



COG Operating LLC

Eddy Co., NM

Admiral Fed Com

Admiral Fed 504H

Wellbore #3 - ST02

Design: Wellbore #3 - ST02

Standard Survey Report

25 April, 2020





Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Admiral Fed 504H
Project:	Eddy Co., NM	TVD Reference:	RT=27 Nabors 893 @ 3007.80ft
Site:	Admiral Fed Com	MD Reference:	RT=27 Nabors 893 @ 3007.80ft
Well:	Admiral Fed 504H	North Reference:	Grid
Wellbore:	Wellbore #3 - ST02	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #3 - ST02	Database:	RyanUSA_32Bit

Project	Eddy Co., 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	Admiral Fed Com		
Site Position:		Northing:	398,188.800 usft
From:	Map	Easting:	608,319.300 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 5' 39.314570 N
		Longitude:	103° 59' 0.790506 W
		Grid Convergence:	0.19 °

Well	Admiral Fed 504H		
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	Easting:
Position Uncertainty		2.00 ft	Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #3 - ST02				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM_FILE	4/16/2020	6.73	59.72	47,747.10000000

Design	Wellbore #3 - ST02				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	357.02	

Survey Program	Date	4/25/2020			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
139.00	13,810.00	Survey #1 ST01 Surveys Nabors (Wellbor	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction	
13,810.00	18,610.00	Survey #2 ST02 Surveys Gordon (Wellbor	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
139.00	0.54	167.22	139.00	-0.64	0.14	-0.65	0.39	0.39	0.00	
317.00	0.65	96.19	316.99	-1.57	1.33	-1.63	0.39	0.06	-39.90	
501.00	2.63	78.38	500.91	-0.83	6.51	-1.17	1.10	1.08	-9.68	
653.00	3.57	63.05	652.69	2.02	14.14	1.28	0.82	0.62	-10.09	
779.00	3.14	54.19	778.47	5.82	20.44	4.75	0.53	-0.34	-7.03	
869.00	2.37	51.39	868.37	8.42	23.89	7.17	0.87	-0.86	-3.11	
961.00	2.69	246.38	960.33	8.74	23.40	7.51	5.45	0.35	-179.36	
1,053.00	3.27	256.26	1,052.21	7.25	18.87	6.26	0.84	0.63	10.74	
1,147.00	2.92	264.71	1,146.07	6.40	13.88	5.67	0.61	-0.37	8.99	

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,240.00	1.19	349.85	1,239.02	7.13	11.35	6.53	3.29	-1.86	91.55
1,334.00	2.00	31.20	1,332.99	9.49	12.03	8.85	1.44	0.86	43.99
1,428.00	1.80	24.46	1,426.94	12.24	13.49	11.52	0.32	-0.21	-7.17
1,523.00	1.71	17.60	1,521.89	14.95	14.54	14.17	0.24	-0.09	-7.22
1,617.00	1.38	20.00	1,615.86	17.35	15.35	16.53	0.36	-0.35	2.55
1,711.00	1.14	19.13	1,709.84	19.30	16.04	18.44	0.26	-0.26	-0.93
1,805.00	0.81	12.91	1,803.82	20.83	16.50	19.94	0.37	-0.35	-6.62
1,899.00	0.66	349.18	1,897.82	22.01	16.55	21.12	0.36	-0.16	-25.24
1,993.00	0.61	348.56	1,991.81	23.03	16.34	22.15	0.05	-0.05	-0.66
2,087.00	0.62	13.53	2,085.80	24.01	16.36	23.13	0.28	0.01	26.56
2,181.00	0.61	25.85	2,179.80	24.96	16.70	24.06	0.14	-0.01	13.11
2,276.00	0.85	68.71	2,274.79	25.67	17.58	24.72	0.61	0.25	45.12
2,370.00	2.08	91.40	2,368.76	25.88	19.93	24.81	1.42	1.31	24.14
2,464.00	1.42	124.01	2,462.72	25.19	22.60	23.98	1.24	-0.70	34.69
2,559.00	1.84	183.44	2,557.69	23.01	23.49	21.75	1.74	0.44	62.56
2,653.00	1.80	169.92	2,651.64	20.05	23.66	18.79	0.46	-0.04	-14.38
2,747.00	2.12	182.52	2,745.58	16.86	23.84	15.59	0.57	0.34	13.40
2,841.00	2.28	160.03	2,839.52	13.36	24.40	12.08	0.93	0.17	-23.93
2,935.00	2.05	162.22	2,933.45	10.00	25.55	8.66	0.26	-0.24	2.33
3,124.00	1.64	174.55	3,122.35	4.09	26.84	2.69	0.30	-0.22	6.52
3,218.00	1.80	211.95	3,216.31	1.50	26.19	0.14	1.18	0.17	39.79
3,311.00	2.15	227.29	3,309.26	-0.92	24.13	-2.18	0.68	0.38	16.49
3,406.00	2.11	220.81	3,404.19	-3.45	21.68	-4.58	0.26	-0.04	-6.82
3,500.00	1.87	224.48	3,498.14	-5.86	19.48	-6.86	0.29	-0.26	3.90
3,594.00	1.71	227.75	3,592.09	-7.90	17.36	-8.79	0.20	-0.17	3.48
3,688.00	1.65	226.84	3,686.05	-9.76	15.34	-10.55	0.07	-0.06	-0.97
3,782.00	1.71	229.28	3,780.01	-11.60	13.29	-12.28	0.10	0.06	2.60
3,876.00	1.35	234.49	3,873.98	-13.16	11.32	-13.73	0.41	-0.38	5.54
3,970.00	1.17	237.21	3,967.95	-14.33	9.62	-14.81	0.20	-0.19	2.89
4,064.00	1.15	234.75	4,061.93	-15.39	8.04	-15.79	0.06	-0.02	-2.62
4,158.00	1.10	232.63	4,155.91	-16.48	6.55	-16.80	0.07	-0.05	-2.26
4,252.00	1.12	236.92	4,249.90	-17.53	5.06	-17.77	0.09	0.02	4.56
4,346.00	1.18	236.67	4,343.88	-18.56	3.49	-18.72	0.06	0.06	-0.27
4,441.00	1.30	234.64	4,438.86	-19.73	1.79	-19.79	0.13	0.13	-2.14
4,535.00	1.23	238.73	4,532.83	-20.87	0.06	-20.84	0.12	-0.07	4.35
4,629.00	1.23	241.01	4,626.81	-21.88	-1.69	-21.76	0.05	0.00	2.43
4,723.00	1.39	239.60	4,720.79	-22.94	-3.55	-22.73	0.17	0.17	-1.50
4,817.00	1.50	236.89	4,814.76	-24.19	-5.57	-23.87	0.14	0.12	-2.88
4,912.00	1.69	238.98	4,909.72	-25.60	-7.81	-25.15	0.21	0.20	2.20
5,006.00	1.80	235.58	5,003.68	-27.14	-10.22	-26.58	0.16	0.12	-3.62
5,101.00	2.10	242.28	5,098.62	-28.80	-12.99	-28.08	0.40	0.32	7.05
5,194.00	2.03	236.99	5,191.56	-30.49	-15.88	-29.62	0.22	-0.08	-5.69
5,288.00	2.35	238.06	5,285.49	-32.41	-18.91	-31.39	0.34	0.34	1.14

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Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,382.00	2.55	237.10	5,379.41	-34.57	-22.30	-33.36	0.22	0.21	-1.02
5,476.00	2.51	235.08	5,473.32	-36.88	-25.74	-35.49	0.10	-0.04	-2.15
5,569.00	2.32	231.06	5,566.23	-39.23	-28.88	-37.68	0.27	-0.20	-4.32
5,664.00	2.33	227.03	5,661.15	-41.76	-31.78	-40.05	0.17	0.01	-4.24
5,758.00	2.38	228.77	5,755.07	-44.35	-34.65	-42.48	0.09	0.05	1.85
5,852.00	2.76	232.83	5,848.98	-47.00	-37.92	-44.96	0.45	0.40	4.32
5,947.00	2.88	232.97	5,943.87	-49.82	-41.65	-47.59	0.13	0.13	0.15
6,040.00	2.87	233.87	6,036.75	-52.60	-45.40	-50.17	0.05	-0.01	0.97
6,135.00	2.88	231.06	6,131.63	-55.50	-49.17	-52.87	0.15	0.01	-2.96
6,229.00	2.76	226.61	6,225.51	-58.54	-52.65	-55.72	0.27	-0.13	-4.73
6,323.00	2.42	223.29	6,319.42	-61.54	-55.66	-58.56	0.40	-0.36	-3.53
6,417.00	2.46	220.11	6,413.33	-64.53	-58.32	-61.41	0.15	0.04	-3.38
6,511.00	2.35	216.49	6,507.25	-67.62	-60.77	-64.37	0.20	-0.12	-3.85
6,605.00	2.05	212.90	6,601.18	-70.58	-62.83	-67.22	0.35	-0.32	-3.82
6,699.00	2.81	230.14	6,695.10	-73.47	-65.51	-69.96	1.11	0.81	18.34
6,794.00	3.74	240.87	6,789.94	-76.47	-70.00	-72.73	1.17	0.98	11.29
6,887.00	3.71	250.02	6,882.75	-78.97	-75.48	-74.94	0.64	-0.03	9.84
6,981.00	2.86	248.59	6,976.59	-80.87	-80.52	-76.57	0.91	-0.90	-1.52
7,075.00	2.88	234.71	7,070.47	-83.09	-84.63	-78.58	0.74	0.02	-14.77
7,169.00	3.30	223.71	7,164.34	-86.41	-88.43	-81.69	0.77	0.45	-11.70
7,262.00	2.96	223.84	7,257.20	-90.08	-91.94	-85.17	0.37	-0.37	0.14
7,356.00	4.10	233.05	7,351.02	-93.85	-96.31	-88.71	1.35	1.21	9.80
7,450.00	2.54	238.10	7,444.86	-96.97	-100.76	-91.60	1.69	-1.66	5.37
7,544.00	2.44	248.39	7,538.77	-98.80	-104.39	-93.24	0.49	-0.11	10.95
7,638.00	4.56	238.94	7,632.59	-101.47	-109.45	-95.64	2.33	2.26	-10.05
7,725.00	4.97	244.96	7,719.29	-104.85	-115.83	-98.69	0.74	0.47	6.92
7,754.00	7.89	325.43	7,748.15	-103.74	-118.10	-97.46	29.63	10.07	277.48
7,785.00	12.40	330.77	7,778.66	-99.08	-120.94	-92.66	14.85	14.55	17.23
7,817.00	16.17	335.79	7,809.67	-92.02	-124.44	-85.42	12.39	11.78	15.69
7,848.00	19.04	336.60	7,839.21	-83.44	-128.22	-76.66	9.29	9.26	2.61
7,880.00	21.26	334.22	7,869.25	-73.42	-132.82	-66.42	7.39	6.94	-7.44
7,911.00	20.89	336.72	7,898.18	-63.28	-137.45	-56.05	3.14	-1.19	8.06
7,942.00	20.42	342.06	7,927.19	-53.06	-141.30	-45.64	6.26	-1.52	17.23
7,974.00	20.43	342.10	7,957.18	-42.43	-144.73	-34.85	0.05	0.03	0.13
8,005.00	21.46	342.13	7,986.13	-31.89	-148.14	-24.14	3.32	3.32	0.10
8,036.00	23.50	340.10	8,014.77	-20.68	-151.98	-12.75	7.04	6.58	-6.55
8,068.00	25.08	344.10	8,043.94	-8.15	-156.01	-0.03	7.13	4.94	12.50
8,099.00	27.13	343.92	8,071.78	4.96	-159.77	13.26	6.62	6.61	-0.58
8,131.00	30.68	342.55	8,099.79	19.76	-164.24	28.27	11.28	11.09	-4.28
8,162.00	34.68	342.62	8,125.87	35.73	-169.25	44.48	12.90	12.90	0.23
8,193.00	35.79	339.93	8,151.20	52.66	-174.99	61.69	6.15	3.58	-8.68
8,225.00	37.30	339.90	8,176.90	70.56	-181.54	79.90	4.72	4.72	-0.09
8,256.00	39.01	338.96	8,201.28	88.49	-188.27	98.15	5.83	5.52	-3.03



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8,288.00	41.09	339.29	8,225.77	107.72	-195.60	117.75	6.53	6.50	1.03	
8,319.00	42.92	339.66	8,248.81	127.15	-202.88	137.53	5.96	5.90	1.19	
8,350.00	45.60	341.61	8,271.01	147.56	-210.04	158.28	9.70	8.65	6.29	
8,381.00	48.47	342.73	8,292.14	169.16	-216.98	180.21	9.63	9.26	3.61	
8,413.00	51.54	343.86	8,312.70	192.63	-224.02	204.02	9.97	9.59	3.53	
8,444.00	53.71	343.99	8,331.52	216.31	-230.84	228.01	7.01	7.00	0.42	
8,476.00	54.01	344.01	8,350.39	241.15	-237.96	253.19	0.94	0.94	0.06	
8,507.00	55.66	343.91	8,368.24	265.50	-244.97	277.88	5.33	5.32	-0.32	
8,538.00	57.31	344.27	8,385.36	290.36	-252.05	303.07	5.41	5.32	1.16	
8,569.00	58.48	343.79	8,401.83	315.60	-259.28	328.65	4.00	3.77	-1.55	
8,601.00	58.23	345.65	8,418.62	341.88	-266.45	355.27	5.01	-0.78	5.81	
8,632.00	57.79	345.70	8,435.05	367.35	-272.96	381.05	1.43	-1.42	0.16	
8,664.00	56.82	344.59	8,452.33	393.38	-279.86	407.40	4.21	-3.03	-3.47	
8,695.00	57.86	343.96	8,469.06	418.50	-286.94	432.86	3.77	3.35	-2.03	
8,727.00	59.26	343.78	8,485.75	444.73	-294.52	459.44	4.40	4.38	-0.56	
8,758.00	59.58	343.78	8,501.52	470.36	-301.98	485.42	1.03	1.03	0.00	
8,790.00	60.27	343.91	8,517.56	496.95	-309.68	512.38	2.18	2.16	0.41	
8,821.00	60.12	343.93	8,532.97	522.80	-317.13	538.58	0.49	-0.48	0.06	
8,853.00	61.81	343.98	8,548.50	549.69	-324.86	565.83	5.28	5.28	0.16	
8,884.00	64.77	344.61	8,562.43	576.34	-332.36	592.84	9.72	9.55	2.03	
8,915.00	65.88	345.69	8,575.37	603.57	-339.58	620.41	4.78	3.58	3.48	
8,947.00	66.49	345.74	8,588.29	631.94	-346.80	649.12	1.91	1.91	0.16	
8,978.00	66.25	345.46	8,600.72	659.45	-353.86	676.96	1.13	-0.77	-0.90	
9,009.00	65.90	345.12	8,613.29	686.86	-361.06	704.70	1.51	-1.13	-1.10	
9,041.00	66.68	345.38	8,626.16	715.19	-368.52	733.38	2.55	2.44	0.81	
9,073.00	68.39	346.79	8,638.39	743.89	-375.63	762.42	6.72	5.34	4.41	
9,104.00	71.75	347.57	8,648.95	772.31	-382.09	791.13	11.09	10.84	2.52	
9,135.00	75.10	347.80	8,657.79	801.33	-388.42	820.44	10.83	10.81	0.74	
9,167.00	76.79	347.60	8,665.57	831.66	-395.04	851.07	5.32	5.28	-0.63	
9,198.00	80.00	348.90	8,671.80	861.39	-401.22	881.08	11.14	10.35	4.19	
9,225.00	82.78	350.10	8,675.84	887.63	-406.08	907.54	11.19	10.30	4.44	
9,301.00	90.84	350.39	8,680.07	962.35	-418.93	982.83	10.61	10.61	0.38	
9,395.00	90.97	351.48	8,678.58	1,055.17	-433.74	1,076.29	1.17	0.14	1.16	
9,489.00	89.82	352.13	8,677.94	1,148.20	-447.13	1,169.90	1.41	-1.22	0.69	
9,583.00	88.78	353.61	8,679.08	1,241.47	-458.80	1,263.64	1.92	-1.11	1.57	
9,677.00	88.77	357.18	8,681.09	1,335.13	-466.34	1,357.56	3.80	-0.01	3.80	
9,771.00	88.77	357.10	8,683.11	1,428.99	-471.03	1,451.54	0.09	0.00	-0.09	
9,865.00	90.12	358.31	8,684.02	1,522.90	-474.80	1,545.53	1.93	1.44	1.29	
9,959.00	90.62	358.03	8,683.42	1,616.85	-477.80	1,639.51	0.61	0.53	-0.30	
10,053.00	91.14	0.87	8,681.97	1,710.83	-478.70	1,733.40	3.07	0.55	3.02	
10,147.00	89.84	357.57	8,681.17	1,804.80	-479.98	1,827.31	3.77	-1.38	-3.51	
10,240.00	90.03	359.23	8,681.27	1,897.76	-482.58	1,920.28	1.80	0.20	1.78	
10,334.00	89.59	2.36	8,681.58	1,991.74	-481.27	2,014.07	3.36	-0.47	3.33	
10,428.00	90.30	3.00	8,681.68	2,085.64	-476.88	2,107.61	1.02	0.76	0.68	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Admiral Fed 504H
Project:	Eddy Co., NM	TVD Reference:	RT=27 Nabors 893 @ 3007.80ft
Site:	Admiral Fed Com	MD Reference:	RT=27 Nabors 893 @ 3007.80ft
Well:	Admiral Fed 504H	North Reference:	Grid
Wellbore:	Wellbore #3 - ST02	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #3 - ST02	Database:	RyanUSA_32Bit

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,522.00	90.29	4.08	8,681.19	2,179.45	-471.07	2,201.00	1.15	-0.01	1.15
10,617.00	89.80	4.13	8,681.12	2,274.21	-464.27	2,295.27	0.52	-0.52	0.05
10,711.00	89.39	3.92	8,681.78	2,367.98	-457.68	2,388.57	0.49	-0.44	-0.22
10,805.00	89.09	2.90	8,683.03	2,461.80	-452.09	2,481.97	1.13	-0.32	-1.09
10,899.00	88.55	1.33	8,684.96	2,555.71	-448.62	2,575.58	1.77	-0.57	-1.67
10,994.00	89.85	0.85	8,686.29	2,650.68	-446.81	2,670.33	1.46	1.37	-0.51
11,088.00	89.81	358.82	8,686.57	2,744.68	-447.08	2,764.21	2.16	-0.04	-2.16
11,182.00	89.90	356.54	8,686.81	2,838.59	-450.89	2,858.20	2.43	0.10	-2.43
11,276.00	88.79	352.54	8,687.88	2,932.14	-459.83	2,952.08	4.42	-1.18	-4.26
11,370.00	89.01	355.67	8,689.69	3,025.61	-469.48	3,045.93	3.34	0.23	3.33
11,465.00	90.83	358.37	8,689.82	3,120.47	-474.42	3,140.92	3.43	1.92	2.84
11,559.00	92.31	358.25	8,687.24	3,214.39	-477.19	3,234.86	1.58	1.57	-0.13
11,654.00	91.24	359.56	8,684.30	3,309.33	-479.00	3,329.76	1.78	-1.13	1.38
11,748.00	92.82	359.54	8,680.97	3,403.26	-479.74	3,423.60	1.68	1.68	-0.02
11,842.00	90.68	0.38	8,678.10	3,497.21	-479.80	3,517.43	2.45	-2.28	0.89
11,935.00	88.21	0.27	8,679.00	3,590.20	-479.28	3,610.26	2.66	-2.66	-0.12
12,030.00	89.30	0.74	8,681.07	3,685.17	-478.44	3,705.06	1.25	1.15	0.49
12,125.00	90.55	0.58	8,681.19	3,780.16	-477.35	3,799.87	1.33	1.32	-0.17
12,219.00	91.70	2.14	8,679.34	3,874.12	-475.12	3,893.58	2.06	1.22	1.66
12,313.00	91.36	2.29	8,676.84	3,968.01	-471.48	3,987.16	0.40	-0.36	0.16
12,406.00	90.97	1.98	8,674.94	4,060.93	-468.02	4,079.77	0.54	-0.42	-0.33
12,500.00	92.08	2.48	8,672.44	4,154.82	-464.36	4,173.34	1.30	1.18	0.53
12,594.00	88.51	2.03	8,671.96	4,248.73	-460.67	4,266.93	3.83	-3.80	-0.48
12,688.00	89.20	1.11	8,673.84	4,342.68	-458.09	4,360.62	1.22	0.73	-0.98
12,782.00	90.83	0.12	8,673.81	4,436.67	-457.08	4,454.43	2.03	1.73	-1.05
12,876.00	88.44	358.94	8,674.41	4,530.65	-457.85	4,548.33	2.84	-2.54	-1.26
12,970.00	89.50	358.91	8,676.10	4,624.62	-459.62	4,642.26	1.13	1.13	-0.03
13,064.00	88.76	357.33	8,677.53	4,718.55	-462.70	4,736.23	1.86	-0.79	-1.68
13,158.00	90.51	356.90	8,678.13	4,812.43	-467.43	4,830.22	1.92	1.86	-0.46
13,246.00	90.32	355.07	8,677.49	4,900.21	-473.59	4,918.20	2.09	-0.22	-2.08
13,340.00	90.65	357.66	8,676.69	4,994.01	-479.55	5,012.18	2.78	0.35	2.76
13,434.00	90.61	358.05	8,675.66	5,087.94	-483.07	5,106.17	0.42	-0.04	0.41
13,529.00	90.22	357.26	8,674.97	5,182.85	-486.95	5,201.16	0.93	-0.41	-0.83
13,623.00	90.07	356.18	8,674.73	5,276.70	-492.33	5,295.16	1.16	-0.16	-1.15
13,717.00	90.57	359.15	8,674.21	5,370.61	-496.16	5,389.14	3.20	0.53	3.16
13,810.00	92.51	0.09	8,671.71	5,463.57	-496.78	5,482.00	2.32	2.09	1.01
13,909.00	91.27	358.54	8,668.44	5,562.50	-497.96	5,580.86	2.00	-1.25	-1.57
14,003.00	92.25	357.38	8,665.56	5,656.39	-501.31	5,674.81	1.62	1.04	-1.23
14,097.00	90.12	357.07	8,663.61	5,750.26	-505.86	5,768.78	2.29	-2.27	-0.33
14,191.00	88.36	358.22	8,664.86	5,844.16	-509.72	5,862.76	2.24	-1.87	1.22
14,285.00	89.00	358.18	8,667.03	5,938.09	-512.67	5,956.71	0.68	0.68	-0.04
14,381.00	89.48	357.56	8,668.30	6,034.02	-516.24	6,052.69	0.82	0.50	-0.65
14,475.00	90.07	357.06	8,668.67	6,127.91	-520.65	6,146.69	0.82	0.63	-0.53



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Admiral Fed 504H
Project:	Eddy Co., NM	TVD Reference:	RT=27 Nabors 893 @ 3007.80ft
Site:	Admiral Fed Com	MD Reference:	RT=27 Nabors 893 @ 3007.80ft
Well:	Admiral Fed 504H	North Reference:	Grid
Wellbore:	Wellbore #3 - ST02	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #3 - ST02	Database:	RyanUSA_32Bit

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
14,569.00	88.92	358.24	8,669.50	6,221.83	-524.50	6,240.68	1.75	-1.22	1.26
14,663.00	89.96	358.25	8,670.42	6,315.78	-527.38	6,334.65	1.11	1.11	0.01
14,757.00	91.10	357.90	8,669.55	6,409.72	-530.54	6,428.63	1.27	1.21	-0.37
14,851.00	91.25	358.65	8,667.62	6,503.65	-533.37	6,522.59	0.81	0.16	0.80
14,945.00	90.12	359.82	8,666.49	6,597.64	-534.62	6,616.51	1.73	-1.20	1.24
15,040.00	88.44	0.66	8,667.69	6,692.62	-534.23	6,711.35	1.98	-1.77	0.88
15,134.00	90.32	1.37	8,668.71	6,786.60	-532.56	6,805.11	2.14	2.00	0.76
15,228.00	86.17	1.36	8,671.58	6,880.51	-530.32	6,898.77	4.41	-4.41	-0.01
15,322.00	85.98	1.33	8,678.02	6,974.26	-528.12	6,992.28	0.20	-0.20	-0.03
15,417.00	86.99	1.11	8,683.84	7,069.06	-526.10	7,086.85	1.09	1.06	-0.23
15,511.00	88.50	0.86	8,687.54	7,162.97	-524.49	7,180.55	1.63	1.61	-0.27
15,605.00	89.23	0.33	8,689.40	7,256.94	-523.51	7,274.35	0.96	0.78	-0.56
15,699.00	90.15	0.07	8,689.91	7,350.94	-523.18	7,368.20	1.02	0.98	-0.28
15,793.00	91.47	359.82	8,688.58	7,444.93	-523.28	7,462.07	1.43	1.40	-0.27
15,887.00	90.26	0.28	8,687.16	7,538.92	-523.19	7,555.92	1.38	-1.29	0.49
15,982.00	91.05	359.35	8,686.08	7,633.91	-523.50	7,650.80	1.28	0.83	-0.98
16,077.00	90.63	359.90	8,684.69	7,728.90	-524.12	7,745.69	0.73	-0.44	0.58
16,170.00	87.97	359.92	8,685.82	7,821.88	-524.27	7,838.56	2.86	-2.86	0.02
16,264.00	87.86	359.79	8,689.24	7,915.82	-524.51	7,932.38	0.18	-0.12	-0.14
16,358.00	89.26	0.22	8,691.60	8,009.79	-524.50	8,026.22	1.56	1.49	0.46
16,452.00	91.24	0.48	8,691.19	8,103.78	-523.92	8,120.06	2.12	2.11	0.28
16,546.00	91.61	0.36	8,688.86	8,197.75	-523.23	8,213.86	0.41	0.39	-0.13
16,640.00	90.04	359.53	8,687.50	8,291.73	-523.32	8,307.73	1.89	-1.67	-0.88
16,734.00	91.27	359.70	8,686.43	8,385.72	-523.96	8,401.62	1.32	1.31	0.18
16,828.00	92.51	359.84	8,683.33	8,479.67	-524.33	8,495.46	1.33	1.32	0.15
16,922.00	91.78	359.65	8,679.81	8,573.60	-524.75	8,589.29	0.80	-0.78	-0.20
17,016.00	90.24	0.24	8,678.15	8,667.58	-524.84	8,683.15	1.75	-1.64	0.63
17,110.00	88.02	0.21	8,679.58	8,761.57	-524.47	8,776.98	2.36	-2.36	-0.03
17,203.00	86.93	359.41	8,683.68	8,854.47	-524.78	8,869.78	1.45	-1.17	-0.86
17,298.00	87.69	358.94	8,688.14	8,949.36	-526.15	8,964.61	0.94	0.80	-0.49
17,393.00	88.67	358.83	8,691.15	9,044.29	-527.99	9,059.51	1.04	1.03	-0.12
17,487.00	89.54	358.83	8,692.62	9,138.26	-529.91	9,153.45	0.93	0.93	0.00
17,581.00	90.85	358.92	8,692.30	9,232.24	-531.76	9,247.40	1.40	1.39	0.10
17,667.00	90.29	358.88	8,691.45	9,318.22	-533.41	9,333.35	0.65	-0.65	-0.05
17,761.00	89.69	359.17	8,691.46	9,412.20	-535.01	9,427.29	0.71	-0.64	0.31
17,855.00	90.66	359.28	8,691.17	9,506.19	-536.28	9,521.22	1.04	1.03	0.12
17,949.00	90.49	359.48	8,690.23	9,600.18	-537.30	9,615.13	0.28	-0.18	0.21
18,043.00	90.92	359.22	8,689.07	9,694.17	-538.36	9,709.05	0.53	0.46	-0.28
18,137.00	90.88	358.59	8,687.60	9,788.14	-540.16	9,802.99	0.67	-0.04	-0.67
18,231.00	91.46	358.51	8,685.68	9,882.09	-542.54	9,896.93	0.62	0.62	-0.09
18,325.00	91.75	358.50	8,683.05	9,976.02	-544.99	9,990.86	0.31	0.31	-0.01
18,419.00	92.80	358.14	8,679.31	10,069.91	-547.74	10,084.76	1.18	1.12	-0.38
18,513.00	93.16	357.81	8,674.43	10,163.72	-551.06	10,178.62	0.52	0.38	-0.35



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Admiral Fed 504H
Project:	Eddy Co., NM	TVD Reference:	RT=27 Nabors 893 @ 3007.80ft
Site:	Admiral Fed Com	MD Reference:	RT=27 Nabors 893 @ 3007.80ft
Well:	Admiral Fed 504H	North Reference:	Grid
Wellbore:	Wellbore #3 - ST02	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #3 - ST02	Database:	RyanUSA_32Bit

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
18,553.00	92.72	357.67	8,672.38	10,203.64	-552.64	10,218.57	1.15	-1.10	-0.35
18,562.89	92.72	357.67	8,671.91	10,213.51	-553.04	10,228.45	0.00	0.00	0.00
LTP Crossing PT @ 18562.89' MD									
18,610.00	92.72	357.67	8,669.67	10,260.52	-554.95	10,275.50	0.00	0.00	0.00
PTB @ 18610 MD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
18,562.89	8,671.91	10,213.51	-553.04	LTP Crossing PT @ 18562.89' MD
18,610.00	8,669.67	10,260.52	-554.95	PTB @ 18610 MD

Checked By: _____	Approved By: _____	Date: _____
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