



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 21, T25S, R28E

Myox 21 State Com #32H

30-015-44002

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 #32H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #32H
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 #32H			
Well Position	+N/-S	0.3 usft	Northing:	403,286.05 usft
	+E/-W	30.0 usft	Easting:	572,952.82 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	Field Strength
			(°)	(°)	(nT)
	IGRF2015	7/24/2017	7.18	59.87	47,806

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	358.77

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	
7,527.1	0.00	0.00	7,527.1	0.0	0.0	0.00	0.00	0.00	0.00	
7,877.1	7.00	270.00	7,876.2	0.0	-21.4	2.00	2.00	0.00	270.00	
8,593.6	7.00	270.00	8,587.4	0.0	-108.7	0.00	0.00	0.00	0.00	
8,943.6	0.00	0.00	8,936.5	0.0	-130.0	2.00	-2.00	0.00	180.00	
9,693.2	89.95	359.50	9,414.0	477.0	-134.2	12.00	12.00	-0.07	359.50	
19,458.3	89.95	359.50	9,423.0	10,241.8	-220.0	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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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
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)									
6,111.0	0.00	0.00	6,111.0	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									
6,461.0	0.00	0.00	6,461.0	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									
6,664.0	0.00	0.00	6,664.0	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									
7,052.0	0.00	0.00	7,052.0	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
Build 2°/100'									
7,527.1	0.00	0.00	7,527.1	0.0	0.0	0.0	0.00	0.00	0.00
7,600.0	1.46	270.00	7,600.0	0.0	-0.9	0.0	2.00	2.00	0.00
7,700.0	3.46	270.00	7,699.9	0.0	-5.2	0.1	2.00	2.00	0.00
7,800.0	5.46	270.00	7,799.6	0.0	-13.0	0.3	2.00	2.00	0.00
EOB @ 7.00° Inc / 270.00° Azm									
7,877.1	7.00	270.00	7,876.2	0.0	-21.4	0.5	2.00	2.00	0.00
7,900.0	7.00	270.00	7,899.0	0.0	-24.1	0.5	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)
SBSG_sand									
7,912.1	7.00	270.00	7,911.0	0.0	-25.6	0.6	0.00	0.00	0.00
8,000.0	7.00	270.00	7,998.2	0.0	-36.3	0.8	0.00	0.00	0.00
8,100.0	7.00	270.00	8,097.5	0.0	-48.5	1.0	0.00	0.00	0.00
8,200.0	7.00	270.00	8,196.7	0.0	-60.7	1.3	0.00	0.00	0.00
8,300.0	7.00	270.00	8,296.0	0.0	-72.9	1.6	0.00	0.00	0.00
8,400.0	7.00	270.00	8,395.2	0.0	-85.1	1.8	0.00	0.00	0.00
8,500.0	7.00	270.00	8,494.5	0.0	-97.3	2.1	0.00	0.00	0.00
Drop 2°/100'									
8,593.6	7.00	270.00	8,587.4	0.0	-108.7	2.3	0.00	0.00	0.00
8,600.0	6.87	270.00	8,593.7	0.0	-109.4	2.4	2.00	-2.00	0.00
8,700.0	4.87	270.00	8,693.2	0.0	-119.7	2.6	2.00	-2.00	0.00
8,800.0	2.87	270.00	8,793.0	0.0	-126.4	2.7	2.00	-2.00	0.00
8,900.0	0.87	270.00	8,892.9	0.0	-129.7	2.8	2.00	-2.00	0.00
TBSG_sand									
8,913.1	0.61	270.00	8,906.0	0.0	-129.9	2.8	2.00	-2.00	0.00
EOD @ Vertical - Build 12°/100'									
8,943.6	0.00	0.00	8,936.5	0.0	-130.0	2.8	2.00	-2.00	0.00
8,950.0	0.77	359.50	8,942.9	0.0	-130.0	2.8	12.00	12.00	0.00
8,975.0	3.77	359.50	8,967.9	1.0	-130.0	3.8	12.00	12.00	0.00
9,000.0	6.77	359.50	8,992.8	3.3	-130.1	6.1	12.00	12.00	0.00
9,025.0	9.77	359.50	9,017.5	6.9	-130.1	9.7	12.00	12.00	0.00
9,050.0	12.77	359.50	9,042.0	11.8	-130.1	14.6	12.00	12.00	0.00
9,075.0	15.77	359.50	9,066.3	18.0	-130.2	20.8	12.00	12.00	0.00
9,100.0	18.77	359.50	9,090.1	25.4	-130.2	28.2	12.00	12.00	0.00
9,125.0	21.77	359.50	9,113.6	34.0	-130.3	36.8	12.00	12.00	0.00
9,150.0	24.77	359.50	9,136.6	43.9	-130.4	46.7	12.00	12.00	0.00
9,175.0	27.77	359.50	9,159.0	55.0	-130.5	57.8	12.00	12.00	0.00
9,200.0	30.77	359.50	9,180.8	67.2	-130.6	70.0	12.00	12.00	0.00
9,225.0	33.77	359.50	9,201.9	80.5	-130.7	83.3	12.00	12.00	0.00
9,250.0	36.77	359.50	9,222.3	95.0	-130.9	97.8	12.00	12.00	0.00
9,275.0	39.77	359.50	9,241.9	110.5	-131.0	113.2	12.00	12.00	0.00
9,300.0	42.77	359.50	9,260.7	126.9	-131.1	129.7	12.00	12.00	0.00
WFMP									
9,308.6	43.80	359.50	9,267.0	132.8	-131.2	135.6	12.00	12.00	0.00
9,325.0	45.77	359.50	9,278.6	144.4	-131.3	147.2	12.00	12.00	0.00
9,350.0	48.77	359.50	9,295.6	162.7	-131.5	165.5	12.00	12.00	0.00
9,375.0	51.77	359.50	9,311.6	182.0	-131.6	184.8	12.00	12.00	0.00
9,400.0	54.77	359.50	9,326.5	202.0	-131.8	204.8	12.00	12.00	0.00
9,425.0	57.77	359.50	9,340.4	222.8	-132.0	225.6	12.00	12.00	0.00
WFMP Lith									
9,443.6	59.99	359.50	9,350.0	238.7	-132.1	241.4	12.00	12.00	0.00
9,450.0	60.77	359.50	9,353.2	244.3	-132.2	247.1	12.00	12.00	0.00
9,475.0	63.77	359.50	9,364.8	266.4	-132.4	269.2	12.00	12.00	0.00
9,500.0	66.77	359.50	9,375.3	289.1	-132.6	291.9	12.00	12.00	0.00
9,525.0	69.77	359.50	9,384.5	312.3	-132.8	315.1	12.00	12.00	0.00
9,550.0	72.77	359.50	9,392.6	336.0	-133.0	338.8	12.00	12.00	0.00
9,575.0	75.77	359.50	9,399.3	360.1	-133.2	362.8	12.00	12.00	0.00
9,600.0	78.77	359.50	9,404.9	384.4	-133.4	387.2	12.00	12.00	0.00
9,625.0	81.77	359.50	9,409.1	409.1	-133.6	411.8	12.00	12.00	0.00
9,650.0	84.77	359.50	9,412.0	433.9	-133.8	436.7	12.00	12.00	0.00
9,675.0	87.77	359.50	9,413.6	458.8	-134.1	461.6	12.00	12.00	0.00

EOC @ 89.95° Inc / 359.50° Azm / 9414.0' TVD

Database: EDM5002
Company: COG Operating, LLC
Project: Eddy County, NM (NAD 27)
Site: Sec 21, T25S, R28E
Well: Myox 21 State Com #32H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well Myox 21 State Com #32H
 RKB @ 3015.0usft (Ensign #156)
 RKB @ 3015.0usft (Ensign #156)
 Grid
 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)
9,693.2	89.95	359.50	9,414.0	477.0	-134.2	479.8	12.00	12.00	0.00
9,700.0	89.95	359.50	9,414.0	483.8	-134.3	486.6	0.00	0.00	0.00
9,800.0	89.95	359.50	9,414.1	583.8	-135.2	586.6	0.00	0.00	0.00
9,900.0	89.95	359.50	9,414.2	683.8	-136.0	686.6	0.00	0.00	0.00
10,000.0	89.95	359.50	9,414.3	783.8	-136.9	786.6	0.00	0.00	0.00
10,100.0	89.95	359.50	9,414.4	883.8	-137.8	886.6	0.00	0.00	0.00
10,200.0	89.95	359.50	9,414.5	983.8	-138.7	986.6	0.00	0.00	0.00
10,300.0	89.95	359.50	9,414.6	1,083.8	-139.6	1,086.6	0.00	0.00	0.00
10,400.0	89.95	359.50	9,414.7	1,183.8	-140.4	1,186.5	0.00	0.00	0.00
10,500.0	89.95	359.50	9,414.7	1,283.8	-141.3	1,286.5	0.00	0.00	0.00
10,600.0	89.95	359.50	9,414.8	1,383.8	-142.2	1,386.5	0.00	0.00	0.00
10,700.0	89.95	359.50	9,414.9	1,483.8	-143.1	1,486.5	0.00	0.00	0.00
10,800.0	89.95	359.50	9,415.0	1,583.8	-143.9	1,586.5	0.00	0.00	0.00
10,900.0	89.95	359.50	9,415.1	1,683.8	-144.8	1,686.5	0.00	0.00	0.00
11,000.0	89.95	359.50	9,415.2	1,783.8	-145.7	1,786.5	0.00	0.00	0.00
11,100.0	89.95	359.50	9,415.3	1,883.8	-146.6	1,886.5	0.00	0.00	0.00
11,200.0	89.95	359.50	9,415.4	1,983.8	-147.5	1,986.5	0.00	0.00	0.00
11,300.0	89.95	359.50	9,415.5	2,083.8	-148.3	2,086.5	0.00	0.00	0.00
11,400.0	89.95	359.50	9,415.6	2,183.8	-149.2	2,186.5	0.00	0.00	0.00
11,500.0	89.95	359.50	9,415.7	2,283.8	-150.1	2,286.5	0.00	0.00	0.00
11,600.0	89.95	359.50	9,415.8	2,383.8	-151.0	2,386.4	0.00	0.00	0.00
11,700.0	89.95	359.50	9,415.9	2,483.8	-151.9	2,486.4	0.00	0.00	0.00
11,800.0	89.95	359.50	9,415.9	2,583.7	-152.7	2,586.4	0.00	0.00	0.00
11,900.0	89.95	359.50	9,416.0	2,683.7	-153.6	2,686.4	0.00	0.00	0.00
12,000.0	89.95	359.50	9,416.1	2,783.7	-154.5	2,786.4	0.00	0.00	0.00
12,100.0	89.95	359.50	9,416.2	2,883.7	-155.4	2,886.4	0.00	0.00	0.00
12,200.0	89.95	359.50	9,416.3	2,983.7	-156.2	2,986.4	0.00	0.00	0.00
12,300.0	89.95	359.50	9,416.4	3,083.7	-157.1	3,086.4	0.00	0.00	0.00
12,400.0	89.95	359.50	9,416.5	3,183.7	-158.0	3,186.4	0.00	0.00	0.00
12,500.0	89.95	359.50	9,416.6	3,283.7	-158.9	3,286.4	0.00	0.00	0.00
12,600.0	89.95	359.50	9,416.7	3,383.7	-159.8	3,386.4	0.00	0.00	0.00
12,700.0	89.95	359.50	9,416.8	3,483.7	-160.6	3,486.4	0.00	0.00	0.00
12,800.0	89.95	359.50	9,416.9	3,583.7	-161.5	3,586.4	0.00	0.00	0.00
12,900.0	89.95	359.50	9,417.0	3,683.7	-162.4	3,686.3	0.00	0.00	0.00
13,000.0	89.95	359.50	9,417.0	3,783.7	-163.3	3,786.3	0.00	0.00	0.00
13,100.0	89.95	359.50	9,417.1	3,883.7	-164.2	3,886.3	0.00	0.00	0.00
13,200.0	89.95	359.50	9,417.2	3,983.7	-165.0	3,986.3	0.00	0.00	0.00
13,300.0	89.95	359.50	9,417.3	4,083.7	-165.9	4,086.3	0.00	0.00	0.00
13,400.0	89.95	359.50	9,417.4	4,183.7	-166.8	4,186.3	0.00	0.00	0.00
13,500.0	89.95	359.50	9,417.5	4,283.7	-167.7	4,286.3	0.00	0.00	0.00
13,600.0	89.95	359.50	9,417.6	4,383.7	-168.5	4,386.3	0.00	0.00	0.00
13,700.0	89.95	359.50	9,417.7	4,483.7	-169.4	4,486.3	0.00	0.00	0.00
13,800.0	89.95	359.50	9,417.8	4,583.7	-170.3	4,586.3	0.00	0.00	0.00
13,900.0	89.95	359.50	9,417.9	4,683.7	-171.2	4,686.3	0.00	0.00	0.00
14,000.0	89.95	359.50	9,418.0	4,783.7	-172.1	4,786.3	0.00	0.00	0.00
14,100.0	89.95	359.50	9,418.1	4,883.7	-172.9	4,886.2	0.00	0.00	0.00
14,200.0	89.95	359.50	9,418.2	4,983.7	-173.8	4,986.2	0.00	0.00	0.00
14,300.0	89.95	359.50	9,418.2	5,083.6	-174.7	5,086.2	0.00	0.00	0.00
14,400.0	89.95	359.50	9,418.3	5,183.6	-175.6	5,186.2	0.00	0.00	0.00
14,500.0	89.95	359.50	9,418.4	5,283.6	-176.5	5,286.2	0.00	0.00	0.00
14,600.0	89.95	359.50	9,418.5	5,383.6	-177.3	5,386.2	0.00	0.00	0.00
14,700.0	89.95	359.50	9,418.6	5,483.6	-178.2	5,486.2	0.00	0.00	0.00
14,800.0	89.95	359.50	9,418.7	5,583.6	-179.1	5,586.2	0.00	0.00	0.00
14,900.0	89.95	359.50	9,418.8	5,683.6	-180.0	5,686.2	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 #32H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #32H
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	89.95	359.50	9,418.9	5,783.6	-180.8	5,786.2	0.00	0.00	0.00
15,100.0	89.95	359.50	9,419.0	5,883.6	-181.7	5,886.2	0.00	0.00	0.00
15,200.0	89.95	359.50	9,419.1	5,983.6	-182.6	5,986.2	0.00	0.00	0.00
15,300.0	89.95	359.50	9,419.2	6,083.6	-183.5	6,086.1	0.00	0.00	0.00
15,400.0	89.95	359.50	9,419.3	6,183.6	-184.4	6,186.1	0.00	0.00	0.00
15,500.0	89.95	359.50	9,419.4	6,283.6	-185.2	6,286.1	0.00	0.00	0.00
15,600.0	89.95	359.50	9,419.4	6,383.6	-186.1	6,386.1	0.00	0.00	0.00
15,700.0	89.95	359.50	9,419.5	6,483.6	-187.0	6,486.1	0.00	0.00	0.00
15,800.0	89.95	359.50	9,419.6	6,583.6	-187.9	6,586.1	0.00	0.00	0.00
15,900.0	89.95	359.50	9,419.7	6,683.6	-188.8	6,686.1	0.00	0.00	0.00
16,000.0	89.95	359.50	9,419.8	6,783.6	-189.6	6,786.1	0.00	0.00	0.00
16,100.0	89.95	359.50	9,419.9	6,883.6	-190.5	6,886.1	0.00	0.00	0.00
16,200.0	89.95	359.50	9,420.0	6,983.6	-191.4	6,986.1	0.00	0.00	0.00
16,300.0	89.95	359.50	9,420.1	7,083.6	-192.3	7,086.1	0.00	0.00	0.00
16,400.0	89.95	359.50	9,420.2	7,183.6	-193.1	7,186.1	0.00	0.00	0.00
16,500.0	89.95	359.50	9,420.3	7,283.6	-194.0	7,286.1	0.00	0.00	0.00
16,600.0	89.95	359.50	9,420.4	7,383.6	-194.9	7,386.0	0.00	0.00	0.00
16,700.0	89.95	359.50	9,420.5	7,483.6	-195.8	7,486.0	0.00	0.00	0.00
16,800.0	89.95	359.50	9,420.6	7,583.6	-196.7	7,586.0	0.00	0.00	0.00
16,900.0	89.95	359.50	9,420.6	7,683.5	-197.5	7,686.0	0.00	0.00	0.00
17,000.0	89.95	359.50	9,420.7	7,783.5	-198.4	7,786.0	0.00	0.00	0.00
17,100.0	89.95	359.50	9,420.8	7,883.5	-199.3	7,886.0	0.00	0.00	0.00
17,200.0	89.95	359.50	9,420.9	7,983.5	-200.2	7,986.0	0.00	0.00	0.00
17,300.0	89.95	359.50	9,421.0	8,083.5	-201.1	8,086.0	0.00	0.00	0.00
17,400.0	89.95	359.50	9,421.1	8,183.5	-201.9	8,186.0	0.00	0.00	0.00
17,500.0	89.95	359.50	9,421.2	8,283.5	-202.8	8,286.0	0.00	0.00	0.00
17,600.0	89.95	359.50	9,421.3	8,383.5	-203.7	8,386.0	0.00	0.00	0.00
17,700.0	89.95	359.50	9,421.4	8,483.5	-204.6	8,486.0	0.00	0.00	0.00
17,800.0	89.95	359.50	9,421.5	8,583.5	-205.4	8,585.9	0.00	0.00	0.00
17,900.0	89.95	359.50	9,421.6	8,683.5	-206.3	8,685.9	0.00	0.00	0.00
18,000.0	89.95	359.50	9,421.7	8,783.5	-207.2	8,785.9	0.00	0.00	0.00
18,100.0	89.95	359.50	9,421.7	8,883.5	-208.1	8,885.9	0.00	0.00	0.00
18,200.0	89.95	359.50	9,421.8	8,983.5	-209.0	8,985.9	0.00	0.00	0.00
18,300.0	89.95	359.50	9,421.9	9,083.5	-209.8	9,085.9	0.00	0.00	0.00
18,400.0	89.95	359.50	9,422.0	9,183.5	-210.7	9,185.9	0.00	0.00	0.00
18,500.0	89.95	359.50	9,422.1	9,283.5	-211.6	9,285.9	0.00	0.00	0.00
18,600.0	89.95	359.50	9,422.2	9,383.5	-212.5	9,385.9	0.00	0.00	0.00
18,700.0	89.95	359.50	9,422.3	9,483.5	-213.4	9,485.9	0.00	0.00	0.00
18,800.0	89.95	359.50	9,422.4	9,583.5	-214.2	9,585.9	0.00	0.00	0.00
18,900.0	89.95	359.50	9,422.5	9,683.5	-215.1	9,685.9	0.00	0.00	0.00
19,000.0	89.95	359.50	9,422.6	9,783.5	-216.0	9,785.8	0.00	0.00	0.00
19,100.0	89.95	359.50	9,422.7	9,883.5	-216.9	9,885.8	0.00	0.00	0.00
19,200.0	89.95	359.50	9,422.8	9,983.5	-217.8	9,985.8	0.00	0.00	0.00
19,300.0	89.95	359.50	9,422.9	10,083.5	-218.6	10,085.8	0.00	0.00	0.00
19,400.0	89.95	359.50	9,422.9	10,183.5	-219.5	10,185.8	0.00	0.00	0.00
TD @ 19458.3' MD / 9423.0' TVD									
19,458.3	89.95	359.50	9,423.0	10,241.8	-220.0	10,244.1	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 #32H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Myox 21 State Com #32H
TVD Reference: RKB @ 3015.0usft (Ensign #156)
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 107.9usft at 9400.0usft MD (9326.5 TVD, 202.0 N, -131.8 E) - Point	0.00	0.00	9,414.0	138.7	-131.3	403,424.80	572,821.57	32° 6' 32.085 N	104° 5' 53.314 W
PBHL - Myox 21 State C - plan hits target center - Point	0.00	0.00	9,423.0	10,241.8	-220.0	413,527.83	572,732.80	32° 8' 12.072 N	104° 5' 54.090 W
LTP - Myox 21 State Cor - plan misses target center by 0.1usft at 19328.4usft MD (9422.9 TVD, 10111.8 N, -218.9 E) - Point	0.00	0.00	9,423.0	10,111.8	-218.9	413,397.88	572,733.96	32° 8' 10.785 N	104° 5' 54.080 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			
6,111.0	6,111.0	Bone Sprg (BSGL)			
6,461.0	6,461.0	U Avalon Sh			
6,664.0	6,664.0	L Avalon Sh			
7,052.0	7,052.0	FBSG_sand			
7,912.1	7,911.0	SBSG_sand			
8,913.1	8,906.0	TBSG_sand			
9,308.6	9,267.0	WFMP			
9,443.6	9,350.0	WFMP Lith			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,527.1	7,527.1	0.0	0.0	Build 2°/100'
7,877.1	7,876.2	0.0	-21.4	EOB @ 7.00° Inc / 270.00° Azm
8,593.6	8,587.4	0.0	-108.7	Drop 2°/100'
8,943.6	8,936.5	0.0	-130.0	EOD @ Vertical - Build 12°/100'
9,693.2	9,414.0	477.0	-134.2	EOC @ 89.95° Inc / 359.50° Azm / 9414.0' TVD
19,458.3	9,423.0	10,241.8	-220.0	TD @ 19458.3' MD / 9423.0' TVD

Myox 21 State Com #32H
Eddy County, NM (NAD 27)
Q170*** & WT-170***
Plan #1

WELL DETAILS: Mays 21 State Com #1294					
		Ground Level:		2950.0	
+WB-0	+B/W	Nothing	Easting	Latitude	Longitude
0.0	0.0	487286.05	572952.82	32° 5' 38.789 N	100° 5' 51.92 W
					Spot

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



ANNOTATIONS									
MD	Inc	Alt	TVD	+/-d	HE/SH	Vbct	Departure	Annotation	
7577.7	8.86	276.05	7517.7	0.0	6.6	0.0	0.0	Buad 27600'	
7877.1	7.00	276.05	7878.3	0.0	-21.4	0.5	21.4	EOB of 280' Inc / 278.96" Arc	
8930.8	7.00	276.05	8927.4	0.0	-108.7	2.3	108.9	Drop 27600'	
9343.9	8.00	0.00	9303.6	0.0	-150.0	2.8	150.0	EOB / Vertical - Build 127196'	
9693.2	89.98	359.58	9614.6	47.7	-73.2	479.8	807.1	EOC of 89.95" Inc / 359.58" Arc / 9614.6" TVD	
10456.3	89.95	359.58	9423.8	10247.9	-726.9	10244.1	10377.2	TD at 10460.3' MD / 9423.8" Arc	

DEMOM TARGET DETAILS						
Notes	TYD	460-8	000-0	Marthing	Easting	Latitude
FTP - Main 21 Mile Com #3291	8414.8	130.7	-131.3	043424.00	572721.56	32° 5' 32.895 N
- plan missives target center by 187 South of 8489 South MD	(3228.5 N, 282.1 W)	-131.8	-131.8			104° 6' 13.354 W
LTP - Main 21 Mile Com #3292	8414.8	130.7	-131.3	043797.80	572735.86	32° 5' 37.785 N
- plan missives target center by 8 South of 18325 South MD	(3422.0 N, 282.1 W)	-131.8	-131.8			104° 6' 54.008 W
PMHL - Main 21 Mile Com #3294	8422.9	10245.6	-230.0	043627.83	572732.86	32° 5' 12.872 N
- plan missives target center						104° 6' 54.008 W

