



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 21, T25S, R28E

Myox 21 State Com #31H

Wellbore #1 *30-015-44000*

Plan: Plan #1

QES Well Planning Report

11 July, 2017



Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 21, T25S, R28E
Well: Myox 21 State Com #31H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #31H
TVD Reference: RKB @ 3016.0usft (Ensign #156)
MD Reference: RKB @ 3016.0usft (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 #31H			
Well Position	+N/-S	0.0 usft	Northing:	403,285.76 usft
	+E/-W	0.0 usft	Easting:	572,922.78 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level: 2,991.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/20/2017	7.18	59.87	47,807

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	357.09

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	
5,294.9	0.00	0.00	5,294.9	0.0	0.0	0.00	0.00	0.00	0.00	
5,644.9	7.00	270.00	5,644.0	0.0	-21.4	2.00	2.00	0.00	270.00	
8,822.0	7.00	270.00	8,797.4	0.0	-408.5	0.00	0.00	0.00	0.00	
9,172.0	0.00	0.00	9,146.5	0.0	-429.9	2.00	-2.00	0.00	180.00	
9,922.1	90.01	359.50	9,624.0	477.5	-434.1	12.00	12.00	-0.07	359.50	
19,685.8	90.01	359.50	9,622.0	10,240.9	-519.9	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									
304.0	0.00	0.00	304.0	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									
669.0	0.00	0.00	669.0	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)									
2,229.0	0.00	0.00	2,229.0	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)									
2,431.0	0.00	0.00	2,431.0	0.0	0.0	0.0	0.00	0.00	0.00
BLCN									
2,486.0	0.00	0.00	2,486.0	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									
3,315.0	0.00	0.00	3,315.0	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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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)
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									
4,562.0	0.00	0.00	4,562.0	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
Build 2°/100'									
5,294.9	0.00	0.00	5,294.9	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.10	270.00	5,300.0	0.0	0.0	0.0	2.00	2.00	0.00
5,400.0	2.10	270.00	5,400.0	0.0	-1.9	0.1	2.00	2.00	0.00
5,500.0	4.10	270.00	5,499.8	0.0	-7.3	0.4	2.00	2.00	0.00
5,600.0	6.10	270.00	5,599.4	0.0	-16.2	0.8	2.00	2.00	0.00
EOB @ 7.00° Inc / 270.00° Azm									
5,644.9	7.00	270.00	5,644.0	0.0	-21.4	1.1	2.00	2.00	0.00
5,700.0	7.00	270.00	5,698.7	0.0	-28.1	1.4	0.00	0.00	0.00
5,800.0	7.00	270.00	5,798.0	0.0	-40.3	2.0	0.00	0.00	0.00
5,900.0	7.00	270.00	5,897.2	0.0	-52.4	2.7	0.00	0.00	0.00
6,000.0	7.00	270.00	5,996.5	0.0	-64.6	3.3	0.00	0.00	0.00
6,100.0	7.00	270.00	6,095.7	0.0	-76.8	3.9	0.00	0.00	0.00
Bone Sprg (BSGL)									
6,115.4	7.00	270.00	6,111.0	0.0	-78.7	4.0	0.00	0.00	0.00
6,200.0	7.00	270.00	6,195.0	0.0	-89.0	4.5	0.00	0.00	0.00
6,300.0	7.00	270.00	6,294.2	0.0	-101.2	5.1	0.00	0.00	0.00
6,400.0	7.00	270.00	6,393.5	0.0	-113.4	5.7	0.00	0.00	0.00
U Avalon Sh									
6,468.0	7.00	270.00	6,461.0	0.0	-121.7	6.2	0.00	0.00	0.00
6,500.0	7.00	270.00	6,492.8	0.0	-125.6	6.4	0.00	0.00	0.00
6,600.0	7.00	270.00	6,592.0	0.0	-137.8	7.0	0.00	0.00	0.00
L Avalon Sh									
6,672.5	7.00	270.00	6,664.0	0.0	-146.6	7.4	0.00	0.00	0.00
6,700.0	7.00	270.00	6,691.3	0.0	-149.9	7.6	0.00	0.00	0.00
6,800.0	7.00	270.00	6,790.5	0.0	-162.1	8.2	0.00	0.00	0.00
6,900.0	7.00	270.00	6,889.8	0.0	-174.3	8.8	0.00	0.00	0.00
7,000.0	7.00	270.00	6,989.0	0.0	-186.5	9.5	0.00	0.00	0.00
FBSG_sand									
7,063.4	7.00	270.00	7,052.0	0.0	-194.2	9.8	0.00	0.00	0.00
7,100.0	7.00	270.00	7,088.3	0.0	-198.7	10.1	0.00	0.00	0.00
7,200.0	7.00	270.00	7,187.5	0.0	-210.9	10.7	0.00	0.00	0.00
7,300.0	7.00	270.00	7,286.8	0.0	-223.1	11.3	0.00	0.00	0.00
7,400.0	7.00	270.00	7,386.0	0.0	-235.3	11.9	0.00	0.00	0.00
7,500.0	7.00	270.00	7,485.3	0.0	-247.4	12.5	0.00	0.00	0.00
7,600.0	7.00	270.00	7,584.6	0.0	-259.6	13.2	0.00	0.00	0.00
7,700.0	7.00	270.00	7,683.8	0.0	-271.8	13.8	0.00	0.00	0.00
7,800.0	7.00	270.00	7,783.1	0.0	-284.0	14.4	0.00	0.00	0.00
7,900.0	7.00	270.00	7,882.3	0.0	-296.2	15.0	0.00	0.00	0.00

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SBSG_sand									
7,928.9	7.00	270.00	7,911.0	0.0	-299.7	15.2	0.00	0.00	0.00
8,000.0	7.00	270.00	7,981.6	0.0	-308.4	15.6	0.00	0.00	0.00
8,100.0	7.00	270.00	8,080.8	0.0	-320.6	16.3	0.00	0.00	0.00
8,200.0	7.00	270.00	8,180.1	0.0	-332.7	16.9	0.00	0.00	0.00
8,300.0	7.00	270.00	8,279.3	0.0	-344.9	17.5	0.00	0.00	0.00
8,400.0	7.00	270.00	8,378.6	0.0	-357.1	18.1	0.00	0.00	0.00
8,500.0	7.00	270.00	8,477.8	0.0	-369.3	18.7	0.00	0.00	0.00
8,600.0	7.00	270.00	8,577.1	0.0	-381.5	19.3	0.00	0.00	0.00
8,700.0	7.00	270.00	8,676.4	0.0	-393.7	20.0	0.00	0.00	0.00
8,800.0	7.00	270.00	8,775.6	0.0	-405.9	20.6	0.00	0.00	0.00
Drop 2°/100'									
8,822.0	7.00	270.00	8,797.4	0.0	-408.5	20.7	0.00	0.00	0.00
8,900.0	5.44	270.00	8,875.0	0.0	-417.0	21.1	2.00	-2.00	0.00
TBSG_sand									
8,931.1	4.82	270.00	8,906.0	0.0	-419.8	21.3	2.00	-2.00	0.00
9,000.0	3.44	270.00	8,974.7	0.0	-424.7	21.5	2.00	-2.00	0.00
9,100.0	1.44	270.00	9,074.6	0.0	-429.0	21.8	2.00	-2.00	0.00
EOD @ Vertical - Build 12°/100'									
9,172.0	0.00	0.00	9,146.5	0.0	-429.9	21.8	2.00	-2.00	0.00
9,175.0	0.36	359.50	9,149.6	0.0	-429.9	21.8	12.00	12.00	0.00
9,200.0	3.36	359.50	9,174.6	0.8	-429.9	22.6	12.00	12.00	0.00
9,225.0	6.36	359.50	9,199.5	2.9	-429.9	24.7	12.00	12.00	0.00
9,250.0	9.36	359.50	9,224.2	6.4	-430.0	28.2	12.00	12.00	0.00
9,275.0	12.36	359.50	9,248.8	11.1	-430.0	32.9	12.00	12.00	0.00
WFMP									
9,293.7	14.61	359.50	9,267.0	15.4	-430.0	37.2	12.00	12.00	0.00
9,300.0	15.36	359.50	9,273.0	17.1	-430.0	38.8	12.00	12.00	0.00
9,325.0	18.36	359.50	9,297.0	24.3	-430.1	46.1	12.00	12.00	0.00
9,350.0	21.36	359.50	9,320.5	32.8	-430.2	54.6	12.00	12.00	0.00
9,375.0	24.36	359.50	9,343.5	42.5	-430.3	64.3	12.00	12.00	0.00
WFMP Lith									
9,382.1	25.22	359.50	9,350.0	45.5	-430.3	67.3	12.00	12.00	0.00
9,400.0	27.36	359.50	9,366.0	53.4	-430.4	75.2	12.00	12.00	0.00
9,425.0	30.36	359.50	9,387.9	65.5	-430.5	87.2	12.00	12.00	0.00
9,450.0	33.36	359.50	9,409.1	78.7	-430.6	100.4	12.00	12.00	0.00
9,475.0	36.36	359.50	9,429.6	93.0	-430.7	114.7	12.00	12.00	0.00
9,500.0	39.36	359.50	9,449.4	108.3	-430.9	130.0	12.00	12.00	0.00
9,525.0	42.36	359.50	9,468.3	124.7	-431.0	146.4	12.00	12.00	0.00
9,550.0	45.36	359.50	9,486.3	142.0	-431.1	163.7	12.00	12.00	0.00
9,575.0	48.36	359.50	9,503.4	160.2	-431.3	181.9	12.00	12.00	0.00
9,600.0	51.36	359.50	9,519.5	179.3	-431.5	201.0	12.00	12.00	0.00
9,625.0	54.36	359.50	9,534.6	199.3	-431.6	220.9	12.00	12.00	0.00
9,650.0	57.36	359.50	9,548.6	220.0	-431.8	241.6	12.00	12.00	0.00
9,675.0	60.36	359.50	9,561.5	241.4	-432.0	263.0	12.00	12.00	0.00
9,700.0	63.36	359.50	9,573.3	263.4	-432.2	285.0	12.00	12.00	0.00
9,725.0	66.36	359.50	9,584.0	286.0	-432.4	307.6	12.00	12.00	0.00
9,750.0	69.36	359.50	9,593.4	309.2	-432.6	330.7	12.00	12.00	0.00
9,775.0	72.36	359.50	9,601.6	332.8	-432.8	354.3	12.00	12.00	0.00
9,800.0	75.36	359.50	9,608.5	356.8	-433.0	378.3	12.00	12.00	0.00
9,825.0	78.36	359.50	9,614.2	381.2	-433.2	402.6	12.00	12.00	0.00
9,850.0	81.36	359.50	9,618.6	405.8	-433.5	427.2	12.00	12.00	0.00
9,875.0	84.36	359.50	9,621.7	430.6	-433.7	452.0	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 #31H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #31H
TVD Reference: RKB @ 3016.0usft (Ensign #156)
MD Reference: RKB @ 3016.0usft (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)
9,900.0	87.36	359.50	9,623.5	455.5	-433.9	476.9	12.00	12.00	0.00
EOC @ 90.01° Inc / 359.50° Azm / 9624.0' TVD									
9,922.1	90.01	359.50	9,624.0	477.5	-434.1	498.9	12.00	12.00	0.00
10,000.0	90.01	359.50	9,624.0	555.5	-434.8	576.8	0.00	0.00	0.00
10,100.0	90.01	359.50	9,624.0	655.5	-435.7	676.7	0.00	0.00	0.00
10,200.0	90.01	359.50	9,623.9	755.5	-436.5	776.6	0.00	0.00	0.00
10,300.0	90.01	359.50	9,623.9	855.5	-437.4	876.5	0.00	0.00	0.00
10,400.0	90.01	359.50	9,623.9	955.5	-438.3	976.5	0.00	0.00	0.00
10,500.0	90.01	359.50	9,623.9	1,055.5	-439.2	1,076.4	0.00	0.00	0.00
10,600.0	90.01	359.50	9,623.9	1,155.5	-440.1	1,176.3	0.00	0.00	0.00
10,700.0	90.01	359.50	9,623.8	1,255.5	-440.9	1,276.2	0.00	0.00	0.00
10,800.0	90.01	359.50	9,623.8	1,355.5	-441.8	1,376.1	0.00	0.00	0.00
10,900.0	90.01	359.50	9,623.8	1,455.4	-442.7	1,476.0	0.00	0.00	0.00
11,000.0	90.01	359.50	9,623.8	1,555.4	-443.6	1,575.9	0.00	0.00	0.00
11,100.0	90.01	359.50	9,623.8	1,655.4	-444.4	1,675.8	0.00	0.00	0.00
11,200.0	90.01	359.50	9,623.7	1,755.4	-445.3	1,775.8	0.00	0.00	0.00
11,300.0	90.01	359.50	9,623.7	1,855.4	-446.2	1,875.7	0.00	0.00	0.00
11,400.0	90.01	359.50	9,623.7	1,955.4	-447.1	1,975.6	0.00	0.00	0.00
11,500.0	90.01	359.50	9,623.7	2,055.4	-448.0	2,075.5	0.00	0.00	0.00
11,600.0	90.01	359.50	9,623.7	2,155.4	-448.8	2,175.4	0.00	0.00	0.00
11,700.0	90.01	359.50	9,623.6	2,255.4	-449.7	2,275.3	0.00	0.00	0.00
11,800.0	90.01	359.50	9,623.6	2,355.4	-450.6	2,375.2	0.00	0.00	0.00
11,900.0	90.01	359.50	9,623.6	2,455.4	-451.5	2,475.1	0.00	0.00	0.00
12,000.0	90.01	359.50	9,623.6	2,555.4	-452.4	2,575.1	0.00	0.00	0.00
12,100.0	90.01	359.50	9,623.6	2,655.4	-453.2	2,675.0	0.00	0.00	0.00
12,200.0	90.01	359.50	9,623.5	2,755.4	-454.1	2,774.9	0.00	0.00	0.00
12,300.0	90.01	359.50	9,623.5	2,855.4	-455.0	2,874.8	0.00	0.00	0.00
12,400.0	90.01	359.50	9,623.5	2,955.4	-455.9	2,974.7	0.00	0.00	0.00
12,500.0	90.01	359.50	9,623.5	3,055.4	-456.8	3,074.6	0.00	0.00	0.00
12,600.0	90.01	359.50	9,623.5	3,155.4	-457.6	3,174.5	0.00	0.00	0.00
12,700.0	90.01	359.50	9,623.4	3,255.4	-458.5	3,274.4	0.00	0.00	0.00
12,800.0	90.01	359.50	9,623.4	3,355.4	-459.4	3,374.4	0.00	0.00	0.00
12,900.0	90.01	359.50	9,623.4	3,455.4	-460.3	3,474.3	0.00	0.00	0.00
13,000.0	90.01	359.50	9,623.4	3,555.4	-461.1	3,574.2	0.00	0.00	0.00
13,100.0	90.01	359.50	9,623.4	3,655.4	-462.0	3,674.1	0.00	0.00	0.00
13,200.0	90.01	359.50	9,623.3	3,755.4	-462.9	3,774.0	0.00	0.00	0.00
13,300.0	90.01	359.50	9,623.3	3,855.4	-463.8	3,873.9	0.00	0.00	0.00
13,400.0	90.01	359.50	9,623.3	3,955.4	-464.7	3,973.8	0.00	0.00	0.00
13,500.0	90.01	359.50	9,623.3	4,055.3	-465.5	4,073.7	0.00	0.00	0.00
13,600.0	90.01	359.50	9,623.2	4,155.3	-466.4	4,173.6	0.00	0.00	0.00
13,700.0	90.01	359.50	9,623.2	4,255.3	-467.3	4,273.6	0.00	0.00	0.00
13,800.0	90.01	359.50	9,623.2	4,355.3	-468.2	4,373.5	0.00	0.00	0.00
13,900.0	90.01	359.50	9,623.2	4,455.3	-469.1	4,473.4	0.00	0.00	0.00
14,000.0	90.01	359.50	9,623.2	4,555.3	-469.9	4,573.3	0.00	0.00	0.00
14,100.0	90.01	359.50	9,623.1	4,655.3	-470.8	4,673.2	0.00	0.00	0.00
14,200.0	90.01	359.50	9,623.1	4,755.3	-471.7	4,773.1	0.00	0.00	0.00
14,300.0	90.01	359.50	9,623.1	4,855.3	-472.6	4,873.0	0.00	0.00	0.00
14,400.0	90.01	359.50	9,623.1	4,955.3	-473.4	4,972.9	0.00	0.00	0.00
14,500.0	90.01	359.50	9,623.1	5,055.3	-474.3	5,072.9	0.00	0.00	0.00
14,600.0	90.01	359.50	9,623.0	5,155.3	-475.2	5,172.8	0.00	0.00	0.00
14,700.0	90.01	359.50	9,623.0	5,255.3	-476.1	5,272.7	0.00	0.00	0.00
14,800.0	90.01	359.50	9,623.0	5,355.3	-477.0	5,372.6	0.00	0.00	0.00
14,900.0	90.01	359.50	9,623.0	5,455.3	-477.8	5,472.5	0.00	0.00	0.00
15,000.0	90.01	359.50	9,623.0	5,555.3	-478.7	5,572.4	0.00	0.00	0.00

Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
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Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #31H
TVD Reference: RKB @ 3016.0usft (Ensign #156)
MD Reference: RKB @ 3016.0usft (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)
15,100.0	90.01	359.50	9,622.9	5,655.3	-479.6	5,672.3	0.00	0.00	0.00
15,200.0	90.01	359.50	9,622.9	5,755.3	-480.5	5,772.2	0.00	0.00	0.00
15,300.0	90.01	359.50	9,622.9	5,855.3	-481.4	5,872.2	0.00	0.00	0.00
15,400.0	90.01	359.50	9,622.9	5,955.3	-482.2	5,972.1	0.00	0.00	0.00
15,500.0	90.01	359.50	9,622.9	6,055.3	-483.1	6,072.0	0.00	0.00	0.00
15,600.0	90.01	359.50	9,622.8	6,155.3	-484.0	6,171.9	0.00	0.00	0.00
15,700.0	90.01	359.50	9,622.8	6,255.3	-484.9	6,271.8	0.00	0.00	0.00
15,800.0	90.01	359.50	9,622.8	6,355.3	-485.8	6,371.7	0.00	0.00	0.00
15,900.0	90.01	359.50	9,622.8	6,455.3	-486.6	6,471.6	0.00	0.00	0.00
16,000.0	90.01	359.50	9,622.8	6,555.3	-487.5	6,571.5	0.00	0.00	0.00
16,100.0	90.01	359.50	9,622.7	6,655.2	-488.4	6,671.4	0.00	0.00	0.00
16,200.0	90.01	359.50	9,622.7	6,755.2	-489.3	6,771.4	0.00	0.00	0.00
16,300.0	90.01	359.50	9,622.7	6,855.2	-490.1	6,871.3	0.00	0.00	0.00
16,400.0	90.01	359.50	9,622.7	6,955.2	-491.0	6,971.2	0.00	0.00	0.00
16,500.0	90.01	359.50	9,622.7	7,055.2	-491.9	7,071.1	0.00	0.00	0.00
16,600.0	90.01	359.50	9,622.6	7,155.2	-492.8	7,171.0	0.00	0.00	0.00
16,700.0	90.01	359.50	9,622.6	7,255.2	-493.7	7,270.9	0.00	0.00	0.00
16,800.0	90.01	359.50	9,622.6	7,355.2	-494.5	7,370.8	0.00	0.00	0.00
16,900.0	90.01	359.50	9,622.6	7,455.2	-495.4	7,470.7	0.00	0.00	0.00
17,000.0	90.01	359.50	9,622.6	7,555.2	-496.3	7,570.7	0.00	0.00	0.00
17,100.0	90.01	359.50	9,622.5	7,655.2	-497.2	7,670.6	0.00	0.00	0.00
17,200.0	90.01	359.50	9,622.5	7,755.2	-498.1	7,770.5	0.00	0.00	0.00
17,300.0	90.01	359.50	9,622.5	7,855.2	-498.9	7,870.4	0.00	0.00	0.00
17,400.0	90.01	359.50	9,622.5	7,955.2	-499.8	7,970.3	0.00	0.00	0.00
17,500.0	90.01	359.50	9,622.4	8,055.2	-500.7	8,070.2	0.00	0.00	0.00
17,600.0	90.01	359.50	9,622.4	8,155.2	-501.6	8,170.1	0.00	0.00	0.00
17,700.0	90.01	359.50	9,622.4	8,255.2	-502.4	8,270.0	0.00	0.00	0.00
17,800.0	90.01	359.50	9,622.4	8,355.2	-503.3	8,370.0	0.00	0.00	0.00
17,900.0	90.01	359.50	9,622.4	8,455.2	-504.2	8,469.9	0.00	0.00	0.00
18,000.0	90.01	359.50	9,622.3	8,555.2	-505.1	8,569.8	0.00	0.00	0.00
18,100.0	90.01	359.50	9,622.3	8,655.2	-506.0	8,669.7	0.00	0.00	0.00
18,200.0	90.01	359.50	9,622.3	8,755.2	-506.8	8,769.6	0.00	0.00	0.00
18,300.0	90.01	359.50	9,622.3	8,855.2	-507.7	8,869.5	0.00	0.00	0.00
18,400.0	90.01	359.50	9,622.3	8,955.2	-508.6	8,969.4	0.00	0.00	0.00
18,500.0	90.01	359.50	9,622.2	9,055.2	-509.5	9,069.3	0.00	0.00	0.00
18,600.0	90.01	359.50	9,622.2	9,155.2	-510.4	9,169.3	0.00	0.00	0.00
18,700.0	90.01	359.50	9,622.2	9,255.1	-511.2	9,269.2	0.00	0.00	0.00
18,800.0	90.01	359.50	9,622.2	9,355.1	-512.1	9,369.1	0.00	0.00	0.00
18,900.0	90.01	359.50	9,622.2	9,455.1	-513.0	9,469.0	0.00	0.00	0.00
19,000.0	90.01	359.50	9,622.1	9,555.1	-513.9	9,568.9	0.00	0.00	0.00
19,100.0	90.01	359.50	9,622.1	9,655.1	-514.8	9,668.8	0.00	0.00	0.00
19,200.0	90.01	359.50	9,622.1	9,755.1	-515.6	9,768.7	0.00	0.00	0.00
19,300.0	90.01	359.50	9,622.1	9,855.1	-516.5	9,868.6	0.00	0.00	0.00
19,400.0	90.01	359.50	9,622.1	9,955.1	-517.4	9,968.5	0.00	0.00	0.00
19,500.0	90.01	359.50	9,622.0	10,055.1	-518.3	10,068.5	0.00	0.00	0.00
19,600.0	90.01	359.50	9,622.0	10,155.1	-519.1	10,168.4	0.00	0.00	0.00
TD @ 19685.8' MD / 9622.0' TVD									
19,685.8	90.01	359.50	9,622.0	10,240.9	-519.9	10,254.1	0.00	0.00	0.00

Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
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Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #31H
TVD Reference: RKB @ 3016.0usft (Ensign #156)
MD Reference: RKB @ 3016.0usft (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
PBHL - Myox 21 State C - plan hits target center - Point	0.00	0.00	9,622.0	10,240.9	-519.9	413,526.71	572,402.88	32° 8' 12.068 N	104° 5' 57.927 W
LTP - Myox 21 State Cor - plan hits target center - Point	0.00	0.00	9,622.0	10,111.0	-518.7	413,396.76	572,404.06	32° 8' 10.782 N	104° 5' 57.917 W
FTP - Myox 21 State Co - plan misses target center by 125.9usft at 9634.1usft MD (9539.8 TVD, 206.7 N, -431.7 E) - Point	0.00	0.00	9,644.0	136.1	-431.1	403,421.86	572,491.69	32° 6' 32.063 N	104° 5' 57.150 W

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
304.0	304.0	Rustler			
669.0	669.0	TOS			
2,229.0	2,229.0	BOS (Fletcher)			
2,431.0	2,431.0	LMAR (Top Delaware)			
2,486.0	2,486.0	BLCN			
3,315.0	3,315.0	CYCN			
4,562.0	4,562.0	BYCN			
6,115.4	6,111.0	Bone Sprg (BSGL)			
6,468.0	6,461.0	U Avalon Sh			
6,672.5	6,664.0	L Avalon Sh			
7,063.4	7,052.0	FBSG_sand			
7,928.9	7,911.0	SBSG_sand			
8,931.1	8,906.0	TBSG_sand			
9,293.7	9,267.0	WFMP			
9,382.1	9,350.0	WFMP Lith			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,294.9	5,294.9	0.0	0.0	Build 2°/100'
5,644.9	5,644.0	0.0	-21.4	EOB @ 7.00° Inc / 270.00° Azm
8,822.0	8,797.4	0.0	-408.5	Drop 2°/100'
9,172.0	9,146.5	0.0	-429.9	EOD @ Vertical - Build 12°/100'
9,922.1	9,624.0	477.5	-434.1	EOC @ 90.01° Inc / 359.50° Azm / 9624.0' TVD
19,685.8	9,622.0	10,240.9	-519.9	TD @ 19685.8' MD / 9622.0' TVD

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

Company Name: COG Operating, LLC
Myox 21 State Com #31H
Eddy County, NM (NAD 27)
Rig: Design #356
Created By: Chase Chambers
Date: 7/18/17

Myox 21 State Com #31H
Eddy County, NM (NAD 27)
Q170** & WT-170**
Plan #1

WELL DETAILS: Myox 21 State Com #31H

MD	HT	Surfing	Ground Level	Eastings	Northings	Lat/Long	Spot
4.4	6.0	402291.78	57201.78	32° 5' 30.747 N	104° 5' 52.141 W		

PROJECT DETAILS: Eddy County, NM (NAD 27)

Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Elevation: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

CONCHO

QES

Q170** & WT-170**

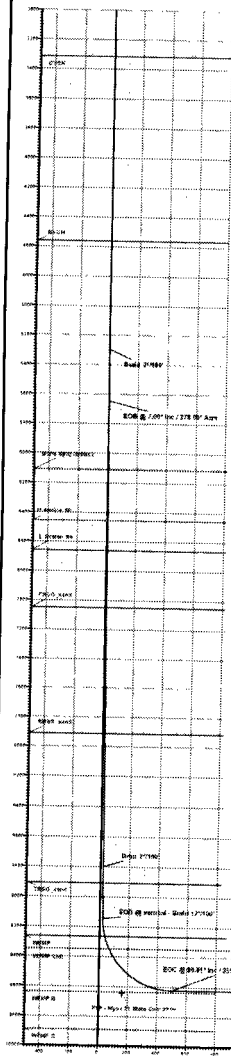
ANNOTATIONS

MD	HT	AS	TVD	HT-6	HT-1W	Wsect	Departure	Annotation
1291.0	8.00	17.00	3264.0	0.0	0.0	7.4	7.4	Build 27100'
1622.0	7.00	270.00	3640.0	0.0	-21.4	1.1	1.1	DO @ 280' Inc / 278.00' Ann
1822.0	7.00	270.00	3712.0	0.0	-408.0	0.1	201.0	DO @ 27100'
1912.0	6.00	8.00	3560.0	0.0	-428.0	21.6	429.0	DO @ Vertical - Build 127100'
1822.1	88.01	351.00	3824.0	477.0	-436.1	488.0	507.0	DO @ 100' Inc / 100.00' Ann 1824.0' TVD
1860.0	88.01	351.00	3822.0	1834.0	-416.0	1824.1	1807.1	TD @ 1860.0' MD / 3822.0' TVD

DESIGN TARGET DETAILS

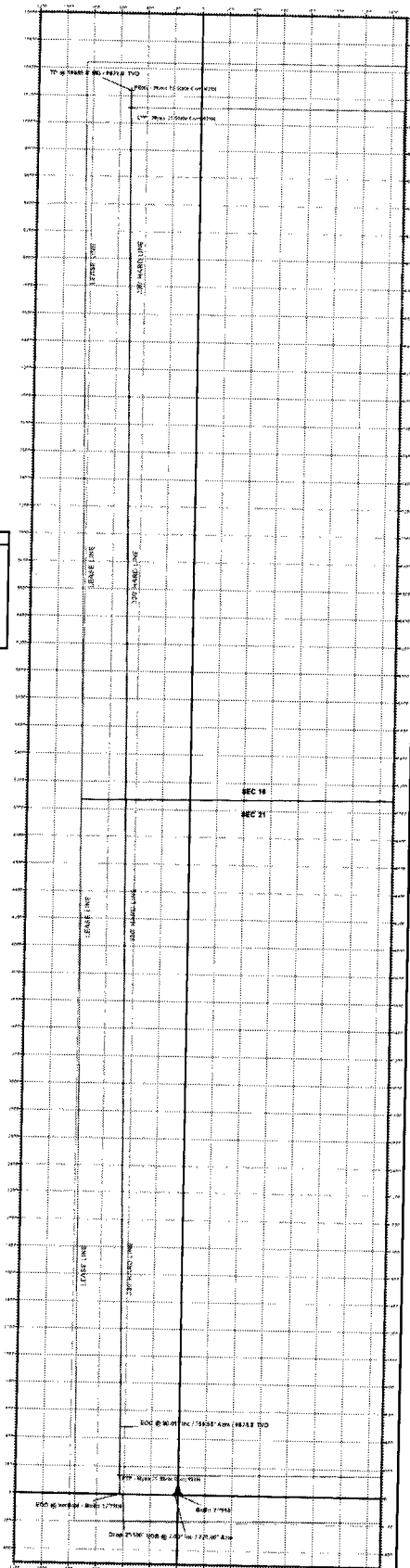
Name	TVD	HT-6	HT-1W	Surfing	Spotting	Latitude	Longitude
LTP - Myox 21 State Com #31H	1822.0	16101.0	-616.7	47399.78	57200.00	32° 5' 30.747 N	104° 5' 52.141 W
PRM - Myox 21 State Com #31H	1822.0	16241.0	-616.0	47328.71	57200.00	32° 5' 32.000 N	104° 5' 57.000 W
FTV - Myox 21 State Com #31H	1864.0	131.1	-231.1	48041.00	57200.00	32° 5' 32.000 N	104° 5' 57.100 W

When missed target center by 120' South of 1824.1' MD 1824.0' TVD, 200' W, 431' D



Azimuths to Grid North
True North: -0.12°
Magnetic North: 7.05°

Magnetic Field
Strength: 47806.8nT
Dip Angle: 59.87°
Date: 7/20/2017
Model: IGRF2015



Vertical Section at 357.09' (200' usft/m)