



COG Operating L L C

Eddy County, NM (NAD 27 NME)

Sec. 31, T 26 S, R 28- E

Way South State Com 701H

30-015-45541

Wellbore #1

Plan: Plan #1

Standard Survey Report

12 December, 2018





Survey Report



Company: COG Operating L L C
Project: Eddy County, NM (NAD 27 NME)
Site: Sec. 31, T 26 S, R 28- E
Well: Way South State Com 701H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Way South State Com 701H
TVD Reference: KB=29 @ 3110.00usft (Noram 23)
MD Reference: KB=29 @ 3110.00usft (Noram 23)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Project	Eddy County, NM (NAD 27 NME)		
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. 31, T 26 S, R 28- E			
Site Position:		Northing:	363,736.60 usft	Latitude: 31.99984
From:	Map	Easting:	566,855.10 usft	Longitude: -104.11767
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.11 °

Well	Way South State Com 701H					
Well Position	+N/-S	0.00 usft	Northing:	364,000.90 usft	Latitude:	32.00057
	+E/-W	0.00 usft	Easting:	566,224.50 usft	Longitude:	-104.11970
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft	Ground Level:	3,081.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/12/2018	7.13	59.63	47,819

Design	Plan #1				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	1.38	

Survey Tool Program	Date 12/12/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	21,559.45	Plan #1 (Wellbore #1)	MWD	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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	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)
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,405.84	0.00	0.00	4,405.84	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
4,500.00	1.88	116.00	4,499.98	-0.68	1.39	-0.64	2.00	2.00	0.00
4,600.00	3.88	116.00	4,599.85	-2.88	5.91	-2.74	2.00	2.00	0.00
4,655.84	5.00	116.00	4,655.52	-4.78	9.80	-4.54	2.00	2.00	0.00
Start 3593.53 hold at 4655.84 MD									
4,700.00	5.00	116.00	4,699.51	-6.47	13.26	-6.15	0.00	0.00	0.00
4,800.00	5.00	116.00	4,799.13	-10.29	21.09	-9.78	0.00	0.00	0.00
4,900.00	5.00	116.00	4,898.75	-14.11	28.92	-13.41	0.00	0.00	0.00

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5,000.00	5.00	116.00	4,998.37	-17.93	36.76	-17.04	0.00	0.00	0.00
5,100.00	5.00	116.00	5,097.99	-21.75	44.59	-20.67	0.00	0.00	0.00
5,200.00	5.00	116.00	5,197.61	-25.57	52.43	-24.30	0.00	0.00	0.00
5,300.00	5.00	116.00	5,297.23	-29.39	60.26	-27.93	0.00	0.00	0.00
5,400.00	5.00	116.00	5,396.85	-33.21	68.09	-31.56	0.00	0.00	0.00
5,500.00	5.00	116.00	5,496.47	-37.03	75.93	-35.19	0.00	0.00	0.00
5,600.00	5.00	116.00	5,596.09	-40.85	83.76	-38.83	0.00	0.00	0.00
5,700.00	5.00	116.00	5,695.71	-44.67	91.59	-42.46	0.00	0.00	0.00
5,800.00	5.00	116.00	5,795.33	-48.49	99.43	-46.09	0.00	0.00	0.00
5,900.00	5.00	116.00	5,894.95	-52.31	107.26	-49.72	0.00	0.00	0.00
6,000.00	5.00	116.00	5,994.57	-56.13	115.09	-53.35	0.00	0.00	0.00
6,100.00	5.00	116.00	6,094.19	-59.96	122.93	-56.98	0.00	0.00	0.00
6,200.00	5.00	116.00	6,193.81	-63.78	130.76	-60.61	0.00	0.00	0.00
6,300.00	5.00	116.00	6,293.43	-67.60	138.59	-64.24	0.00	0.00	0.00
6,400.00	5.00	116.00	6,393.05	-71.42	146.43	-67.87	0.00	0.00	0.00
6,500.00	5.00	116.00	6,492.67	-75.24	154.26	-71.50	0.00	0.00	0.00
6,600.00	5.00	116.00	6,592.28	-79.06	162.09	-75.14	0.00	0.00	0.00
6,700.00	5.00	116.00	6,691.90	-82.88	169.93	-78.77	0.00	0.00	0.00
6,800.00	5.00	116.00	6,791.52	-86.70	177.76	-82.40	0.00	0.00	0.00
6,900.00	5.00	116.00	6,891.14	-90.52	185.59	-86.03	0.00	0.00	0.00
7,000.00	5.00	116.00	6,990.76	-94.34	193.43	-89.66	0.00	0.00	0.00
7,100.00	5.00	116.00	7,090.38	-98.16	201.26	-93.29	0.00	0.00	0.00
7,200.00	5.00	116.00	7,190.00	-101.98	209.10	-96.92	0.00	0.00	0.00
7,300.00	5.00	116.00	7,289.62	-105.80	216.93	-100.55	0.00	0.00	0.00
7,400.00	5.00	116.00	7,389.24	-109.62	224.76	-104.18	0.00	0.00	0.00
7,500.00	5.00	116.00	7,488.86	-113.44	232.60	-107.82	0.00	0.00	0.00
7,600.00	5.00	116.00	7,588.48	-117.27	240.43	-111.45	0.00	0.00	0.00
7,700.00	5.00	116.00	7,688.10	-121.09	248.26	-115.08	0.00	0.00	0.00
7,800.00	5.00	116.00	7,787.72	-124.91	256.10	-118.71	0.00	0.00	0.00
7,900.00	5.00	116.00	7,887.34	-128.73	263.93	-122.34	0.00	0.00	0.00
8,000.00	5.00	116.00	7,986.96	-132.55	271.76	-125.97	0.00	0.00	0.00
8,100.00	5.00	116.00	8,086.58	-136.37	279.60	-129.60	0.00	0.00	0.00
8,200.00	5.00	116.00	8,186.20	-140.19	287.43	-133.23	0.00	0.00	0.00
8,249.37	5.00	116.00	8,235.38	-142.08	291.30	-135.03	0.00	0.00	0.00
Start Drop -2.00									
8,300.00	3.99	116.00	8,285.85	-143.81	294.86	-136.68	2.00	-2.00	0.00
8,400.00	1.99	116.00	8,385.71	-146.10	299.55	-138.85	2.00	-2.00	0.00
8,499.37	0.00	0.00	8,485.06	-146.85	301.10	-139.57	2.00	-2.00	0.00
Start 195.00 hold at 8499.37 MD									
8,500.00	0.00	0.00	8,485.69	-146.85	301.10	-139.57	0.00	0.00	0.00
8,600.00	0.00	0.00	8,585.69	-146.85	301.10	-139.57	0.00	0.00	0.00
8,694.37	0.00	0.00	8,680.06	-146.85	301.10	-139.57	0.00	0.00	0.00
Start DLS 10.00 TFO 359.99									
8,700.00	0.56	359.99	8,685.69	-146.83	301.10	-139.54	10.00	10.00	0.00



Survey Report

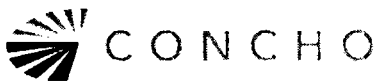


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8,800.00	10.56	359.99	8,785.09	-137.14	301.09	-129.86	10.00	10.00	0.00
8,900.00	20.56	359.99	8,881.31	-110.35	301.09	-103.07	10.00	10.00	0.00
9,000.00	30.56	359.99	8,971.40	-67.25	301.08	-59.99	10.00	10.00	0.00
9,100.00	40.56	359.99	9,052.65	-9.17	301.06	-1.92	10.00	10.00	0.00
9,200.00	50.56	359.99	9,122.57	62.14	301.05	69.37	10.00	10.00	0.00
9,300.00	60.56	359.99	9,179.05	144.52	301.03	151.72	10.00	10.00	0.00
9,400.00	70.56	359.99	9,220.36	235.44	301.01	242.62	10.00	10.00	0.00
9,500.00	80.56	359.99	9,245.26	332.16	300.99	339.31	10.00	10.00	0.00
9,590.40	89.60	359.99	9,253.00	422.13	300.96	429.25	10.00	10.00	0.00
Start 11969.06 hold at 9590.40 MD									
9,600.00	89.60	359.99	9,253.07	431.73	300.96	438.85	0.00	0.00	0.00
9,700.00	89.60	359.99	9,253.76	531.73	300.94	538.82	0.00	0.00	0.00
9,800.00	89.60	359.99	9,254.46	631.73	300.92	638.79	0.00	0.00	0.00
9,900.00	89.60	359.99	9,255.15	731.73	300.89	738.75	0.00	0.00	0.00
10,000.00	89.60	359.99	9,255.84	831.72	300.87	838.72	0.00	0.00	0.00
10,100.00	89.60	359.99	9,256.54	931.72	300.85	938.69	0.00	0.00	0.00
10,200.00	89.60	359.99	9,257.23	1,031.72	300.82	1,038.66	0.00	0.00	0.00
10,300.00	89.60	359.99	9,257.92	1,131.72	300.80	1,138.63	0.00	0.00	0.00
10,400.00	89.60	359.99	9,258.62	1,231.72	300.78	1,238.60	0.00	0.00	0.00
10,500.00	89.60	359.99	9,259.31	1,331.71	300.75	1,338.56	0.00	0.00	0.00
10,600.00	89.60	359.99	9,260.01	1,431.71	300.73	1,438.53	0.00	0.00	0.00
10,700.00	89.60	359.99	9,260.70	1,531.71	300.71	1,538.50	0.00	0.00	0.00
10,800.00	89.60	359.99	9,261.39	1,631.71	300.68	1,638.47	0.00	0.00	0.00
10,900.00	89.60	359.99	9,262.09	1,731.70	300.66	1,738.44	0.00	0.00	0.00
11,000.00	89.60	359.99	9,262.78	1,831.70	300.64	1,838.40	0.00	0.00	0.00
11,100.00	89.60	359.99	9,263.47	1,931.70	300.62	1,938.37	0.00	0.00	0.00
11,200.00	89.60	359.99	9,264.17	2,031.70	300.59	2,038.34	0.00	0.00	0.00
11,300.00	89.60	359.99	9,264.86	2,131.69	300.57	2,138.31	0.00	0.00	0.00
11,400.00	89.60	359.99	9,265.55	2,231.69	300.55	2,238.28	0.00	0.00	0.00
11,500.00	89.60	359.99	9,266.25	2,331.69	300.52	2,338.24	0.00	0.00	0.00
11,600.00	89.60	359.99	9,266.94	2,431.69	300.50	2,438.21	0.00	0.00	0.00
11,700.00	89.60	359.99	9,267.63	2,531.68	300.48	2,538.18	0.00	0.00	0.00
11,800.00	89.60	359.99	9,268.33	2,631.68	300.45	2,638.15	0.00	0.00	0.00
11,900.00	89.60	359.99	9,269.02	2,731.68	300.43	2,738.12	0.00	0.00	0.00
12,000.00	89.60	359.99	9,269.71	2,831.68	300.41	2,838.08	0.00	0.00	0.00
12,100.00	89.60	359.99	9,270.41	2,931.67	300.38	2,938.05	0.00	0.00	0.00
12,200.00	89.60	359.99	9,271.10	3,031.67	300.36	3,038.02	0.00	0.00	0.00
12,300.00	89.60	359.99	9,271.79	3,131.67	300.34	3,137.99	0.00	0.00	0.00
12,400.00	89.60	359.99	9,272.49	3,231.67	300.32	3,237.96	0.00	0.00	0.00
12,500.00	89.60	359.99	9,273.18	3,331.66	300.29	3,337.93	0.00	0.00	0.00
12,600.00	89.60	359.99	9,273.87	3,431.66	300.27	3,437.89	0.00	0.00	0.00
12,700.00	89.60	359.99	9,274.57	3,531.66	300.25	3,537.86	0.00	0.00	0.00
12,800.00	89.60	359.99	9,275.26	3,631.66	300.22	3,637.83	0.00	0.00	0.00



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Wellbore: Wellbore #1
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TVD Reference: KB=29 @ 3110.00usft (Noram 23)
MD Reference: KB=29 @ 3110.00usft (Noram 23)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
12,900.00	89.60	359.99	9,275.95	3,731.66	300.20	3,737.80	0.00	0.00	0.00
13,000.00	89.60	359.99	9,276.65	3,831.65	300.18	3,837.77	0.00	0.00	0.00
13,100.00	89.60	359.99	9,277.34	3,931.65	300.15	3,937.73	0.00	0.00	0.00
13,200.00	89.60	359.99	9,278.03	4,031.65	300.13	4,037.70	0.00	0.00	0.00
13,300.00	89.60	359.99	9,278.73	4,131.65	300.11	4,137.67	0.00	0.00	0.00
13,400.00	89.60	359.99	9,279.42	4,231.64	300.08	4,237.64	0.00	0.00	0.00
13,500.00	89.60	359.99	9,280.11	4,331.64	300.06	4,337.61	0.00	0.00	0.00
13,600.00	89.60	359.99	9,280.81	4,431.64	300.04	4,437.57	0.00	0.00	0.00
13,700.00	89.60	359.99	9,281.50	4,531.64	300.02	4,537.54	0.00	0.00	0.00
13,800.00	89.60	359.99	9,282.19	4,631.63	299.99	4,637.51	0.00	0.00	0.00
13,900.00	89.60	359.99	9,282.89	4,731.63	299.97	4,737.48	0.00	0.00	0.00
14,000.00	89.60	359.99	9,283.58	4,831.63	299.95	4,837.45	0.00	0.00	0.00
14,100.00	89.60	359.99	9,284.27	4,931.63	299.92	4,937.41	0.00	0.00	0.00
14,200.00	89.60	359.99	9,284.97	5,031.62	299.90	5,037.38	0.00	0.00	0.00
14,300.00	89.60	359.99	9,285.66	5,131.62	299.88	5,137.35	0.00	0.00	0.00
14,400.00	89.60	359.99	9,286.36	5,231.62	299.85	5,237.32	0.00	0.00	0.00
14,500.00	89.60	359.99	9,287.05	5,331.62	299.83	5,337.29	0.00	0.00	0.00
14,600.00	89.60	359.99	9,287.74	5,431.61	299.81	5,437.26	0.00	0.00	0.00
14,700.00	89.60	359.99	9,288.44	5,531.61	299.78	5,537.22	0.00	0.00	0.00
14,800.00	89.60	359.99	9,289.13	5,631.61	299.76	5,637.19	0.00	0.00	0.00
14,900.00	89.60	359.99	9,289.82	5,731.61	299.74	5,737.16	0.00	0.00	0.00
15,000.00	89.60	359.99	9,290.52	5,831.60	299.71	5,837.13	0.00	0.00	0.00
15,100.00	89.60	359.99	9,291.21	5,931.60	299.69	5,937.10	0.00	0.00	0.00
15,200.00	89.60	359.99	9,291.90	6,031.60	299.67	6,037.06	0.00	0.00	0.00
15,300.00	89.60	359.99	9,292.60	6,131.60	299.65	6,137.03	0.00	0.00	0.00
15,400.00	89.60	359.99	9,293.29	6,231.60	299.62	6,237.00	0.00	0.00	0.00
15,500.00	89.60	359.99	9,293.98	6,331.59	299.60	6,336.97	0.00	0.00	0.00
15,600.00	89.60	359.99	9,294.68	6,431.59	299.58	6,436.94	0.00	0.00	0.00
15,700.00	89.60	359.99	9,295.37	6,531.59	299.55	6,536.90	0.00	0.00	0.00
15,800.00	89.60	359.99	9,296.06	6,631.59	299.53	6,636.87	0.00	0.00	0.00
15,900.00	89.60	359.99	9,296.76	6,731.58	299.51	6,736.84	0.00	0.00	0.00
16,000.00	89.60	359.99	9,297.45	6,831.58	299.48	6,836.81	0.00	0.00	0.00
16,100.00	89.60	359.99	9,298.14	6,931.58	299.46	6,936.78	0.00	0.00	0.00
16,200.00	89.60	359.99	9,298.84	7,031.58	299.44	7,036.74	0.00	0.00	0.00
16,300.00	89.60	359.99	9,299.53	7,131.57	299.41	7,136.71	0.00	0.00	0.00
16,400.00	89.60	359.99	9,300.22	7,231.57	299.39	7,236.68	0.00	0.00	0.00
16,500.00	89.60	359.99	9,300.92	7,331.57	299.37	7,336.65	0.00	0.00	0.00
16,600.00	89.60	359.99	9,301.61	7,431.57	299.35	7,436.62	0.00	0.00	0.00
16,700.00	89.60	359.99	9,302.30	7,531.56	299.32	7,536.59	0.00	0.00	0.00
16,800.00	89.60	359.99	9,303.00	7,631.56	299.30	7,636.55	0.00	0.00	0.00
16,900.00	89.60	359.99	9,303.69	7,731.56	299.28	7,736.52	0.00	0.00	0.00
17,000.00	89.60	359.99	9,304.38	7,831.56	299.25	7,836.49	0.00	0.00	0.00
17,100.00	89.60	359.99	9,305.08	7,931.55	299.23	7,936.46	0.00	0.00	0.00
17,200.00	89.60	359.99	9,305.77	8,031.55	299.21	8,036.43	0.00	0.00	0.00



Survey Report



Company: COG Operating L L C
Project: Eddy County, NM (NAD 27 NME)
Site: Sec. 31, T 26 S, R 28- E
Well: Way South State Com 701H
Wellbore: Wellbore #1
Design: Plan #1

Local Co-ordinate Reference: Well Way South State Com 701H
TVD Reference: KB=29 @ 3110.00usft (Noram 23)
MD Reference: KB=29 @ 3110.00usft (Noram 23)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
17,300.00	89.60	359.99	9,306.46	8,131.55	299.18	8,136.39	0.00	0.00	0.00
17,400.00	89.60	359.99	9,307.16	8,231.55	299.16	8,236.36	0.00	0.00	0.00
17,500.00	89.60	359.99	9,307.85	8,331.54	299.14	8,336.33	0.00	0.00	0.00
17,600.00	89.60	359.99	9,308.54	8,431.54	299.11	8,436.30	0.00	0.00	0.00
17,700.00	89.60	359.99	9,309.24	8,531.54	299.09	8,536.27	0.00	0.00	0.00
17,800.00	89.60	359.99	9,309.93	8,631.54	299.07	8,636.23	0.00	0.00	0.00
17,900.00	89.60	359.99	9,310.62	8,731.53	299.05	8,736.20	0.00	0.00	0.00
18,000.00	89.60	359.99	9,311.32	8,831.53	299.02	8,836.17	0.00	0.00	0.00
18,100.00	89.60	359.99	9,312.01	8,931.53	299.00	8,936.14	0.00	0.00	0.00
18,200.00	89.60	359.99	9,312.71	9,031.53	298.98	9,036.11	0.00	0.00	0.00
18,300.00	89.60	359.99	9,313.40	9,131.53	298.95	9,136.07	0.00	0.00	0.00
18,400.00	89.60	359.99	9,314.09	9,231.52	298.93	9,236.04	0.00	0.00	0.00
18,500.00	89.60	359.99	9,314.79	9,331.52	298.91	9,336.01	0.00	0.00	0.00
18,600.00	89.60	359.99	9,315.48	9,431.52	298.88	9,435.98	0.00	0.00	0.00
18,700.00	89.60	359.99	9,316.17	9,531.52	298.86	9,535.95	0.00	0.00	0.00
18,800.00	89.60	359.99	9,316.87	9,631.51	298.84	9,635.92	0.00	0.00	0.00
18,900.00	89.60	359.99	9,317.56	9,731.51	298.81	9,735.88	0.00	0.00	0.00
19,000.00	89.60	359.99	9,318.25	9,831.51	298.79	9,835.85	0.00	0.00	0.00
19,100.00	89.60	359.99	9,318.95	9,931.51	298.77	9,935.82	0.00	0.00	0.00
19,200.00	89.60	359.99	9,319.64	10,031.50	298.74	10,035.79	0.00	0.00	0.00
19,300.00	89.60	359.99	9,320.33	10,131.50	298.72	10,135.76	0.00	0.00	0.00
19,400.00	89.60	359.99	9,321.03	10,231.50	298.70	10,235.72	0.00	0.00	0.00
19,500.00	89.60	359.99	9,321.72	10,331.50	298.68	10,335.69	0.00	0.00	0.00
19,600.00	89.60	359.99	9,322.41	10,431.49	298.65	10,435.66	0.00	0.00	0.00
19,700.00	89.60	359.99	9,323.11	10,531.49	298.63	10,535.63	0.00	0.00	0.00
19,800.00	89.60	359.99	9,323.80	10,631.49	298.61	10,635.60	0.00	0.00	0.00
19,900.00	89.60	359.99	9,324.49	10,731.49	298.58	10,735.56	0.00	0.00	0.00
20,000.00	89.60	359.99	9,325.19	10,831.48	298.56	10,835.53	0.00	0.00	0.00
20,100.00	89.60	359.99	9,325.88	10,931.48	298.54	10,935.50	0.00	0.00	0.00
20,200.00	89.60	359.99	9,326.57	11,031.48	298.51	11,035.47	0.00	0.00	0.00
20,300.00	89.60	359.99	9,327.27	11,131.48	298.49	11,135.44	0.00	0.00	0.00
20,400.00	89.60	359.99	9,327.96	11,231.47	298.47	11,235.40	0.00	0.00	0.00
20,500.00	89.60	359.99	9,328.65	11,331.47	298.44	11,335.37	0.00	0.00	0.00
20,600.00	89.60	359.99	9,329.35	11,431.47	298.42	11,435.34	0.00	0.00	0.00
20,700.00	89.60	359.99	9,330.04	11,531.47	298.40	11,535.31	0.00	0.00	0.00
20,800.00	89.60	359.99	9,330.73	11,631.47	298.38	11,635.28	0.00	0.00	0.00
20,900.00	89.60	359.99	9,331.43	11,731.46	298.35	11,735.25	0.00	0.00	0.00
21,000.00	89.60	359.99	9,332.12	11,831.46	298.33	11,835.21	0.00	0.00	0.00
21,100.00	89.60	359.99	9,332.81	11,931.46	298.31	11,935.18	0.00	0.00	0.00
21,200.00	89.60	359.99	9,333.51	12,031.46	298.28	12,035.15	0.00	0.00	0.00
21,300.00	89.60	359.99	9,334.20	12,131.45	298.26	12,135.12	0.00	0.00	0.00
21,400.00	89.60	359.99	9,334.89	12,231.45	298.24	12,235.09	0.00	0.00	0.00
21,500.00	89.60	359.99	9,335.59	12,331.45	298.21	12,335.05	0.00	0.00	0.00

Company: COG Operating L L C
Project: Eddy County, NM (NAD 27 NME)
Site: Sec. 31, T 26 S, R 28- E
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Design: Plan #1

Local Co-ordinate Reference: Well Way South State Com 701H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
21,559.45	89.60	359.99	9,336.00	12,390.90	298.20	12,394.49	0.00	0.00	0.00
TD at 21559.45									

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Way South State Corr - hit/miss target - Shape - Point	0.00	0.00	8,680.06	-146.85	301.10	363,854.04	566,525.60	32.00017	-104.11873
Way South State Corr - plan hits target center - Point	0.00	0.00	9,125.15	65.30	300.00	364,066.20	566,524.50	32.00075	-104.11874
Way South State Corr - plan misses target center by 1.05usft at 9204.07usft MD (9125.14 TVD, 65.29 N, 301.05 E) - Point	0.00	0.00	9,335.10	12,260.90	298.20	376,261.80	566,522.70	32.03428	-104.11866
Way South State Corr - plan misses target center by 0.03usft at 21429.45usft MD (9335.10 TVD, 12260.90 N, 298.23 E) - Point	0.00	0.00	9,336.00	12,390.90	298.20	376,391.80	566,522.70	32.03463	-104.11866

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
16.00	16.00	Rustler		0.00	
605.00	605.00	TOS		0.00	
2,197.00	2,197.00	BOS (Fletcher)		0.00	
2,378.00	2,378.00	LMAR (Top Delaware)		0.00	
2,412.00	2,412.00	BLCN		0.00	
3,185.00	3,185.00	CYCN		0.00	
4,438.00	4,438.00	BYCN		0.00	
6,022.52	6,017.00	Bone Sprg (BSGL)			
6,380.88	6,374.00	U Avalon Sh			
6,588.67	6,581.00	L Avalon Sh			
6,793.45	6,785.00	B Avalon Sh			
6,940.01	6,931.00	FBSG_sand			
7,556.35	7,545.00	SBSG_sand			
7,872.56	7,860.00	SBSG_sand_Base			
8,690.31	8,676.00	TBSG_sand			
9,063.27	9,024.00	WFMP			
9,285.96	9,172.00	WFMP A SHALE			



Survey Report



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Local Co-ordinate Reference: Well Way South State Com 701H
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Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4406	4406	0	0	Start Build 2.00
4656	4656	-5	10	Start 3593.53 hold at 4655.84 MD
8249	8235	-142	291	Start Drop -2.00
8499	8485	-147	301	Start 195.00 hold at 8499.37 MD
8694	8680	-147	301	Start DLS 10.00 TFO 359.99
9590	9253	422	301	Start 11969.06 hold at 9590.40 MD
21,559	9336	12,391	298	TD at 21559.45

Checked By: _____ Approved By: _____ Date: _____