



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 21, T25S, R28E

Myox 21 State Com #33H

30-015-44003

Wellbore #1

Plan: Plan #1

QES Well Planning Report

10 July, 2017



Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 21, T25S, R28E
Well: Myox 21 State Com #33H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #33H
TVD Reference: RKB @ 3015.0usft (Ensign #156)
MD Reference: RKB @ 3015.0usft (Ensign #156)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Eddy County, NM (NAD 27)		
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 21, T25S, R28E			
Site Position:		Northing:	403,285.76 usft	Latitude: 32° 6' 30.707 N
From: Map		Easting:	572,922.78 usft	Longitude: 104° 5' 52.141 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.13 °

Well	Myox 21 State Com #33H			
Well Position	+N/-S	0.5 usft	Northing:	403,286.30 usft
	+E/-W	60.0 usft	Easting:	572,982.78 usft
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft
			Ground Level:	2,990.0 usft

Wellbore	Wellbore #1			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)
	IGRF2015	7/10/2017	7.18	59.87
				Field Strength (nT) 47,810

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	0.45

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	
7,412.9	0.00	0.00	7,412.9	0.0	0.0	0.00	0.00	0.00	0.00	
7,762.9	7.00	90.00	7,762.0	0.0	21.4	2.00	2.00	0.00	90.00	
8,807.1	7.00	90.00	8,798.4	0.0	148.6	0.00	0.00	0.00	0.00	
9,157.1	0.00	0.00	9,147.5	0.0	170.0	2.00	-2.00	0.00	180.00	
9,905.3	89.78	359.50	9,625.0	475.6	165.8	12.00	12.00	-0.07	359.50	
19,672.7	89.78	359.50	9,662.0	10,242.6	79.9	0.00	0.00	0.00	0.00	PBHL - Myox 21 State

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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)
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
Rustler									
305.0	0.00	0.00	305.0	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
TOS									
670.0	0.00	0.00	670.0	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
BOS (Fletcher)									
2,230.0	0.00	0.00	2,230.0	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
LMAR (Top Delaware)									
2,432.0	0.00	0.00	2,432.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
2,487.0	0.00	0.00	2,487.0	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
CYCN									
3,316.0	0.00	0.00	3,316.0	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

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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)
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
BYCN									
4,563.0	0.00	0.00	4,563.0	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
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
Bone Sprg (BSGL)									
6,112.0	0.00	0.00	6,112.0	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
U Avalon Sh									
6,462.0	0.00	0.00	6,462.0	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
L Avalon Sh									
6,665.0	0.00	0.00	6,665.0	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
FBSG_sand									
7,053.0	0.00	0.00	7,053.0	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
Build 2°/100'									
7,412.9	0.00	0.00	7,412.9	0.0	0.0	0.0	0.00	0.00	0.00
7,500.0	1.74	90.00	7,500.0	0.0	1.3	0.0	2.00	2.00	0.00
7,600.0	3.74	90.00	7,599.9	0.0	6.1	0.0	2.00	2.00	0.00
7,700.0	5.74	90.00	7,699.5	0.0	14.4	0.1	2.00	2.00	0.00
EOB @ 7.00° Inc / 90.00° Azm									
7,762.9	7.00	90.00	7,762.0	0.0	21.4	0.2	2.00	2.00	0.00
7,800.0	7.00	90.00	7,798.9	0.0	25.9	0.2	0.00	0.00	0.00
7,900.0	7.00	90.00	7,898.1	0.0	38.1	0.3	0.00	0.00	0.00

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SBSG_sand									
7,914.0	7.00	90.00	7,912.0	0.0	39.8	0.3	0.00	0.00	0.00
8,000.0	7.00	90.00	7,997.4	0.0	50.3	0.4	0.00	0.00	0.00
8,100.0	7.00	90.00	8,096.6	0.0	62.4	0.5	0.00	0.00	0.00
8,200.0	7.00	90.00	8,195.9	0.0	74.6	0.6	0.00	0.00	0.00
8,300.0	7.00	90.00	8,295.1	0.0	86.8	0.7	0.00	0.00	0.00
8,400.0	7.00	90.00	8,394.4	0.0	99.0	0.8	0.00	0.00	0.00
8,500.0	7.00	90.00	8,493.6	0.0	111.2	0.9	0.00	0.00	0.00
8,600.0	7.00	90.00	8,592.9	0.0	123.4	1.0	0.00	0.00	0.00
8,700.0	7.00	90.00	8,692.1	0.0	135.6	1.1	0.00	0.00	0.00
Drop 2°/100'									
8,807.1	7.00	90.00	8,798.4	0.0	148.6	1.2	0.00	0.00	0.00
8,900.0	5.14	90.00	8,890.8	0.0	158.4	1.2	2.00	-2.00	0.00
TBSG_sand									
8,916.2	4.82	90.00	8,907.0	0.0	159.8	1.2	2.00	-2.00	0.00
9,000.0	3.14	90.00	8,990.6	0.0	165.7	1.3	2.00	-2.00	0.00
9,100.0	1.14	90.00	9,090.5	0.0	169.4	1.3	2.00	-2.00	0.00
EOD @ Vertical - Build 12°/100'									
9,157.1	0.00	0.00	9,147.5	0.0	170.0	1.3	2.00	-2.00	0.00
9,175.0	2.15	359.50	9,165.5	0.3	170.0	1.7	12.00	12.00	0.00
9,200.0	5.15	359.50	9,190.4	1.9	169.9	3.3	12.00	12.00	0.00
9,225.0	8.15	359.50	9,215.2	4.8	169.9	6.1	12.00	12.00	0.00
9,250.0	11.15	359.50	9,239.9	9.0	169.9	10.3	12.00	12.00	0.00
9,275.0	14.15	359.50	9,264.3	14.5	169.8	15.8	12.00	12.00	0.00
WFMP									
9,278.8	14.61	359.50	9,268.0	15.4	169.8	16.8	12.00	12.00	0.00
9,300.0	17.15	359.50	9,288.4	21.2	169.8	22.6	12.00	12.00	0.00
9,325.0	20.15	359.50	9,312.0	29.2	169.7	30.6	12.00	12.00	0.00
9,350.0	23.15	359.50	9,335.3	38.4	169.6	39.8	12.00	12.00	0.00
WFMP Lith									
9,367.2	25.22	359.50	9,351.0	45.5	169.6	46.8	12.00	12.00	0.00
9,375.0	26.15	359.50	9,358.0	48.9	169.5	50.2	12.00	12.00	0.00
9,400.0	29.15	359.50	9,380.1	60.5	169.4	61.8	12.00	12.00	0.00
9,425.0	32.15	359.50	9,401.6	73.2	169.3	74.5	12.00	12.00	0.00
9,450.0	35.15	359.50	9,422.4	87.1	169.2	88.4	12.00	12.00	0.00
9,475.0	38.15	359.50	9,442.5	102.0	169.1	103.3	12.00	12.00	0.00
9,500.0	41.15	359.50	9,461.7	117.9	168.9	119.3	12.00	12.00	0.00
9,525.0	44.15	359.50	9,480.1	134.9	168.8	136.2	12.00	12.00	0.00
9,550.0	47.15	359.50	9,497.6	152.8	168.6	154.1	12.00	12.00	0.00
9,575.0	50.15	359.50	9,514.1	171.5	168.5	172.8	12.00	12.00	0.00
9,600.0	53.15	359.50	9,529.6	191.1	168.3	192.4	12.00	12.00	0.00
9,625.0	56.15	359.50	9,544.1	211.5	168.1	212.8	12.00	12.00	0.00
9,650.0	59.15	359.50	9,557.5	232.6	167.9	233.9	12.00	12.00	0.00
9,675.0	62.15	359.50	9,569.7	254.4	167.7	255.7	12.00	12.00	0.00
9,700.0	65.15	359.50	9,580.8	276.8	167.5	278.1	12.00	12.00	0.00
9,725.0	68.15	359.50	9,590.7	299.8	167.3	301.1	12.00	12.00	0.00
9,750.0	71.15	359.50	9,599.4	323.2	167.1	324.5	12.00	12.00	0.00
9,775.0	74.15	359.50	9,606.9	347.1	166.9	348.4	12.00	12.00	0.00
9,800.0	77.15	359.50	9,613.1	371.3	166.7	372.6	12.00	12.00	0.00
9,825.0	80.15	359.50	9,618.0	395.8	166.5	397.1	12.00	12.00	0.00
9,850.0	83.15	359.50	9,621.6	420.5	166.3	421.8	12.00	12.00	0.00
9,875.0	86.15	359.50	9,623.9	445.4	166.0	446.7	12.00	12.00	0.00
9,900.0	89.15	359.50	9,625.0	470.4	165.8	471.7	12.00	12.00	0.00

Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 21, T25S, R28E
Well: Myox 21 State Com #33H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #33H
TVD Reference: RKB @ 3015.0usft (Ensign #156)
MD Reference: RKB @ 3015.0usft (Ensign #156)
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)
EOC @ 89.78° Inc / 359.50° Azm / 9625.0' TVD									
9,905.3	89.78	359.50	9,625.0	475.6	165.8	476.9	12.00	12.00	0.00
10,000.0	89.78	359.50	9,625.4	570.4	165.0	571.6	0.00	0.00	0.00
10,100.0	89.78	359.50	9,625.7	670.4	164.1	671.6	0.00	0.00	0.00
10,200.0	89.78	359.50	9,626.1	770.4	163.2	771.6	0.00	0.00	0.00
10,300.0	89.78	359.50	9,626.5	870.4	162.3	871.6	0.00	0.00	0.00
10,400.0	89.78	359.50	9,626.9	970.4	161.4	971.6	0.00	0.00	0.00
10,500.0	89.78	359.50	9,627.3	1,070.3	160.6	1,071.6	0.00	0.00	0.00
10,600.0	89.78	359.50	9,627.6	1,170.3	159.7	1,171.6	0.00	0.00	0.00
10,700.0	89.78	359.50	9,628.0	1,270.3	158.8	1,271.5	0.00	0.00	0.00
10,800.0	89.78	359.50	9,628.4	1,370.3	157.9	1,371.5	0.00	0.00	0.00
10,900.0	89.78	359.50	9,628.8	1,470.3	157.0	1,471.5	0.00	0.00	0.00
11,000.0	89.78	359.50	9,629.2	1,570.3	156.2	1,571.5	0.00	0.00	0.00
11,100.0	89.78	359.50	9,629.5	1,670.3	155.3	1,671.5	0.00	0.00	0.00
11,200.0	89.78	359.50	9,629.9	1,770.3	154.4	1,771.5	0.00	0.00	0.00
11,300.0	89.78	359.50	9,630.3	1,870.3	153.5	1,871.5	0.00	0.00	0.00
11,400.0	89.78	359.50	9,630.7	1,970.3	152.6	1,971.4	0.00	0.00	0.00
11,500.0	89.78	359.50	9,631.0	2,070.3	151.8	2,071.4	0.00	0.00	0.00
11,600.0	89.78	359.50	9,631.4	2,170.3	150.9	2,171.4	0.00	0.00	0.00
11,700.0	89.78	359.50	9,631.8	2,270.3	150.0	2,271.4	0.00	0.00	0.00
11,800.0	89.78	359.50	9,632.2	2,370.3	149.1	2,371.4	0.00	0.00	0.00
11,900.0	89.78	359.50	9,632.6	2,470.3	148.3	2,471.4	0.00	0.00	0.00
12,000.0	89.78	359.50	9,632.9	2,570.3	147.4	2,571.4	0.00	0.00	0.00
12,100.0	89.78	359.50	9,633.3	2,670.3	146.5	2,671.3	0.00	0.00	0.00
12,200.0	89.78	359.50	9,633.7	2,770.3	145.6	2,771.3	0.00	0.00	0.00
12,300.0	89.78	359.50	9,634.1	2,870.3	144.7	2,871.3	0.00	0.00	0.00
12,400.0	89.78	359.50	9,634.5	2,970.3	143.9	2,971.3	0.00	0.00	0.00
12,500.0	89.78	359.50	9,634.8	3,070.3	143.0	3,071.3	0.00	0.00	0.00
12,600.0	89.78	359.50	9,635.2	3,170.3	142.1	3,171.3	0.00	0.00	0.00
12,700.0	89.78	359.50	9,635.6	3,270.2	141.2	3,271.3	0.00	0.00	0.00
12,800.0	89.78	359.50	9,636.0	3,370.2	140.3	3,371.2	0.00	0.00	0.00
12,900.0	89.78	359.50	9,636.3	3,470.2	139.5	3,471.2	0.00	0.00	0.00
13,000.0	89.78	359.50	9,636.7	3,570.2	138.6	3,571.2	0.00	0.00	0.00
13,100.0	89.78	359.50	9,637.1	3,670.2	137.7	3,671.2	0.00	0.00	0.00
13,200.0	89.78	359.50	9,637.5	3,770.2	136.8	3,771.2	0.00	0.00	0.00
13,300.0	89.78	359.50	9,637.9	3,870.2	135.9	3,871.2	0.00	0.00	0.00
13,400.0	89.78	359.50	9,638.2	3,970.2	135.1	3,971.1	0.00	0.00	0.00
13,500.0	89.78	359.50	9,638.6	4,070.2	134.2	4,071.1	0.00	0.00	0.00
WFMP B									
13,599.7	89.78	359.50	9,639.0	4,169.9	133.3	4,170.9	0.00	0.00	0.00
13,600.0	89.78	359.50	9,639.0	4,170.2	133.3	4,171.1	0.00	0.00	0.00
13,700.0	89.78	359.50	9,639.4	4,270.2	132.4	4,271.1	0.00	0.00	0.00
13,800.0	89.78	359.50	9,639.8	4,370.2	131.6	4,371.1	0.00	0.00	0.00
13,900.0	89.78	359.50	9,640.1	4,470.2	130.7	4,471.1	0.00	0.00	0.00
14,000.0	89.78	359.50	9,640.5	4,570.2	129.8	4,571.1	0.00	0.00	0.00
14,100.0	89.78	359.50	9,640.9	4,670.2	128.9	4,671.0	0.00	0.00	0.00
14,200.0	89.78	359.50	9,641.3	4,770.2	128.0	4,771.0	0.00	0.00	0.00
14,300.0	89.78	359.50	9,641.7	4,870.2	127.2	4,871.0	0.00	0.00	0.00
14,400.0	89.78	359.50	9,642.0	4,970.2	126.3	4,971.0	0.00	0.00	0.00
14,500.0	89.78	359.50	9,642.4	5,070.2	125.4	5,071.0	0.00	0.00	0.00
14,600.0	89.78	359.50	9,642.8	5,170.2	124.5	5,171.0	0.00	0.00	0.00
14,700.0	89.78	359.50	9,643.2	5,270.2	123.6	5,271.0	0.00	0.00	0.00
14,800.0	89.78	359.50	9,643.5	5,370.2	122.8	5,370.9	0.00	0.00	0.00
14,900.0	89.78	359.50	9,643.9	5,470.1	121.9	5,470.9	0.00	0.00	0.00

Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 21, T25S, R28E
Well: Myox 21 State Com #33H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #33H
TVD Reference: RKB @ 3015.0usft (Ensign #156)
MD Reference: RKB @ 3015.0usft (Ensign #156)
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)
15,000.0	89.78	359.50	9,644.3	5,570.1	121.0	5,570.9	0.00	0.00	0.00
15,100.0	89.78	359.50	9,644.7	5,670.1	120.1	5,670.9	0.00	0.00	0.00
15,200.0	89.78	359.50	9,645.1	5,770.1	119.2	5,770.9	0.00	0.00	0.00
15,300.0	89.78	359.50	9,645.4	5,870.1	118.4	5,870.9	0.00	0.00	0.00
15,400.0	89.78	359.50	9,645.8	5,970.1	117.5	5,970.9	0.00	0.00	0.00
15,500.0	89.78	359.50	9,646.2	6,070.1	116.6	6,070.8	0.00	0.00	0.00
15,600.0	89.78	359.50	9,646.6	6,170.1	115.7	6,170.8	0.00	0.00	0.00
15,700.0	89.78	359.50	9,647.0	6,270.1	114.9	6,270.8	0.00	0.00	0.00
15,800.0	89.78	359.50	9,647.3	6,370.1	114.0	6,370.8	0.00	0.00	0.00
15,900.0	89.78	359.50	9,647.7	6,470.1	113.1	6,470.8	0.00	0.00	0.00
16,000.0	89.78	359.50	9,648.1	6,570.1	112.2	6,570.8	0.00	0.00	0.00
16,100.0	89.78	359.50	9,648.5	6,670.1	111.3	6,670.8	0.00	0.00	0.00
16,200.0	89.78	359.50	9,648.8	6,770.1	110.5	6,770.7	0.00	0.00	0.00
16,300.0	89.78	359.50	9,649.2	6,870.1	109.6	6,870.7	0.00	0.00	0.00
16,400.0	89.78	359.50	9,649.6	6,970.1	108.7	6,970.7	0.00	0.00	0.00
16,500.0	89.78	359.50	9,650.0	7,070.1	107.8	7,070.7	0.00	0.00	0.00
16,600.0	89.78	359.50	9,650.4	7,170.1	106.9	7,170.7	0.00	0.00	0.00
16,700.0	89.78	359.50	9,650.7	7,270.1	106.1	7,270.7	0.00	0.00	0.00
16,800.0	89.78	359.50	9,651.1	7,370.1	105.2	7,370.7	0.00	0.00	0.00
16,900.0	89.78	359.50	9,651.5	7,470.1	104.3	7,470.6	0.00	0.00	0.00
17,000.0	89.78	359.50	9,651.9	7,570.1	103.4	7,570.6	0.00	0.00	0.00
17,100.0	89.78	359.50	9,652.3	7,670.0	102.6	7,670.6	0.00	0.00	0.00
17,200.0	89.78	359.50	9,652.6	7,770.0	101.7	7,770.6	0.00	0.00	0.00
17,300.0	89.78	359.50	9,653.0	7,870.0	100.8	7,870.6	0.00	0.00	0.00
17,400.0	89.78	359.50	9,653.4	7,970.0	99.9	7,970.6	0.00	0.00	0.00
17,500.0	89.78	359.50	9,653.8	8,070.0	99.0	8,070.6	0.00	0.00	0.00
17,600.0	89.78	359.50	9,654.1	8,170.0	98.2	8,170.5	0.00	0.00	0.00
17,700.0	89.78	359.50	9,654.5	8,270.0	97.3	8,270.5	0.00	0.00	0.00
17,800.0	89.78	359.50	9,654.9	8,370.0	96.4	8,370.5	0.00	0.00	0.00
17,900.0	89.78	359.50	9,655.3	8,470.0	95.5	8,470.5	0.00	0.00	0.00
18,000.0	89.78	359.50	9,655.7	8,570.0	94.6	8,570.5	0.00	0.00	0.00
18,100.0	89.78	359.50	9,656.0	8,670.0	93.8	8,670.5	0.00	0.00	0.00
18,200.0	89.78	359.50	9,656.4	8,770.0	92.9	8,770.5	0.00	0.00	0.00
18,300.0	89.78	359.50	9,656.8	8,870.0	92.0	8,870.4	0.00	0.00	0.00
18,400.0	89.78	359.50	9,657.2	8,970.0	91.1	8,970.4	0.00	0.00	0.00
18,500.0	89.78	359.50	9,657.6	9,070.0	90.2	9,070.4	0.00	0.00	0.00
18,600.0	89.78	359.50	9,657.9	9,170.0	89.4	9,170.4	0.00	0.00	0.00
18,700.0	89.78	359.50	9,658.3	9,270.0	88.5	9,270.4	0.00	0.00	0.00
18,800.0	89.78	359.50	9,658.7	9,370.0	87.6	9,370.4	0.00	0.00	0.00
18,900.0	89.78	359.50	9,659.1	9,470.0	86.7	9,470.4	0.00	0.00	0.00
19,000.0	89.78	359.50	9,659.5	9,570.0	85.9	9,570.3	0.00	0.00	0.00
19,100.0	89.78	359.50	9,659.8	9,670.0	85.0	9,670.3	0.00	0.00	0.00
19,200.0	89.78	359.50	9,660.2	9,770.0	84.1	9,770.3	0.00	0.00	0.00
19,300.0	89.78	359.50	9,660.6	9,869.9	83.2	9,870.3	0.00	0.00	0.00
19,400.0	89.78	359.50	9,661.0	9,969.9	82.3	9,970.3	0.00	0.00	0.00
19,500.0	89.78	359.50	9,661.3	10,069.9	81.5	10,070.3	0.00	0.00	0.00
19,600.0	89.78	359.50	9,661.7	10,169.9	80.6	10,170.3	0.00	0.00	0.00
TD @ 19672.7' MD / 9662.0' TVD									
19,672.7	89.78	359.50	9,662.0	10,242.6	79.9	10,243.0	0.00	0.00	0.00

Database: EDM5002
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MD Reference: RKB @ 3015.0usft (Ensign #156)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
FTP - Myox 21 State Co - plan misses target center by 106.4usft at 9614.7usft MD (9538.2 TVD, 203.0 N, 168.2 E) - Point	0.00	0.00	9,625.0	141.4	168.7	403,427.74	573,151.50	32° 6' 32.107 N	104° 5' 49.478 W
LTP - Myox 21 State Cor - plan misses target center by 0.5usft at 19542.8usft MD (9661.5 TVD, 10112.7 N, 81.1 E) - Point	0.00	0.00	9,662.0	10,112.7	81.1	413,399.00	573,063.89	32° 8' 10.789 N	104° 5' 50.243 W
PBHL - Myox 21 State C - plan hits target center - Point	0.00	0.00	9,662.0	10,242.6	79.9	413,528.95	573,062.72	32° 8' 12.075 N	104° 5' 50.253 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
305.0	305.0	Rustler			
670.0	670.0	TOS			
2,230.0	2,230.0	BOS (Fletcher)			
2,432.0	2,432.0	LMAR (Top Delaware)			
2,487.0	2,487.0	BLCN			
3,316.0	3,316.0	CYCN			
4,563.0	4,563.0	BYCN			
6,112.0	6,112.0	Bone Sprg (BSGL)			
6,462.0	6,462.0	U Avalon Sh			
6,665.0	6,665.0	L Avalon Sh			
7,053.0	7,053.0	FBSG_sand			
7,914.0	7,912.0	SBSG_sand			
8,916.2	8,907.0	TBSG_sand			
9,278.8	9,268.0	WFMP			
9,367.2	9,351.0	WFMP Lith			
13,599.7	9,639.0	WFMP B			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,412.9	7,412.9	0.0	0.0	Build 2°/100'
7,762.9	7,762.0	0.0	21.4	EOB @ 7.00° Inc / 90.00° Azm
8,807.1	8,798.4	0.0	148.6	Drop 2°/100'
9,157.1	9,147.5	0.0	170.0	EOD @ Vertical - Build 12°/100'
9,905.3	9,625.0	475.6	165.8	EOC @ 89.78° Inc / 359.50° Azm / 9625.0' TVD
19,672.7	9,662.0	10,242.6	79.9	TD @ 19672.7' MD / 9662.0' TVD

Myox 21 State Com #33H
Eddy County, NM (NAD 27)
Q170*** & WT-170***
Plan #1

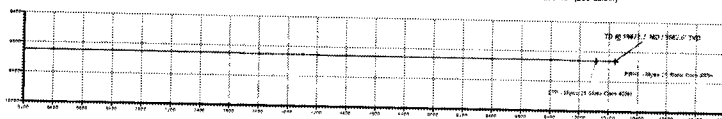
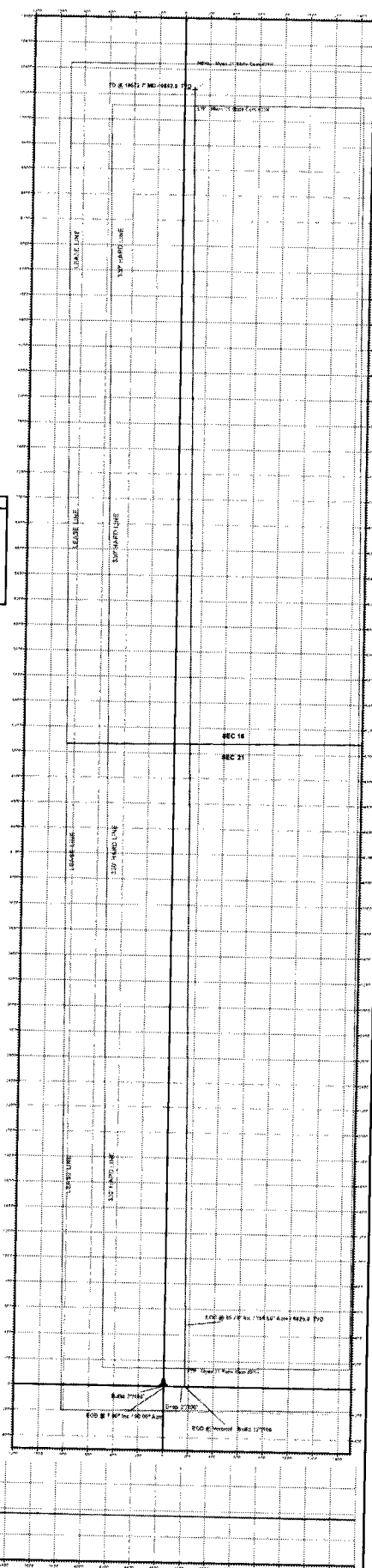
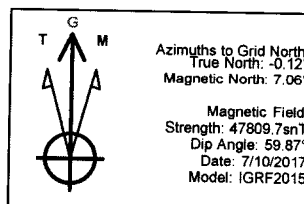
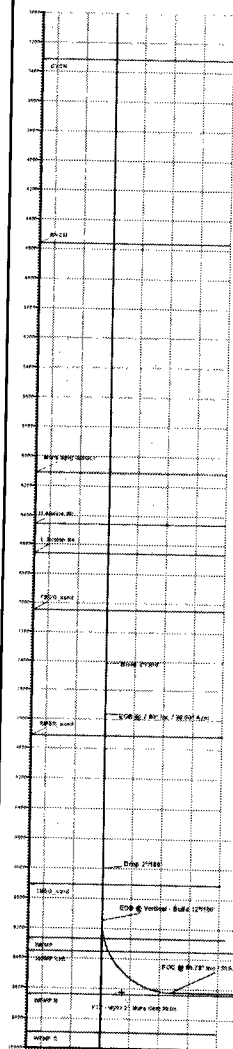
WELL DETAILS: Mues 21 State Cem #7334					
404-B	421-W	Nothing	Ground Level:	2999.9	
0.0	0.0	403288.36	Easting	Latitude	Longitude
			572962.72	32° 0' 30.711 N	104° 5' 51.644 W
					Shot

PROJECT DETAILS: Eddy County, NM (NAD 27)	
Geodetic System:	US State Plane 1927 (Exact solution)
Datum:	NAD 1927 (NADCON CONUS)
Ellipsoid:	Clarke 1886
Zone:	New Mexico East 3001
System Datum:	Mean Sea Level



ANNOTATIONS									
MD	Inc	Alt	TVD	WOB	WOB	Value	Departure	Annotations	
7412.0	0.00	0.00	7412.0	0.0	0.0	0.0	0.0		
7782.0	7.00	60.00	7782.0	0.0	0.0	0.2	21.4	DROP 77.82" Inc / 90.00" Arm	
7982.0	7.00	90.00	7982.0	0.0	0.0	0.2	1.68	EOD 79.82" Inc / 90.00" Arm	
9157.0	0.00	0.00	9157.0	0.0	0.0	0.0	0.0	EOD 91.57" Inc / 90.00" Arm	
9099.0	90.70	365.50	9099.0	475.0	105.0	475.0	645.0	EOD 90.70" Inc / 355.34" Arm / 90.25" W FWD	
9407.0	25.70	265.50	9407.0	79.0	102.40	102.40	1061.0	TD 94.07" WMD / 90.02" W FWD	

DESIGN TARGET DATA							
Name	TYD	966.8	46.40	Northing	Eastings	Latitude	Longitude
LTW - Myer 21 State Cam #234	9673.9	5451.6	46.40	463427.4	873516.9	32° 0' 32.10" N	104° 5' 47.12" W
LTW - plan misses target center by 188.40m at 9614.70m TYD	9632.7	5293.8	168.2 E				
LTW - plan misses target center by 188.40m at 9614.70m TYD	9632.7	5293.8	168.2 E	413296.0	873603.9	37° 0' 18.70" N	104° 5' 58.23" W
PSM - Myer 21 State Cam #234	9662.0	10122.7	78.9	4329.95	873602.72	37° 12.70" N	104° 56.24" W



Myox 21 State Com 33H

	Hole Size	Casing	Wt	Depth	Cmt	TOC
Surface	17.5	13.375	54.5	350'	275	0
Intrmd	12.25	9.625	40	8,900'	2,400	0
Prod	8.5	5.5	20	19,673'	2,500	8,600'

Plan to drill a 17-1/2" hole to 350' with Fresh Water. Run 13-3/8", 54.5#, J-55 csg and cmt to surface. Drill 12-1/4" hole to 8,900' with Diesel/Brine emulsion mud, and run 9-5/8", 40# L-80 and cement to surface. Drill 8-1/2" vertical, curve, and lateral with oil base mud to approximately 19,673' MD. Run 5-1/2", 20#, P-110 csg and cement to 8,600'.

Well Control

Type	Pressure	Test	Manufacture
Double Ram	5000	5000	Horn