

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTNMOCD
HobbsFORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018HOBBS OCP
DEC 5 2016
RECEIVED**SUNDRY NOTICES AND REPORTS ON WELLS**
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.***SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		5. Lease Serial No. NMNM123527
2. Name of Operator COG PRODUCTION LLC		6. If Indian, Allottee or Tribe Name
3a. Address 2208 W MAIN STREET ARTESIA, NM 88210		7. If Unit or CA/Agreement, Name and/or No.
3b. Phone No. (include area code) Ph: 575-748-6945		8. Well Name and No. SOMBRERO FEDERAL COM 4H ✓
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 13 T24S R34E SWSW 460FSL 380FWL ✓		9. API Well No. 30-025-43286-00-X1
		10. Field and Pool or Exploratory Area RED HILLS
		11. County or Parish, State LEA COUNTY, NM

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

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

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

COG Operating LLC, respectfully requests approval for the following changes to the original approved APD.

BHL

From: 2310' FSL & 380' FWL Section 12. T24S. R34E
To: 2440' FSL & 380' FWL Section 12. T24S. R34E
C102 attached.

DRILLING

New landing target TVD for EOC is 9,605ft TVD.
New landing target TVD for EOL is 9,311ft TVD.
New well plan gives us new well TD of 16,664.9ft MD.

original COAs still stand

14. I hereby certify that the foregoing is true and correct. Electronic Submission #359112 verified by the BLM Well Information System For COG PRODUCTION LLC, sent to the Hobbs Committed to AFMSS for processing by MUSTAFA HAQUE on 12/01/2016 (17MH0008SE)	
Name (Printed/Typed) MAYTE X REYES	Title REGULATORY ANALYST
Signature (Electronic Submission)	Date 11/29/2016
THIS SPACE FOR FEDERAL OR STATE OFFICE USE	
Approved By _____	Title _____ Date _____
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office _____

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

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

KGZ

Additional data for EC transaction #359112 that would not fit on the form

32. Additional remarks, continued

Directional plan attached.



COG Operating, LLC

Lea County, NM

Sec 13, T24-S, R34-E

Sombrero Federal Com 4H

Wellbore #1

Plan: Design #1

QES Well Planning Report

28 November, 2016



Database: EDM5002
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 13, T24-S, R34-E
Well: Sombrero Federal Com 4H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference: Well Sombrero Federal Com 4H
TVD Reference: Well @ 3503.5usft (Noram #21)
MD Reference: Well @ 3503.5usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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	Sec 13, T24-S, R34-E		
Site Position:		Northing:	441,802.50 usft
From:	Map	Easting:	779,235.60 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 12' 41.070 N
		Longitude:	103° 25' 49.787 W
		Grid Convergence:	0.48 °

Well	Sombrero Federal Com 4H		
Well Position	+N/-S	0.0 usft	Northing: 441,802.50 usft
	+E/-W	0.0 usft	Easting: 779,235.60 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 12' 41.070 N
		Longitude:	103° 25' 49.787 W
		Ground Level:	3,474.5 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	11/28/2016	6.95
			Dip Angle (°)
			60.08
			Field Strength (nT)
			48,002

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			359.51

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	
9,128.0	0.00	0.00	9,128.0	0.0	0.0	0.00	0.00	0.00	0.00	
9,898.8	92.49	359.51	9,605.0	498.2	-4.2	12.00	12.00	-0.06	359.51	
16,664.9	92.49	359.51	9,311.0	7,257.7	-61.6	0.00	0.00	0.00	0.00	PBHL - Sombrero Fec



Well Planning Report



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North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
Rustler									
1,210.0	0.00	0.00	1,210.0	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
TOS									
1,538.0	0.00	0.00	1,538.0	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

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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)
5,000.0	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
BOS (Fletcher)									
5,339.0	0.00	0.00	5,339.0	0.0	0.0	0.0	0.00	0.00	0.00
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
LMAR (Top Delaware)									
5,623.0	0.00	0.00	5,623.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
5,676.0	0.00	0.00	5,676.0	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
CYCN									
6,562.0	0.00	0.00	6,562.0	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
BYCN									
8,003.0	0.00	0.00	8,003.0	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

Build 12° / 100'

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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)
9,128.0	0.00	0.00	9,128.0	0.0	0.0	0.0	0.00	0.00	0.00
9,200.0	8.64	359.51	9,199.7	5.4	0.0	5.4	12.00	12.00	0.00
9,300.0	20.64	359.51	9,296.3	30.6	-0.3	30.6	12.00	12.00	0.00
Bone Sprg (BSGL)									
9,353.0	27.00	359.51	9,344.7	52.0	-0.4	52.0	12.00	12.00	0.00
U Avalon SH									
9,395.6	32.11	359.51	9,381.8	73.1	-0.6	73.1	12.00	12.00	0.00
9,400.0	32.64	359.51	9,385.5	75.4	-0.6	75.4	12.00	12.00	0.00
9,500.0	44.64	359.51	9,463.5	137.7	-1.2	137.7	12.00	12.00	0.00
9,600.0	56.64	359.51	9,526.8	214.9	-1.8	214.9	12.00	12.00	0.00
9,700.0	68.64	359.51	9,572.7	303.5	-2.6	303.6	12.00	12.00	0.00
9,800.0	80.64	359.51	9,599.1	399.8	-3.4	399.8	12.00	12.00	0.00
EOB @ 92.49° Inc / 359.51° Azm									
9,898.8	92.49	359.51	9,605.0	498.2	-4.2	498.2	12.00	12.00	0.00
9,900.0	92.49	359.51	9,605.0	499.4	-4.2	499.5	0.00	0.00	0.00
10,000.0	92.49	359.51	9,600.6	599.3	-5.1	599.4	0.00	0.00	0.00
10,100.0	92.49	359.51	9,596.3	699.2	-5.9	699.3	0.00	0.00	0.00
10,200.0	92.49	359.51	9,591.9	799.1	-6.8	799.2	0.00	0.00	0.00
10,300.0	92.49	359.51	9,587.6	899.0	-7.6	899.1	0.00	0.00	0.00
10,400.0	92.49	359.51	9,583.2	998.9	-8.5	999.0	0.00	0.00	0.00
10,500.0	92.49	359.51	9,578.9	1,098.9	-9.3	1,098.9	0.00	0.00	0.00
10,600.0	92.49	359.51	9,574.5	1,198.8	-10.2	1,198.8	0.00	0.00	0.00
10,700.0	92.49	359.51	9,570.2	1,298.7	-11.0	1,298.7	0.00	0.00	0.00
10,800.0	92.49	359.51	9,565.9	1,398.6	-11.9	1,398.6	0.00	0.00	0.00
10,900.0	92.49	359.51	9,561.5	1,498.5	-12.7	1,498.5	0.00	0.00	0.00
11,000.0	92.49	359.51	9,557.2	1,598.4	-13.6	1,598.4	0.00	0.00	0.00
11,100.0	92.49	359.51	9,552.8	1,698.3	-14.4	1,698.3	0.00	0.00	0.00
11,200.0	92.49	359.51	9,548.5	1,798.2	-15.3	1,798.2	0.00	0.00	0.00
11,300.0	92.49	359.51	9,544.1	1,898.1	-16.1	1,898.1	0.00	0.00	0.00
11,400.0	92.49	359.51	9,539.8	1,998.0	-17.0	1,998.0	0.00	0.00	0.00
11,500.0	92.49	359.51	9,535.4	2,097.9	-17.8	2,097.9	0.00	0.00	0.00
11,600.0	92.49	359.51	9,531.1	2,197.8	-18.7	2,197.9	0.00	0.00	0.00
11,700.0	92.49	359.51	9,526.7	2,297.7	-19.5	2,297.8	0.00	0.00	0.00
11,800.0	92.49	359.51	9,522.4	2,397.6	-20.3	2,397.7	0.00	0.00	0.00
11,900.0	92.49	359.51	9,518.1	2,497.5	-21.2	2,497.6	0.00	0.00	0.00
12,000.0	92.49	359.51	9,513.7	2,597.4	-22.0	2,597.5	0.00	0.00	0.00
12,100.0	92.49	359.51	9,509.4	2,697.3	-22.9	2,697.4	0.00	0.00	0.00
12,200.0	92.49	359.51	9,505.0	2,797.2	-23.7	2,797.3	0.00	0.00	0.00
12,300.0	92.49	359.51	9,500.7	2,897.1	-24.6	2,897.2	0.00	0.00	0.00
12,400.0	92.49	359.51	9,496.3	2,997.0	-25.4	2,997.1	0.00	0.00	0.00
12,500.0	92.49	359.51	9,492.0	3,096.9	-26.3	3,097.0	0.00	0.00	0.00
12,600.0	92.49	359.51	9,487.6	3,196.8	-27.1	3,196.9	0.00	0.00	0.00
12,700.0	92.49	359.51	9,483.3	3,296.7	-28.0	3,296.8	0.00	0.00	0.00
12,800.0	92.49	359.51	9,478.9	3,396.6	-28.8	3,396.7	0.00	0.00	0.00
12,900.0	92.49	359.51	9,474.6	3,496.5	-29.7	3,496.6	0.00	0.00	0.00
13,000.0	92.49	359.51	9,470.3	3,596.4	-30.5	3,596.5	0.00	0.00	0.00
13,100.0	92.49	359.51	9,465.9	3,696.3	-31.4	3,696.4	0.00	0.00	0.00
13,200.0	92.49	359.51	9,461.6	3,796.2	-32.2	3,796.3	0.00	0.00	0.00
13,300.0	92.49	359.51	9,457.2	3,896.1	-33.1	3,896.2	0.00	0.00	0.00
13,400.0	92.49	359.51	9,452.9	3,996.0	-33.9	3,996.2	0.00	0.00	0.00
13,500.0	92.49	359.51	9,448.5	4,095.9	-34.8	4,096.1	0.00	0.00	0.00
13,600.0	92.49	359.51	9,444.2	4,195.8	-35.6	4,196.0	0.00	0.00	0.00
13,700.0	92.49	359.51	9,439.8	4,295.7	-36.5	4,295.9	0.00	0.00	0.00

Database: EDM5002
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 13, T24-S, R34-E
Well: Sombrero Federal Com 4H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference: Well Sombrero Federal Com 4H
TVD Reference: Well @ 3503.5usft (Noram #21)
MD Reference: Well @ 3503.5usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
13,800.0	92.49	359.51	9,435.5	4,395.6	-37.3	4,395.8	0.00	0.00	0.00
13,900.0	92.49	359.51	9,431.1	4,495.5	-38.2	4,495.7	0.00	0.00	0.00
14,000.0	92.49	359.51	9,426.8	4,595.4	-39.0	4,595.6	0.00	0.00	0.00
14,100.0	92.49	359.51	9,422.5	4,695.3	-39.9	4,695.5	0.00	0.00	0.00
14,200.0	92.49	359.51	9,418.1	4,795.2	-40.7	4,795.4	0.00	0.00	0.00
14,300.0	92.49	359.51	9,413.8	4,895.1	-41.5	4,895.3	0.00	0.00	0.00
14,400.0	92.49	359.51	9,409.4	4,995.0	-42.4	4,995.2	0.00	0.00	0.00
14,500.0	92.49	359.51	9,405.1	5,094.9	-43.2	5,095.1	0.00	0.00	0.00
14,600.0	92.49	359.51	9,400.7	5,194.8	-44.1	5,195.0	0.00	0.00	0.00
14,700.0	92.49	359.51	9,396.4	5,294.7	-44.9	5,294.9	0.00	0.00	0.00
14,800.0	92.49	359.51	9,392.0	5,394.6	-45.8	5,394.8	0.00	0.00	0.00
14,900.0	92.49	359.51	9,387.7	5,494.5	-46.6	5,494.7	0.00	0.00	0.00
15,000.0	92.49	359.51	9,383.3	5,594.4	-47.5	5,594.6	0.00	0.00	0.00
15,100.0	92.49	359.51	9,379.0	5,694.3	-48.3	5,694.5	0.00	0.00	0.00
15,200.0	92.49	359.51	9,374.7	5,794.2	-49.2	5,794.5	0.00	0.00	0.00
15,300.0	92.49	359.51	9,370.3	5,894.1	-50.0	5,894.4	0.00	0.00	0.00
15,400.0	92.49	359.51	9,366.0	5,994.0	-50.9	5,994.3	0.00	0.00	0.00
15,500.0	92.49	359.51	9,361.6	6,093.9	-51.7	6,094.2	0.00	0.00	0.00
15,600.0	92.49	359.51	9,357.3	6,193.8	-52.6	6,194.1	0.00	0.00	0.00
15,700.0	92.49	359.51	9,352.9	6,293.8	-53.4	6,294.0	0.00	0.00	0.00
15,800.0	92.49	359.51	9,348.6	6,393.7	-54.3	6,393.9	0.00	0.00	0.00
15,900.0	92.49	359.51	9,344.2	6,493.6	-55.1	6,493.8	0.00	0.00	0.00
16,000.0	92.49	359.51	9,339.9	6,593.5	-56.0	6,593.7	0.00	0.00	0.00
16,100.0	92.49	359.51	9,335.5	6,693.4	-56.8	6,693.6	0.00	0.00	0.00
16,200.0	92.49	359.51	9,331.2	6,793.3	-57.7	6,793.5	0.00	0.00	0.00
16,300.0	92.49	359.51	9,326.9	6,893.2	-58.5	6,893.4	0.00	0.00	0.00
16,400.0	92.49	359.51	9,322.5	6,993.1	-59.4	6,993.3	0.00	0.00	0.00
16,500.0	92.49	359.51	9,318.2	7,093.0	-60.2	7,093.2	0.00	0.00	0.00
16,600.0	92.49	359.51	9,313.8	7,192.9	-61.0	7,193.1	0.00	0.00	0.00
TD @ 16665' MD / 9311' TVD									
16,664.9	92.49	359.51	9,311.0	7,257.7	-61.6	7,258.0	0.00	0.00	0.00

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL - Sombrero Feder	0.00	0.00	9,311.0	7,257.7	-61.6	449,060.20	779,174.00	32° 13' 52.891 N	103° 25' 49.795 W
- plan hits target center									
- Point									

Database: EDM5002
Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 13, T24-S, R34-E
Well: Sombrero Federal Com 4H
Wellbore: Wellbore #1
Design: Design #1

Local Co-ordinate Reference: Well Sombrero Federal Com 4H
TVD Reference: Well @ 3503.5usft (Noram #21)
MD Reference: Well @ 3503.5usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,210.0	1,210.0	Rustler		-2.49	359.51
1,538.0	1,538.0	TOS		-2.49	359.51
5,339.0	5,339.0	BOS (Fletcher)		-2.49	359.51
5,623.0	5,623.0	LMAR (Top Delaware)		-2.49	359.51
5,676.0	5,676.0	BLCN		-2.49	359.51
6,562.0	6,562.0	CYCN		-2.49	359.51
8,003.0	8,003.0	BYCN		-2.49	359.51
9,353.0	9,344.7	Bone Sprg (BSGL)		-2.49	359.51
9,395.6	9,381.8	U Avalon SH		-2.49	359.51

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,128.0	9,128.0	0.0	0.0	Build 12° / 100'
9,898.8	9,605.0	498.2	-4.2	EOB @ 92.49° Inc / 359.51° Azm
16,664.9	9,311.0	7,257.7	-61.6	TD @ 16665' MD / 9311' TVD

Company Name: COG Operating, LLC
Sombbrero Federal Com 4H
Lea County, NM
Rig: Noram #21
Created By: Kris Ray
Date: 11/28/2016

Sombbrero Federal Com 4H
Lea County, NM
Q160*** & WT-160***
Design #1

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LTP - Sombbrero Federal Com 4H	0.0	7127.6	-60.7	448930.13	779174.34	32° 13' 51.604 N	103° 25' 49.796 W
PBHL - Sombbrero Federal Com 4H - plan Nits target center	9311.0	7257.7	-61.6	449060.20	779174.00	32° 13' 52.891 N	103° 25' 49.795 W

WELL DETAILS: Sombbrero Federal Com 4H

Ground Level:	3474.5
Northing	779235.60
Easting	32° 12' 41.979 N
Latitude	103° 25' 49.797 W
Longitude	

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



Azimuths to Grid North

Correction: 6.47°

Magnetic Field
Strength: 48001.8snT
Dip Angle: 60.08°
Date: 11/28/2016
Model: IGRF2015

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
9128.0	0.00	0.00	9128.0	0.0	0.0	0.0	0.0	Build 12" / 100'
9893.9	92.49	359.51	9605.0	498.2	-4.2	498.2	498.2	EOB @ 92.49° Inc / 359.51° Azm
16664.9	92.49	359.51	9311.0	7257.7	-61.6	7258.0	7258.0	TD @ 16665' MD / 9311' TVD

