

OCD – HOBBS
10/03/2016
RECEIVED

COG OPERATING LLC

LEA COUNTY, NM

LUDEMAN

FASCINATOR FEE COM #1H

OWB

Plan: DWD Plan 4 - neg vs step out

Standard Survey Report

19 September, 2016

COG Operating LLC

Survey Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Well:	FASCINATOR FEE COM #1H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	DWD Plan 4 - neg vs step out	Database:	EDM_Users

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	LUDEMAN		
Site Position:		Northing:	409,564.70 usft
From:	Map	Easting:	795,348.70 usft
Position Uncertainty:	0.0 usft	Slot Radius:	17-1/2 "
		Latitude:	32° 7' 20.696 N
		Longitude:	103° 22' 45.584 W
		Grid Convergence:	0.51 °

Well	FASCINATOR FEE COM #1H		
Well Position	+N/-S	21,385.9 usft	Northing:
	+E/-W	-6,925.5 usft	Easting:
Position Uncertainty		0.0 usft	Wellhead Elevation:
			0.0 usf
			Latitude:
			32° 10' 52.913 N
			Longitude:
			103° 24' 3.954 W
			Ground Level:
			3,316.0 usf

Wellbore	OWB		
Magnetics	Model Name	Sample Date	Declination (°)
	WMM2015	1/7/2016	7.04
			Dip Angle (°)
			60.06
			Field Strength (nT)
			48,073

Design	DWD Plan 4 - neg vs step out		
Audit Notes:			
Version:	Phase:	PROTOTYPE	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	21,385.9	-6,925.5
			Direction (°)
			4.67

Survey Tool Program	Date	9/15/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	20,345.2	DWD Plan 4 - neg vs step out (OWB)	MWD	OWSG MWD - Standard

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	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	21,385.9	-6,925.5	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)
1,000.0	0.00	0.00	1,000.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
1,050.0	0.00	0.00	1,050.0	21,385.9	-6,925.5	0.0	0.00	0.00	0.00
1,100.0	1.00	104.31	1,100.0	21,385.8	-6,925.1	-0.1	2.00	2.00	0.00
1,200.0	3.00	104.31	1,199.9	21,384.9	-6,921.7	-0.7	2.00	2.00	0.00
1,229.2	3.58	104.31	1,229.1	21,384.5	-6,920.1	-0.9	2.00	2.00	0.00
1,300.0	3.58	104.31	299.7	21,383.4	-6,915.8	-1.7	0.00	0.00	0.00
1,400.0	3.58	104.31	1,399.5	21,381.9	-6,909.7	-2.7	0.00	0.00	0.00
1,500.0	3.58	104.31	1,499.4	21,380.3	-6,903.7	-3.8	0.00	0.00	0.00
1,600.0	3.58	104.31	1,599.2	21,378.8	-6,897.6	-4.8	0.00	0.00	0.00
1,700.0	3.58	104.31	1,699.0	21,377.2	-6,891.6	-5.9	0.00	0.00	0.00
1,800.0	3.58	104.31	1,798.8	21,375.7	-6,885.5	-6.9	0.00	0.00	0.00
1,900.0	3.58	104.31	1,898.6	21,374.2	-6,879.4	-8.0	0.00	0.00	0.00
2,000.0	3.58	104.31	1,998.4	21,372.6	-6,873.4	-9.0	0.00	0.00	0.00
2,100.0	3.58	104.31	2,098.2	21,371.1	-6,867.3	-10.1	0.00	0.00	0.00
2,200.0	3.58	104.31	2,198.0	21,369.5	-6,861.3	-11.1	0.00	0.00	0.00
2,300.0	3.58	104.31	2,297.8	21,368.0	-6,855.2	-12.1	0.00	0.00	0.00
2,400.0	3.58	104.31	2,397.6	21,366.4	-6,849.2	-13.2	0.00	0.00	0.00
2,500.0	3.58	104.31	2,497.4	21,364.9	-6,843.1	-14.2	0.00	0.00	0.00
2,600.0	3.58	104.31	2,597.2	21,363.3	-6,837.0	-15.3	0.00	0.00	0.00
2,700.0	3.58	104.31	2,697.0	21,361.8	-6,831.0	-16.3	0.00	0.00	0.00
2,800.0	3.58	104.31	2,796.8	21,360.2	-6,824.9	-17.4	0.00	0.00	0.00
2,900.0	3.58	104.31	2,896.6	21,358.7	-6,818.9	-18.4	0.00	0.00	0.00
3,000.0	3.58	104.31	2,996.4	21,357.2	-6,812.8	-19.5	0.00	0.00	0.00
3,100.0	3.58	104.31	3,096.2	21,355.6	-6,806.8	-20.5	0.00	0.00	0.00
3,200.0	3.58	104.31	3,196.0	21,354.1	-6,800.7	-21.6	0.00	0.00	0.00
3,300.0	3.58	104.31	3,295.8	21,352.5	-6,794.6	-22.6	0.00	0.00	0.00
3,400.0	3.58	104.31	3,395.6	21,351.0	-6,788.6	-23.7	0.00	0.00	0.00
3,500.0	3.58	104.31	3,495.4	21,349.4	-6,782.5	-24.7	0.00	0.00	0.00
3,600.0	3.58	104.31	3,595.2	21,347.9	-6,776.5	-25.8	0.00	0.00	0.00
3,700.0	3.58	104.31	3,695.1	21,346.3	-6,770.4	-26.8	0.00	0.00	0.00
3,800.0	3.58	104.31	3,794.9	21,344.8	-6,764.4	-27.8	0.00	0.00	0.00
3,900.0	3.58	104.31	3,894.7	21,343.3	-6,758.3	-28.9	0.00	0.00	0.00
4,000.0	3.58	104.31	3,994.5	21,341.7	-6,752.3	-29.9	0.00	0.00	0.00
4,100.0	3.58	104.31	4,094.3	21,340.2	-6,746.2	-31.0	0.00	0.00	0.00
4,200.0	3.58	104.31	4,194.1	21,338.6	-6,740.1	-32.0	0.00	0.00	0.00
4,300.0	3.58	104.31	4,293.9	21,337.1	-6,734.1	-33.1	0.00	0.00	0.00
4,400.0	3.58	104.31	4,393.7	21,335.5	-6,728.0	-34.1	0.00	0.00	0.00
4,500.0	3.58	104.31	4,493.5	21,334.0	-6,722.0	-35.2	0.00	0.00	0.00
4,600.0	3.58	104.31	4,593.3	21,332.4	-6,715.9	-36.2	0.00	0.00	0.00
4,700.0	3.58	104.31	4,693.1	21,330.9	-6,709.9	-37.3	0.00	0.00	0.00
4,800.0	3.58	104.31	4,792.9	21,329.4	-6,703.8	-38.3	0.00	0.00	0.00
4,900.0	3.58	104.31	4,892.7	21,327.8	-6,697.7	-39.4	0.00	0.00	0.00
5,000.0	3.58	104.31	4,992.5	21,326.3	-6,691.7	-40.4	0.00	0.00	0.00
5,100.0	3.58	104.31	5,092.3	21,324.7	-6,685.6	-41.4	0.00	0.00	0.00

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5,200.0	3.58	104.31	5,192.1	21,323.2	-6,679.6	-42.5	0.00	0.00	0.00
5,300.0	3.58	104.31	5,291.9	21,321.6	-6,673.5	-43.5	0.00	0.00	0.00
5,400.0	3.58	104.31	5,391.7	21,320.1	-6,667.5	-44.6	0.00	0.00	0.00
5,500.0	3.58	104.31	5,491.5	21,318.5	-6,661.4	-45.6	0.00	0.00	0.00
5,600.0	3.58	104.31	5,591.3	21,317.0	-6,655.3	-46.7	0.00	0.00	0.00
5,700.0	3.58	104.31	5,691.1	21,315.4	-6,649.3	-47.7	0.00	0.00	0.00
5,800.0	3.58	104.31	5,790.9	21,313.9	-6,643.2	-48.8	0.00	0.00	0.00
5,900.0	3.58	104.31	5,890.7	21,312.4	-6,637.2	-49.8	0.00	0.00	0.00
6,000.0	3.58	104.31	5,990.6	21,310.8	-6,631.1	-50.9	0.00	0.00	0.00
6,100.0	3.58	104.31	6,090.4	21,309.3	-6,625.1	-51.9	0.00	0.00	0.00
6,200.0	3.58	104.31	6,190.2	21,307.7	-6,619.0	-53.0	0.00	0.00	0.00
6,300.0	3.58	104.31	6,290.0	21,306.2	-6,612.9	-54.0	0.00	0.00	0.00
6,400.0	3.58	104.31	6,389.8	21,304.6	-6,606.9	-55.1	0.00	0.00	0.00
6,500.0	3.58	104.31	6,489.6	21,303.1	-6,600.8	-56.1	0.00	0.00	0.00
6,600.0	3.58	104.31	6,589.4	21,301.5	-6,594.8	-57.1	0.00	0.00	0.00
6,700.0	3.58	104.31	6,689.2	21,300.0	-6,588.7	-58.2	0.00	0.00	0.00
6,800.0	3.58	104.31	6,789.0	21,298.5	-6,582.7	-59.2	0.00	0.00	0.00
6,900.0	3.58	104.31	6,888.8	21,296.9	-6,576.6	-60.3	0.00	0.00	0.00
7,000.0	3.58	104.31	6,988.6	21,295.4	-6,570.6	-61.3	0.00	0.00	0.00
7,100.0	3.58	104.31	7,088.4	21,293.8	-6,564.5	-62.4	0.00	0.00	0.00
7,200.0	3.58	104.31	7,188.2	21,292.3	-6,558.4	-63.4	0.00	0.00	0.00
7,300.0	3.58	104.31	7,288.0	21,290.7	-6,552.4	-64.5	0.00	0.00	0.00
7,400.0	3.58	104.31	7,387.8	21,289.2	-6,546.3	-65.5	0.00	0.00	0.00
7,500.0	3.58	104.31	7,487.6	21,287.6	-6,540.3	-66.6	0.00	0.00	0.00
7,600.0	3.58	104.31	7,587.4	21,286.1	-6,534.2	-67.6	0.00	0.00	0.00
7,700.0	3.58	104.31	7,687.2	21,284.6	-6,528.2	-68.7	0.00	0.00	0.00
7,800.0	3.58	104.31	7,787.0	21,283.0	-6,522.1	-69.7	0.00	0.00	0.00
7,900.0	3.58	104.31	7,886.8	21,281.5	-6,516.0	-70.8	0.00	0.00	0.00
8,000.0	3.58	104.31	7,986.6	21,279.9	-6,510.0	-71.8	0.00	0.00	0.00
8,100.0	3.58	104.31	8,086.4	21,278.4	-6,503.9	-72.8	0.00	0.00	0.00
8,200.0	3.58	104.31	8,186.3	21,276.8	-6,497.9	-73.9	0.00	0.00	0.00
8,300.0	3.58	104.31	8,286.1	21,275.3	-6,491.8	-74.9	0.00	0.00	0.00
8,400.0	3.58	104.31	8,385.9	21,273.7	-6,485.8	-76.0	0.00	0.00	0.00
8,500.0	3.58	104.31	8,485.7	21,272.2	-6,479.7	-77.0	0.00	0.00	0.00
8,600.0	3.58	104.31	8,585.5	21,270.6	-6,473.6	-78.1	0.00	0.00	0.00
8,700.0	3.58	104.31	8,685.3	21,269.1	-6,467.6	-79.1	0.00	0.00	0.00
8,800.0	3.58	104.31	8,785.1	21,267.6	-6,461.5	-80.2	0.00	0.00	0.00
8,900.0	3.58	104.31	8,884.9	21,266.0	-6,455.5	-81.2	0.00	0.00	0.00
9,000.0	3.58	104.31	8,984.7	21,264.5	-6,449.4	-82.3	0.00	0.00	0.00
9,100.0	3.58	104.31	9,084.5	21,262.9	-6,443.4	-83.3	0.00	0.00	0.00
9,200.0	3.58	104.31	9,184.3	21,261.4	-6,437.3	-84.4	0.00	0.00	0.00
9,300.0	3.58	104.31	9,284.1	21,259.8	-6,431.2	-85.4	0.00	0.00	0.00
9,400.0	3.58	104.31	9,383.9	21,258.3	-6,425.2	-86.5	0.00	0.00	0.00

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9,500.0	3.58	104.31	9,483.7	21,256.7	-6,419.1	-87.5	0.00	0.00	0.00
9,600.0	3.58	104.31	9,583.5	21,255.2	-6,413.1	-88.5	0.00	0.00	0.00
9,700.0	3.58	104.31	9,683.3	21,253.7	-6,407.0	-89.6	0.00	0.00	0.00
9,800.0	3.58	104.31	9,783.1	21,252.1	-6,401.0	-90.6	0.00	0.00	0.00
9,900.0	3.58	104.31	9,882.9	21,250.6	-6,394.9	-91.7	0.00	0.00	0.00
10,000.0	3.58	104.31	9,982.7	21,249.0	-6,388.9	-92.7	0.00	0.00	0.00
10,100.0	3.58	104.31	10,082.5	21,247.5	-6,382.8	-93.8	0.00	0.00	0.00
10,200.0	3.58	104.31	10,182.3	21,245.9	-6,376.7	-94.8	0.00	0.00	0.00
10,300.0	3.58	104.31	10,282.1	21,244.4	-6,370.7	-95.9	0.00	0.00	0.00
10,400.0	3.58	104.31	10,382.0	21,242.8	-6,364.6	-96.9	0.00	0.00	0.00
10,500.0	3.58	104.31	10,481.8	21,241.3	-6,358.6	-98.0	0.00	0.00	0.00
10,600.0	3.58	104.31	10,581.6	21,239.8	-6,352.5	-99.0	0.00	0.00	0.00
10,700.0	3.58	104.31	10,681.4	21,238.2	-6,346.5	-100.1	0.00	0.00	0.00
10,800.0	3.58	104.31	10,781.2	21,236.7	-6,340.4	-101.1	0.00	0.00	0.00
10,900.0	3.58	104.31	10,881.0	21,235.1	-6,334.3	-102.1	0.00	0.00	0.00
11,000.0	3.58	104.31	10,980.8	21,233.6	-6,328.3	-103.2	0.00	0.00	0.00
11,100.0	3.58	104.31	11,080.6	21,232.0	-6,322.2	-104.2	0.00	0.00	0.00
11,200.0	3.58	104.31	11,180.4	21,230.5	-6,316.2	-105.3	0.00	0.00	0.00
11,300.0	3.58	104.31	11,280.2	21,228.9	-6,310.1	-106.3	0.00	0.00	0.00
11,400.0	3.58	104.31	11,380.0	21,227.4	-6,304.1	-107.4	0.00	0.00	0.00
11,500.0	3.58	104.31	11,479.8	21,225.9	-6,298.0	-108.4	0.00	0.00	0.00
11,600.0	3.58	104.31	11,579.6	21,224.3	-6,291.9	-109.5	0.00	0.00	0.00
11,700.0	3.58	104.31	11,679.4	21,222.8	-6,285.9	-110.5	0.00	0.00	0.00
11,800.0	3.58	104.31	11,779.2	21,221.2	-6,279.8	-111.6	0.00	0.00	0.00
11,900.0	3.58	104.31	11,879.0	21,219.7	-6,273.8	-112.6	0.00	0.00	0.00
12,000.0	3.58	104.31	11,978.8	21,218.1	-6,267.7	-113.7	0.00	0.00	0.00
12,100.0	3.58	104.31	12,078.6	21,216.6	-6,261.7	-114.7	0.00	0.00	0.00
12,108.4	3.58	104.31	12,087.0	21,216.5	-6,261.2	-114.8	0.00	0.00	0.00
12,200.0	10.66	18.44	12,178.0	21,223.8	-6,255.7	-107.0	12.00	7.73	-93.74
12,300.0	22.34	8.13	12,273.7	21,251.5	-6,250.0	-79.0	12.00	11.68	-10.30
12,400.0	34.24	4.76	12,361.6	21,298.5	-6,245.0	-31.7	12.00	11.90	-3.37
12,500.0	46.19	2.99	12,437.9	21,362.8	-6,240.8	32.8	12.00	11.95	-1.77
12,600.0	58.15	1.81	12,499.1	21,441.6	-6,237.5	111.5	12.00	11.96	-1.18
12,700.0	70.12	0.91	12,542.6	21,531.4	-6,235.4	201.2	12.00	11.97	-0.90
12,800.0	82.10	0.14	12,566.6	21,628.3	-6,234.6	297.8	12.00	11.98	-0.77
12,877.1	91.34	359.58	12,571.0	21,705.2	-6,234.7	374.5	12.00	11.98	-0.73
12,900.0	91.34	359.58	12,570.5	21,728.1	-6,234.9	397.3	0.00	0.00	0.00
13,000.0	91.34	359.58	12,568.1	21,828.0	-6,235.7	496.8	0.00	0.00	0.00
13,100.0	91.34	359.58	12,565.8	21,928.0	-6,236.4	596.4	0.00	0.00	0.00
13,200.0	91.34	359.58	12,563.4	22,028.0	-6,237.1	696.0	0.00	0.00	0.00
13,300.0	91.34	359.58	12,561.1	22,128.0	-6,237.9	795.6	0.00	0.00	0.00
13,400.0	91.34	359.58	12,558.8	22,227.9	-6,238.6	895.1	0.00	0.00	0.00
13,500.0	91.34	359.58	12,556.4	22,327.9	-6,239.4	994.7	0.00	0.00	0.00

COG Operating LLC

Survey Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Well:	FASCINATOR FEE COM #1H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	DWD Plan 4 - neg vs step out	Database:	EDM_Users

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)
13,600.0	91.34	359.58	12,554.1	22,427.9	-6,240.1	1,094.3	0.00	0.00	0.00
13,700.0	91.34	359.58	12,551.8	22,527.8	-6,240.8	1,193.9	0.00	0.00	0.00
13,800.0	91.34	359.58	12,549.4	22,627.8	-6,241.6	1,293.5	0.00	0.00	0.00
13,900.0	91.34	359.58	12,547.1	22,727.8	-6,242.3	1,393.0	0.00	0.00	0.00
14,000.0	91.34	359.58	12,544.7	22,827.7	-6,243.1	1,492.6	0.00	0.00	0.00
14,100.0	91.34	359.58	12,542.4	22,927.7	-6,243.8	1,592.2	0.00	0.00	0.00
14,200.0	91.34	359.58	12,540.1	23,027.7	-6,244.5	1,691.8	0.00	0.00	0.00
14,300.0	91.34	359.58	12,537.7	23,127.7	-6,245.3	1,791.3	0.00	0.00	0.00
14,400.0	91.34	359.58	12,535.4	23,227.6	-6,246.0	1,890.9	0.00	0.00	0.00
14,500.0	91.34	359.58	12,533.0	23,327.6	-6,246.8	1,990.5	0.00	0.00	0.00
14,600.0	91.34	359.58	12,530.7	23,427.6	-6,247.5	2,090.1	0.00	0.00	0.00
14,700.0	91.34	359.58	12,528.4	23,527.5	-6,248.2	2,189.7	0.00	0.00	0.00
14,800.0	91.34	359.58	12,526.0	23,627.5	-6,249.0	2,289.2	0.00	0.00	0.00
14,900.0	91.34	359.58	12,523.7	23,727.5	-6,249.7	2,388.8	0.00	0.00	0.00
15,000.0	91.34	359.58	12,521.4	23,827.4	-6,250.5	2,488.4	0.00	0.00	0.00
15,100.0	91.34	359.58	12,519.0	23,927.4	-6,251.2	2,588.0	0.00	0.00	0.00
15,200.0	91.34	359.58	12,516.7	24,027.4	-6,251.9	2,687.5	0.00	0.00	0.00
15,300.0	91.34	359.58	12,514.3	24,127.3	-6,252.7	2,787.1	0.00	0.00	0.00
15,400.0	91.34	359.58	12,512.0	24,227.3	-6,253.4	2,886.7	0.00	0.00	0.00
15,500.0	91.34	359.58	12,509.7	24,327.3	-6,254.2	2,986.3	0.00	0.00	0.00
15,600.0	91.34	359.58	12,507.3	24,427.3	-6,254.9	3,085.9	0.00	0.00	0.00
15,700.0	91.34	359.58	12,505.0	24,527.2	-6,255.6	3,185.4	0.00	0.00	0.00
15,800.0	91.34	359.58	12,502.6	24,627.2	-6,256.4	3,285.0	0.00	0.00	0.00
15,900.0	91.34	359.58	12,500.3	24,727.2	-6,257.1	3,384.6	0.00	0.00	0.00
16,000.0	91.34	359.58	12,498.0	24,827.1	-6,257.9	3,484.2	0.00	0.00	0.00
16,100.0	91.34	359.58	12,495.6	24,927.1	-6,258.6	3,583.7	0.00	0.00	0.00
16,200.0	91.34	359.58	12,493.3	25,027.1	-6,259.3	3,683.3	0.00	0.00	0.00
16,300.0	91.34	359.58	12,491.0	25,127.0	-6,260.1	3,782.9	0.00	0.00	0.00
16,400.0	91.34	359.58	12,488.6	25,227.0	-6,260.8	3,882.5	0.00	0.00	0.00
16,500.0	91.34	359.58	12,486.3	25,327.0	-6,261.6	3,982.1	0.00	0.00	0.00
16,600.0	91.34	359.58	12,483.9	25,427.0	-6,262.3	4,081.6	0.00	0.00	0.00
16,700.0	91.34	359.58	12,481.6	25,526.9	-6,263.0	4,181.2	0.00	0.00	0.00
16,800.0	91.34	359.58	12,479.3	25,626.9	-6,263.8	4,280.8	0.00	0.00	0.00
16,900.0	91.34	359.58	12,476.9	25,726.9	-6,264.5	4,380.4	0.00	0.00	0.00
17,000.0	91.34	359.58	12,474.6	25,826.8	-6,265.3	4,480.0	0.00	0.00	0.00
17,100.0	91.34	359.58	12,472.2	25,926.8	-6,266.0	4,579.5	0.00	0.00	0.00
17,200.0	91.34	359.58	12,469.9	26,026.8	-6,266.7	4,679.1	0.00	0.00	0.00
17,300.0	91.34	359.58	12,467.6	26,126.7	-6,267.5	4,778.7	0.00	0.00	0.00
17,400.0	91.34	359.58	12,465.2	26,226.7	-6,268.2	4,878.3	0.00	0.00	0.00
17,500.0	91.34	359.58	12,462.9	26,326.7	-6,269.0	4,977.8	0.00	0.00	0.00
17,600.0	91.34	359.58	12,460.6	26,426.7	-6,269.7	5,077.4	0.00	0.00	0.00
17,700.0	91.34	359.58	12,458.2	26,526.6	-6,270.4	5,177.0	0.00	0.00	0.00
17,800.0	91.34	359.58	12,455.9	26,626.6	-6,271.2	5,276.6	0.00	0.00	0.00
17,900.0	91.34	359.58	12,453.5	26,726.6	-6,271.9	5,376.2	0.00	0.00	0.00

COG Operating LLC

Survey Report

Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site LUDEMAN
Project:	LEA COUNTY, NM	TVD Reference:	WELL @ 3342.0usft (Original Well Elev)
Site:	LUDEMAN	MD Reference:	WELL @ 3342.0usft (Original Well Elev)
Well:	FASCINATOR FEE COM #1H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	DWD Plan 4 - neg vs step out	Database:	EDM_Users

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)
18,000.0	91.34	359.58	12,451.2	26,826.5	-6,272.6	5,475.7	0.00	0.00	0.00
18,100.0	91.34	359.58	12,448.9	26,926.5	-6,273.4	5,575.3	0.00	0.00	0.00
18,200.0	91.34	359.58	12,446.5	27,026.5	-6,274.1	5,674.9	0.00	0.00	0.00
18,300.0	91.34	359.58	12,444.2	27,126.4	-6,274.9	5,774.5	0.00	0.00	0.00
18,400.0	91.34	359.58	12,441.8	27,226.4	-6,275.6	5,874.0	0.00	0.00	0.00
18,500.0	91.34	359.58	12,439.5	27,326.4	-6,276.3	5,973.6	0.00	0.00	0.00
18,600.0	91.34	359.58	12,437.2	27,426.4	-6,277.1	6,073.2	0.00	0.00	0.00
18,700.0	91.34	359.58	12,434.8	27,526.3	-6,277.8	6,172.8	0.00	0.00	0.00
18,800.0	91.34	359.58	12,432.5	27,626.3	-6,278.6	6,272.4	0.00	0.00	0.00
18,900.0	91.34	359.58	12,430.2	27,726.3	-6,279.3	6,371.9	0.00	0.00	0.00
19,000.0	91.34	359.58	12,427.8	27,826.2	-6,280.0	6,471.5	0.00	0.00	0.00
19,100.0	91.34	359.58	12,425.5	27,926.2	-6,280.8	6,571.1	0.00	0.00	0.00
19,200.0	91.34	359.58	12,423.1	28,026.2	-6,281.5	6,670.7	0.00	0.00	0.00
19,300.0	91.34	359.58	12,420.8	28,126.1	-6,282.3	6,770.2	0.00	0.00	0.00
19,400.0	91.34	359.58	12,418.5	28,226.1	-6,283.0	6,869.8	0.00	0.00	0.00
19,500.0	91.34	359.58	12,416.1	28,326.1	-6,283.7	6,969.4	0.00	0.00	0.00
19,600.0	91.34	359.58	12,413.8	28,426.1	-6,284.5	7,069.0	0.00	0.00	0.00
19,700.0	91.34	359.58	12,411.4	28,526.0	-6,285.2	7,168.6	0.00	0.00	0.00
19,800.0	91.34	359.58	12,409.1	28,626.0	-6,286.0	7,268.1	0.00	0.00	0.00
19,900.0	91.34	359.58	12,406.8	28,726.0	-6,286.7	7,367.7	0.00	0.00	0.00
20,000.0	91.34	359.58	12,404.4	28,825.9	-6,287.4	7,467.3	0.00	0.00	0.00
20,100.0	91.34	359.58	12,402.1	28,925.9	-6,288.2	7,566.9	0.00	0.00	0.00
20,200.0	91.34	359.58	12,399.8	29,025.9	-6,288.9	7,666.4	0.00	0.00	0.00
20,300.0	91.34	359.58	12,397.4	29,125.8	-6,289.7	7,766.0	0.00	0.00	0.00
20,345.2	91.34	359.58	12,396.4	29,171.0	-6,290.0	7,811.0	0.00	0.00	0.00

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
Fascinator Fee Com - plan hits target center - Point	0.00	0.00	0.0	21,385.9	-6,925.5	430,950.60	788,423.20	32° 10' 52.913 N	103° 24' 3.954 W
Fascinator Fee Com - plan misses target center by 0.4usft at 20345.2usft MD (12396.4 TVD, 29171.0 N, -6290.0 E) - Point	0.00	0.00	12,396.0	29,171.0	-6,290.0	438,735.70	789,058.70	32° 12' 9.892 N	103° 23' 55.773 W
Fascinator Fee Com - plan hits target center - Point	0.00	0.00	12,571.0	21,705.2	-6,234.7	431,269.91	789,113.95	32° 10' 56.013 N	103° 23' 55.885 W

Checked By: _____ Approved By: _____ Date: _____