15-711

OCD Hobbs

Form 3160-3
(March 2012)

SECRETARY'S POTASH

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HOBBS OCD
JAN 28 2016
RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

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

5. Lease Serial No.
NMNM85937

6. If Indian, Allotee or Tribe Name

1a. Type of Work: ☑ DRILL ☐ REENTER

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

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

8. Lease Name and Well No. (38682)
Airbonita 12 Federal #8H

2. Name of Operator
COG Operating LLC. (229137)

9. API Well No.
30-025-43049

3a. Address
2208 West Main Street
Artesia, NM 88210

3b. Phone No. *(include area code)*
575-748-6940

10. Field and Pool, or Exploratory (51683)
Red Tank; Bone Spring

4. Location of Well *(Report location clearly and in accordance with any State requirements.*)*
At surface 60' FSL & 560' FWL Unit Letter M (SWSW) SHL
At proposed prod. Zone 330' FNL & 380' FWL Unit Letter D (NWNW) BHL

UNORTHODOX LOCATION

11. Sec., T.R.M. or Blk and Survey or Area
Sec. 12 - T22S - R32E

14. Distance in miles and direction from nearest town or post office*
About 25 miles from Malaga

12. County or Parish
Lea County

13. State
NM

15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. Unit line, if any) 60'.	16. No. of acres in lease 800	17. Spacing Unit dedicated to this well 160
18. Distance from location* to nearest well, drilling, completed, applied for, on this lease, ft. SHL: 30' (Proposed Airbonita #4H) BHL: 1674'	19. Proposed Depth TVD: 10811' MD: 15473'	20. BLM/BIA Bond No. on file NMB000740 &NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3678.1' GL	22. Approximate date work will start* 9/1/2015	23. Estimated duration 30 days

24. Attachments

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

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

25. Signature Mayte Reyes	Name *(Printed/Typed)* Mayte Reyes	Date 5-6-15
Title Regulatory Analyst		
Approved by *(Signature)* /s/George MacDonell	Name *(Printed/Typed)*	Date JAN 22 2016
Title FIELD MANAGER	Office CARLSBAD FIELD OFFICE	

Application approval does not warrant or certify that the applicant holds legan or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations theron.
Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Continued on page 2)

*(Instructions on page 2)

KZ 01/29/16

Carlsbad Controlled Water Basin

Approval Subject to General Requirements & Special Stipulations Attached

SEE ATTACHED FOR CONDITIONS OF APPROVAL

FEB 01 2016

AIRBONITA 12 FED #8H

FID	OPERATOR	WELL_NAME	LATITUDE	LONGITUDE	API	SECTION	TOWNSHIP	RANGE	FTG_NS	NS_CD	FTG_EW	EW_CD	TVD_DEPTH	COMPL_STAT
0	OXY USA INC	WBR FEDERAL 001	32.393621	-103.623119	3002530137	13	22.0S	32E	1980	N	990	E	15261	Active
1	COG OPERATING LLC	PROHIBITION FEDERAL UNIT 001	32.408109	-103.634871	3002531137	12	22.0S	32E	1980	N	660	W	15112	Active
2	COG OPERATING LLC	PROHIBITION FEDERAL UNIT 002	32.404438	-103.647301	3002531716	11	22.0S	32E	1980	S	2080	W	10100	Active
3	COG OPERATING LLC	PROHIBITION FEDERAL UNIT 003	32.40814	-103.623143	3002532142	12	22.0S	32E	1980	N	990	E	13780	Active
4	EOG RESOURCES INC	RED TANK FEDERAL 004	32.389006	-103.647112	3002532528	14	22.0S	32E	1650	S	2135	W	8900	Active
5	EOG RESOURCES INC	RED TANK FEDERAL 006	32.389016	-103.643434	3002532545	14	22.0S	32E	1650	S	1980	E	10100	Active
6	COG OPERATING LLC	PROHIBITION FEDERAL UNIT 004	32.392656	-103.64344	3002532758	14	22.0S	32E	2310	N	1980	E	9000	Active
7	MARALO LLC	PROHIBITION FEDERAL UNIT 005	32.392647	-103.647049	3002532759	14	22.0S	32E	2310	N	2155	W	8714	Plugged
8	COG OPERATING LLC	PROHIBITION FEDERAL UNIT 006	32.392665	-103.640217	3002532760	14	22.0S	32E	2310	N	990	E	9000	Active
9	SUNSET WELL SERVICE INC	REDCHECKER 14 FEDERAL 001	32.385396	-103.640205	3002532764	14	22.0S	32E	330	S	990	E	10100	Active
10	EOG RESOURCES INC	REDCHECKER 14 FEDERAL 002	32.389024	-103.640211	3002532765	14	22.0S	32E	1650	S	990	E	8905	Active
11	OXY USA INC	WBR FEDERAL 002	32.385408	-103.635908	3002532999	13	22.0S	32E	330	S	330	W	10070	Active
12	OXY USA INC	WBR FEDERAL 003	32.389036	-103.635914	3002533026	13	22.0S	32E	1650	S	330	W	10100	Active
13	OXY USA INC	WBR FEDERAL 005	32.386337	-103.629464	3002535256	13	22.0S	32E	660	S	2310	W	15445	Active
14	OXY USA INC	BOOTLEG RIDGE 14 FEDERAL COM 001	32.389934	-103.639138	3002535530	14	22.0S	32E	1980	S	660	E	0	
15	OXY USA INC	WBR FEDERAL 007	32.389965	-103.62947	3002535722	13	22.0S	32E	1980	S	2310	W	10150	Active
16	OXY USA INC	WBR FEDERAL 009	32.393107	-103.629671	3002536063	13	22.0S	32E	2160	N	2250	W	10050	Active
17	OXY USA INC	WBR FEDERAL 010	32.396736	-103.629482	3002536064	13	22.0S	32E	840	N	2310	W	10050	Active
18	OXY USA INC	BOOTLEG 11 FEDERAL COM 001	32.404589	-103.642386	3002536265	11	22.0S	32E	2030	S	1650	E	15160	Active
19	OXY USA INC	WBR FEDERAL 012	32.39286	-103.634423	3002536415	13	22.0S	32E	2245	N	790	W	10080	Active
20	YATES PETROLEUM CORPORATION	MICRO BREW BEU FEDERAL 001	32.387251	-103.627405	3002536883	13	22.0S	32E	990	S	2310	E	10200	Active
21	OXY USA INC	WBR FEDERAL 004	32.387502	-103.626331	3002537007	13	22.0S	32E	1080	S	1980	E	0	
22	OXY USA INC	WBR FEDERAL 008	32.385415	-103.633759	3002537008	13	22.0S	32E	330	S	990	W	0	
23	OXY USA INC	WBR FEDERAL 011D	32.398126	-103.633781	3002537009	13	22.0S	32E	330	N	990	W	0	
24	OXY USA INC	BOOTLEG 11 FEDERAL COM 002	32.408075	-103.64763	3002537083	11	22.0S	32E	1980	N	1980	W	15203	Active
25	COG OPERATING LLC	PROHIBITION 12 FEDERAL 008	32.404609	-103.635028	3002537227	12	22.0S	32E	2030	S	610	W	8998	Active
26	COG OPERATING LLC	PROHIBITION 12 FEDERAL 007	32.408392	-103.631648	3002537228	12	22.0S	32E	1880	N	1650	W	8960	Active
27	COG OPERATING LLC	PROHIBITION 12 FEDERAL 010	32.404485	-103.630567	3002537819	12	22.0S	32E	1980	S	1980	W	8990	Active
28	COG OPERATING LLC	PROHIBITION 12 FEDERAL 012	32.400856	-103.630562	3002537821	12	22.0S	32E	660	S	1980	W	8990	Active
29	COG OPERATING LLC	PROHIBITION 12 FEDERAL 013	32.407716	-103.62744	3002537822	12	22.0S	32E	2130	N	2310	E	0	
30	OXY USA INC	WBR FEDERAL 011	32.398119	-103.635929	3002537929	13	22.0S	32E	330	N	330	W	10050	Active
31	COG OPERATING LLC	PROHIBITION 12 FEDERAL 014	32.404496	-103.626751	3002538238	12	22.0S	32E	1980	S	2100	E	0	
32	COG OPERATING LLC	PROHIBITION 12 FEDERAL 015	32.400868	-103.626745	3002538239	12	22.0S	32E	660	S	2100	E	0	
33	COG OPERATING LLC	AIRBONITA 12 FEDERAL COM 002	32.400085	-103.626353	3002540179	12	22.0S	32E	375	S	1980	E	14110	New (Not drilled or compl)
34	OXY USA INC	WBR 13 SWD 001	32.389974	-103.622159	3002541380	13	22.0S	32E	1974	S	697	E	0	New (Not drilled or compl)
35	COG OPERATING LLC	AIRBONITA 12 FEDERAL COM 001H	32.399593	-103.62098	3002541491	12	22.0S	32E	190	S	330	E	11937	New (Not drilled or compl)
36	OXY USA INC	SPEAK EASY UNIT 002H	32.418496	-103.635961	3002540306	1	22.0S	32E	1800	S	330	W	12735	New (Not drilled or compl)
37	OXY USA INC	RUM RUNNER 2 FEDERAL COM 001H	32.422615	-103.638115	3002540095	2	22.0S	32E	1980	N	330	E	13774	New (Not drilled or compl)
38	OXY USA INC	RIDGE RUNNER 7 STATE 001H	32.403746	-103.619375	3002541646	7	22.0S	33E	1700	S	165	W	0	New (Not drilled or compl)

COG Operating LLC, Airbonita 12 Federal 8H

1. Geologic Formations

TVD of target	10811'	Pilot hole depth	N/A
MD at TD:	15473'	Deepest expected fresh water:	580'

Basin

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	885'	Water	
Top of Salt	969'	Salt	
Lamar	4725'		
Delaware Group	4824'	Oil/Gas	
Bone Spring	8596'	Oil/Gas	
Second Bone Spring	10377'	Target Zone	
Wolfcamp	11918'	Will Not Penetrate	

*H2S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program

See COA

Hole Size	Casing Interval From	To	Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
17.5"	0	~~940~~ 980	13.375"	54.5	J55	STC	2.57	1.23	10.03
12.25"	0	4300	9.625"	40	J55	BTC	1.28	0.78*	3.32
12.25"	4350	4750	9.625"	40	L80	BTC	1.39	1.14	50.89
8.75"	0	15473	5.5"	17	P110	LTC	1.48	2.10	1.69D
				BLM Minimum Safety Factor			1.125	1	1.6 Dry 1.8 Wet

- All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h
- BLM standard formulas used on all safety factor calculations
- Assumed 9 ppg MW equivalent pore pressure
- *Explanation for SF's below BLM's minimum standards:
  - 9-5/8" Burst SF @ 0.78 – used BLM's frac gradiant scenario to qualify
    - 3950 psi / 4750' = 0.83 > 0.7

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	N

Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	
Is well located in SOPA but not in R-111-P?	Y
If yes, are the first 2 strings cemented to surface and 3rd string cement tied back 500' into previous casing?	Y
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	N
If yes, are there two strings cemented to surface?	
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	N
If yes, are there three strings cemented to surface?	

3. Cementing Program

Casing	# Sks	Wt. lb/ gal	Yld ft3/ sack	H_20 gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	440	13.5	1.75	9.15	5.5	Lead: Class C + 4.0% Gel + 2.0% CaCl2
	240	14.8	1.35	6.57	7	Tail: Class C + 2.0% CaCl2
Inter.	1080	13.5	1.73	9.15	5.5	Lead: Class C + 4.0% Gel
	350	14.8	1.34	6.47	5.5	Tail: Class C
Prod.	1055	10.3	3.5	21.16	90	Lead: Tuned Lite + 2 lb/sk Kol-Seal + 0.125 lb/sk. Pol-E-Flake + 0.5 lb/sk HALAD-9 + 0.25 lb/sk D-Air 5000
	1225	14.4	1.25	5.69	19	Tail: Class H + 0.5% HALAD-9 + 0.05% SA-1015 + 1% NaCL + 2% Gel

Casing String	TOC	% Excess
Surface	0'	66%
Intermediate	0'	66%
Production	0'	45%

4. Pressure Control Equipment

N	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.

BOP installed and tested before drilling which hole?	Size?	Min. Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	X	WP
			Blind Ram		WP
			Pipe Ram		
			Double Ram		
			Other*		
8-3/4"	13-5/8"	3M	Annular	X	50% WP
			Blind Ram	X	WP
			Pipe Ram	X	
			Double Ram		
			Other *		

See COA

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

N	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.	
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.	
	N	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic.	

See COA

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. shoe	FW Gel	8.4-9.4	32-34	N/C
Surf csg	Int shoe	Saturated Brine	10.0-10.2	28-30	N/C
Int shoe	TD	Cut Brine	8.8-9.2	28-30	N/C

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring

6. Logging and Testing Procedures

Logging, Coring and Testing.	
X	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
	No Logs are planned based on well control or offset log information.
	Drill stem test? If yes, explain
	Coring? If yes, explain

Additional logs planned		Interval
	Resistivity	
	Density	
	CBL	
X	Mud log	Production
	PEX	

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	5,060 psi @ 10811' TVD
Abnormal Temperature	No

Mitigation measure for abnormal conditions. Describe: No abnormal drilling conditions are expected to occur.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
N	H2S is present
Y	H2S Plan attached

See COA

8. Other facets of operation

Is this a walking operation? ~~Yes~~ NO. If multiple wells are being drilled submit a Sundry.
Will be pre-setting casing? No

Attachments

- Directional Plan
- BOP & Choke Schematics
- C102 and supporting maps
- Rig plat
- H2S schematic
- H2S contingency plan
- Interim reclamation plat
- Variance for Flex Hose

CONCHO

COG Operating LLC

Lea County, NM
Airbonita 12 Federal
#8H

OH

Plan: Plan #1

Standard Planning Report

05 March, 2015

TERRA DIRECTIONAL SERVICES, L.L.C.

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #8H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3709.2usft
Project:	Lea County, NM	**MD Reference:**	KB @ 3709.2usft
Site:	Airbonita 12 Federal	**North Reference:**	Grid
Well:	#8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project Lea County, NM

Map System:	US State Plane 1927 (Exact solution)	**System Datum:**	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site Airbonita 12 Federal

Site Position:		**Northing:**	509,618.50 usft	**Latitude:**	32° 23' 56.826 N
From:	Map	**Easting:**	715,682.90 usft	**Longitude:**	103° 38' 4.321 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.37 °

Well #8H

Well Position	**+N/-S**	-0.5 usft	**Northing:**	509,618.00 usft	**Latitude:**	32° 23' 56.823 N
	+E/-W	-29.9 usft	**Easting:**	715,653.00 usft	**Longitude:**	103° 38' 4.670 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	0.0 usft	**Ground Level:**	3,678.1 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/5/2015	7.17	60.24	48,341

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	357.47

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,312.5	0.00	0.00	10,312.5	0.0	0.0	0.00	0.00	0.00	0.00	
11,060.2	89.73	357.47	10,790.0	474.7	-21.0	12.00	12.00	-0.34	357.47	
15,473.1	89.73	357.47	10,811.0	4,883.2	-215.8	0.00	0.00	0.00	0.00	PBHL (A12F #8H/OH)

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #8H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3709.2usft
Project:	Lea County, NM	**MD Reference:**	KB @ 3709.2usft
Site:	Airbonita 12 Federal	**North Reference:**	Grid
Well:	#8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3709.2usft
Project:	Lea County, NM	MD Reference:	KB @ 3709.2usft
Site:	Airbonita 12 Federal	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00
10,100.0	0.00	0.00	10,100.0	0.0	0.0	0.0	0.00	0.00	0.00
10,200.0	0.00	0.00	10,200.0	0.0	0.0	0.0	0.00	0.00	0.00
10,300.0	0.00	0.00	10,300.0	0.0	0.0	0.0	0.00	0.00	0.00
10,312.5	0.00	0.00	10,312.5	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start DLS 12.00 TFO 357.47									
10,325.0	1.50	357.47	10,325.0	0.2	0.0	0.2	12.00	12.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #8H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3709.2usft
Project:	Lea County, NM	**MD Reference:**	KB @ 3709.2usft
Site:	Airbonita 12 Federal	**North Reference:**	Grid
Well:	#8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,350.0	4.50	357.47	10,350.0	1.5	-0.1	1.5	12.00	12.00	0.00
10,375.0	7.50	357.47	10,374.8	4.1	-0.2	4.1	12.00	12.00	0.00
10,400.0	10.50	357.47	10,399.5	8.0	-0.4	8.0	12.00	12.00	0.00
10,425.0	13.50	357.47	10,424.0	13.2	-0.6	13.2	12.00	12.00	0.00
10,450.0	16.50	357.47	10,448.1	19.6	-0.9	19.7	12.00	12.00	0.00
10,475.0	19.50	357.47	10,471.9	27.4	-1.2	27.4	12.00	12.00	0.00
10,500.0	22.50	357.47	10,495.2	36.3	-1.6	36.3	12.00	12.00	0.00
10,525.0	25.50	357.47	10,518.1	46.5	-2.1	46.5	12.00	12.00	0.00
10,550.0	28.50	357.47	10,540.3	57.8	-2.6	57.9	12.00	12.00	0.00
10,575.0	31.50	357.47	10,562.0	70.3	-3.1	70.4	12.00	12.00	0.00
10,600.0	34.50	357.47	10,582.9	83.9	-3.7	84.0	12.00	12.00	0.00
10,625.0	37.50	357.47	10,603.2	98.6	-4.4	98.7	12.00	12.00	0.00
10,650.0	40.50	357.47	10,622.6	114.3	-5.1	114.4	12.00	12.00	0.00
10,675.0	43.50	357.47	10,641.2	131.0	-5.8	131.1	12.00	12.00	0.00
10,700.0	46.50	357.47	10,658.8	148.7	-6.6	148.8	12.00	12.00	0.00
10,725.0	49.50	357.47	10,675.6	167.2	-7.4	167.4	12.00	12.00	0.00
10,750.0	52.50	357.47	10,691.3	186.6	-8.2	186.8	12.00	12.00	0.00
10,775.0	55.50	357.47	10,706.0	206.8	-9.1	207.0	12.00	12.00	0.00
10,800.0	58.50	357.47	10,719.6	227.8	-10.1	228.0	12.00	12.00	0.00
10,825.0	61.50	357.47	10,732.1	249.4	-11.0	249.6	12.00	12.00	0.00
10,850.0	64.50	357.47	10,743.5	271.6	-12.0	271.9	12.00	12.00	0.00
10,875.0	67.50	357.47	10,753.6	294.5	-13.0	294.7	12.00	12.00	0.00
10,900.0	70.50	357.47	10,762.6	317.8	-14.0	318.1	12.00	12.00	0.00
10,925.0	73.50	357.47	10,770.3	341.5	-15.1	341.9	12.00	12.00	0.00
10,950.0	76.50	357.47	10,776.8	365.6	-16.2	366.0	12.00	12.00	0.00
10,975.0	79.50	357.47	10,782.0	390.1	-17.2	390.5	12.00	12.00	0.00
11,000.0	82.50	357.47	10,785.9	414.7	-18.3	415.1	12.00	12.00	0.00
11,025.0	85.50	357.47	10,788.5	439.6	-19.4	440.0	12.00	12.00	0.00
11,050.0	88.50	357.47	10,789.8	464.5	-20.5	465.0	12.00	12.00	0.00
11,060.2	89.73	357.47	10,790.0	474.7	-21.0	475.2	12.00	12.00	0.00
EOC - Start 4412.8 hold at 11060.2 MD									
11,100.0	89.73	357.47	10,790.1	514.5	-22.7	515.0	0.00	0.00	0.00
11,200.0	89.73	357.47	10,790.6	614.4	-27.2	615.0	0.00	0.00	0.00
11,300.0	89.73	357.47	10,791.1	714.3	-31.6	715.0	0.00	0.00	0.00
11,400.0	89.73	357.47	10,791.6	814.2	-36.0	815.0	0.00	0.00	0.00
11,500.0	89.73	357.47	10,792.1	914.1	-40.4	915.0	0.00	0.00	0.00
11,600.0	89.73	357.47	10,792.5	1,014.0	-44.8	1,015.0	0.00	0.00	0.00
11,700.0	89.73	357.47	10,793.0	1,113.9	-49.2	1,115.0	0.00	0.00	0.00
11,800.0	89.73	357.47	10,793.5	1,213.8	-53.6	1,215.0	0.00	0.00	0.00
11,900.0	89.73	357.47	10,794.0	1,313.7	-58.1	1,315.0	0.00	0.00	0.00
12,000.0	89.73	357.47	10,794.4	1,413.6	-62.5	1,415.0	0.00	0.00	0.00
12,100.0	89.73	357.47	10,794.9	1,513.5	-66.9	1,515.0	0.00	0.00	0.00
12,200.0	89.73	357.47	10,795.4	1,613.4	-71.3	1,615.0	0.00	0.00	0.00
12,300.0	89.73	357.47	10,795.9	1,713.3	-75.7	1,715.0	0.00	0.00	0.00
12,400.0	89.73	357.47	10,796.3	1,813.2	-80.1	1,814.9	0.00	0.00	0.00
12,500.0	89.73	357.47	10,796.8	1,913.1	-84.5	1,914.9	0.00	0.00	0.00
12,600.0	89.73	357.47	10,797.3	2,013.0	-89.0	2,014.9	0.00	0.00	0.00
12,700.0	89.73	357.47	10,797.8	2,112.9	-93.4	2,114.9	0.00	0.00	0.00
12,800.0	89.73	357.47	10,798.3	2,212.8	-97.8	2,214.9	0.00	0.00	0.00
12,900.0	89.73	357.47	10,798.7	2,312.7	-102.2	2,314.9	0.00	0.00	0.00
13,000.0	89.73	357.47	10,799.2	2,412.6	-106.6	2,414.9	0.00	0.00	0.00
13,100.0	89.73	357.47	10,799.7	2,512.5	-111.0	2,514.9	0.00	0.00	0.00
13,200.0	89.73	357.47	10,800.2	2,612.4	-115.4	2,614.9	0.00	0.00	0.00
13,300.0	89.73	357.47	10,800.6	2,712.3	-119.9	2,714.9	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well #8H
Company:	COG Operating LLC	**TVD Reference:**	KB @ 3709.2usft
Project:	Lea County, NM	**MD Reference:**	KB @ 3709.2usft
Site:	Airbonita 12 Federal	**North Reference:**	Grid
Well:	#8H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,400.0	89.73	357.47	10,801.1	2,812.2	-124.3	2,814.9	0.00	0.00	0.00
13,500.0	89.73	357.47	10,801.6	2,912.1	-128.7	2,914.9	0.00	0.00	0.00
13,600.0	89.73	357.47	10,802.1	3,012.0	-133.1	3,014.9	0.00	0.00	0.00
13,700.0	89.73	357.47	10,802.5	3,111.9	-137.5	3,114.9	0.00	0.00	0.00
13,800.0	89.73	357.47	10,803.0	3,211.8	-141.9	3,214.9	0.00	0.00	0.00
13,900.0	89.73	357.47	10,803.5	3,311.7	-146.4	3,314.9	0.00	0.00	0.00
14,000.0	89.73	357.47	10,804.0	3,411.6	-150.8	3,414.9	0.00	0.00	0.00
14,100.0	89.73	357.47	10,804.5	3,511.5	-155.2	3,514.9	0.00	0.00	0.00
14,200.0	89.73	357.47	10,804.9	3,611.4	-159.6	3,614.9	0.00	0.00	0.00
14,300.0	89.73	357.47	10,805.4	3,711.3	-164.0	3,714.9	0.00	0.00	0.00
14,400.0	89.73	357.47	10,805.9	3,811.2	-168.4	3,814.9	0.00	0.00	0.00
14,500.0	89.73	357.47	10,806.4	3,911.1	-172.8	3,914.9	0.00	0.00	0.00
14,600.0	89.73	357.47	10,806.8	4,011.0	-177.3	4,014.9	0.00	0.00	0.00
14,700.0	89.73	357.47	10,807.3	4,110.9	-181.7	4,114.9	0.00	0.00	0.00
14,800.0	89.73	357.47	10,807.8	4,210.8	-186.1	4,214.9	0.00	0.00	0.00
14,900.0	89.73	357.47	10,808.3	4,310.7	-190.5	4,314.9	0.00	0.00	0.00
15,000.0	89.73	357.47	10,808.7	4,410.6	-194.9	4,414.9	0.00	0.00	0.00
15,100.0	89.73	357.47	10,809.2	4,510.5	-199.3	4,514.9	0.00	0.00	0.00
15,200.0	89.73	357.47	10,809.7	4,610.4	-203.7	4,614.9	0.00	0.00	0.00
15,300.0	89.73	357.47	10,810.2	4,710.3	-208.2	4,714.9	0.00	0.00	0.00
15,400.0	89.73	357.47	10,810.7	4,810.2	-212.6	4,814.9	0.00	0.00	0.00
15,473.1	89.73	357.47	10,811.0	4,883.2	-215.8	4,888.0	0.00	0.00	0.00
TD at 15473.1									

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
EOC (A12F #8H/OH Pla - plan hits target center - Point	0.00	0.00	10,790.0	474.7	-21.0	510,092.70	715,632.02	32° 24' 1.521 N	103° 38' 4.878 W
PBHL (A12F #8H/OH) - plan hits target center - Point	0.00	0.00	10,811.0	4,883.2	-215.8	514,501.20	715,437.20	32° 24' 45.157 N	103° 38' 6.815 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
10,312.5	10,312.5	0.0	0.0	KOP - Start DLS 12.00 TFO 357.47
11,060.2	10,790.0	474.7	-21.0	EOC - Start 4412.8 hold at 11060.2 MD
15,473.1	10,811.0	4,883.2	-215.8	TD at 15473.1

CONCHO

COG Operating LLC
Project: Lea County, NM
Site: Airbonita 12 Federal
Well: #8H
Wellbore: OH
Plan: Plan #1 (#8H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	10312.5	0.00	0.00	10312.5	0.0	0.0	0.00	0.00	0.0	
3	11060.2	89.73	357.47	10790.0	474.7	-21.0	12.00	357.47	475.2	
4	15473.1	89.73	357.47	10811.0	4883.2	-215.8	0.00	0.00	4888.0	PBHL (A12F #8H/OH)

WELL DETAILS: #8H

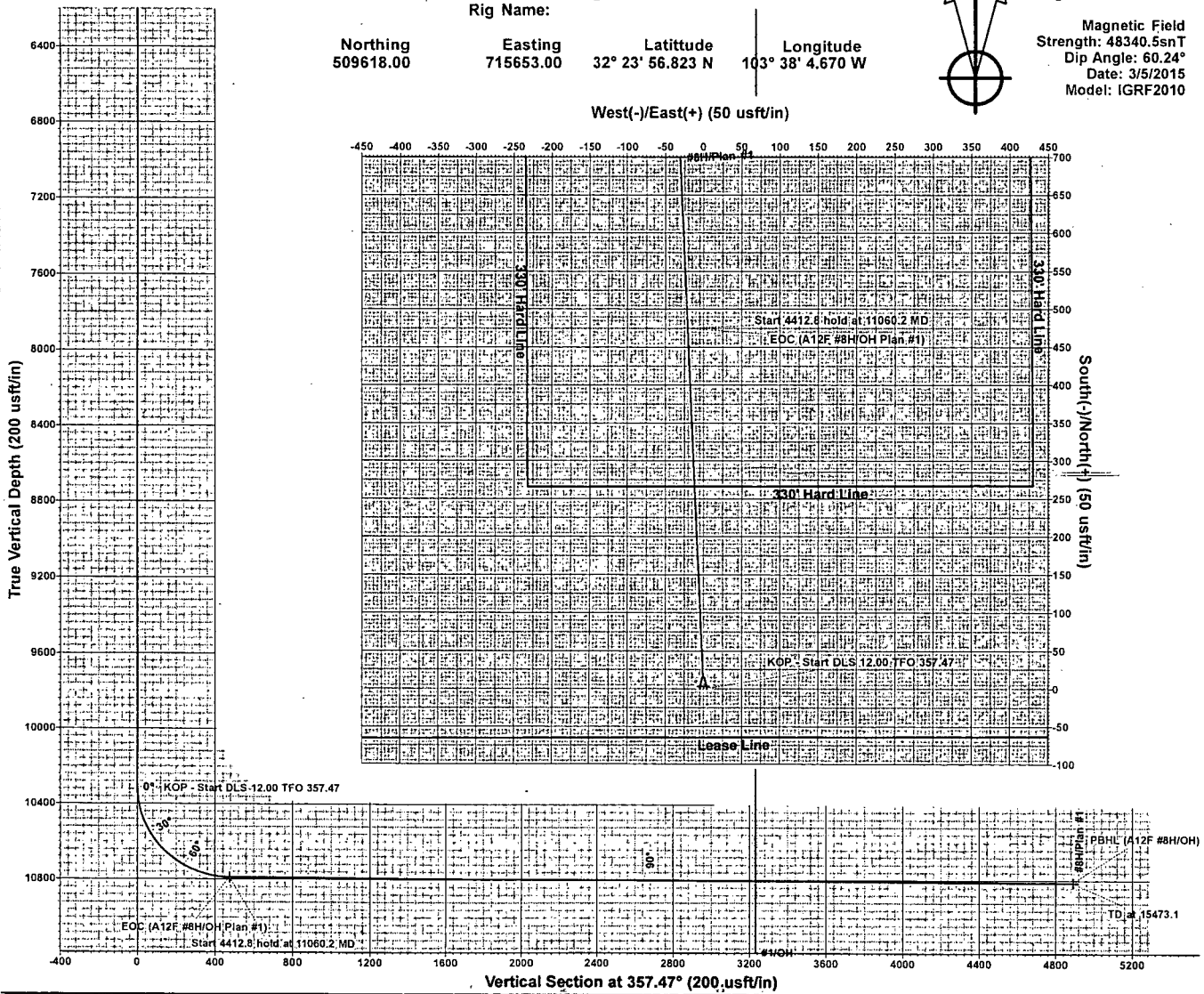
Ground Elevation:: 3678.1
RKB Elevation: KB @ 3709.2usft
Rig Name:

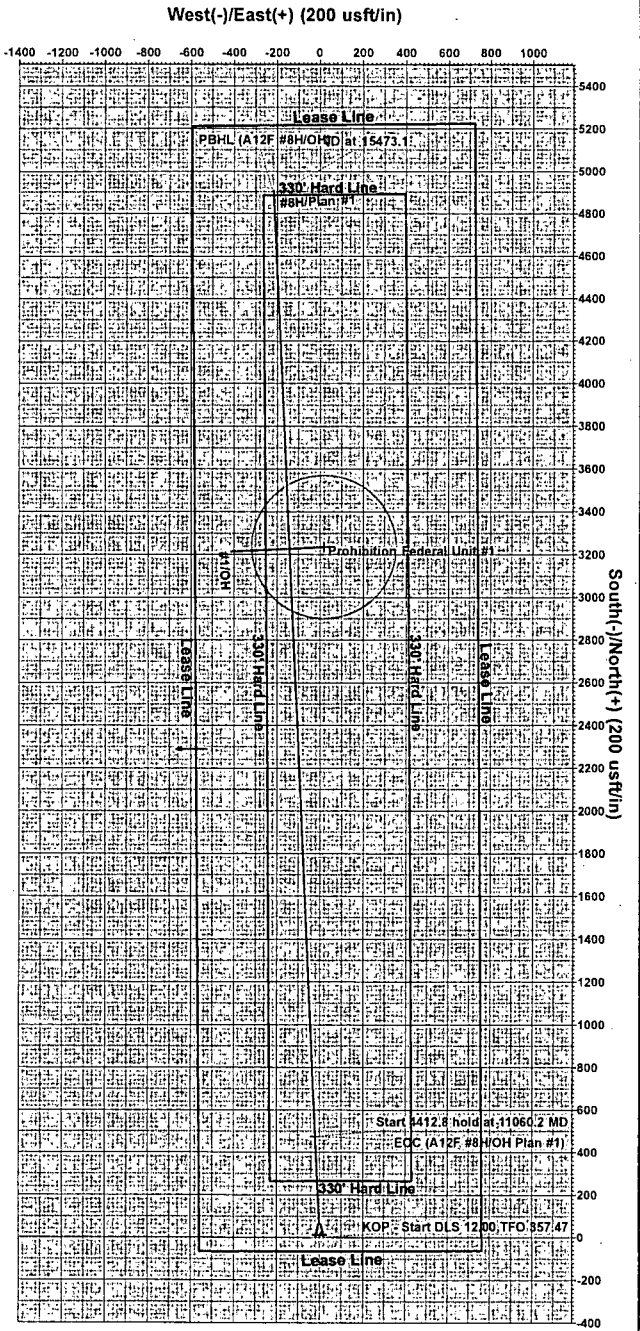
Northing	Easting	Latittude	Longitude
509618.00	715653.00	32° 23' 56.823 N	103° 38' 4.670 W

G T M

Azimuths to Grid North
True North: -0.37°
Magnetic North: 6.79°

Magnetic Field
Strength: 48340.5snT
Dip Angle: 60.24°
Date: 3/5/2015
Model: IGRF2010





Terra Directional Services LLC
322 Spring Hill Drive, Suite A300. Spring, Tx 77386
Phone: 432-425-7532

PROJECT DETAILS: Lea County, NM
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters) (In feet)

POD Number	POD Sub-basin	Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 02096			ED	2	3	14	22S	32E		627204	3584464*	435	360	75
C 02821		C	LE	2	2	3	14	22S	32E	627303	3584563*	540	340	200
C 02939		C	LE	3	3	1	19	22S	32E	620234	3583042*	280		

Average Depth to Water: **350 feet**

Minimum Depth: **340 feet**

Maximum Depth: **360 feet**

Record Count: 3

PLSS Search:

Township: 22S **Range:** 32E

***UTM location was derived from PLSS - see Help**

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

No records found.

PLSS Search:

Section(s): 12 **Township:** 22S **Range:** 32E