

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

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

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 3160-4 or 3160-5 form.

Operator Signature Date: 9/18/14

Well information:

API WELL #	Well Name	Well #	Operator Name	Type	Stat	County	Surf. Owner	UL	Sec	Twp	N/S	Rng	W/E
30-039-31219-00-00	LYBROOK A12 2306	001H	ENCANA OIL & GAS (USA) INC.	O	N	Rio Arriba	F	A	12	23	N	6	W

Application Type:

- ☐ P&A ☒ Drilling/Casing Change ☐ Location Change
☐ Recomplete/DHC (For hydraulic fracturing operations review EPA Underground injection control Guidance #84)
☐ Other:

Conditions of Approval:

Notify NMOCD 24hrs prior to beginning operations
Hold C104 for directional survey and as drilled plat
Hold C104 for NSL

NMOCD Approved by Signature

9-26-14
Date

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CONFIDENTIAL

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

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

5. Lease Serial No.
NMNM 1118127

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

RCUD SEP 24 11

SUBMIT IN TRIPLICATE – Other instructions on page 2.

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

SEP 19 2014

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)
720-876-5867

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

Pending OIL CONS. DIV.

8. Well Name and No.
Lybrook A12-2306 01H

9. API Well No.
30-039-31219 DIST. 3

10. Field and Pool or Exploratory Area
Counselors Gallup-Dakota

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
SHL: 81' FNL and 264' FEL Section 12, T23N, R6W
BHL: 330' FSL and 400' FEL Section 12, T23N, R6W

11. County or Parish, State
Rio Arriba, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other
	☒ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

Encana Oil & Gas (USA) Inc. (Encana) wishes to modify the drilling plan for the Lybrook A12-2306 01H well to cement the 4 1/2" production liner, instead of running open hole swell packers, as previously planned. Attached is an updated Directional Drilling Plan, 10-Point Drilling Plan and Wellbore Diagram that reflect this change. Please note, the 7" ICP was also moved from approximately 72 degrees to approximately 55 degrees.

CONDITIONS OF APPROVAL

Adhere to previously issued stipulations

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

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)

Cristi Bauer

Title Operations Technician

Signature

Cristi Bauer

Date 09/18/2014

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

William Tambekau

Title Petroleum Engineer

Date 9/22/2014

Conditions of approval, if any, are attached. Approval of this notice 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.

Office FFO

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.

(Instructions on page 2)

NMOCDA

LOC: NE/4 NE/4 Sec12 T23N R6W, 81' FNL, 26'			Encana Natural Gas				ENG: Drew Tschach 9/18/14		
County: Rio Arriba			WELL SUMMARY				RIG: Aztec 950		
WELL: Lybrook A12-2306 01H							GLE: 6693		
							RKBE: 6710.5		
MWD	OPEN HOLE	FORM	DEPTH			HOLE	CASING	MW	DEVIATION
LWD	LOGGING		TVD	MD					
			60	60'		26	16" 42.09# 100sx Type I Neat 16.0ppg cmt	Fresh wtr 8.3-9.2	
Multi-Well pad take survey every stand and run anti-collision report prior to spud	None	San Jose Fn.	0			12 1/4	9 5/8" 36ppf J55 STC TOC Surface with 100% OH Excess: 276 sks Type III Cement + 1% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.2% bwoc FL-52A + 58.9% Fresh Water.	Fresh wtr 8.3-10	Vertical <1°
		Nacimiento Fn.	surface						
		9 5/8" Csg	500	500.00					
Survey Every 60'-120', updating anticollision report after surveys. Stop operations and contact drilling engineer if separation factor approaches 1.5	No OH logs	Ojo Alamo Ss. Kirtland Shale	1,511 1,696			8 3/4	7" 26ppf J55 LTC TOC @ surface (100% OH excess - 70% Lead 30% Tail) Stage 1 Total: 1293sks Stage 1 Lead: 736 sks Premium Lite FM + 3% CaCl2 + 0.25/sk Cello Flake + 5#/sk LCM-1 + 8% Bentonite + 0.4% FL-52A + 0.4% Sodium Metasilicate. Mixed at 12.1 ppg. Yield 2.13 cuft/sk.	Fresh Wtr 8.3-10	Vertical <1°
		Fruitland Coal	1,923						
		Pictured Cliffs Ss. Lewis Shale	2,028 2,173						
		Cliffhouse Ss. Menefee Fn.	2,859 3,588						
		Point Lookout Ss. Mancos Shale	4,293 4,471						
	Mud logger onsite	KOP	4,989	4,989					
Surveys every 30' through the curve		Mancos Silt	5,113						
		Gallup Fn.	5,333						
		7" Csg	5,460	5,541'					
Surveys every stand to TD unless directed otherwise by Geologist	No OH Logs	Horizontal Target TD	5,580 5,561	10,263		6 1/8	100' overlap at liner top 4722' Drilled Lateral		Horz Inc/TVD 90.9deg/5579.5ft TD = 10263.2 MD
MWD Gamma Directional		Base Gallup	5,656				4 1/2" 11.6ppf SB80 LTC TOC @ hanger (50% OH excess) Stage 1 Total: 279sks Stage 1 Blend: 279 sks Premium Lite High Strength FM + 0.7% bwoc R-3 + 3% bwow Potassium Chloride + 0.25lbs/sack Cello Flake + 0.5% bwoc CD-32 + 1.15% bwoc FL-52A + 60 lbs/sack Calcium Carbonate + 124.4% Fresh Water. Yield 2.63 cuft/sk.	WBM 8.3-10	

NOTES:

- 1) Drill with 26" bit to 60', set 16" 42.09ppf conductor pipe
- 2) Drill surface to 500', R&C 9 5/8" casing
- 3) N/U BOP and surface equipment
- 4) Drill to KOP of 4989', 8 3/4 inch holesize
- 5) Start curve at 10deg/100' build rate
- 6) Drill to csg point of 5541' MD
- 7) R&C 7" csg, circ cmt to surface
- 8) Land at ~90 deg, drill lateral to 10263' run 4 1/2 inch cemented liner

ROVD SEP 24 '14
OIL CONS. DIV.
DIST. 3

Lybrook A12-2306 01H

SHL: NE/4 NE/4 Sec12 T23N R6W, 81' FNL, 264' FEL

BHL: SE/4 SE/4 Sec 12 T23N R6W, 330' FSL, 400' FEL

Rio Arriba, New Mexico

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

1. ESTIMATED TOPS OF GEOLOGICAL MARKERS (TVD)

The estimated tops of important geologic markers are as follows:

Formation	Depth (TVD) units = feet
San Jose Fn.	n/a
Nacimiento Fn.	surface
Ojo Alamo Ss.	1,511
Kirtland Shale	1,696
Fruitland Coal	1,923
Pictured Cliffs Ss.	2,028
Lewis Shale	2,173
Cliffhouse Ss.	2,859
Menefee Fn.	3,588
Point Lookout Ss.	4,293
Mancos Shale	4,471
Mancos Silt	5,113
Gallup Fn.	5,333
Base Gallup	5,656

The referenced surface elevation is 6693', KB 6711'

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

Substance	Formation	Depth (TVD) units = feet
Water/Gas	Fruitland Coal	1,923
Oil/Gas	Pictured Cliffs Ss.	2,028
Oil/Gas	Cliffhouse Ss.	2,859
Gas	Menefee Fn.	3,588
Oil/Gas	Point Lookout Ss.	4,293
Oil/Gas	Mancos Shale	4,471
Oil/Gas	Mancos Silt	5,113
Oil/Gas	Gallup Fn.	5,333

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

Lybrook A12-2306 01H

SHL: NE/4 NE/4 Sec12 T23N R6W, 81' FNL, 264' FEL

BHL: SE/4 SE/4 Sec 12 T23N R6W, 330' FSL, 400' FEL

Rio Arriba, New Mexico

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.
- i) BOP remote controls shall be located on the rig floor at a location readily accessible to the driller. Master controls shall be on the ground at the accumulator and shall have the capability to function all preventers.
- j) The kill line shall be 2-inch minimum and contain two kill line valves, one of which shall be a check valve.
- k) The choke line shall be a 2-inch minimum and contain two choke line valves (2-inch minimum).
- l) The choke and manifold shall contain two adjustable chokes.
- m) Hand wheels shall be installed on all ram preventers.
- n) Safety valves and wrenches (with subs for drill string connections) shall be available on the rig floor at all times.
- o) Inside BOP or float sub shall also be available on the rig floor at all times.

Proposed BOP and choke manifold arrangements are attached.

4. CASING & CEMENTING PROGRAM

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

- a) The proposed casing design is as follows:

Casing	Depth (MD)	Hole Size	Csg Size	Weight	Grade
Conductor	0'-60'	26"	16"	42.09#	
Surface	0'-500'	12 1/4"	9 5/8"	36#	J55, STC New
Intermediate	0'-5541'	8 3/4"	7"	26#	J55, LTC New
Production Liner	5441'-10263'	6 1/8"	4 1/2"	11.6#	B80*, LTC New

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

*B80 pipe specifications are attached

Casing design is subject to revision based on geologic conditions encountered

Lybrook A12-2306 01H**SHL: NE/4 NE/4 Sec12 T23N R6W, 81' FNL, 264' FEL****BHL: SE/4 SE/4 Sec 12 T23N R6W, 330' FSL, 400' FEL****Rio Arriba, New Mexico**

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

b) The proposed cementing program is as follows

Casing	Depth (MD)	Cement Volume (sacks)	Cement Type & Yield	Designed TOC	Centralizers
Conductor	0'-60'	100 sks	Type I Neat 16 ppg	Surface	None
Surface	0'-500'	276 sks	Type III Cement + 1% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.2% bwoc FL-52A + 58.9% Fresh Water	Surface	1 per joint on bottom 3 joints
Intermediate	0'-5541'	100% open hole excess Stage 1 Lead: 736 sks Stage 1 Tail: 557 sks	Lead: PremLite + 3% CaCl + 0.25lb/sk CelloFlake + 5lb/sk LCM, 12.1ppg 2.13cuft/sk Tail: Type III Cmt + 1% CaCl + 0.25lb/sk Cello Flake 14.5ppg 1.38cuft/sk	Surface	1 every 3 joints through water bearing zones
Production Liner	5441'-10263'	50% OH excess Stage 1 Blend Total: 279sks	Blend: Premium Lite High Strength FM + 0.7% bwoc R-3 + 3% bwoc Potassium Chloride + 0.25lbs/sack Cello Flake + 0.5% bwoc CD-32 + 1.15% bwoc FL- 52A + 60 lbs/sack Calcium Carbonate + 124.4% Fresh Water.	Liner Hanger	N/A

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

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

5. WELL PLAN & DIRECTIONAL DRILLING PROGRAM

The proposed horizontal well will have a kick off point of 4989'. Directional plans are attached.

Description	Proposed Depth (TVD/MD)	Formation
Horizontal Lateral TD	5561'/10263'	Gallup

Lybrook A12-2306 01H

SHL: NE/4 NE/4 Sec12 T23N R6W, 81' FNL, 264' FEL

BHL: SE/4 SE/4 Sec 12 T23N R6W, 330' FSL, 400' FEL

Rio Arriba, New Mexico

6. DRILLING FLUIDS PROGRAM

a) Surface through Intermediate Casing Point:

Hole Size (in)	Depth (TVD/MD)	Mud Type	Density (ppg)	Viscosity (sec/qt)	Fluid Loss (cc)
30"	0-60'/60'	Fresh Water	8.3-9.2	38-100	4-28
12 1/4"	0'-500'/500'	Fresh Water	8.3-10	60-70	NC
8 3/4"	500'/500'-5460'/5541'	Fresh Water LSND	8.3-10	40-50	8-10

b) Intermediate Casing Point to TD:

Hole Size (in)	Depth (TVD/MD)	Mud Type	Density (ppg)	Viscosity (sec/qt)	Fluid Loss (cc)
6 1/8"	5460'/5541'- 5561'/10263'	Fresh Water LSND	8.3-10	15-25	<15

- c) There will be sufficient mud on location to control a blowout should one occur. Mud flow and volume will be monitored both visually and with electronic pit volume totalizers. Mud tests shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.
- d) A closed-loop system will be used to recover drilling fluid and dry cuttings in both phases of the well and on all hole intervals. Above-ground tanks will be utilized to hold cuttings and fluids for rig operations. A frac tank will be on location to store fresh water. Waste will be disposed of properly at an EPA-approved hazardous waste facility. Fresh water cuttings will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystems, Inc. The location will be lined in accordance with the Surface Use Plan of Operations.

7. TESTING, CORING, & LOGGING

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

Cased Hole:

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

8. ABNORMAL PRESSURES & HYDROGEN SULFIDE

The anticipated bottom hole pressure is +/- 2611 psi based on a 9.0 ppg at 5580' TVD of the horizontal lateral target. No abnormal pressure or temperatures are anticipated.

No hydrogen sulfide gas is anticipated, however, if H₂S is encountered, the guidelines in Onshore Order No. 6 will be followed.

9. ANTICIPATED START DATE AND DURATION OF OPERATIONS

Drilling is estimated to commence on January 1, 2015. It is anticipated that completion operations will begin within 30 days after the well has been drilled depending on fracture treatment schedules with various pumping service companies.

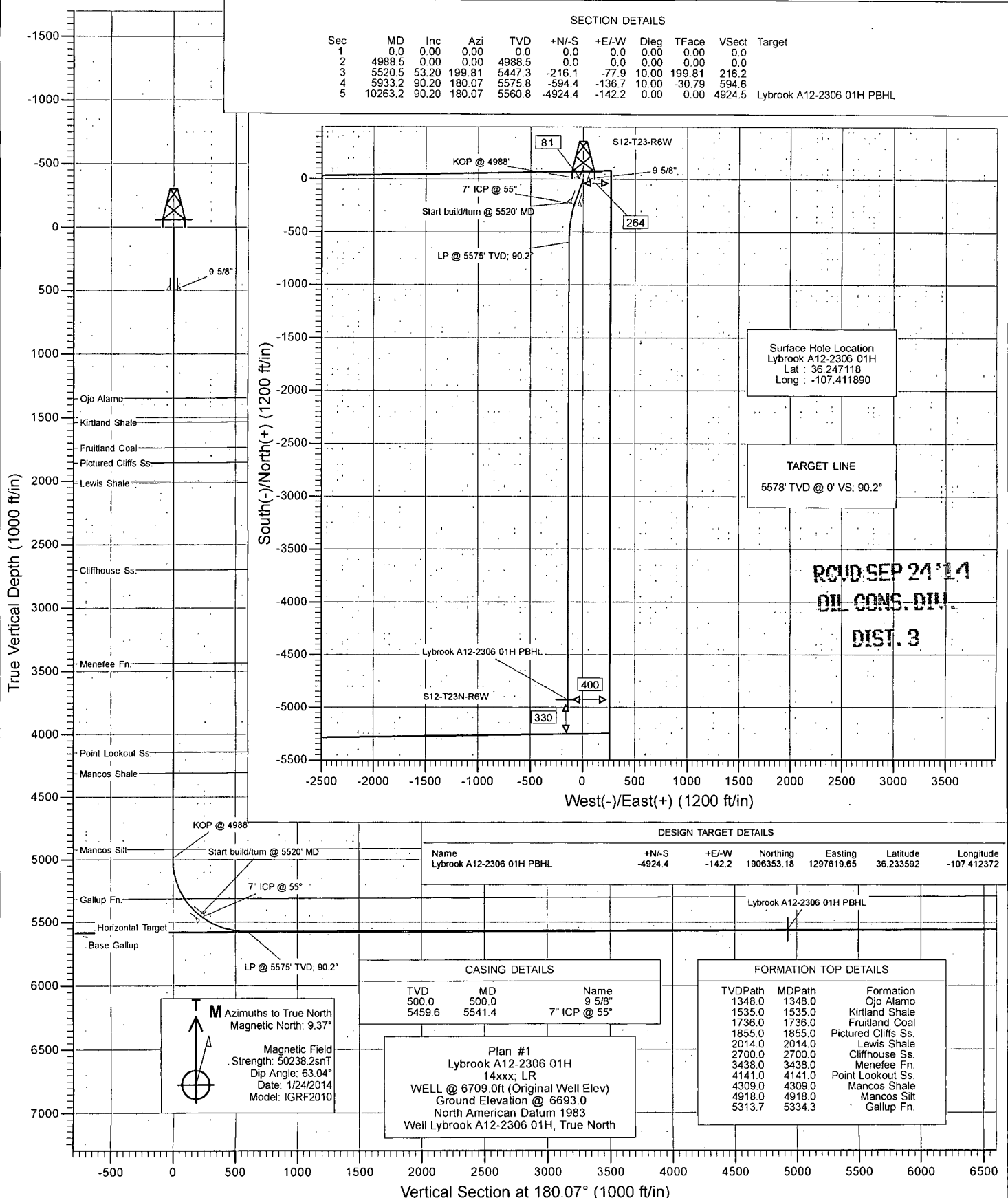
It is anticipated that the drilling of this well will take approximately 20 days.



Project: Rio Arriba County, NM
 Site: S12-T23N-R6W
 Well: Lybrook A12-2306 01H
 Wellbore: Hz
 Design: Plan #1



SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	4988.5	0.00	0.00	4988.5	0.0	0.0	0.00	0.00	0.0	
3	5520.5	53.20	199.81	5447.3	-216.1	-77.9	10.00	199.81	216.2	
4	5933.2	90.20	180.07	5575.8	-594.4	-136.7	10.00	-30.79	594.6	
5	10263.2	90.20	180.07	5560.8	-4924.4	-142.2	0.00	0.00	4924.5	Lybrook A12-2306 01H PBHL



RCVD SEP 24 '14
 OIL CONS. DIV.
 DIST. 3

DESIGN TARGET DETAILS					
Name	+N/-S	+E/-W	Northing	Easting	Latitude
Lybrook A12-2306 01H PBHL	-4924.4	-142.2	1906353.18	1297619.65	36.233592

CASING DETAILS		
TVD	MD	Name
500.0	500.0	9 5/8"
5459.6	5541.4	7" ICP @ 55"

FORMATION TOP DETAILS		
TVDPath	MDPATH	Formation
1348.0	1348.0	Ojo Alamo
1535.0	1535.0	Kirtland Shale
1736.0	1736.0	Fruitland Coal
1855.0	1855.0	Pictured Cliffs Ss.
2014.0	2014.0	Lewis Shale
2700.0	2700.0	Cliffhouse Ss.
3438.0	3438.0	Menefee Fn.
4141.0	4141.0	Point Lookout Ss.
4309.0	4309.0	Mancos Shale
4918.0	4918.0	Mancos Silt
5313.7	5334.3	Gallup Fn.

Plan #1
 Lybrook A12-2306 01H
 14xxx; LR
 WELL @ 6709.0ft (Original Well Elev)
 Ground Elevation @ 6693.0
 North American Datum 1983
 Well Lybrook A12-2306 01H, True North

Vertical Section at 180.07° (1000 ft/in)

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: EnCana Oil & Gas (USA) Inc
Project: Rio Arriba County, NM
Site: S12-T23N-R6W
Well: Lybrook A12-2306 01H
Wellbore: Hz
Design: Plan #1

Local Co-ordinate Reference: Well Lybrook A12-2306 01H
TVD Reference: WELL @ 6709.0ft (Original Well Elev)
MD Reference: WELL @ 6709.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Project	Rio Arriba 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	S12-T23N-R6W			
Site Position:		Northing:	1,911,275.48 ft	Latitude: 36.247118
From:	Lat/Long	Easting:	1,297,820.84 ft	Longitude: -107.411890
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence: -0.69 °

Well	Lybrook A12-2306 01H			
Well Position	+N/-S	0.0 ft	Northing:	1,911,275.48 ft
	+E/-W	0.0 ft	Easting:	1,297,820.84 ft
Position Uncertainty	0.0 ft		Wellhead Elevation:	ft
			Ground Level:	6,693.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/24/2014	9.37	63.04	50,238

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	180.07

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	
4,988.5	0.00	0.00	4,988.5	0.0	0.0	0.00	0.00	0.00	0.00	
5,520.5	53.20	199.81	5,447.3	-216.1	-77.9	10.00	10.00	0.00	199.81	
5,933.2	90.20	180.07	5,575.8	-594.4	-136.7	10.00	8.97	-4.78	-30.79	
10,263.2	90.20	180.07	5,560.8	-4,924.4	-142.2	0.00	0.00	0.00	0.00	Lybrook A12-2306 01H

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: EnCana Oil & Gas (USA) Inc
Project: Rio Arriba County, NM
Site: S12-T23N-R6W
Well: Lybrook A12-2306 01H
Wellbore: Hz
Design: Plan #1

Local Co-ordinate Reference: Well Lybrook A12-2306 01H
TVD Reference: WELL @ 6709.0ft (Original Well Elev)
MD Reference: WELL @ 6709.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	9 5/8"
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,348.0	0.00	0.00	1,348.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo
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	
1,535.0	0.00	0.00	1,535.0	0.0	0.0	0.0	0.00	0.00	Kirtland Shale
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	
1,736.0	0.00	0.00	1,736.0	0.0	0.0	0.0	0.00	0.00	Fruitland Coal
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,855.0	0.00	0.00	1,855.0	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	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	
2,014.0	0.00	0.00	2,014.0	0.0	0.0	0.0	0.00	0.00	Lewis Shale
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	
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	Cliffhouse Ss.
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	
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	
3,438.0	0.00	0.00	3,438.0	0.0	0.0	0.0	0.00	0.00	Menefee Fn.
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	
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	
4,141.0	0.00	0.00	4,141.0	0.0	0.0	0.0	0.00	0.00	Point Lookout Ss.
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	
4,309.0	0.00	0.00	4,309.0	0.0	0.0	0.0	0.00	0.00	Mancos Shale

Planning Report

Database: USA EDM 5000 Multi Users DB
 Company: EnCana Oil & Gas (USA) Inc
 Project: Rio Arriba County, NM
 Site: S12-T23N-R6W
 Well: Lybrook A12-2306 01H
 Wellbore: Hz
 Design: Plan #1

Local Co-ordinate Reference: Well Lybrook A12-2306 01H
 TVD Reference: WELL @ 6709.0ft (Original Well Elev)
 MD Reference: WELL @ 6709.0ft (Original Well Elev)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	
4,918.0	0.00	0.00	4,918.0	0.0	0.0	0.0	0.00	0.00	Mancos Silt
4,988.5	0.00	0.00	4,988.5	0.0	0.0	0.0	0.00	0.00	KOP @ 4988'
5,000.0	1.15	199.81	5,000.0	-0.1	0.0	0.1	9.99	9.99	
5,100.0	11.15	199.81	5,099.3	-10.2	-3.7	10.2	10.00	10.00	
5,200.0	21.15	199.81	5,195.2	-36.3	-13.1	36.3	10.00	10.00	
5,300.0	31.15	199.81	5,284.9	-77.7	-28.0	77.8	10.00	10.00	
5,334.3	34.57	199.81	5,313.7	-95.2	-34.3	95.2	10.00	10.00	Gallup Fn.
5,400.0	41.14	199.81	5,365.5	-133.1	-48.0	133.2	10.00	10.00	
5,500.0	51.14	199.81	5,434.7	-200.9	-72.4	201.0	10.00	10.00	
5,520.5	53.20	199.81	5,447.3	-216.1	-77.9	216.2	10.00	10.00	Start build/turn @ 5520' MD
5,541.4	55.00	198.51	5,459.6	-232.1	-83.4	232.2	10.00	8.63	7" ICP @ 55°
5,600.0	60.12	195.13	5,491.0	-279.4	-97.7	279.6	10.00	8.74	
5,700.0	69.03	190.08	5,533.9	-367.5	-117.2	367.6	10.00	8.91	
5,800.0	78.07	185.61	5,562.2	-462.4	-130.2	462.5	10.00	9.04	
5,900.0	87.17	181.43	5,575.1	-561.2	-136.2	561.4	10.00	9.11	
5,933.2	90.20	180.07	5,575.8	-594.4	-136.7	594.6	10.01	9.13	LP @ 5575' TVD; 90.2°
6,000.0	90.20	180.07	5,575.6	-661.2	-136.8	661.4	0.00	0.00	
6,100.0	90.20	180.07	5,575.2	-761.2	-136.9	761.4	0.00	0.00	
6,200.0	90.20	180.07	5,574.9	-861.2	-137.0	861.4	0.00	0.00	
6,300.0	90.20	180.07	5,574.5	-961.2	-137.1	961.4	0.00	0.00	
6,400.0	90.20	180.07	5,574.2	-1,061.2	-137.3	1,061.4	0.00	0.00	
6,500.0	90.20	180.07	5,573.8	-1,161.2	-137.4	1,161.4	0.00	0.00	
6,600.0	90.20	180.07	5,573.5	-1,261.2	-137.5	1,261.4	0.00	0.00	
6,700.0	90.20	180.07	5,573.2	-1,361.2	-137.6	1,361.4	0.00	0.00	
6,800.0	90.20	180.07	5,572.8	-1,461.2	-137.8	1,461.4	0.00	0.00	
6,900.0	90.20	180.07	5,572.5	-1,561.2	-137.9	1,561.4	0.00	0.00	
7,000.0	90.20	180.07	5,572.1	-1,661.2	-138.0	1,661.4	0.00	0.00	
7,100.0	90.20	180.07	5,571.8	-1,761.2	-138.2	1,761.4	0.00	0.00	
7,200.0	90.20	180.07	5,571.4	-1,861.2	-138.3	1,861.4	0.00	0.00	
7,300.0	90.20	180.07	5,571.1	-1,961.2	-138.4	1,961.4	0.00	0.00	
7,400.0	90.20	180.07	5,570.7	-2,061.2	-138.5	2,061.4	0.00	0.00	
7,500.0	90.20	180.07	5,570.4	-2,161.2	-138.7	2,161.4	0.00	0.00	
7,600.0	90.20	180.07	5,570.0	-2,261.2	-138.8	2,261.4	0.00	0.00	
7,700.0	90.20	180.07	5,569.7	-2,361.2	-138.9	2,361.4	0.00	0.00	
7,800.0	90.20	180.07	5,569.3	-2,461.2	-139.0	2,461.4	0.00	0.00	
7,900.0	90.20	180.07	5,569.0	-2,561.2	-139.2	2,561.4	0.00	0.00	
8,000.0	90.20	180.07	5,568.6	-2,661.2	-139.3	2,661.4	0.00	0.00	
8,100.0	90.20	180.07	5,568.3	-2,761.2	-139.4	2,761.4	0.00	0.00	
8,200.0	90.20	180.07	5,568.0	-2,861.2	-139.5	2,861.4	0.00	0.00	
8,300.0	90.20	180.07	5,567.6	-2,961.2	-139.7	2,961.4	0.00	0.00	
8,400.0	90.20	180.07	5,567.3	-3,061.2	-139.8	3,061.4	0.00	0.00	
8,500.0	90.20	180.07	5,566.9	-3,161.2	-139.9	3,161.4	0.00	0.00	
8,600.0	90.20	180.07	5,566.6	-3,261.2	-140.0	3,261.4	0.00	0.00	
8,700.0	90.20	180.07	5,566.2	-3,361.2	-140.2	3,361.4	0.00	0.00	
8,800.0	90.20	180.07	5,565.9	-3,461.2	-140.3	3,461.4	0.00	0.00	
8,900.0	90.20	180.07	5,565.5	-3,561.2	-140.4	3,561.4	0.00	0.00	

Planning Report

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 Project: Rio Arriba County, NM
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 Wellbore: Hz
 Design: Plan #1

Local Co-ordinate Reference: Well Lybrook A12-2306 01H
 TVD Reference: WELL @ 6709.0ft (Original Well Elev)
 MD Reference: WELL @ 6709.0ft (Original Well Elev)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
9,000.0	90.20	180.07	5,565.2	-3,661.2	-140.6	3,661.4	0.00	0.00	
9,100.0	90.20	180.07	5,564.8	-3,761.2	-140.7	3,761.4	0.00	0.00	
9,200.0	90.20	180.07	5,564.5	-3,861.2	-140.8	3,861.4	0.00	0.00	
9,300.0	90.20	180.07	5,564.1	-3,961.2	-140.9	3,961.4	0.00	0.00	
9,400.0	90.20	180.07	5,563.8	-4,061.2	-141.1	4,061.4	0.00	0.00	
9,500.0	90.20	180.07	5,563.4	-4,161.2	-141.2	4,161.4	0.00	0.00	
9,600.0	90.20	180.07	5,563.1	-4,261.2	-141.3	4,261.4	0.00	0.00	
9,700.0	90.20	180.07	5,562.8	-4,361.2	-141.4	4,361.4	0.00	0.00	
9,800.0	90.20	180.07	5,562.4	-4,461.2	-141.6	4,461.4	0.00	0.00	
9,900.0	90.20	180.07	5,562.1	-4,561.2	-141.7	4,561.4	0.00	0.00	
10,000.0	90.20	180.07	5,561.7	-4,661.2	-141.8	4,661.4	0.00	0.00	
10,100.0	90.20	180.07	5,561.4	-4,761.2	-141.9	4,761.4	0.00	0.00	
10,200.0	90.20	180.07	5,561.0	-4,861.2	-142.1	4,861.4	0.00	0.00	
10,263.2	90.20	180.07	5,560.8	-4,924.4	-142.2	4,924.5	0.00	0.00	TD at 10263.2

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 A12-2306 01H f	0.00	0.00	5,560.8	-4,924.4	-142.2	1,906,353.18	1,297,619.65	36.233592	-107.412372
- plan hits target center									
- Point									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
5,541.4	5,459.6	7" ICP @ 55°	0.000	0.000
500.0	500.0	9 5/8"	0.000	0.000

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,348.0	1,348.0	Ojo Alamo		-0.20	180.07
1,535.0	1,535.0	Kirtland Shale		-0.20	180.07
1,736.0	1,736.0	Fruitland Coal		-0.20	180.07
1,855.0	1,855.0	Pictured Cliffs Ss.		-0.20	180.07
2,014.0	2,014.0	Lewis Shale		-0.20	180.07
2,700.0	2,700.0	Cliffhouse Ss.		-0.20	180.07
3,438.0	3,438.0	Menefee Fn.		-0.20	180.07
4,141.0	4,141.0	Point Lookout Ss.		-0.20	180.07
4,309.0	4,309.0	Mancos Shale		-0.20	180.07
4,918.0	4,918.0	Mancos Silt		-0.20	180.07
5,334.3	5,314.0	Gallup Fn.		-0.20	180.07

Planning Report

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Company: EnCana Oil & Gas (USA) Inc
Project: Rio Arriba County, NM
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TVD Reference: WELL @ 6709.0ft (Original Well Elev)
MD Reference: WELL @ 6709.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,988.5	4,988.5	0.0	0.0	KOP @ 4988'
5,520.5	5,447.3	-216.1	-77.9	Start build/turn @ 5520' MD
5,933.2	5,575.8	-594.4	-136.7	LP @ 5575' TVD; 90.2°
10,263.2	5,560.8	-4,924.4	-142.2	TD at 10263.2