	0.00	
9,200.0	90.40	271.20	5,345.3	548.5	-3,931.5	3,942.1	0.00	0.00	
9,300.0	90.40	271.20	5,344.6	550.6	-4,031.4	4,042.1	0.00	0.00	
9,400.0	90.40	271.20	5,343.9	552.7	-4,131.4	4,142.1	0.00	0.00	
9,500.0	90.40	271.20	5,343.2	554.8	-4,231.4	4,242.1	0.00	0.00	
9,600.0	90.40	271.20	5,342.5	556.9	-4,331.4	4,342.1	0.00	0.00	
9,622.5	90.40	271.20	5,342.4	557.3	-4,353.9	4,364.6	0.00	0.00	TD at 9622.5 - Lybrook A01-2206 01H PBHL - L

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 A01-2206 01H F	0.00	359.30	4,960.5	554.6	-4,356.2	1,884,150.89	1,292,805.77	36.172452	-107.427778
- plan misses target center by 381.8ft at 9622.5ft MD (5342.4 TVD, 557.3 N, -4353.9 E)									
- Polygon									
Point 1			4,960.5	-300.0	-330.0	1,883,850.84	1,292,475.82		
Point 2			4,960.5	660.0	-330.0	1,884,810.84	1,292,475.67		
Point 3			4,960.5	660.0	500.0	1,884,810.96	1,293,305.67		
Point 4			4,960.5	660.0	-330.0	1,884,810.84	1,292,475.67		
Lybrook A01-2206 01H F	0.00	359.30	5,342.4	557.3	-4,353.9	1,884,153.63	1,292,808.13	36.172460	-107.427770
- plan hits target center									
- Point									
Lybrook A01-2206 01H F	0.00	359.30	4,987.3	474.3	-516.0	1,884,024.60	1,296,644.76	36.172233	-107.414768
- plan misses target center by 375.8ft at 5717.9ft MD (5357.5 TVD, 465.5 N, -451.6 E)									
- Point									
Lybrook A01-2206 01H F	0.00	359.30	5,368.1	476.9	-513.6	1,884,027.20	1,296,647.16	36.172240	-107.414760
- plan misses target center by 3.7ft at 5781.7ft MD (5365.8 TVD, 474.1 N, -514.2 E)									
- Point									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
5,596.3	5,327.2	7" @ 72°	7.000	7.500
500.0	500.0	Surface Casing	0.000	0.000

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Lybrook A01-2206 01H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	13' KB @ 6893.0ft
Project:	Sandoval County, NM	MD Reference:	13' KB @ 6893.0ft
Site:	Lybrook	North Reference:	True
Well:	Lybrook A01-2206 01H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #5		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
93.0	93.0	Nacimiento Fn.		-0.40	271.20
1,318.0	1,318.0	Ojo Alamo Ss.		-0.40	271.20
1,457.0	1,457.0	Kirtland Shale		-0.40	271.20
1,558.0	1,558.0	Fruitland Coal		-0.40	271.20
1,840.0	1,840.0	Pictured Cliffs Ss.		-0.40	271.20
1,958.0	1,958.0	Lewis Shale		-0.40	271.20
2,680.0	2,680.0	Cliffhouse Ss.		-0.40	271.20
3,391.0	3,391.0	Menefee Fn.		-0.40	271.20
4,086.0	4,086.0	Point Lookout Ss.		-0.40	271.20
4,293.0	4,293.0	Mancos Shale		-0.40	271.20
4,863.6	4,855.0	Mancos Silt		-0.40	271.20
5,083.7	5,033.0	Mancos Silt Base		-0.40	271.20
5,215.5	5,128.0	Gallup Fn.		-0.40	271.20

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,605.0	4,605.0	0.0	0.0	KOP @ 4605'
5,007.8	4,975.5	134.5	-18.7	Start build/turn 2 5007' MD
5,852.5	5,368.7	478.4	-584.8	LP @ 5852' MD; 90.4°
9,622.5	5,342.4	557.3	-4,353.9	TD at 9622.5

WELLHEAD BLOWOUT CONTROL SYSTEM



Well name and number:

Lybrook A01-2206 01H

