

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

David R. Catanach Division Director
Oil Conservation Division



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

Operator Signature Date: 2-5-15

Well information;

Operator Encana, Well Name and Number Gallo Canyon Unit 1123 2306 #2H

API# 30-043-21264, Section 23, 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
- ☒ Regarding Hydraulic Fracturing, review EPA Underground Injection Control Guidance 84
- ☒ Oil base muds are not to be used until fresh water zones are cased and cemented providing isolation from the oil or diesel. This includes synthetic oils. Oil based mud, drilling fluids and solids must be contained in a steel closed loop system.
- ☒ Well-bore communication is regulated under 19.15.29 NMAC. This requires well-bore Communication to be reported in accordance with 19.15.29.8.

**APD Held for
Name Change
See Sundry*


NMOCD Approved by Signature

8-12-15
Date *KC*

JUN 15 2015

Form 3160-3
(March 2012)

FEB 06 2015

FORM APPROVED
OMB No. 1004-0137
Expires October 31, 2014UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM-17009 Gallo Canyon Unit 131017X
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name N/A
2. Name of Operator Encana Oil & Gas (USA) Inc.		7. If Unit or CA Agreement, Name and No. NMNM 131017X
3a. Address 370 17th Street, Suite 1700 Denver, CO 80202		8. Lease Name and Well No. Gallo Canyon Unit N23-2306 02H
3b. Phone No. (include area code) 720-876-3740		9. API Well No. 30-043-21264
4. Location of Well (Report location clearly and in accordance with any State requirements.)* At surface N 927' FSL and 1887' FWL, Section 23, T23N, R6W At proposed prod. zone N 1875' FSL and 1500' FWL, Section 25, T23N, R6W		10. Field and Pool, or Exploratory Counselors Gallup-Dakota
14. Distance in miles and direction from nearest town or post office* +/- 56.8 miles South from the intersection of HWY 550 & HWY 64 in Bloomfield, NM		11. Sec., T. R. M. or Blk. and Survey or Area Section 23, T23N, R6W NMPM
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) BHL is 3755.57' FEL Section 25, T23N, R6W	16. No. of acres in lease NMNM 131017X- 5,120 acres	12. County or Parish Sandoval
17. Spacing Unit dedicated to this well 5,120 acres- Sections 22-26 and 33-36, T23N, R6W	13. State NM	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL +/- 30' W Gallo Canyon Unit N23-2306 01H	19. Proposed Depth 5,503' TVD; 11,907' MD	20. BLM/BIA Bond No. on file COB-000235
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 6,946' GL; 6,962' KB	22. Approximate date work will start* 07/01/2015	23. Estimated duration 20 days

24. Attachments

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

- 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 Rosalie Thim	Name (Printed/Typed) Rosalie Thim	Date 02/05/2015
Title Regulatory Analyst		
Approved by (Signature) DJ Monkeios	Name (Printed/Typed)	Date 6/10/15
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.

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

*(Instructions on page 2)

NMCCD TV

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

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

DISTRICT I

1085 N. French Dr., Hobbs, N.M. 88240
Phone: (505) 595-6101 Fax: (505) 595-0780

DISTRICT II

811 S. First St., Artesia, N.M. 88210
Phone: (505) 748-1883 Fax: (505) 748-0780

DISTRICT III

1000 E. Bruce Rd., Aztec, N.M. 87410
Phone: (505) 834-6178 Fax: (505) 834-6170

DISTRICT IV

1280 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-5480 Fax: (505) 476-8468

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 Dr.
Santa Fe, NM 87505

FEB 06 2015

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number 30-043-21264		*Pool Code 13379	*Pool Name COUNSELORS GALLUP-DAKOTA
*Property Code 315083	*Property Name GALLO CANYON UNIT N23-2306		*Well Number 104H-02H
*GRID No. 282327	*Operator Name ENCANA OIL & GAS (USA) INC.		*Elevation 6945.5

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
N	23	23N	6W		927'	SOUTH	1887'	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
K	25	23N	6W		1875'	SOUTH	1500'	WEST	SANDOVAL

*Dedicated Acres PROJECT AREA
PENETRATED SPACING UNITS: (S2 SEC. 23, E2
SEC. 26 & W/2 SEC. 25, T23N, R6W, 960 acres)
5,120 ACRES - ALL OF SEC 22-26; 34-36 T23N R6W -
UNDIVIDED UNIT

*Joint or Infill

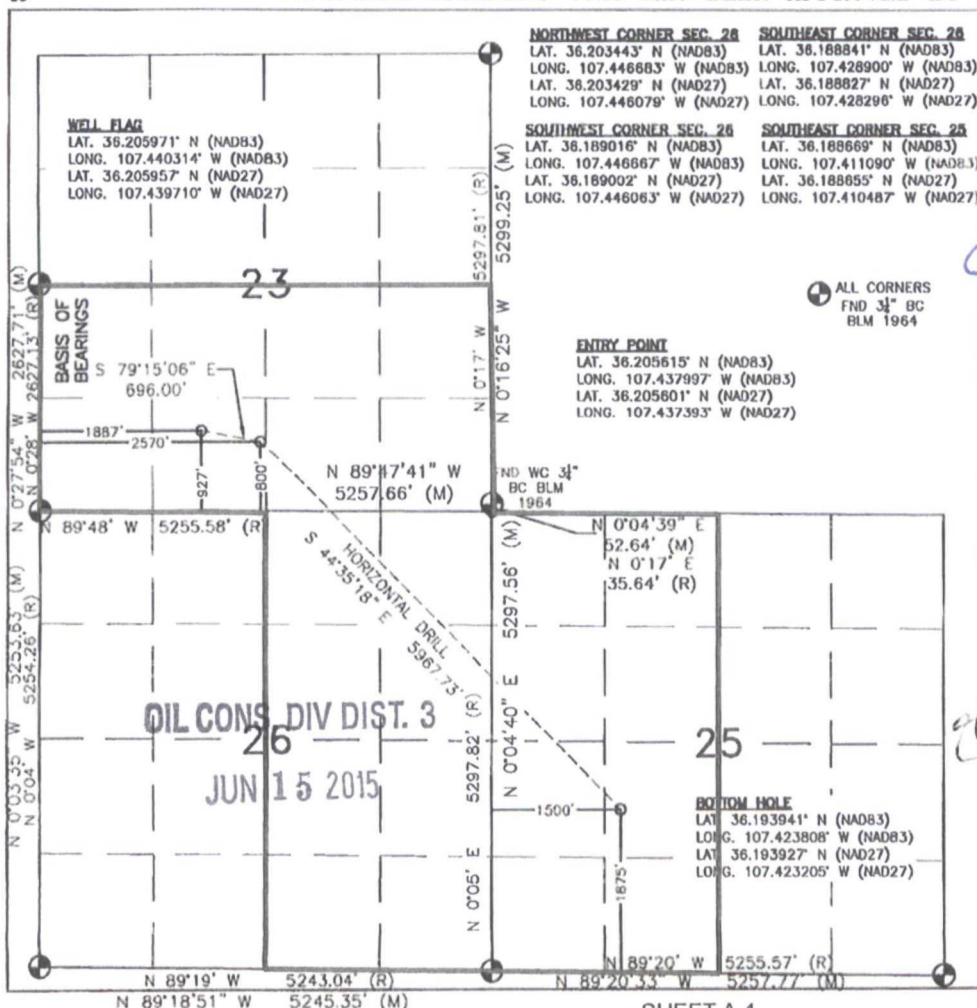
*Consolidation Code

*Order No.

R-13718-A (5,120 acres)

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

18



1635 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-8181 Fax: (575) 393-0780

511 E. First St., Artesia, N.M. 88210
Phone: (505) 748-1888 Fax: (505) 748-9790

1000 Rio Brazos Rd., Artes, N.M. 87410
Phone: (505) 334-8178 Fax: (505) 334-8170

1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3480 Fax: (505) 476-3482

State of New Mexico
Energy, Minerals & Natural Resources Department

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Submit one copy to appropriate
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OIL CONSERVATION DIVISION

1220 South St. Francis Dr.
Santa Fe, NM 87505

☐ AMENDED REPORT

WELL FLAG

LAT. 36.205971° N (NAD83)
LONG. 107.440314° W (NAD83)
LAT. 36.205957° N (NAD27)
LONG. 107.439710° W (NAD27)

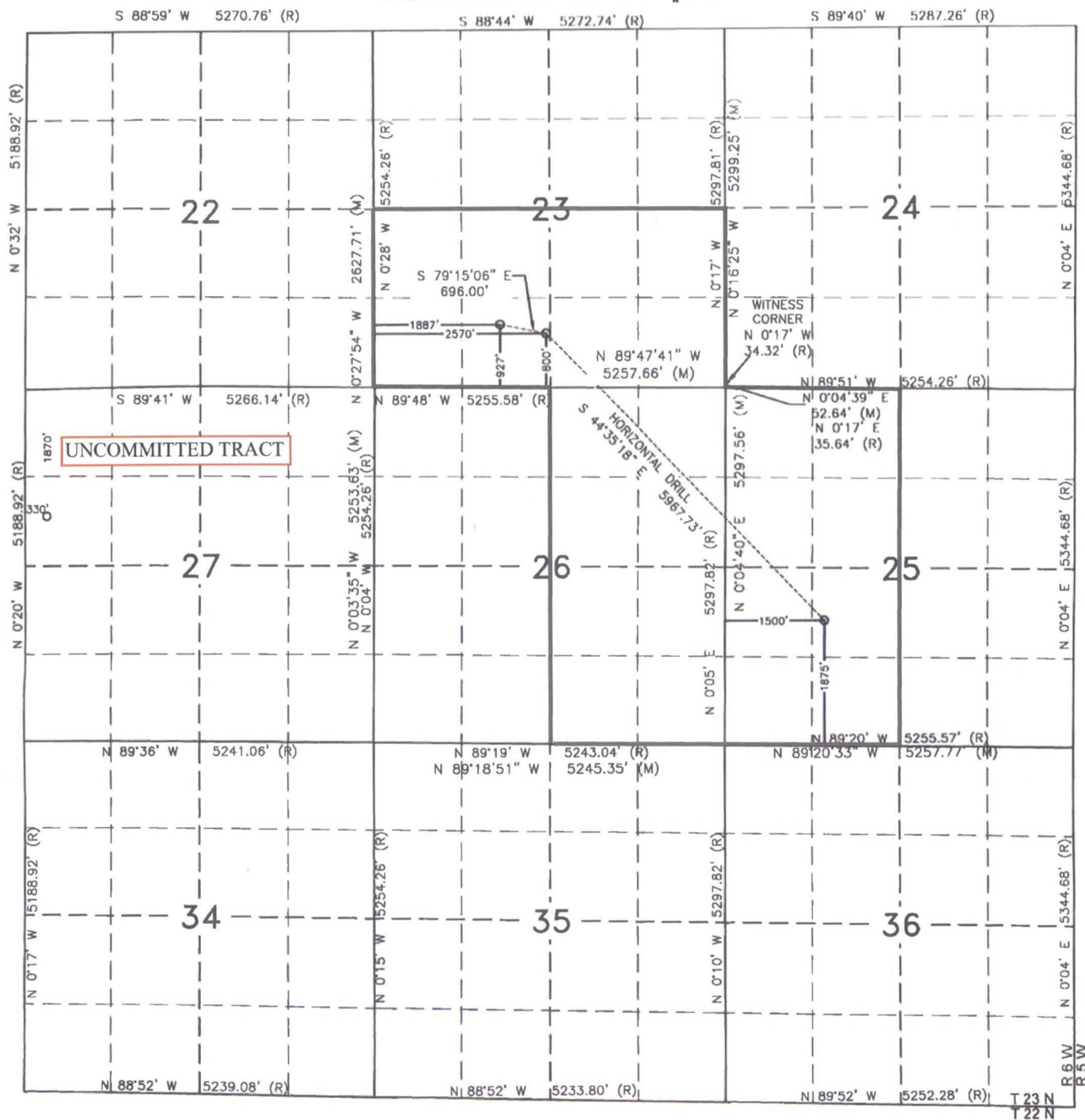
ENTRY POINT

LAT. 36.205815° N (NAD83)
LONG. 107.437997° W (NAD83)
LAT. 36.205601° N (NAD27)
LONG. 107.437393° W (NAD27)

BOTTOM HOLE

BOTTOM PALE
LAT. 36.193941° N (NAD83)
LONG. 107.423808° W (NAD83)
LAT. 36.193927° N (NAD27)
LONG. 107.423205° W (NAD27)

ENCANA OIL & GAS (USA) INC.
GALLO CANYON UNIT N23-2306 #02H



GCU N23-2306 02H

SHL: 927' FSL, 1887' FWL Sec 23 T23N R06W

BHL: 1875' FSL, 1500' FWL Sec 25 T23N R06W

Sandoval, New Mexico

Encana Oil & Gas (USA) Inc.
Drilling Plan

1. ESTIMATED TOPS OF GEOLOGICAL MARKERS (TVD)

The estimated tops of important geologic markers are as follows:

Formation	Depth (TVD) units = feet
San Jose Fn.	n/a
Nacimiento Fn.	surface
Ojo Alamo Ss.	1,489
Kirtland Shale	1,597
Fruitland Coal	1,761
Pictured Cliffs Ss.	2,038
Lewis Shale	2,154
Cliffhouse Ss.	2,828
Menefee Fn.	3,550
Point Lookout Ss.	4,254
Mancos Shale	4,453
Mancos Silt	5,062
Gallup Fn.	5,303
Base Gallup	5,628

The referenced surface elevation is 6946', KB 6962'

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

Substance	Formation	Depth (TVD) units = feet
Water/Gas	Fruitland Coal	1,761
Oil/Gas	Pictured Cliffs Ss.	2,038
Oil/Gas	Cliffhouse Ss.	2,828
Gas	Menefee Fn.	3,550
Oil/Gas	Point Lookout Ss.	4,254
Oil/Gas	Mancos Shale	4,453
Oil/Gas	Mancos Silt	5,062
Oil/Gas	Gallup Fn.	5,303

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

GCU N23-2306 02H

SHL: 927' FSL, 1887' FWL Sec 23 T23N R06W

BHL: 1875' FSL, 1500' FWL Sec 25 T23N R06W

Sandoval, 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'-5567'	8 3/4"	7"	26#	J55, LTC New
Production Liner	5467'-11907'	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

GCU N23-2306 02H

SHL: 927' FSL, 1887' FWL Sec 23 T23N R06W

BHL: 1875' FSL, 1500' FWL Sec 25 T23N R06W

Sandoval, New Mexico

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

b) The proposed cementing program is as follows

Casing	Depth (MD)	Cement Volume (sacks)	Cement Type & Yield	Designed TOC	Centralizers
Conductor	0'-60'	100 sks	Type I Neat 16 ppg	Surface	None
Surface	0'-500'	228 sks	Type III Cement + 1% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.2% bwoc FL-52A + 58.9% Fresh Water	Surface	1 per joint on bottom 3 joints
Intermediate	0'-5567'	100% open hole excess Stage 1 Lead: 519 sks Stage 1 Tail: 395 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	5467'- 11907'	50% OH excess Stage 1 Blend Total: 361sks	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. Yield 2.63 cuft/sk	Liner Hanger	N/A

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

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

5. WELL PLAN & DIRECTIONAL DRILLING PROGRAM

The proposed horizontal well will have a kick off point of 3900'. Directional plans are attached.

Description	Proposed Depth (TVD/MD)	Formation
Horizontal Lateral TD	5503'/11907'	Gallup

GCU N23-2306 02H

SHL: 927' FSL, 1887' FWL Sec 23 T23N R06W

BHL: 1875' FSL, 1500' FWL Sec 25 T23N R06W

Sandoval, New Mexico

6. DRILLING FLUIDS PROGRAM

a) Surface through Intermediate Casing Point:

Hole Size (in)	Depth (TVD/MD)	Mud Type	Density (ppg)	Viscosity (sec/qt)	Fluid Loss (cc)
30"	0-60'/60'	Fresh Water	8.3-9.2	38-100	4-28
12 1/4"	0'-500'/500'	Fresh Water	8.3-10	60-70	NC
8 3/4"	500'/500'-5446'/5567'	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"	5446'/5567'- 5503'/11907'	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 +/- 2602 psi based on a 9.0 ppg at 5560' 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 July 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.

LOC: 927' FSL, 1887' FWL Sec 23 T23N R06E			Encana Natural Gas				ENG: Michael Sanch		2-3-15	
County: Sandoval			WELL SUMMARY				RIG: Unassigned			
WELL: GCU N23-2306 02H							GLE: 6945.5			
							RKBE: 6961.5			
MWD	OPEN HOLE	FORM	DEPTH			HOLE	CASING	MW	DEVIATION	
LWD	LOGGING		TVD	MD				SIZE		SPECS
			60	60'			16" 42.09#	Fresh wtr		
			0			26	100sx Type I Neat 16.0ppg cmt	8.3-9.2		
Multi-Well pad take survey every stand and run anti-collision report prior to spud	None	San Jose Fn.								
		Nacimiento Fn.	surface				9 5/8" 36ppf J55 LTC	Fresh wtr	Vertical	
		9 5/8" Csg	500	500.00		12 1/4	TOC Surface with 100% OH Excess: 228 sks Type III Cement + 1% bwoc Calcium Chloride + 0.25 lbs/sack Cello Flake + 0.2% bwoc FL-52A + 58.9% Fresh Water.	8.3-10	<1°	
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	1,489 1,597				7" 26ppf J55 LTC	Fresh Wtr	Vertical	
		Fruitland Coal	1,761				TOC @ surface		<1°	
		Pictured Cliffs Ss. Lewis Shale	2,038 2,154			8 3/4	(100% OH excess - 70% Lead 30% Tail) Stage 1 Total: 914sks	8.3-10		
		Cliffhouse Ss. Menefee Fn.	2,828 3,550				Stage 1 Lead: 519 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.			
		Point Lookout Ss. Mancos Shale	4,254 4,453				Stage 1 Tail: 395 sks Type III Cement + 1% CaCl2 + 0.25#/sk Cello Flake + 0.2% FL-52A. Mixed at 14.6 ppg. Yield 1.38 cuft/sk.			
	Mud logger onsite	KOP	3,900	3,900						
Surveys every 30' through the curve		Mancos Silt	5,062							
		Gallup Fn.	5,303							
		7" Csg	5,446	5,567'						
Surveys every stand to TD unless directed otherwise by Geologist	No OH Logs	Horizontal Target	5,560			6 1/8	100' overlap at liner top		Horz Inc/TVD	
		TD	5,503	11,907			6339' Drilled Lateral		90.5deg/5559.5ft	
		Base Gallup	5,628						TD = 11906.6 MD	
MWD							4 1/2" 11.6ppf SB80 LTC	WBM		
Gamma							TOC @ hanger	8.3-10		
Directional							(50% OH excess) Stage 1 Total: 361sks			
							Stage 1 Blend: 361 sks Premium Lite High Strength FM + 0.7% bwoc R-3 + 3% bwow Potassium Chloride + 0.25lbs/sack Cello Flake + 0.5% bwoc CD-32 + 1.15% bwoc FL-52A + 60 lbs/sack Calcium Carbonate + 124.4% Fresh Water. Yield 2.63 cuft/sk.			

NOTES:

- 1) Drill with 26" bit to 60', set 16" 42.09ppf conductor pipe
- 2) Drill surface to 500', R&C 9 5/8" casing
- 3) N/U BOP and surface equipment
- 4) Drill to KOP of 3900', 8 3/4 inch holesize
- 5) Start curve at 10deg/100' build rate
- 6) Drill to csg point of 5567' MD
- 7) R&C 7" csg, circ cmt to surface
- 8) Land at ~55 deg, drill lateral to 11907' run 4 1/2 inch cemented liner

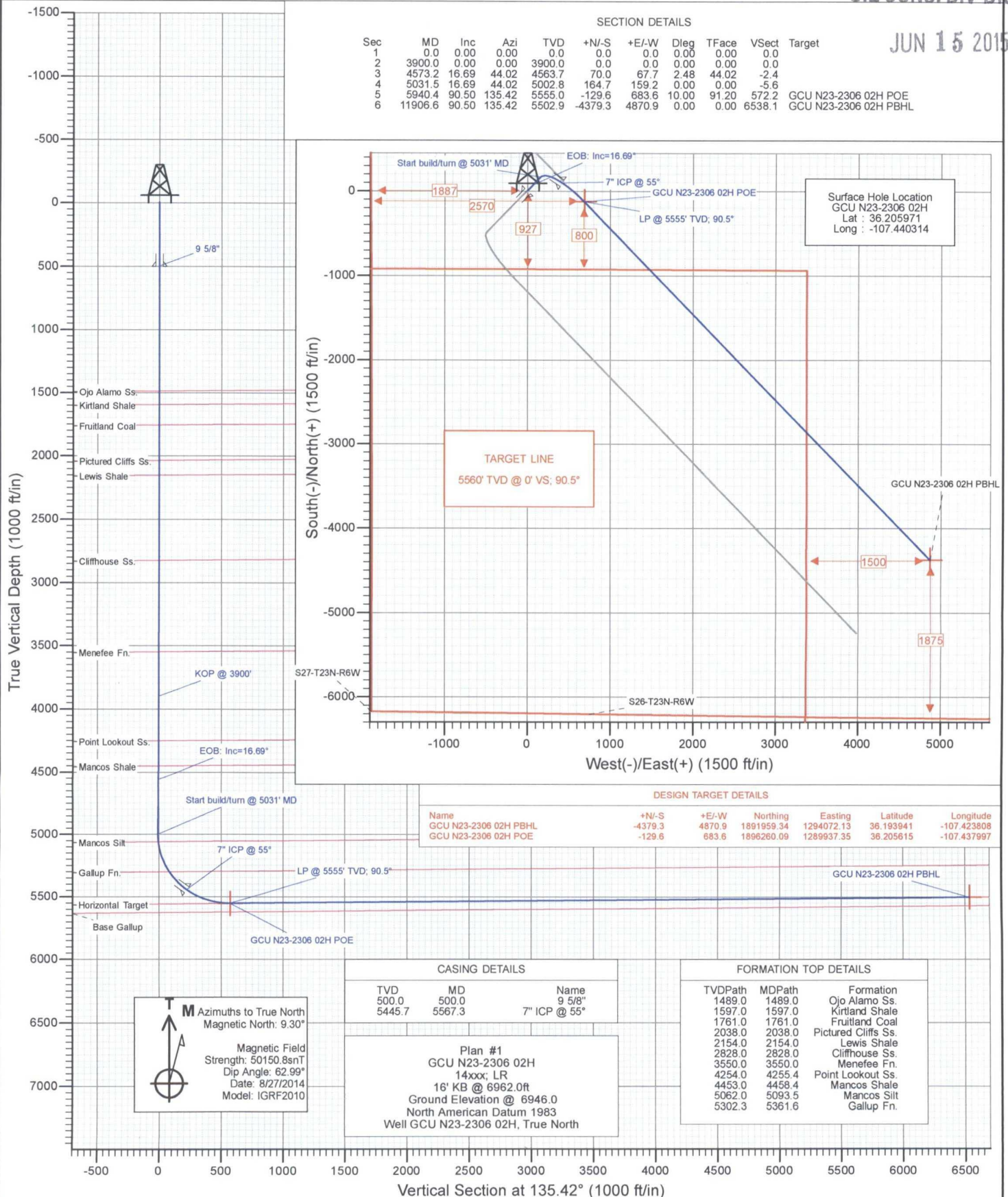


Project: Sandoval County, NM
Site: S23-T23N-R6W
Well: GCU N23-2306 02H
Wellbore: HZ
Design: Plan #1



OIL CONS. DIV DIST. 3

JUN 15 2015



Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well GCU N23-2306 02H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	16' KB @ 6962.0ft
Project:	Sandoval County, NM	MD Reference:	16' KB @ 6962.0ft
Site:	S23-T23N-R6W	North Reference:	True
Well:	GCU N23-2306 02H	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		S23-T23N-R6W			
Site Position:		Northing:	1,896,152.77 ft	Latitude:	36.205251
From:	Lat/Long	Easting:	1,287,884.94 ft	Longitude:	-107.444948
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-0.71 °

Well	GCU N23-2306 02H					
Well Position	+N-S	0.0 ft	Northing:	1,896,398.06 ft	Latitude:	36.205971
	+E-W	0.0 ft	Easting:	1,289,255.35 ft	Longitude:	-107.440314
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	6,946.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/27/2014	9.30	62.99	50,151

Design	Plan #1			
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	135.42

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	
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.00	0.00	0.00	0.00	
4,573.2	16.69	44.02	4,563.7	70.0	67.7	2.48	2.48	0.00	44.02	
5,031.5	16.69	44.02	5,002.8	164.7	159.2	0.00	0.00	0.00	0.00	
5,940.4	90.50	135.42	5,555.0	-129.6	683.6	10.00	8.12	10.06	91.20	GCU N23-2306 02H F
11,906.6	90.50	135.42	5,502.9	-4,379.3	4,870.9	0.00	0.00	0.00	0.00	GCU N23-2306 02H F

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well GCU N23-2306 02H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	16' KB @ 6962.0ft
Project:	Sandoval County, NM	MD Reference:	16' KB @ 6962.0ft
Site:	S23-T23N-R6W	North Reference:	True
Well:	GCU N23-2306 02H	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
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	9 5/8"
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,489.0	0.00	0.00	1,489.0	0.0	0.0	0.0	0.00	0.00	Ojo Alamo Ss.
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,597.0	0.00	0.00	1,597.0	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	
1,761.0	0.00	0.00	1,761.0	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	
1,900.0	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	
2,038.0	0.00	0.00	2,038.0	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	
2,154.0	0.00	0.00	2,154.0	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	
2,828.0	0.00	0.00	2,828.0	0.0	0.0	0.0	0.00	0.00	Cliffhouse Ss.
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	
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	
3,550.0	0.00	0.00	3,550.0	0.0	0.0	0.0	0.00	0.00	Menefee Fn.
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	KOP @ 3900'
4,000.0	2.48	44.02	4,000.0	1.6	1.5	-0.1	2.48	2.48	
4,100.0	4.96	44.02	4,099.8	6.2	6.0	-0.2	2.48	2.48	
4,200.0	7.44	44.02	4,199.2	14.0	13.5	-0.5	2.48	2.48	
4,255.4	8.81	44.02	4,254.0	19.6	19.0	-0.7	2.48	2.48	Point Lookout Ss.
4,300.0	9.92	44.02	4,298.0	24.8	24.0	-0.8	2.48	2.48	

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well GCU N23-2306 02H
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	16' KB @ 6962.0ft
Project:	Sandoval County, NM	MD Reference:	16' KB @ 6962.0ft
Site:	S23-T23N-R6W	North Reference:	True
Well:	GCU N23-2306 02H	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
4,400.0	12.40	44.02	4,396.1	38.7	37.4	-1.3	2.48	2.48	
4,458.4	13.85	44.02	4,453.0	48.3	46.7	-1.6	2.48	2.48	Mancos Shale
4,500.0	14.88	44.02	4,493.3	55.7	53.8	-1.9	2.48	2.48	
4,573.2	16.69	44.02	4,563.7	70.0	67.7	-2.4	2.48	2.48	EOB: Inc=16.69°
4,600.0	16.69	44.02	4,589.4	75.6	73.0	-2.6	0.00	0.00	
4,700.0	16.69	44.02	4,685.2	96.2	93.0	-3.3	0.00	0.00	
4,800.0	16.69	44.02	4,781.0	116.9	112.9	-4.0	0.00	0.00	
4,900.0	16.69	44.02	4,876.7	137.5	132.9	-4.7	0.00	0.00	
5,000.0	16.69	44.02	4,972.5	158.2	152.9	-5.4	0.00	0.00	
5,031.5	16.69	44.02	5,002.8	164.7	159.2	-5.6	0.00	0.00	Start build/turn @ 5031' MD
5,093.5	17.65	64.87	5,062.0	175.1	173.9	-2.7	10.00	1.55	Mancos Silt
5,100.0	17.87	66.87	5,068.2	175.9	175.7	-2.0	10.00	3.37	
5,200.0	23.29	91.14	5,161.9	181.5	209.6	17.8	10.00	5.42	
5,300.0	30.98	105.32	5,251.0	174.3	254.3	54.3	10.00	7.69	
5,361.6	36.24	111.13	5,302.3	163.6	286.6	84.7	10.00	8.54	Gallup Fn.
5,400.0	39.63	114.05	5,332.5	154.5	308.4	106.4	10.00	8.84	
5,500.0	48.74	120.02	5,404.2	122.6	370.2	172.6	10.00	9.10	
5,567.3	55.00	123.16	5,445.7	94.8	415.3	223.9	10.00	9.31	7" ICP @ 55°
5,600.0	58.07	124.51	5,463.8	79.6	437.9	250.7	10.00	9.39	
5,700.0	67.53	128.15	5,509.4	26.9	509.4	338.4	10.00	9.46	
5,800.0	77.07	131.33	5,539.8	-34.0	582.5	433.1	10.00	9.53	
5,900.0	86.63	134.26	5,554.0	-101.1	655.0	531.8	10.00	9.57	
5,940.4	90.50	135.42	5,555.0	-129.6	683.6	572.2	10.00	9.58	LP @ 5555' TVD; 90.5° - GCU N23-2306 02H F
6,000.0	90.50	135.42	5,554.5	-172.1	725.5	631.8	0.00	0.00	
6,100.0	90.50	135.42	5,553.6	-243.3	795.7	731.8	0.00	0.00	
6,200.0	90.50	135.42	5,552.7	-314.5	865.9	831.8	0.00	0.00	
6,300.0	90.50	135.42	5,551.9	-385.8	936.0	931.8	0.00	0.00	
6,400.0	90.50	135.42	5,551.0	-457.0	1,006.2	1,031.8	0.00	0.00	
6,500.0	90.50	135.42	5,550.1	-528.2	1,076.4	1,131.8	0.00	0.00	
6,600.0	90.50	135.42	5,549.2	-599.5	1,146.6	1,231.8	0.00	0.00	
6,700.0	90.50	135.42	5,548.4	-670.7	1,216.8	1,331.8	0.00	0.00	
6,800.0	90.50	135.42	5,547.5	-741.9	1,287.0	1,431.8	0.00	0.00	
6,900.0	90.50	135.42	5,546.6	-813.1	1,357.1	1,531.8	0.00	0.00	
7,000.0	90.50	135.42	5,545.7	-884.4	1,427.3	1,631.8	0.00	0.00	
7,100.0	90.50	135.42	5,544.9	-955.6	1,497.5	1,731.8	0.00	0.00	
7,200.0	90.50	135.42	5,544.0	-1,026.8	1,567.7	1,831.7	0.00	0.00	
7,300.0	90.50	135.42	5,543.1	-1,098.1	1,637.9	1,931.7	0.00	0.00	
7,400.0	90.50	135.42	5,542.3	-1,169.3	1,708.1	2,031.7	0.00	0.00	
7,500.0	90.50	135.42	5,541.4	-1,240.5	1,778.2	2,131.7	0.00	0.00	
7,600.0	90.50	135.42	5,540.5	-1,311.7	1,848.4	2,231.7	0.00	0.00	
7,700.0	90.50	135.42	5,539.6	-1,383.0	1,918.6	2,331.7	0.00	0.00	
7,800.0	90.50	135.42	5,538.8	-1,454.2	1,988.8	2,431.7	0.00	0.00	
7,900.0	90.50	135.42	5,537.9	-1,525.4	2,059.0	2,531.7	0.00	0.00	
8,000.0	90.50	135.42	5,537.0	-1,596.7	2,129.2	2,631.7	0.00	0.00	
8,100.0	90.50	135.42	5,536.1	-1,667.9	2,199.3	2,731.7	0.00	0.00	
8,200.0	90.50	135.42	5,535.3	-1,739.1	2,269.5	2,831.7	0.00	0.00	
8,300.0	90.50	135.42	5,534.4	-1,810.3	2,339.7	2,931.7	0.00	0.00	
8,400.0	90.50	135.42	5,533.5	-1,881.6	2,409.9	3,031.7	0.00	0.00	
8,500.0	90.50	135.42	5,532.6	-1,952.8	2,480.1	3,131.7	0.00	0.00	
8,600.0	90.50	135.42	5,531.8	-2,024.0	2,550.3	3,231.7	0.00	0.00	
8,700.0	90.50	135.42	5,530.9	-2,095.3	2,620.4	3,331.7	0.00	0.00	
8,800.0	90.50	135.42	5,530.0	-2,166.5	2,690.6	3,431.7	0.00	0.00	

Planning Report

Database: USA EDM 5000 Multi Users DB
 Company: EnCana Oil & Gas (USA) Inc
 Project: Sandoval County, NM
 Site: S23-T23N-R6W
 Well: GCU N23-2306 02H
 Wellbore: HZ
 Design: Plan #1

Local Co-ordinate Reference: Well GCU N23-2306 02H
 TVD Reference: 16' KB @ 6962.0ft
 MD Reference: 16' KB @ 6962.0ft
 North Reference: True
 Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
8,900.0	90.50	135.42	5,529.2	-2,237.7	2,760.8	3,531.7	0.00	0.00	
9,000.0	90.50	135.42	5,528.3	-2,309.0	2,831.0	3,631.7	0.00	0.00	
9,100.0	90.50	135.42	5,527.4	-2,380.2	2,901.2	3,731.7	0.00	0.00	
9,200.0	90.50	135.42	5,526.5	-2,451.4	2,971.4	3,831.7	0.00	0.00	
9,300.0	90.50	135.42	5,525.7	-2,522.6	3,041.5	3,931.7	0.00	0.00	
9,400.0	90.50	135.42	5,524.8	-2,593.9	3,111.7	4,031.7	0.00	0.00	
9,500.0	90.50	135.42	5,523.9	-2,665.1	3,181.9	4,131.7	0.00	0.00	
9,600.0	90.50	135.42	5,523.0	-2,736.3	3,252.1	4,231.7	0.00	0.00	
9,700.0	90.50	135.42	5,522.2	-2,807.6	3,322.3	4,331.7	0.00	0.00	
9,800.0	90.50	135.42	5,521.3	-2,878.8	3,392.4	4,431.6	0.00	0.00	
9,900.0	90.50	135.42	5,520.4	-2,950.0	3,462.6	4,531.6	0.00	0.00	
10,000.0	90.50	135.42	5,519.5	-3,021.2	3,532.8	4,631.6	0.00	0.00	
10,100.0	90.50	135.42	5,518.7	-3,092.5	3,603.0	4,731.6	0.00	0.00	
10,200.0	90.50	135.42	5,517.8	-3,163.7	3,673.2	4,831.6	0.00	0.00	
10,300.0	90.50	135.42	5,516.9	-3,234.9	3,743.4	4,931.6	0.00	0.00	
10,400.0	90.50	135.42	5,516.1	-3,306.2	3,813.5	5,031.6	0.00	0.00	
10,500.0	90.50	135.42	5,515.2	-3,377.4	3,883.7	5,131.6	0.00	0.00	
10,600.0	90.50	135.42	5,514.3	-3,448.6	3,953.9	5,231.6	0.00	0.00	
10,700.0	90.50	135.42	5,513.4	-3,519.8	4,024.1	5,331.6	0.00	0.00	
10,800.0	90.50	135.42	5,512.6	-3,591.1	4,094.3	5,431.6	0.00	0.00	
10,900.0	90.50	135.42	5,511.7	-3,662.3	4,164.5	5,531.6	0.00	0.00	
11,000.0	90.50	135.42	5,510.8	-3,733.5	4,234.6	5,631.6	0.00	0.00	
11,100.0	90.50	135.42	5,509.9	-3,804.8	4,304.8	5,731.6	0.00	0.00	
11,200.0	90.50	135.42	5,509.1	-3,876.0	4,375.0	5,831.6	0.00	0.00	
11,300.0	90.50	135.42	5,508.2	-3,947.2	4,445.2	5,931.6	0.00	0.00	
11,400.0	90.50	135.42	5,507.3	-4,018.5	4,515.4	6,031.6	0.00	0.00	
11,500.0	90.50	135.42	5,506.5	-4,089.7	4,585.6	6,131.6	0.00	0.00	
11,600.0	90.50	135.42	5,505.6	-4,160.9	4,655.7	6,231.6	0.00	0.00	
11,700.0	90.50	135.42	5,504.7	-4,232.1	4,725.9	6,331.6	0.00	0.00	
11,800.0	90.50	135.42	5,503.8	-4,303.4	4,796.1	6,431.6	0.00	0.00	
11,900.0	90.50	135.42	5,503.0	-4,374.6	4,866.3	6,531.6	0.00	0.00	
11,906.6	90.50	135.42	5,502.9	-4,379.3	4,870.9	6,538.1	0.00	0.00	TD at 11906.6 - GCU N23-2306 02H PBHL

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
GCU N23-2306 02H PO - plan hits target center - Point	0.00	0.00	5,555.0	-129.6	683.6	1,896,260.09	1,289,937.35	36.205615	-107.437997
GCU N23-2306 02H PBI - plan hits target center - Point	0.00	0.00	5,502.9	-4,379.3	4,870.9	1,891,959.34	1,294,072.13	36.193941	-107.423808
	500.0	500.0	9 5/8"					0.000	0.000
	5,567.3	5,445.7	7" ICP @ 55°					0.000	0.000

Planning Report

Database: USA EDM 5000 Multi Users DB
Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Site: S23-T23N-R6W
Well: GCU N23-2306 02H
Wellbore: HZ
Design: Plan #1

Local Co-ordinate Reference: Well GCU N23-2306 02H
TVD Reference: 16' KB @ 6962.0ft
MD Reference: 16' KB @ 6962.0ft
North Reference: True
Survey Calculation Method: Minimum Curvature

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,489.0	1,489.0	Ojo Alamo Ss.		-0.50	135.42
1,597.0	1,597.0	Kirtland Shale		-0.50	135.42
1,761.0	1,761.0	Fruitland Coal		-0.50	135.42
2,038.0	2,038.0	Pictured Cliffs Ss.		-0.50	135.42
2,154.0	2,154.0	Lewis Shale		-0.50	135.42
2,828.0	2,828.0	Cliffhouse Ss.		-0.50	135.42
3,550.0	3,550.0	Menefee Fn.		-0.50	135.42
4,255.4	4,254.0	Point Lookout Ss.		-0.50	135.42
4,458.4	4,453.0	Mancos Shale		-0.50	135.42
5,093.5	5,062.0	Mancos Silt		-0.50	135.42
5,361.6	5,303.0	Gallup Fn.		-0.50	135.42

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,900.0	3,900.0	0.0	0.0	KOP @ 3900'
4,573.2	4,563.7	70.0	67.7	EOB: Inc=16.69°
5,031.5	5,002.8	164.7	159.2	Start build/turn @ 5031' MD
5,940.4	5,555.0	-129.6	683.6	LP @ 5555' TVD; 90.5°
11,906.6	5,502.9	-4,379.3	4,870.9	TD at 11906.6

EnCana Oil & Gas (USA) Inc

Sandoval County, NM

S23-T23N-R6W

GCU N23-2306 02H

HZ

Plan #1

Anticollision Report

27 August, 2014

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well GCU N23-2306 02H
Project:	Sandoval County, NM	TVD Reference:	16' KB @ 6962.0ft
Reference Site:	S23-T23N-R6W	MD Reference:	16' KB @ 6962.0ft
Site Error:	0.0ft	North Reference:	True
Reference Well:	GCU N23-2306 02H	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:	GLOBAL FILTER APPLIED: All wellpaths within 200'+ 100/1000 of reference
Interpolation Method:	MD Interval 100.0ft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 1,390.7ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	Systematic Ellipse
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic

Survey Tool Program	Date	8/27/2014
From (ft)	To (ft)	Survey (Wellbore)
0.0	11,905.7	Plan #1 (HZ)
		Tool Name
		Geolink 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						
S15-T23N-R6W						
GCU O15-2306 01H - HZ - Plan #1	5,616.0	11,470.5	88.8	41.6	1.881	CC, ES, SF
S23-T23N-R6W						
GCU N23-2306 01H - HZ - Plan #1	2,000.0	2,000.0	29.8	22.8	4.299	CC, ES, SF

Anticollision Report

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Reference Site:	S23-T23N-R6W	MD Reference:	16' KB @ 6962.0ft
Site Error:	0.0ft	North Reference:	True
Reference Well:	GCU N23-2306 02H	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		S15-T23N-R6W - GCU O15-2306 01H - HZ - Plan #1											Offset Site Error:		0.0 ft
Survey Program:		0-Geolink MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance					Separation Factor	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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Total Uncertainty Axis				
4,300.0	4,298.0	11,260.7	5,573.9	7.5	131.3	7.07	269.2	283.6	1,297.8	1,161.5	136.37	9.517			
4,400.0	4,396.1	11,259.6	5,573.9	7.7	131.3	10.82	270.0	282.7	1,198.2	1,063.7	134.52	8.908			
4,500.0	4,493.3	11,258.3	5,574.0	8.0	131.2	24.00	270.9	281.8	1,098.4	972.3	126.11	8.710			
4,600.0	4,589.4	11,257.0	5,574.0	8.3	131.2	95.15	271.8	280.9	998.4	971.8	26.61	37.526			
4,700.0	4,685.2	11,255.7	5,574.0	8.6	131.2	95.63	272.7	280.0	898.4	871.2	27.25	32.973			
4,800.0	4,781.0	11,254.4	5,574.0	8.9	131.1	96.24	273.6	279.1	798.4	770.3	28.06	28.449			
4,900.0	4,876.7	11,253.1	5,574.0	9.3	131.1	97.01	274.6	278.1	698.4	669.3	29.15	23.962			
5,000.0	4,972.5	11,251.7	5,574.0	9.6	131.1	98.04	275.5	277.2	598.4	567.8	30.65	19.521			
5,100.0	5,068.2	11,254.5	5,574.0	10.0	131.1	-111.65	273.6	279.2	498.5	470.5	28.05	17.775			
5,200.0	5,161.9	11,273.7	5,573.8	10.4	131.6	-133.83	260.0	292.8	400.5	370.4	30.16	13.280			
5,300.0	5,251.0	11,309.7	5,573.5	10.9	132.3	-146.31	234.6	318.2	307.3	273.5	33.90	9.067			
5,400.0	5,332.5	11,361.2	5,573.1	11.4	133.4	-153.30	198.1	354.7	221.8	183.6	38.25	5.799			
5,500.0	5,404.2	11,426.9	5,572.5	12.2	134.8	-157.35	151.7	401.1	146.6	103.8	42.79	3.425			
5,600.0	5,463.8	11,470.5	5,572.1	13.1	135.8	-159.78	120.9	432.0	90.5	43.7	46.78	1.934			
5,616.0	5,472.1	11,470.5	5,572.1	13.2	135.8	-160.11	120.9	432.0	88.8	41.6	47.22	1.881	CC, ES, SF		
5,700.0	5,509.4	11,470.5	5,572.1	14.2	135.8	-161.42	120.9	432.0	126.6	77.2	49.39	2.563			
5,800.0	5,539.8	11,470.5	5,572.1	15.6	135.8	-162.15	120.9	432.0	216.0	164.5	51.51	4.193			
5,900.0	5,554.0	11,470.5	5,572.1	17.1	135.8	-159.04	120.9	432.0	314.9	255.0	59.88	5.259			
6,000.0	5,554.5	11,470.5	5,572.1	18.7	135.8	13.98	120.9	432.0	414.8	369.5	45.31	9.156			
6,100.0	5,553.6	11,470.5	5,572.1	20.4	135.8	13.98	120.9	432.0	514.8	469.0	45.78	11.245			
6,200.0	5,552.7	11,470.5	5,572.1	22.2	135.8	13.98	120.9	432.0	614.8	568.5	46.26	13.290			
6,300.0	5,551.9	11,470.5	5,572.1	24.0	135.8	13.98	120.9	432.0	714.7	668.0	46.75	15.290			
6,400.0	5,551.0	11,470.5	5,572.1	25.9	135.8	13.98	120.9	432.0	814.7	767.5	47.24	17.247			
6,500.0	5,550.1	11,470.5	5,572.1	27.8	135.8	13.98	120.9	432.0	914.7	867.0	47.74	19.161			
6,600.0	5,549.2	11,470.5	5,572.1	29.8	135.8	13.98	120.9	432.0	1,014.7	966.4	48.24	21.033			
6,700.0	5,548.4	11,470.5	5,572.1	31.8	135.8	13.98	120.9	432.0	1,114.7	1,065.9	48.75	22.864			
6,800.0	5,547.5	11,470.5	5,572.1	33.8	135.8	13.98	120.9	432.0	1,214.7	1,165.4	49.27	24.656			
6,900.0	5,546.6	11,470.5	5,572.1	35.8	135.8	13.98	120.9	432.0	1,314.7	1,264.9	49.78	26.409			

Anticollision Report

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Project:	Sandoval County, NM	TVD Reference:	16' KB @ 6962.0ft
Reference Site:	S23-T23N-R6W	MD Reference:	16' KB @ 6962.0ft
Site Error:	0.0ft	North Reference:	True
Reference Well:	GCU N23-2306 02H	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 S23-T23N-R6W - GCU N23-2306 01H - HZ - Plan #1													Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD													Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		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	-119.29	-14.6	-26.0	29.8					
100.0	100.0	100.0	100.0	0.1	0.1	-119.29	-14.6	-26.0	29.8	29.5	0.29	101.528		
200.0	200.0	200.0	200.0	0.3	0.3	-119.29	-14.6	-26.0	29.8	29.1	0.64	46.350		
300.0	300.0	300.0	300.0	0.5	0.5	-119.29	-14.6	-26.0	29.8	28.8	0.99	30.030		
400.0	400.0	400.0	400.0	0.7	0.7	-119.29	-14.6	-26.0	29.8	28.4	1.34	22.209		
500.0	500.0	500.0	500.0	0.8	0.8	-119.29	-14.6	-26.0	29.8	28.1	1.69	17.621		
600.0	600.0	600.0	600.0	1.0	1.0	-119.29	-14.6	-26.0	29.8	27.7	2.04	14.603		
700.0	700.0	700.0	700.0	1.2	1.2	-119.29	-14.6	-26.0	29.8	27.4	2.39	12.468		
800.0	800.0	800.0	800.0	1.4	1.4	-119.29	-14.6	-26.0	29.8	27.0	2.74	10.878		
900.0	900.0	900.0	900.0	1.5	1.5	-119.29	-14.6	-26.0	29.8	26.7	3.09	9.648		
1,000.0	1,000.0	1,000.0	1,000.0	1.7	1.7	-119.29	-14.6	-26.0	29.8	26.3	3.43	8.667		
1,100.0	1,100.0	1,100.0	1,100.0	1.9	1.9	-119.29	-14.6	-26.0	29.8	26.0	3.78	7.868		
1,200.0	1,200.0	1,200.0	1,200.0	2.1	2.1	-119.29	-14.6	-26.0	29.8	25.6	4.13	7.203		
1,300.0	1,300.0	1,300.0	1,300.0	2.2	2.2	-119.29	-14.6	-26.0	29.8	25.3	4.48	6.642		
1,400.0	1,400.0	1,400.0	1,400.0	2.4	2.4	-119.29	-14.6	-26.0	29.8	24.9	4.83	6.162		
1,500.0	1,500.0	1,500.0	1,500.0	2.6	2.6	-119.29	-14.6	-26.0	29.8	24.6	5.18	5.747		
1,600.0	1,600.0	1,600.0	1,600.0	2.8	2.8	-119.29	-14.6	-26.0	29.8	24.2	5.53	5.384		
1,700.0	1,700.0	1,700.0	1,700.0	2.9	2.9	-119.29	-14.6	-26.0	29.8	23.9	5.88	5.064		
1,800.0	1,800.0	1,800.0	1,800.0	3.1	3.1	-119.29	-14.6	-26.0	29.8	23.5	6.23	4.780		
1,900.0	1,900.0	1,900.0	1,900.0	3.3	3.3	-119.29	-14.6	-26.0	29.8	23.2	6.58	4.527		
2,000.0	2,000.0	2,000.0	2,000.0	3.5	3.5	-119.29	-14.6	-26.0	29.8	22.8	6.93	4.299 CC, ES, SF		
2,100.0	2,100.0	2,099.0	2,099.0	3.6	3.6	-120.14	-15.8	-27.2	31.4	24.2	7.27	4.322		
2,200.0	2,200.0	2,197.7	2,197.6	3.8	3.8	-122.24	-19.4	-30.8	36.5	28.8	7.62	4.784		
2,300.0	2,300.0	2,296.0	2,295.4	4.0	4.0	-124.69	-25.4	-36.7	44.9	36.9	7.97	5.631		
2,400.0	2,400.0	2,393.5	2,392.3	4.2	4.2	-126.88	-33.7	-45.0	56.7	48.4	8.33	6.815		
2,500.0	2,500.0	2,490.2	2,487.8	4.3	4.4	-128.63	-44.3	-55.4	72.0	63.3	8.69	8.285		
2,600.0	2,600.0	2,585.8	2,581.7	4.5	4.7	-129.96	-57.0	-68.0	90.5	81.5	9.06	9.993		
2,700.0	2,700.0	2,680.0	2,673.6	4.7	4.9	-130.96	-71.6	-82.5	112.4	102.9	9.45	11.893		
2,800.0	2,800.0	2,775.8	2,766.5	4.9	5.2	-131.72	-88.2	-98.9	136.7	126.8	9.86	13.870		
2,900.0	2,900.0	2,872.7	2,860.5	5.0	5.6	-132.26	-105.1	-115.7	161.2	150.9	10.28	15.687		
3,000.0	3,000.0	2,969.7	2,954.5	5.2	5.9	-132.65	-122.0	-132.4	185.7	175.0	10.70	17.345		
3,100.0	3,100.0	3,066.6	3,048.5	5.4	6.3	-132.96	-138.9	-149.1	210.2	199.0	11.14	18.863		
3,200.0	3,200.0	3,163.6	3,142.5	5.6	6.6	-133.20	-155.8	-165.9	234.7	223.1	11.59	20.253		
3,300.0	3,300.0	3,260.5	3,236.5	5.7	7.0	-133.39	-172.6	-182.6	259.2	247.2	12.04	21.528		
3,400.0	3,400.0	3,357.5	3,330.5	5.9	7.4	-133.55	-189.5	-199.3	283.7	271.2	12.50	22.702		
3,500.0	3,500.0	3,454.4	3,424.4	6.1	7.8	-133.69	-206.4	-216.1	308.2	295.3	12.96	23.784		
3,600.0	3,600.0	3,551.4	3,518.4	6.3	8.2	-133.81	-223.3	-232.8	332.7	319.3	13.43	24.783		
3,700.0	3,700.0	3,648.3	3,612.4	6.4	8.6	-133.91	-240.2	-249.5	357.3	343.4	13.90	25.708		
3,800.0	3,800.0	3,745.3	3,706.4	6.6	9.0	-133.99	-257.1	-266.3	381.8	367.4	14.37	26.567		
3,900.0	3,900.0	3,842.2	3,800.4	6.8	9.4	-134.07	-274.0	-283.0	406.3	391.4	14.85	27.365		
4,000.0	4,000.0	3,938.6	3,893.8	7.0	9.9	-178.15	-290.8	-299.7	432.9	419.1	15.36	28.161		
4,100.0	4,099.8	4,033.7	3,986.1	7.1	10.3	-178.21	-307.3	-316.1	463.7	449.6	15.85	28.997		
4,200.0	4,199.2	4,127.5	4,076.9	7.3	10.7	-178.27	-323.7	-332.3	498.5	484.2	16.32	29.809		
4,300.0	4,298.0	4,219.6	4,166.2	7.5	11.1	-178.33	-339.7	-348.2	537.4	522.8	16.79	30.600		
4,400.0	4,396.1	4,309.9	4,253.8	7.7	11.5	-178.39	-355.4	-363.8	580.2	565.4	17.29	31.399		
4,500.0	4,493.3	4,398.4	4,339.6	8.0	11.9	-178.45	-370.8	-379.0	626.8	611.8	17.79	32.199		
4,600.0	4,589.4	4,484.8	4,423.3	8.3	12.3	-178.51	-385.9	-393.9	677.2	662.0	18.29	33.000		
4,700.0	4,685.2	4,570.6	4,506.5	8.6	12.6	-178.59	-400.8	-408.7	728.5	713.0	18.79	33.801		
4,800.0	4,781.0	4,656.4	4,589.7	8.9	13.0	-178.66	-415.8	-423.6	779.8	764.0	19.29	34.602		
4,900.0	4,876.7	4,742.2	4,672.9	9.3	13.4	-178.72	-430.7	-438.4	831.1	815.0	19.79	35.403		
5,000.0	4,972.5	4,828.0	4,756.1	9.6	13.8	-178.78	-445.7	-453.2	882.5	866.0	20.29	36.204		
5,100.0	5,068.2	4,913.8	4,839.2	10.0	14.2	155.54	-460.6	-468.0	933.7	916.9	20.79	37.005		

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 GCU N23-2306 02H
Project:	Sandoval County, NM	TVD Reference:	16' KB @ 6962.0ft
Reference Site:	S23-T23N-R6W	MD Reference:	16' KB @ 6962.0ft
Site Error:	0.0ft	North Reference:	True
Reference Well:	GCU N23-2306 02H	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 S23-T23N-R6W - GCU N23-2306 01H - HZ - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD														Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		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			
5,200.0	5,161.9	4,997.8	4,920.7	10.4	14.6	128.23	-475.3	-482.5	984.2	966.7	17.46	56.359			
5,300.0	5,251.0	5,079.4	4,999.7	10.9	14.9	112.12	-489.7	-496.3	1,033.2	1,015.0	18.23	56.677			
5,400.0	5,332.5	5,169.3	5,086.3	11.4	15.3	102.32	-512.5	-504.7	1,080.1	1,061.0	19.07	56.651			
5,500.0	5,404.2	5,269.8	5,179.7	12.2	15.8	96.04	-549.0	-502.0	1,123.5	1,103.5	19.97	56.262			
5,600.0	5,463.8	5,385.6	5,279.6	13.1	16.4	92.13	-604.1	-483.4	1,162.0	1,141.0	21.05	55.205			
5,700.0	5,509.4	5,522.2	5,381.3	14.2	17.1	89.97	-684.3	-441.0	1,193.9	1,171.3	22.64	52.735			
5,800.0	5,539.8	5,684.0	5,472.1	15.6	18.3	89.09	-794.2	-365.6	1,217.1	1,191.8	25.33	48.051			
5,900.0	5,554.0	5,869.4	5,527.7	17.1	20.1	88.97	-929.5	-252.9	1,229.3	1,199.7	29.56	41.582			
6,000.0	5,554.5	6,014.6	5,533.9	18.7	21.8	89.04	-1,034.1	-152.8	1,230.8	1,196.8	33.97	36.233			
6,100.0	5,553.6	6,114.6	5,533.2	20.4	23.1	89.05	-1,105.4	-82.7	1,231.0	1,193.6	37.38	32.935			
6,200.0	5,552.7	6,214.6	5,532.5	22.2	24.6	89.06	-1,176.8	-12.7	1,231.2	1,190.0	41.19	29.892			
6,300.0	5,551.9	6,314.6	5,531.8	24.0	26.1	89.07	-1,248.2	57.4	1,231.3	1,186.3	45.04	27.340			
6,400.0	5,551.0	6,414.6	5,531.1	25.9	27.8	89.07	-1,319.5	127.4	1,231.5	1,182.6	48.96	25.156			
6,500.0	5,550.1	6,514.6	5,530.4	27.8	29.5	89.08	-1,390.9	197.5	1,231.7	1,178.8	52.93	23.271			
6,600.0	5,549.2	6,614.6	5,529.7	29.8	31.2	89.09	-1,462.2	267.5	1,231.9	1,174.9	56.95	21.632			
6,700.0	5,548.4	6,714.6	5,529.0	31.8	33.0	89.10	-1,533.6	337.6	1,232.1	1,171.1	61.00	20.198			
6,800.0	5,547.5	6,814.6	5,528.3	33.8	34.9	89.11	-1,605.0	407.6	1,232.2	1,167.2	65.08	18.934			
6,900.0	5,546.6	6,914.6	5,527.6	35.8	36.8	89.12	-1,676.3	477.7	1,232.4	1,163.2	69.18	17.814			
7,000.0	5,545.7	7,014.6	5,527.0	37.8	38.7	89.13	-1,747.7	547.8	1,232.6	1,159.3	73.31	16.814			
7,100.0	5,544.9	7,114.6	5,526.3	39.8	40.6	89.13	-1,819.0	617.8	1,232.8	1,155.3	77.45	15.917			
7,200.0	5,544.0	7,214.6	5,525.6	41.9	42.6	89.14	-1,890.4	687.9	1,233.0	1,151.4	81.60	15.109			
7,300.0	5,543.1	7,314.6	5,524.9	43.9	44.5	89.15	-1,961.7	757.9	1,233.1	1,147.4	85.77	14.377			
7,400.0	5,542.3	7,414.6	5,524.2	46.0	46.5	89.16	-2,033.1	828.0	1,233.3	1,143.4	89.95	13.711			
7,500.0	5,541.4	7,514.6	5,523.5	48.1	48.5	89.17	-2,104.5	898.0	1,233.5	1,139.4	94.13	13.104			
7,600.0	5,540.5	7,614.6	5,522.8	50.2	50.5	89.18	-2,175.8	968.1	1,233.7	1,135.4	98.33	12.546			
7,700.0	5,539.6	7,714.6	5,522.1	52.2	52.5	89.18	-2,247.2	1,038.1	1,233.9	1,131.3	102.53	12.034			
7,800.0	5,538.8	7,814.6	5,521.4	54.3	54.6	89.19	-2,318.5	1,108.2	1,234.0	1,127.3	106.74	11.562			
7,900.0	5,537.9	7,914.6	5,520.7	56.4	56.6	89.20	-2,389.9	1,178.2	1,234.2	1,123.3	110.95	11.124			
8,000.0	5,537.0	8,014.6	5,520.0	58.5	58.7	89.21	-2,461.3	1,248.3	1,234.4	1,119.2	115.17	10.718			
8,100.0	5,536.1	8,114.6	5,519.3	60.6	60.7	89.22	-2,532.6	1,318.3	1,234.6	1,115.2	119.39	10.341			
8,200.0	5,535.3	8,214.6	5,518.6	62.7	62.8	89.23	-2,604.0	1,388.4	1,234.8	1,111.2	123.61	9.989			
8,300.0	5,534.4	8,314.6	5,517.9	64.8	64.8	89.24	-2,675.3	1,458.4	1,234.9	1,107.1	127.84	9.660			
8,400.0	5,533.5	8,414.6	5,517.3	66.9	66.9	89.24	-2,746.7	1,528.5	1,235.1	1,103.1	132.07	9.352			
8,500.0	5,532.6	8,514.6	5,516.6	69.0	69.0	89.25	-2,818.0	1,598.5	1,235.3	1,099.0	136.31	9.063			
8,600.0	5,531.8	8,614.6	5,515.9	71.1	71.1	89.26	-2,889.4	1,668.6	1,235.5	1,094.9	140.55	8.791			
8,700.0	5,530.9	8,714.6	5,515.2	73.2	73.1	89.27	-2,960.8	1,738.7	1,235.7	1,090.9	144.79	8.534			
8,800.0	5,530.0	8,814.6	5,514.5	75.4	75.2	89.28	-3,032.1	1,808.7	1,235.9	1,086.8	149.03	8.293			
8,900.0	5,529.2	8,914.6	5,513.8	77.5	77.3	89.29	-3,103.5	1,878.8	1,236.0	1,082.8	153.27	8.064			
9,000.0	5,528.3	9,014.6	5,513.1	79.6	79.4	89.30	-3,174.8	1,948.8	1,236.2	1,078.7	157.52	7.848			
9,100.0	5,527.4	9,114.6	5,512.4	81.7	81.5	89.30	-3,246.2	2,018.9	1,236.4	1,074.6	161.77	7.643			
9,200.0	5,526.5	9,214.6	5,511.7	83.8	83.6	89.31	-3,317.6	2,088.9	1,236.6	1,070.6	166.01	7.449			
9,300.0	5,525.7	9,314.6	5,511.0	85.9	85.7	89.32	-3,388.9	2,159.0	1,236.8	1,066.5	170.26	7.264			
9,400.0	5,524.8	9,414.6	5,510.3	88.1	87.8	89.33	-3,460.3	2,229.0	1,236.9	1,062.4	174.52	7.088			
9,500.0	5,523.9	9,514.6	5,509.6	90.2	89.9	89.34	-3,531.6	2,299.1	1,237.1	1,058.3	178.77	6.920			
9,600.0	5,523.0	9,614.6	5,508.9	92.3	92.0	89.35	-3,603.0	2,369.1	1,237.3	1,054.3	183.02	6.760			
9,700.0	5,522.2	9,714.6	5,508.2	94.4	94.1	89.35	-3,674.3	2,439.2	1,237.5	1,050.2	187.28	6.608			
9,800.0	5,521.3	9,814.6	5,507.5	96.6	96.2	89.36	-3,745.7	2,509.2	1,237.7	1,046.1	191.53	6.462			
9,900.0	5,520.4	9,914.6	5,506.9	98.7	98.3	89.37	-3,817.1	2,579.3	1,237.8	1,042.1	195.79	6.322			
10,000.0	5,519.5	10,014.6	5,506.2	100.8	100.4	89.38	-3,888.4	2,649.3	1,238.0	1,038.0	200.05	6.189			
10,100.0	5,518.7	10,114.6	5,505.5	102.9	102.5	89.39	-3,959.8	2,719.4	1,238.2	1,033.9	204.31	6.060			
10,200.0	5,517.8	10,214.6	5,504.8	105.1	104.6	89.40	-4,031.1	2,789.4	1,238.4	1,029.8	208.57	5.938			
10,300.0	5,516.9	10,314.6	5,504.1	107.2	106.7	89.40	-4,102.5	2,859.5	1,238.6	1,025.7	212.83	5.820			

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 GCU N23-2306 02H
Project:	Sandoval County, NM	TVD Reference:	16' KB @ 6962.0ft
Reference Site:	S23-T23N-R6W	MD Reference:	16' KB @ 6962.0ft
Site Error:	0.0ft	North Reference:	True
Reference Well:	GCU N23-2306 02H	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 S23-T23N-R6W - GCU N23-2306 01H - HZ - Plan #1														Offset Site Error:	0.0 ft
Survey Program: 0-Geolink MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance				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)	Total Uncertainty Axis	Separation Factor			
10,400.0	5,516.1	10,414.6	5,503.4	109.3	108.9	89.41	-4,173.9	2,929.6	1,238.8	1,021.7	217.09	5.706			
10,500.0	5,515.2	10,514.6	5,502.7	111.4	111.0	89.42	-4,245.2	2,999.6	1,238.9	1,017.6	221.35	5.597			
10,600.0	5,514.3	10,614.6	5,502.0	113.6	113.1	89.43	-4,316.6	3,069.7	1,239.1	1,013.5	225.61	5.492			
10,700.0	5,513.4	10,714.6	5,501.3	115.7	115.2	89.44	-4,387.9	3,139.7	1,239.3	1,009.4	229.88	5.391			
10,800.0	5,512.6	10,814.6	5,500.6	117.8	117.3	89.45	-4,459.3	3,209.8	1,239.5	1,005.3	234.14	5.294			
10,900.0	5,511.7	10,914.6	5,499.9	119.9	119.4	89.46	-4,530.6	3,279.8	1,239.7	1,001.3	238.40	5.200			
11,000.0	5,510.8	11,014.6	5,499.2	122.1	121.5	89.46	-4,602.0	3,349.9	1,239.8	997.2	242.67	5.109			
11,100.0	5,509.9	11,114.6	5,498.5	124.2	123.7	89.47	-4,673.4	3,419.9	1,240.0	993.1	246.93	5.022			
11,200.0	5,509.1	11,214.6	5,497.8	126.3	125.8	89.48	-4,744.7	3,490.0	1,240.2	989.0	251.20	4.937			
11,300.0	5,508.2	11,314.6	5,497.2	128.5	127.9	89.49	-4,816.1	3,560.0	1,240.4	984.9	255.46	4.855			
11,400.0	5,507.3	11,414.6	5,496.5	130.6	130.0	89.50	-4,887.4	3,630.1	1,240.6	980.8	259.73	4.776			
11,500.0	5,506.5	11,514.6	5,495.8	132.7	132.1	89.51	-4,958.8	3,700.1	1,240.7	976.8	264.00	4.700			
11,600.0	5,505.6	11,614.6	5,495.1	134.9	134.3	89.51	-5,030.2	3,770.2	1,240.9	972.7	268.26	4.626			
11,700.0	5,504.7	11,714.6	5,494.4	137.0	136.4	89.52	-5,101.5	3,840.2	1,241.1	968.6	272.53	4.554			
11,800.0	5,503.8	11,814.6	5,493.7	139.1	138.5	89.53	-5,172.9	3,910.3	1,241.3	964.5	276.80	4.484			
11,900.0	5,503.0	11,913.8	5,493.0	141.3	140.6	89.54	-5,243.7	3,979.8	1,241.5	960.4	281.05	4.417			
11,906.6	5,502.9	11,913.8	5,493.0	141.4	140.6	89.54	-5,243.7	3,979.8	1,241.5	960.3	281.19	4.415			

Anticollision Report

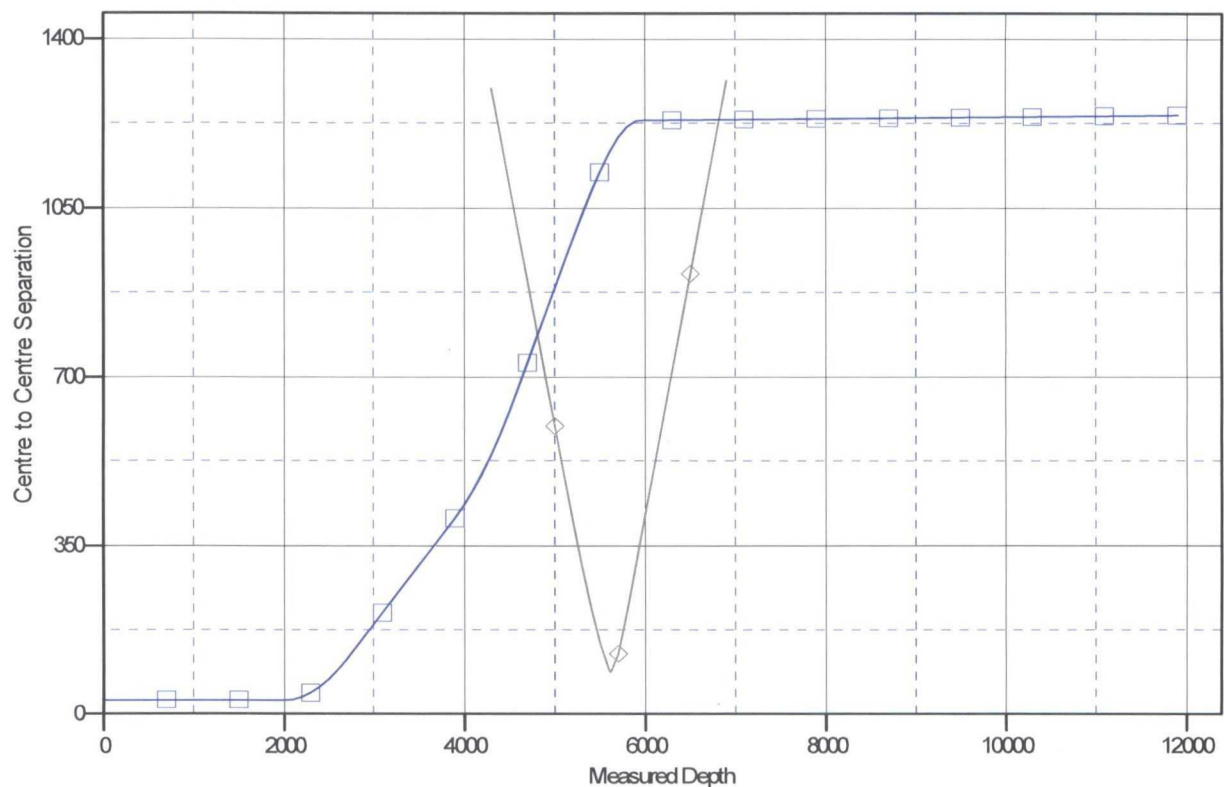
Company: EnCana Oil & Gas (USA) Inc
Project: Sandoval County, NM
Reference Site: S23-T23N-R6W
Site Error: 0.0ft
Reference Well: GCU N23-2306 02H
Well Error: 0.0ft
Reference Wellbore: HZ
Reference Design: Plan #1

Local Co-ordinate Reference: Well GCU N23-2306 02H
TVD Reference: 16' KB @ 6962.0ft
MD Reference: 16' KB @ 6962.0ft
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: USA EDM 5000 Multi Users DB
Offset TVD Reference: Offset Datum

Reference Depths are relative to 16' KB @ 6962.0ft
 Offset Depths are relative to Offset Datum
 Central Meridian is -106.250000 °

Coordinates are relative to: GCU N23-2306 02H
 Coordinate System is US State Plane 1983, New Mexico Central Zone
 Grid Convergence at Surface is: -0.70°

Ladder Plot



LEGEND

GCU O15-2306 01H, HZ, Plan #1 V0
 GCU N23-2306 01H, HZ, Plan #1 V0

Gallo Canyon Unit N23-2306 02H

**SHL: SESW Section 23, T23N, R6W
927 FSL and 1887 FWL**

**BHL: NESW Section 25, T23N, R6W
1875 FSL and 1500 FWL**

Sandoval County, New Mexico

Lease Number: NMNM 131017X

diameter, buried steel well connect pipeline that was submitted to the Bureau of Land Management on July 8, 2014.

2. A 30' x 50' silt trap will be installed at STA 14+52.30 to STA 15+02.30 for erosion control.

7. METHODS FOR HANDLING WASTE

A. Cuttings

1. A closed-loop system will be used. Cuttings will be moved through a shaker system on the drill rig that separates drilling fluids from the cuttings. Cuttings will be stored onsite in above-ground storage tanks. Cuttings will be pulled from the storage tanks, mixed with saw dust or similar absorbent material, and disposed of at the Envirotech, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.
2. The closed-loop system storage tanks will be adequately sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.
3. A 20-mil liner will be installed under tanks, pumps, ancillary facilities, and truck loading/unloading areas associated with the closed-loop system.

B. Drilling Fluids

1. A closed-loop system will be used. Drilling fluids will be stored onsite in above-ground storage tanks. Upon termination of drilling operations, the drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical. Residual fluids will be vacuumed from the storage tanks and disposed of at Basin Disposal, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.
2. The closed-loop system storage tanks will be adequately sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.
3. The closed-loop system storage tanks will be placed in bermed secondary containment sized to accommodate a minimum of 110 percent of the volume of the largest storage tank.
4. A 20-mil liner will be installed under tanks, pumps, ancillary facilities, and truck loading/unloading areas associated with the closed-loop system.

C. Flowback Water

1. The water-based solution that flows back to the surface during and after completion operations will be placed in storage tanks on the location.
2. Flowback water will be confined to a storage tank for a period not to exceed 90 days after initial production and will be disposed of at Basin Disposal, Inc. and/or Industrial Ecosystem, Inc. waste disposal facilities.

- D. Spills** – any spills of non-freshwater fluids will be immediately cleaned up and removed to an approved disposal site. Encana will also notify the BLM within 24 hours of any spill.

- E. Sewage** – self-contained, chemical toilets will be provided for human waste disposal. The toilet holding tanks will be pumped, as needed, and the contents thereof disposed of in an approved sewage disposal facility. The toilets will be onsite during all operations.

- F. Garbage and other waste material** – garbage, trash and other waste materials will be collected in a portable, self-contained and fully-enclosed trash container during drilling and completion

ENCANA OIL & GAS (USA) INC.

GALLO CANYON UNIT N23-2306 #02H

927' FSL & 1887' FWL

LOCATED IN THE SE/4 SW/4 OF SECTION 23, T23N, R6W, N.M.P.M.,
SANDOVAL COUNTY, NEW MEXICO

DIRECTIONS

- 1) FROM THE INTERSECTION OF HWY 64 & HWY 550 IN BLOOMFIELD, GO SOUTH ON HWY 550, 56.5 MILES (M.P. 95.1) .
- 2) TURN LEFT ONTO DIRT ROAD AND GO 0.3 MILES TO WHERE ACCESS IS STAKED ON LEFT SIDE OF ROAD.

WELL FLAG LOCATED AT LAT. 36.205971° N, LONG.107.440314° W (NAD 83).

JOB No.: ENC234
DATE: 05/30/2014
DRAWN BY: TWT



Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

WELLHEAD BLOWOUT CONTROL SYSTEM

encana

Well Name and Number:
GCU N23-2306 02H

